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A Review study on Application of Data Mining Techniques in CRM of Pharmaceutical Industry

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ABSTRACT

Here author described Customer relationship management (CRM), CRM is basically data mining technology also CRM of enterprise of medical industry and its applications are also discussed for that classification tree algorithm is used. The information flow in the pharmaceutical industry was simple and the application of technology was veryquiet in last two decades. However, Now a days today's world technology has become most vital part of the business processes, the process of transfer of information becomes more complicated. Today increasingly technology is being used to help the pharmaceutical firms manage their inventories and to develop new product and services. The paper explains the role of data mining in pharmaceutical industry. The paper presents how Data Mining (DM) discovers and extracts useful patterns from this large data to find observable patterns. The paper demonstrates the ability of Data Mining in improving the quality of decision making process in pharma industry.

Keywords : Data Mining; CRM, Decision Tree, Tree Algorithm, Frequent Pattern Algorithm.

I. INTRODUCTION

Data Mining is the process of getting information from big data sets through the use of algorithms and techniques drawn from the field of Statistics, Machine Learning and Data Base Management Systems (DBMS). Eventually data analysis methods often involve interpretation and manual work of information that is slow, costly.

Recently, number of professionals have guessed that revenue growth for the pharmaceutical company will slow from the healthy 12% rate to 5-6% rate and it has number of implications for the drug identification technologies companies. Most of the drug discovery technology industries are attempting to face this challenge through developing solutions that will force new drugs to "fail faster and safer." Although this is a vital goal and if realized, would definitely create value for the industry, these solutions often over-promise and unestimated the obstacles that stand in the path to lower clinical failure rates. Marketing systems focused on expanding incomes will be more persuading than those that address lessening cost. Exhibiting that advances will empower pharmaceutical organizations to all the more likely target and market to certain client portions will expand appropriation of that innovation, and will open the entryway for undertakings went for diminishing expenses and expanding clinical preliminaries throughput. The importance of decision support in the delivery of

managed healthcare can hardly be overemphasized. An assortment of choice help capacities will be important to expand the profitability of medicinal work force, examine care results, and ceaselessly refine care conveyance procedures to stay beneficial while holding the line on expenses and keeping up nature of consideration. Healthcare decision support is faced with the challenges of complex and diverse data and knowledge forms and tasks the absence of institutionalized phrasing contrasted with essential sciences, the stringent execution and precision prerequisites and the commonness of inheritance frameworks. Data mining the existence sciences scientist to mine information to comprehend security and viability profiles inside the patient populace. By handling the subject of patient choice inside the structure of exhibiting bunches that are most responsive, Data mining is certain to enter the medication advancement commercial center. Information mining structure empowers pros to make altered hubs that can be shared all through the association, making the application alluring to talented modelers in a pharmaceutical organization's bioinformatics division. The paper talks about how Data Mining finds and concentrates valuable examples from this substantial information to discover detectable examples.

Data Mining, popularly called as knowledge discovery in large data, enables firms and organizations to make estimated decisions by assembling, accumulating, analyzing and accessing corporate data. It uses numerous of tools like analytical processing tools, query and reporting tools, and Decision Support System (DSS) tools.

II. DATA MINING TECHNIQUES

Pharma industries rely on decision-oriented, systemic selection models that enable the decision maker to evaluate the payoff that is expected to result from the implementation of a proposed selection program. Such models go beyond an examination of the size of the validity coefficient and take a host of issues such as capital budgeting and strategic outcomes at the group and organizational levels. Many organizations generate mountains of data about their new drugs discovered and its performance reports, etc. This data is a strategic resource. Now, making use of most of these strategic resources will lead to improving the quality of pharma industries. Give six important steps in the Data Mining process as 1.Problem Definition. 2. Knowledge acquisition. 3. Data selection. 4. Data Preprocessing. 5. Analysis and Interpretation. 6. Reporting and Use identify the Data Mining process as 1. Definition of the objectives of the analysis. 2. Selection &Pretreatment of the data. 4. Explanatory analysis. 5. Specification of the statistical methods. 6. Analysis of the data. 7. Evaluation and comparison of methods. 8. Interpretation of the chosen model. The techniques and methods in Data Mining need brief mention to have better understanding.

III. APPLICATIONS OF DATA MINING IN THE PHARMACEUTICAL INDUSTRY

Most healthcare institutions lack the appropriate information systems to produce reliable reports with respect to other information than purely financial and volume related statements. The management of pharma industry starts to recognize the relevance of the definition of drugs and products in relation to management information. In the turmoil between costs, care-results and patient satisfaction the right balance is needed and can be found in upcoming information and Communication technology. The delivery of healthcare has always been information intensive, and there are signs that the industry is recognizing the increasing importance of information processing in the new managed care environment. Most automated systems are used as a tool for daily work: they are focused on ‘production’. All the data, which are used to keep the organization running, operational data, are in these automated systems.

These systems are also called legacy systems. There is a growing need to do more with the data of an organization than to use them for administration only. A lot of information is hidden in the legacy systems. This information can easily be extracted. Most of the times this cannot be done directly from the legacy systems, because these are not build to answer questions that are unpredictable. Research shows that that successful decision systems enriched with analytical solutions are necessary for healthcare information systems. Given the size of the databases being queried, there is likely to be a trade-off in accuracy of information and processing time. Sampling techniques and tests of significance may be satisfactory to identify some of the more common relationships; however, uncommon relationships may require substantial search time. The thoroughness of the search depends on the importance of the query, the indexing structures used, and the level of detail supplied in the query. Of course, the real data mining challenge comes when the user supplies only a minimal amount of information. For example: find possible serious side effects involving food and any type or brand of antacid. A user-interface may be designed to accept all kinds of information from the user (e.g., weight, sex, age, foods consumed, reactions reported, dosage, length of usage). Then, based upon the information in the databases and the relevant data entered by the user, a list of warnings or known reactions should be reported. Note that user profiles can contain large amounts of information, and efficient and effective data mining tools need to be developed to probe the databases for relevant information. Secondly, the patient's profile should be recorded along with any adverse reactions reported by the patient, so that future correlations can be reported. Over time, the databases will become much larger, and interaction data for existing medicines will become more complete. The amount of existing pharmaceutical information (pharmacological properties, dosages, contraindications, warnings, etc.) is enormous; however, this fact reflects the number of medicines on the market, rather than an abundance of detailed information about each product. One of the major problems with pharmaceutical data is actually a lack of information. For example, a food and drug administration department estimated that only about 1% of serious events are reported to the food and drug administration department. Fear of litigation may be a contributing factor; however, most health care providers simply don't have the time to fill out reports of possible adverse drug reactions. Furthermore, it is expensive and time-consuming for pharmaceutical companies to perform a thorough job of data collection, especially when most of the information is not required by law. Finally, one should note that the food and drug administration department does not require manufacturers to test new medicines for potential interactions. There are in general three stages of drug development namely finding of new drugs, development tests and predicts drug behavior, clinical trials test the drug in humans and commercialization takes drug and sells it to likely consumers.

Data mining applications in health can have huge potential what's more, convenience. In any case, the accomplishment of healthcareservices Data mining depends on the accessibility of clean social insurance information. In this regard, it is important that the human services industry investigate how information can be better caught, put away, readied what's more, mined. Conceivable bearings incorporate the institutionalization of clinical vocabulary and the sharing of information crosswise over associations to upgrade the advantages of social insurance information mining applications

DATA MINING PROCESS STEPS:

1) Business issue identification: This is most crucial step of DM also DM needs to find the business situation and also needs to know every data

related to industry. Otherwise data mining could not able to asses result.

2) Data mining database establishment: Database is not required in data mining but by maintain it differently can help for administrative purpose. And can help to study the old data warehouse.
3) Data analyses: This task is helpful in identifying the results.
4) Data modeling preparation: It consist of four steps i. variable selection: data variable choosing is vital because you can not enter all variables at a time by doing so require large time to process. ii .data selection: it is also inefficient to select data and use the whole data. iii. New variable construction: is also necessary iv. Adjust variable: according to need of data miner
5) Model development: acquire correct analytical method and model according to issues.
6) Model evaluation: For getting result apply the model.

DATA MINING ALGORITHMS AND TECHNIQUES

Various algorithms and techniques like Classification, Clustering,Regression, Artificial Intelligence, Neural Networks, Association Rules,Decision Trees, Genetic Algorithm, Nearest Neighbor method etc., are utilized for knowledge discovery from databases.

Classification is the most commonly applied data mining technique,which employs a set of pre-classified examples to develop a model that can classify the population of records at large.

The section I explains the Introduction of data mining and data mining techniques and its application in pharma. Section II presents the literature review of existing systems and Section III present proposed system implementation details which includes preprocessing and feature extraction, and Graph evaluation Section IV presents experimental analysis, results and discussion of proposed system. Section V concludes our proposed system. While at the end list of references paper are presented.

IV. LITERATURE REVIEW

The development of Information Technology has generated large amount of databases and huge data in various areas. The research in databases and information technology has given rise to an approach to store and manipulate this precious data for further decision making. DM is aprocess of extraction of useful information and patterns from huge data. It is also called as knowledge discovery process, knowledge mining from data, knowledge extraction or pattern analysis. To generate information it requires massive collection of data. The data can be simple numerical figures and text documents, to more complex information such as spatial data, multimedia data, and hypertext documents.

Author in paper [2] Discussed some key term regarding data mining like what is data mining, what kind of data is used in data mining, data mining functionalities, what kind of patterns are mined in DM, data mining system classification, issues present in data mining, evaluation structure of database, author says that data mining is referred as knowledge Discovery in Databases (KDD). Present DM classification based on kinds of databases mined, he kinds of knowledge mined, and the kinds of techniques utilized to mine it.

Here [3] presented fundamental issues of knowledge discovery, clustering and classification, trend and analysis, dependency derivation, integrated discovery systems, augmented database systems, and application, Now a days we have seen large data is generated called as big data and for managing that data needs new tools and techniques that can guide us to transfer this data in useful knowledge. Advancement in Knowledge Discovery and Data Mining carries the

latest research in databases, machine learning, and artificial intelligence that are part of the exciting and rapidly growing field of knowledge discovery and data mining.

The healthcare data are not constrained to simply quantitative information, for example, doctors' notes or clinical records, it is important to additionally investigate the utilization of content mining to grow the extension and nature of what social insurance information mining can right now do. In specific, it is helpful to probably coordinate information and content mining [5]. It is additionally valuable to investigate how advanced indicative pictures can be brought into human services information mining applications. Some advancement has been made in these regions [6][7].

The delivery of health care has dependably been data serious, also, there are signs that the business is perceiving the expanding significance of data handling in the new overseen care condition [8].

Data mining applications likewise can advantage medicinal healthcare suppliers, for example, emergency clinics, facilities and doctors, and patients, for instance, by distinguishing powerful medications and best practices [9],[10] The Centers for Medicare also, Medicaid Services has utilized information mining to build up an imminent installment framework for inpatient restoration [11] The human services industry can profit extraordinarily from information mining applications.

Pharmaceutical industries can profit by social insurance CRM furthermore, information mining, as well. By following which doctors endorse which drugs and for what purposes, pharmaceutical organizations can choose whom to target, show what is the most economical or on the other hand best treatment plan for an infirmity, help recognize doctors whose rehearses are fit to explicit clinical preliminaries [12]. Pharmaceutical companies can utilize data mining techniques to colossal masses of genomic information to anticipate how a patient's hereditary cosmetics decides his or her reaction to a medication treatment [13].

Data mining applications can be developed to evaluate the effectiveness of medical treatments. By comparing the causes, symptoms, and courses of treatments, data mining can deliver an analysis of which courses of action prove effective [14].Now days, Sierra Health Services has utilized data mining broadly to distinguish zones for quality upgrades, counting treatment rules, disease management groups, and cost administration [15].

A UI might be intended to acknowledge a wide range of data from the client (e.g., weight, sex, age, foods consumed, reactionsoccurred, dosage,length of use). At that point, in light of the data in the databases and the significant information entered by the client, a rundown of admonitions or known reactions ought to be accounted for. Note that client profiles can contain a lot of data, and productive and successful data mining devices should be created to test the databases for applicable data. Second, the patient's profile ought to be recorded along with any unfavorable responses detailed by the patient, with the goal that future connections can be accounted for. After some time, the databases will turn out to be a lot bigger, and cooperation information for existing prescriptions will turn out to be increasingly finished [16].

V. SYSTEM ARCHITECTURE

Here in Fig.1 Drug dataset is taken as an input after that applied preprocessing on that to extract features. Among the extracted features essential features are selected for further processing after that tree algorithm is selected and then Frequent Pattern algorithm used for tree modeling. After that evaluation graph are generated.

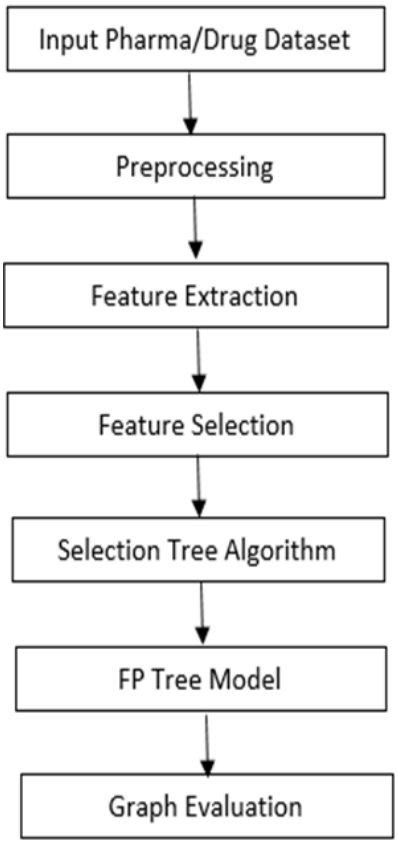


Fig 1. System Architecture

VI. RESULT AND DISCUSSIONS

A. Experimental Setup

All the experimental cases are implemented in Java in congestion with Netbeans tools and MySql as backend, algorithms and strategies, and the competing classification approach along with various feature extraction technique, and run in environment with System having configuration of Intel Core i5-6200U, 2.30 GHz Windows 10 (64 bit) machine with 8GB of RAM

VII. CONCLUSION

Here we discussed how data mining techniques used in pharmaceutical industry and why it is used also we present some application where data mining used. Basically data mining is used in field of healthcare system to identify revenue of medicine also by using data mining we can collect huge data and separate useful information among them. It helps to gather drug data like which drug is generally more prescribed in which area. it can help to identify symptoms causes and analyze which course is needed to cure the patient. So pharmaceutical company uses CRM and data mining for making profit by identifying which doctors prescribe which drug and for what purpose according to that they target them to generate revenue.

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Searching Grade Scheme and Malware Recognition Within Google Play Application

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ABSTRACT

To introduce FairPlay, a work of fiction system that discover and leverages traces left behind by fraudsters, to distinguish both malware and apps subjected to investigate status fraud. FairPlay associate review behavior and distinctively combine detect review associations with linguistic and behavioral signals gleaned from Google Play app records (87 K apps, 2.9 M reviews, and 2.4M reviewers, unruffled over half a year), in order to organize suspicious apps. FairPlay achieves over 95 percent accuracy in classify gold regular datasets of malware, counterfeit and legitimate apps. Deceptive behaviors in Google Play, the most trendy Android app market, fuel Search rank abuse and malware proliferation. To make out malware, preceding work has paying attention on app executable and acquiescence analysis. It will show that 75 percent of the acknowledged malware apps engage in hunt rank fraud. FairPlay discover hundreds of fraudulent apps that presently evade Google Bouncer's recognition machinery.

Keywords : Fair Play, Dataset, Google Play, Malware, Google Bouncer, Proliferation.

I. INTRODUCTION

Android does a software horde embrace not only in commission organization but also middleware as well as solution applications. Android come in the midst of an Android market which is online software accumulate. It was residential by Google. It allows robot users to select, and download applications residential by third gathering developers and use them. Android at the start came into subsistence with the sure fire scheme that developments are given the power and autonomy to create engrossing Mobile application while taking advantage of the whole thing that the mobile handset has to offer.

Machine is built on open Linux Kernel. This particular software for Mobile Application is made to be open source, thereby giving the occasion to the developers to commence and incorporate any technological advancement. Fabricate on custom virtual machine android gives its users the totaling usage and purpose power, to begin an interactive and efficient application and prepared Software for your phone. Google's mobile operating device, the robot is its tremendous creation in the perfect creation of Software Applications for the transportable phone arena it also facilitate the g-juice in your transportable thus initiate a whole new world of Mobile Technology skill by its regulars. Arokia IT is technically equipped to initiate any level of these wonderful software applications using the android intellect from Google. Around in the year 2007, Google announce its Android Operating System and Open Handset Alliance through these two major donations to the mobile industry that ultimately misrepresented our knowledge with portable interface.

II. LITERATURE REVIEW

a) GRAPH BASED OPINION SPAM DETECTION

Graph base approach has been projected to tackle judgment spam. Ye and Akoglu compute the ability of a product to be a spam drive target, and then gather spammers on a 2-hop sub chart induced by the products with the peak chance values. Akoglu et al. Surround fraud detection as a signed network arrangement problem and organize users and harvest that form a bipartite complex, using a propagation-based algorithm.

FairPlay's relational advance differs as it identifies apps reviewed in a bordering time interval, by group of users with a history of reviewing apps in frequent. FairPlay combine the results of this move toward with behavioral and linguistic clues, extract from longitudinal app figures, to perceive mutually investigate rank design and malware apps. We accentuate that search rank fraud goes ahead of estimation spam, as it imply fabricate not only reviews, but also customer app install measures and ratings.

b) AN ANDROID-BASED MECHANISM FOR ENERGY EFFICIENT LOCALIZATION DEPENDING ON INDOOR/OUTDO

Location-based application on modern smart phone have acknowledged rife usage in today's society—to the point where it can even be said that many have grow to be conditional on these type of applications. Location in turn is used to geotag posts on social medium websites, to distribute the local withstand and news, to help users take the helm to a desired location, and to provide information on close to restaurant and stores. However, users regularly have to balance the expediency and functionality of these location-based applications with a Smartphone's battery life. The tradeoff between these two comes down to exactness against energy. Applications that require fine-grained setting in turn opt to use the power-hungry GPS, while applications with more coarse necessities may use the network-based provider, which is less accurate, but has superior energy savings. The user is often given the ability to toggle position services on or off and, with Android phones, can also selectively allow or disable the formerly mentioned two methods to fine-tune their phone's accuracy/energy transaction. However, in most cases, the regular user will not pay much attention to this option due to absentmindedness, not knowing such options are available, or a lack of familiarity on the liveliness costs. On the other hand, developers of location-based application can trim down energy consumption by smartly choosing among using the GPS or the set-up contributor depending on application rations or other context. However, developers cannot always predict when to energetically control between methods. In other cases, locations return by the network-based method will not be accurate enough for proper functionality of some applications (e.g., navigational applications)—in this case, the GPS will always be invoked regardless of environment or context. As a result, this leads to a waste of energy in situations where the GPS is unavailable or inaccurate, such as in indoor environment or "urban canyons."

c) SEMANTICS-BASED ONLINE MALWARE DETECTION: TOWARDS EFFICIENT REAL-TIME PROTECTION AGAINST MALWARE

In this work, we in attendance the first system call based come up to using hardware-enhanced planning that employ appliance learning practice for malware recognition. We name it GuardOL (guard online). GuardOL use a novel regularity centralized model (FCM) for attribute structure to learn the malevolent behavioral pattern from known malware sample. Our frequency-centralized model takes the occurrence of resource-critical system calls into account and constructs facial appearance by federation system

calls using inclusive rules to imprison the semantics of malicious behavior. To this end, GuardOL extract the structure calls (with their point of view and go again values) for the duration of execution on the supercomputer and groups relevant system calls to construct features using FCM. The skin texture obtained from the malware and benign sample are used to educate multilayer perception (MLP), an reproduction neural complex model, which is used at runtime to act upon the arrangement of the running curriculum as malware or benevolent. We widen an architectural design of GuardOL based on our proposed methodology. For the proof of concept, we put into operation our model in FPGA. We leverage the advantages of FPGA platform to obtain a high routine training and exposure at a low cost and reconfigurability for place fabrication functionality upgrade to adapt to new malware samples. Reconfigurability of FPGA also allows sharing of hardware for classifier schooling and runtime exposure. Our draw near aims to capture the semantics of malicious behavior with the proposed frequency federal model with therefore has the potential to detect malware variants with even zero-day (previously unseen) attacks. Compare to the software approaches, GuardOL is resistant to aforesaid advanced malware technique, as it is based on hardware. Unlike software techniques, it cannot be disabling or open by sophisticated technique (e.g., anti-virtual contraption and anti-debugger) and thus malicious activities force not is hidden beginning detection. In addition, our implementation offers a power efficient malware detection design, which has low reserve demands and unimportant piece overhead on the system. The FPGA accomplishment of GuardOL consumes 0.36 W during training and 0.264 W at runtime. Our fallout shows that GuardOL achieves faster detection with zero routine penalties on the supercomputer.

d) ANDROID MALWARE DETECTION WITH CONTRASTING PERMISSION PATTERNS

An anomaly uncovering technique uses its knowledge of what constitute normal behavior to decide the maliciousness of an submission under check up. Instead, misuse detection uses the categorization of what is known to be malicious to settle on the cruelty of an application under inspection. Typically, each routine uses a “summary” in place of the distinctiveness of normal/abnormal application for detecting malware. More exclusively, normal shape is used in anomaly recognition, whereas anomalous profile is old in misuse detection. Generally, anomaly exposure and use wrongly revealing may have sky-scraping false affirmative rate and high false negative rate correspondingly due to the limitations. There is a considerable difference between malwares and clean application on the distribution of dism. Most malwares have much greater dism than that of clean applications, which implies that dism is a perfect metric for distinguishing malwares from clean applications. However, as the consequence of classifier imbalance, almost all instances have positive ethics of dism. To offset this movement away, a positive discrimination coefficient ε, is needed for making the final decisions. Divergent patterns as well as their support degrees of malware and clean datasets are considered as the distinctiveness that discriminates malwares from clean applications. Hence, we present a malware exposure support with a amalgam profile composed by MP, ClP and CoP, which are represented by unique acquiescence patterns in malware dataset, unique permission patterns in unsoiled dataset and frequently required permission pattern respectively. To execute the proposed outline, an ensemble classifier, Enclamald, is developed. Each divergent permission model plays the role of a weak classifier and votes for the ultimate result. We present a metric, dism, as the aggregate result of all involved weak classifiers to quantify how likely a function is malevolent.

III. METHODOLOGY

FairPlay correlate review proceedings and distinctively combine detect appraise interaction with syntactical and behavioral signal gleaned from Google Play app data, in order to identify disbelieving apps. FairPlay achieves over 95% accuracy in classify gold ordinary datasets of malware, fraudulent and lawful apps. We show that 75% of the identified malware apps fit into place in search rank fraud. Impartiality discovers hundreds of fraudulent apps that currently evade Google Bouncer's uncovering equipment. FairPlay also help the discovery of more than 1,000 reviews, reported for 193 apps that reveal a new brand of influential review operation. We uncover these malicious acts by picking out such trails. For illustration, the high price tag of setting up valid Google Play financial statement services fraudsters to reprocess their financial statement transversely review writing jobs, assembly them likely to review more apps in familiar than regular users. Resource constraint can compel fraudsters to post reviews surrounded by tiny time interval.

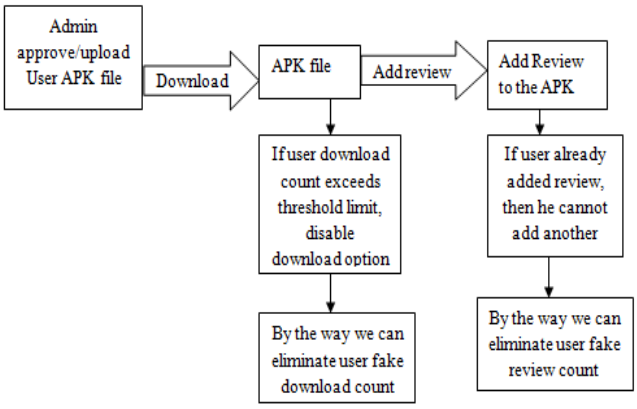


Fig 1. System Architecture

Within this, we inaugurate FairPlay, a narrative organism that discover and leverages traces left following by fraudsters, to perceive both malware and apps subjected to investigate rank fraud. Objectivity show a relationship appraise activities and outstandingly combine detected review relations with syntactical and behavioral signals gleaned from Google Play app data, in order to identify doubtful apps. FairPlay achieves over 95% accuracy in classifying gold standard datasets of malware, fraudulent and equitable apps. We show that 75% of the branded malware apps employ in search status deception. FairPlay discover hundreds of fraudulent apps that at this time evade Google Bouncer's detection technology. FairPlay also help the discovery of more than 1,000 reviews, report for 193 apps that divulge a new category of forceful review operation. We unearth these malicious acts by preference out such trails. For instance, the high cost of situation up valid Google Play financial statement forces fraudsters to reuse their balance sheet across assessment writing jobs, making them likely to review more apps in universal than ordinary users. Resource constraints container make fraudsters to situation reviews contained by short time intervals. The 1,024 coerced reviews are posted for 193 apps. While a large amount of the 193 apps have customary less than 20 coerced reviews, 5 apps have every one received more than 40 such reviews. We have observed several duplicate among the coerced reviews. We identify two promising explanation. First, as we earlier mentioned, some apps do not keep track of the user having reviewed them, thus repetitively coerce subsequent review from the equivalent user. A second enlightenment is that seemingly coerced reviews can also be posted as parts of a negative consider rank fraud battle. However, in cooperation scenario describe apps likely to have been subjected to falsified behaviors.

Advantages

- Be capable of detect valid reviews.
- Be able to identify fraud users and malware meter.
- Identifies authoritative reviews course of action.

IV. RESULT AND DISCUSSION

In order to find confirmation of systematic coercive review campaign, we have parsed the 2.9 million reviews of our dataset to identify those whose text contains one of the root words ½"make", "ask", "force" and "rate". Upon manual scrutiny of the results, we have found 1,024 coerced reviews. The reviews make public that apps involved in coercive review campaign either have bugs (e.g., they ask the user to rate 5 stars even after the user has rated them), or wage the user by removing ads, providing supplementary features, unlocking the next game level, boosting the user's entertainment level or openhanded game point.

The 1,024 coerced reviews were posted for 193 apps.While most of the 193 apps have received less than 20 coerced reviews, 5 apps have each routine more than 40 such reviews. We have pragmatic several duplicate surrounded by the coerce review. We identify two promising explanations. First, as we previously mention, some apps carry out not keep track of the user having reviewed them, thus repeatedly coerce subsequent reviews starting the same user. A second explanation is that seemingly coerced reviews, can also posted as part of a off-putting search rank fraud operation. However, both scenarios describe apps likely to have be subjected to deceptive behaviors.

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Evaluation of *in Vitro* Antioxidant Potential of *Carissa Carandas* Genotype found in NE India

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ABSTRACT

The present work was designed to study the antioxidant potential of various parts of *Carrisa carandas* using different assay systems. *C. carandas* is a semi-wild shrubby plant species found in Assam (India). The species is being used in various traditional medicinal practices in Assam and other parts of NE India. The methanol extract of the fruits of *C. carandas* showed highest radical scavenging activity against DPPH (1, 1diphenyl-2-picryl hydrazyl). Ethanol extract of the fruits showed highest radical scavenging activity against H_2O_2. The study revealed that the fruits, leaves and seeds extract of *C. carandas* possesses potent antioxidant activity. The antioxidant potential was determined to be in the following order: Fruit > Leaf > Seed extracts.

Keywords: *Carissa Carandas,* Antioxidant,Radical Scavenging, DPPH, Reducing Power.

I. INTRODUCTION

Plants are well known source of biologically active natural products with potent therapeutic value. Phytoconstituents such as carotenoids, tocopherols and polyphenols possess considerable antioxidant capacity. It is known that reactive oxygen species (ROS) play a crucial role in the development of various ailments such as arthritis, asthma, dementia, carcinoma and several others. Moreover, the excess production of active oxygen species like O_2, H_2O_2 and OH– may lead to tissue injury, DNA damage, thiol oxidation and lipid peroxidation, cardiac disorder, chronic gut inflammation, cancer and AIDS in humans [1]. However, free radicals play a positive role in phagocytosis, energy production and regulation of cell growth. But free radicals produced in the body react with various biological molecules namely lipids, proteins and deoxyribonucleic acids resulting in oxidative stress [1], [2], [3], [4]. Oxidative stress is commonly defined as a disturbance in the prooxidant and antioxidant balance. Although human body is protected by natural antioxidant defense, there is always a demand for antioxidants from plant sources. Therefore, identification of antioxidant rich plant resources and evaluation of their antioxidant potential is considered as a high priority area of research.

C. carandas L. is a 3-5 m tall evergreen shrub or climbing tree with strong thorns in pairs (Figure 1). The species has been found in semi-wild situation in home gardens in several places of Assam and other parts of North East India [5]. “Semi-wild” applies to those plants that are indigenous and naturalized to the region while nurtured also through maintenance or acceptance by people in their crop fields and home gardens [6]. Stem is fresh green, cylindrical in shape, smooth on surface, 4–5 cm internodes. The branches are set with sharp simple or forked thorns in pairs in the axils of the leaves, 2-4 cm long and are usually alternate, numerous and spreading, forming dense masses; branches are usually without spines. Bark is smooth light grey or yellowish brown [7]. Leaves are simple, evergreen, opposite [8]. Flowers are white,

often tinged with pale-pink coloured, found in groups, scarcely odorous. Fruits have fairly thin but tough peel. Peel and pulp are usually green and pinkish white when immature but turns purplish- red to dark-purple and shiny when ripened depending on the genotype. Ripe fruits are sweet and edible. Unripe ones are sour and pickled. Various parts of *C. carandas* have been used in many ethno-medicines as stated in several published work [9], [10], [11], [12], [13]. Roots are used as stomachic and anthelmintic in traditional medicinal practices of Assam. Decoction of leaves is given in the treatment of remittent fever [5]. However scientific validation of the medicinal information for the *C. carandas* genotype found in Assam is obscure. Considering the medicinal importance, the objectives of this study was designed to evaluate the antioxidant potential of various parts viz., fruit, leaf and seed of *Carissa carandas* using DPPH (1,1diphenyl-2-picryl hydrazyl) and hydrogen peroxide (H_2O_2) radical scavenging methods.

II. METHODS AND MATERIAL

Plant samples were collected from a semi-wild population of *C. carandas* found in a local Garden in Nagaon district of Assam, India. The fresh leaves, fruits and seeds were gathered during the month of June to August, 2018. The specimen was identified in the Department of Botany, Gauhati University, Assam, India. All the chemicals and solvents were of analytical grade obtained from Hi-Media Laboratories Pvt. Ltd., Mumbai. A UV-visible spectrophotometer (Thermo Fischer scientific) was used for recording the spectra.

The collected samples were cleaned and washed thoroughly using tap water followed by distilled water. The ripened fruits were sliced into small pieces to increase the surface area; seeds were removed and then dried under shade for 7 days. Dried samples were then ground to produce fine homogenous powder using a grinder. The powdered samples were preserved in clean plastic containers away from light, heat and moisture until use. For preparation of cold extracts, 10g of each powdered plant sample (leaf, fruit and seed) soaked in 100mL of selected solvents viz., Ethanol, Acetone, Methanol, Ethyl Acetate, Diethyl ether, petroleum ether, Chloroform and Distilled water at room temperature. Each sample was filtered using Whatman no.1 filter paper and the filtered solutions were evaporated to dryness using water bath at 40^{o}C for overnight. The plant extracts were then stored at 4^{o}C for further analysis. Chemical analysis was done to estimate antioxidant activity of the samples.

The antioxidant activity of 8 different extracts (methanol, ethanol, acetone, chloroform, petroleum ether, distilled water, ethyl acetate and diethyl ether) of *C. carandas* plant material was assayed. The extracts were tested for their radical scavenging ability against DPPH as per method described by Blois [14]. The scavenging activity of the extracts on hydroxyl radical was measured according to a method earlier described by Ruch [15] and Yu *et al.* [16]. Reducing Power Assay was carried out as per the method described by Yildrin [17].



Figure 1: A fruiting twig of *Carissa carandas* found in Assam (India)

DPPH Scavenging Assay

Stock solutions of all the extracts of different plant parts with the concentration of 1000µg/ml were prepared by dissolving 20mg of the extract separately in eight number of different solvents (Ethanol, Acetone, Methanol, Ethyl Acetate, Diethyl ether, petroleum ether, Chloroform and Distilled water) and the final volume was made up to 20ml. The stock was diluted to various concentrations like 10µg/ml, 20µg/ml, 40µg/ml, 80µg/ml and 160µg/ml solutions with each solvent earlier used for extraction. The total volume was made 1ml in all the test tubes and to this 2ml of solvent solution of DPPH was added thereby making the final volume to 3ml. The test tubes were incubated at 37°C for 30minutes. Optical densities of these samples were measured for degree of discoloration from purple to yellow at 517 nm along with blank. Each of the above mentioned eight solvents with respective plant extracts served as blank. Ascorbic acid was used as a standard. Lower absorbance of the reaction mixture indicated higher free radical scavenging activity.

The DPPH radical scavenging activity of the plant extracts were calculated by the following equation:

$$\% \text{ inhabitation} = [A_0 - A_s] / A_0 \times 100$$

Where,

A_0 = Absorbance of DPPH (unreduced)

A_S = Absorbance of the sample and standard

The percentage scavenging activity of each extract was compared with L-Ascorbic acid, the positive control. IC50 is defined as the concentration of antioxidant that causes 50% loss of the initial DPPH free radical concentration (color). IC50 of reference antioxidant compound i.e. ascorbic acid was used for comparison to IC50 of the extracts. The least value of IC50 represents the better antioxidant and high value for antioxidant activity. IC50 value of each extract was determined from the plotted graph of percentage DPPH neutralization versus concentration of extract.

Statistical Analysis

The data were subjected to statistical analysis by Origin ver. 6.1. All the assays were recorded in triplicates and the values were expressed as mean ± S.D. Each measurements were significantly different at $p<0.05$.

Hydrogen Peroxide Scavenging Assay

Hydrogen peroxide (40 mM) was prepared in phosphate buffer (50 mM pH 7.4). Different concentration of the plant extracts (10 µg/ml to 160 µg/ml) was added to 600 µl of H_2O_2 (0.6 ml, 40 mM) and the final volume was made 3ml with distilled water. The concentration of hydrogen peroxide was determined by absorption at 230 nm after 10 min against a blank solution containing phosphate buffer without hydrogen peroxide. Ascorbic acid was taken as standard. The percentage of hydrogen peroxide scavenging of both the extracts and standard compounds was calculated as in the case of DPPH.

$$\% \text{ inhabitation} = [A_0 - A_s] / A_0 \times 100$$

Where,

A_0- = Absorbance of H_2O_2 (unreduced)

A_S- = Absorbance of the sample and standard

Hydrogen peroxide produces hydroxyl radicals in cells. Scavenging of these radicals by the test extract is used as a test for antioxidant activity. The reduction of these radicals is seen by the decreased absorbance at 230nm with increasing concentration of the test extract. The mean percentage H_2O_2 inhibition values were plotted against concentration.

Reducing Power Assay

Substances having the reducing potential react with potassium ferricyanide (Fe^{3+}) to potassium ferro cyanide (Fe^{2+}) which then further react with ferric chloride to form a Ferric –Ferrous complex which has an absorbance maximum at 700nm. Phosphate buffer was prepared by mixing Dibasic Sodium Phosphate (37.50ml of 0.2M) with 62.5ml of monobasic sodium

phosphate and diluted to 100ml with distilled water. Different concentration of the plant extracts (10µg/ml-160µg/ml) were mixed with 2.5ml of phosphate buffer (pH6.6) and 2.5ml of 10g/l (1%) potassium ferricyanide. The mixture was incubated at 50°C for 30 minutes and an aliquot (2.5 ml) of 10% of trichloroacetic acid was added to the mixture which was then centrifuged at 3000 rpm for 10minutes. Finally 2.5ml of the upper layer was mixed with 2.5m of distilled water and 0.5 ml of 1g/l (0.1%) ferric chloride. The absorbance of resulting solution was measured at 700nm by using a UV-visible spectrophotometer. Water was used as blank while L-Ascorbic acid was used as standard. Increasing absorbance of the reaction mixture indicates increase in reducing power assay. Reducing power of each extract was estimated from the plotted graph of percentage reducing power versus concentration of extract.

III.RESULTS AND DISCUSSION

DPPH Radical scavenging assay

The fruit extracts exhibited a potent free radical scavenging activity. The inhibition percentage of methanol extract of fruit showed highest radical scavenging activity gradually increasing from 28.37% to 91.22% at 10µg/ml -160µg/ml. Ethyl acetate extract showed less activity compared to ethanol, chloroform, acetone, water, diethyl ether and petroleum ether extracts respectively (Table1; Figure 2). Methanol and ethanol extracts of fruit showed 50% and above inhibition at 40µg/ml. fruits extracts in chloroform, water, acetone and petroleum ether showed at 80µg/ml while diethyl ether at 160µg/ml and ethyl acetate showed above 160µg/ml. The extracts showed significant influence when compared to ascorbic acid. The leaf extracts exhibited radical scavenging activity against DPPH. The inhibition percentage of leaf methanol extract showed 28.37% to 80.79% at 10µg/ml -160µg/ml while petroleum ether showed less scavenging activity compared to ethanol, chloroform, acetone, water, diethyl ether and ethyl acetate respectively (Table 2; Figure 3). Methanol, ethanol, chloroform and acetone extracts of leaf showed 50% and above inhibition at 40µg/ml and water showed at 80µg/ml while diethyl ether and petroleum ether at 160µg/ml and ethyl acetate showed above 160µg/ml. The leaf extracts showed less significant scavenging activity compared to fruit extract. The inhibition % of seed extracts increased with increasing the concentration. The inhibition percentage of seed methanol extract showed 28.94% to 78.05% at 10-160µg/ml while petroleum ether showed less scavenging activity compared to chloroform, ethanol, acetone, water, ethyl acetate and diethyl ether respectively (Table 3; Figure 4). The seed methanol extract showed 50% and above inhibition at 20µg/ml while chloroform and ethanol extract showed at 40µg/ml. Acetone showed at 80µg/ml while water, ethyl acetate and diethyl ether at 160µg/ml and petroleum ether showed above 160µg/ml.

H_2O_2 Radical scavenging assay

The inhibition % of Fruit extracts against H_2O_2 exhibited a strong free radical scavenging activity. The inhibition percentage of fruit ethanol extract showed 55.80% to 88.73 % at 10µg/ml-160µg/ml while petroleum ether showed less scavenging activity compared to the extracts in chloroform, methanol, acetone, water, ethyl acetate and diethyl ether respectively (Table 4; Figure 5). The fruit ethanol extract showed 50% and above inhibition at 20µg/ml while chloroform at 40µg/ml. Methanol extract showed at 10µg/ml, acetone and water at 80µg/ml, ethyl acetate at 160µg/ml and, diethyl ether and petroleum ether showed above 160µg/ml concentration. The inhibition % of leaf extracts increased with increase in the concentration. The inhibition percentage of leaf ethanol extract showed 45.95% to 96.02 % at 10µg/ml-160µg/ml while ethyl acetate showed less scavenging activity compared to chloroform, water, methanol, acetone, petroleum ether and diethyl ether respectively (Table 5, Figure 6).

Ethanol and chloroform extract of leaf showed 50% and above inhibition at 20µg/ml. Water extract of leaf showed activity at 40µg/ml, methanol and acetone extracts showed at 80µg/ml while petroleum ether and diethyl ether showed activity at 160µg/ml. The leaf extracts showed significant influence when compared to ascorbic acid. The seed extracts exhibit radical scavenging activity against H_2O_2. The inhibition percentage of seed ethanol extract showed 45.75% to 92.11 % at 10µg/ml-160µg/ml while diethyl ether showed less scavenging activity compared to methanol, chloroform, water, acetone, petroleum ether and ethyl acetate respectively (Table 6, Figure 7). The seed ethanol extract showed 50% and above inhibition at 20µg/ml, methanol and chloroform showed at 40µg/ml while water, acetone, petroleum ether showed at 160µg/ml and diethyl ether and ethyl acetate at above 160µg/ml. The seed extracts showed less significant scavenging activity compared to fruit and leaf extracts.

Reducing power assay

The fruit extracts showed an increase in reducing power with increase in the concentration. The fruit methanol extract showed 0.188 to 1.915 at 10µg/ml-160µg/ml while petroleum ether showed less reducing power compared to ethanol, chloroform, acetone, water, diethyl ether and ethyl acetate (Table 7, Figure 8). The leaf methanol extract showed 0.167 to 1.574 at 10µg/ml-160µg/ml while petroleum ether showed less reducing power compared to chloroform, ethanol, acetone, water, ethyl acetate and diethyl ether (Table 8, Figure 9).The seed ethanol extract showed increasing reducing power gradually from 0.141 to 1.265 at 10µg/ml -160µg/ml while ethyl acetate showed less reducing power compared to methanol, acetone, chloroform, water, diethyl ether and petroleum ether (Table 9, Figure 10).

Table 1: %inhibition concentration for DPPH radical scavenging activity of Fruit extracts of *Carissa carandas* L.

Sl. No.	Conc. (µg/ml)	%inhibition								
		ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	19.91±0.11	28.37±0.29	27.42±0.11	21.25±0.11	16.60±0.19	14.31±0.19	12.79±0.19	10.31±0.33	5.53±0.19
2	20	25.05±0.89	38.04±0.11	32.25±0.19	37.79±0.19	20.68±0.11	38.17±0.19	23.35±0.11	21.57±0.19	11.13±0.29
3	40	28.90±0.76	76.97±0.11	54.01±0.19	48.15±0.11	40.49±0.19	40.49±0.19	28.18±0.29	28.37±0.29	20.99±0.19
4	80	32.87±0.74	80.85±0.11	75.19±0.19	77.67±0.19	51.85±0.22	67.94±0.19	49.55±0.11	53.50±0.11	25.83±0.11
5	160	42.07±0.91	91.22±0.29	90.52±0.11	85.31±0.19	79.96±0.19	75.76±0.19	64.38±0.11	56.11±0.42	49.68±0.11

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

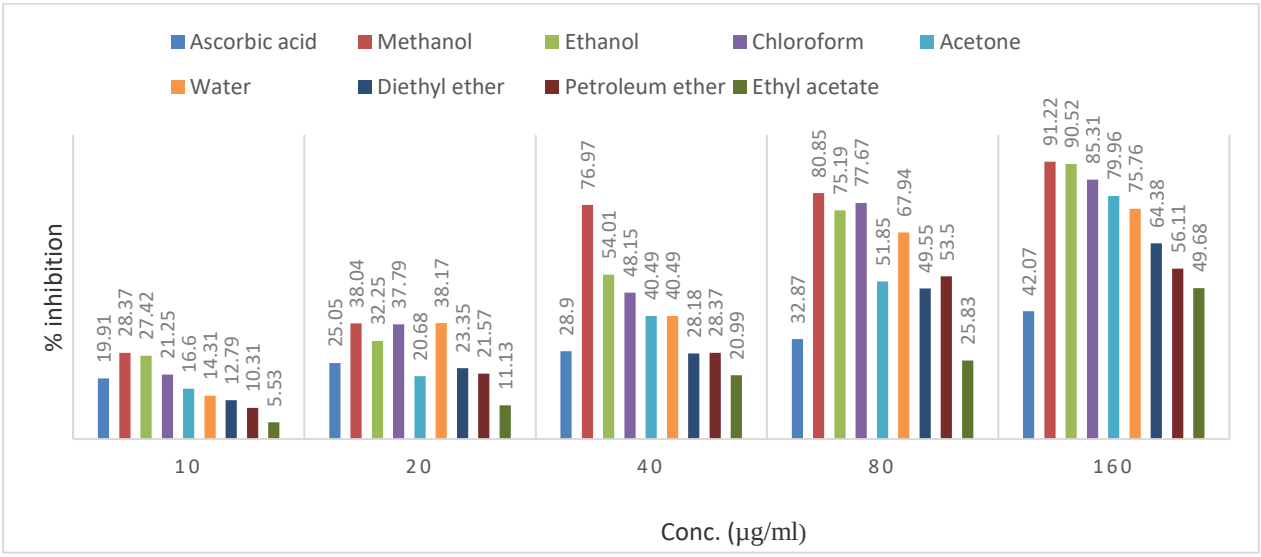


Figure 2: DPPH scavenging activity of Fruit extracts of *Carissa carandas* L.

Table 2: % inhibition concentration for DPPH radical scavenging activity of Leaf extracts of *Carissa carandas*

Sl. No	Conc. (µg/ml)	%inhibition								
		ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	19.91±0.11	28.37±0.29	25.83±0.11	20.48±0.11	16.60±0.19	14.76±0.61	11.13±0.29	10.43±0.11	8.52±0.11
2	20	25.05±0.89	43.38±0.58	49.55±0.11	38.17±0.19	37.47±0.11	29.14±0.19	28.44±0.19	27.42±0.11	18.70±0.19
3	40	28.90±0.76	51.21±0.29	56.30±0.19	52.16±0.11	59.22±0.11	43.38±0.58	33.97±0.19	30.60±0.11	30.47±0.11
4	80	32.87±0.74	71.18±0.19	69.21±0.11	69.66±0.19	49.68±0.11	58.91±0.22	43.70±0.19	44.34±0.29	38.42±0.29
5	160	42.07±0.91	80.79±0.11	79.58±0.19	78.82±0.19	76.91±0.19	63.10±0.11	59.73±0.19	56.81±0.11	48.16±0.11

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

Table 3: % inhibition concentration for DPPH radical scavenging activity of Seed extracts of *Carissa carandas*

Sl. No	Conc. (µg/ml)	%inhibition								
		ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	19.91±0.11	28.94±0.29	21.37±0.19	23.41±0.11	19.66±0.19	18.70±0.19	8.46±0.11	6.87±0.19	10.37±0.11
2	20	25.05±0.89	58.84±0.29	48.60±0.72	49.11±0.72	38.23±0.22	38.17±0.19	21.37±0.19	12.85±0.11	21.12±0.29
3	40	28.90±0.76	63.10±0.58	55.53±0.19	58.27±1.23	44.95±0.19	44.53±0.22	37.85±0.22	38.23±0.22	37.98±0.38
4	80	32.87±0.74	71.76±0.38	68.34±0.94	64.70±0.19	65.39±0.11	49.62±0.19	43.64±0.22	38.97±0.19	48.16±0.11
5	160	42.07±0.91	78.05±0.19	71.76±1.16	76.15±0.19	68.64±0.29	63.04±0.11	56.49±0.19	44.21±0.11	59.73±0.19

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

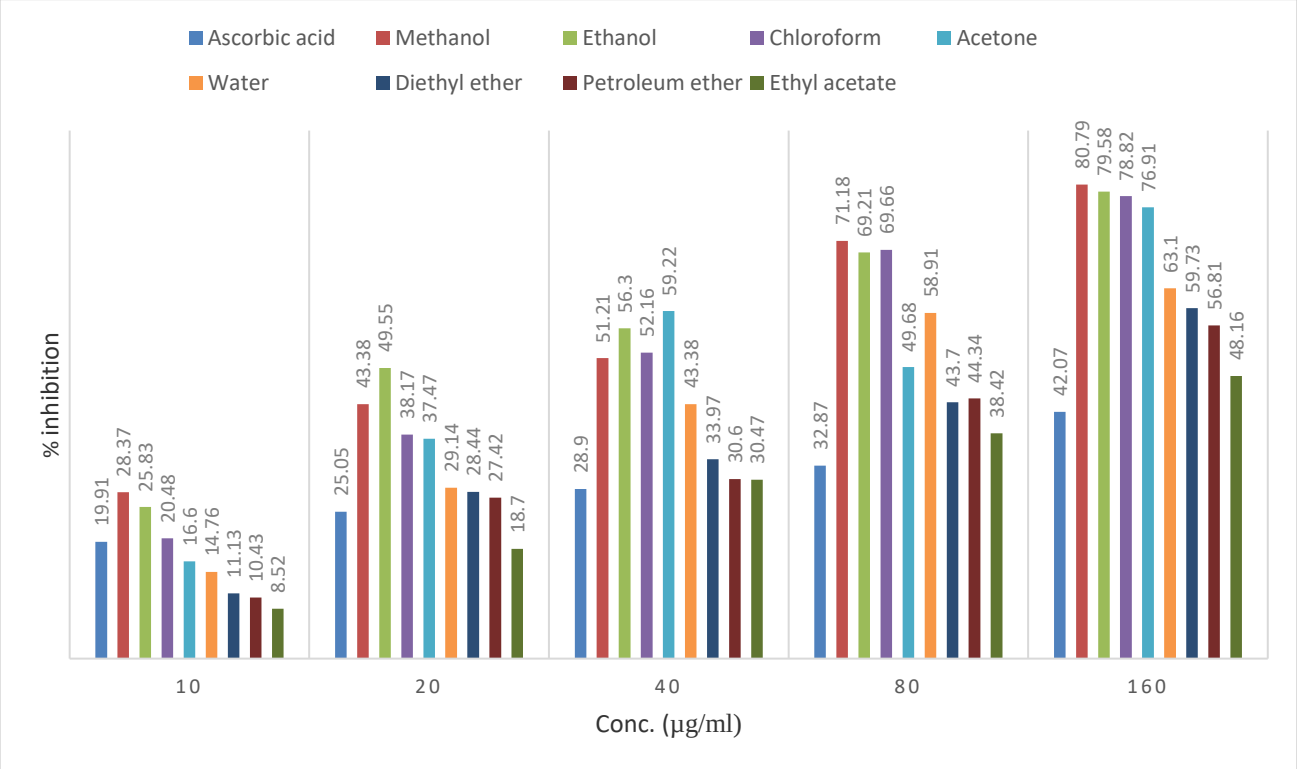


Figure 3: DPPH scavenging activity of Leaf extracts of *Carissa carandas* L

Table 4: % inhibition concentration for H_2O_2 radical scavenging activity of Fruit extracts of *Carissa carandas*

Sl. No	Conc. (µg/ml)	%inhibition								
		ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	10.79±0.20	55.80±0.12	48.38±0.20	39.88±0.20	20.85±0.20	16.80±0.20	11.07±0.12	5.40±0.23	12.96±0.20
2	20	27.47±0.20	60.53±0.20	63.56±0.41	49.80±0.20	30.77±0.20	28.14±0.20	21.26±0.20	8.64±0.23	26.92±0.20
3	40	36.47±0.47	68.22±0.20	74.97±0.12	52.43±0.20	49.06±0.31	47.17±0.20	33.60±0.20	9.72±0.20	31.16±0.02
4	80	53.36±0.59	80.36±0.20	91.36±0.31	79.76±0.20	67.41±0.20	55.67±0.20	42.11±0.20	25.37±0.12	45.95±0.20
5	160	54.5±0.45	88.73±0.42	92.31±0.20	87.65±0.20	74.29±0.20	93.52±0.12	46.09±0.31	35.83±0.20	80.84±0.20

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

Table 5: % inhibitionconcentration for H_2O_2 radical scavenging activity of Leaf extracts of *Carissa carandas* **L.**

Sl. No	Conc. (µg/ml)	%inhibition								
		ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	10.79±0.20	20.99±0.12	45.95±0.20	39.68±0.20	20.65±0.20	32.19±0.20	5.47±0.20	14.17±0.20	8.77±0.23
2	20	27.47±0.20	21.05±0.20	62.82±0.31	58.30±0.20	21.12±0.12	46.15±0.20	8.70±0.20	28.07±0.23	11.10±0.12
3	40	36.47±0.47	42.71±0.20	85.83±0.41	80.77±0.20	41.70±0.20	68.15±0.12	17.21±0.20	46.49±0.42	27.80±0.62
4	80	53.36±0.59	60.12±0.20	92.11±0.20	91.50±0.20	62.75±0.20	87.65±0.20	31.98±0.20	48.58±0.20	33.60±0.20
5	160	54.5±0.45	89.27±0.20	96.02±0.31	92.11±0.20	89.34±0.42	90.49±0.20	57.29±0.20	70.38±0.31	45.69±0.31

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

Table 6: % inhibition concentration for H_2O_2 radical scavenging activity of Seed extracts of *Carissa carandas*

Sl. No	Conc. (µg/ml)	%inhibition								
		ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	10.79±0.20	24.70±0.20	45.75±0.20	28.14±0.20	10.53±0.20	8.70±0.20	12.82±0.12	5.87±0.20	7.49±0.20
2	20	27.47±0.20	37.25±0.20	60.39±0.12	45.55±0.20	18.62±0.20	18.42±0.20	28.34±0.20	20.65±0.20	10.73±0.20
3	40	36.47±0.47	55.06±0.20	70.11±0.31	63.16±0.20	30.57±0.20	21.86±0.41	33.20±0.20	31.98±0.21	25.44±0.12
4	80	53.36±0.59	63.09±0.31	91.10±0.20	83.20±0.20	46.22±0.31	40.49±0.20	46.15±0.70	48.18±0.20	38.80±0.31
5	160	54.5±0.45	85.43±0.20	92.11±0.20	91.30±0.20	74.49±0.21	63.36±0.20	47.71±0.31	86.44±0.20	46.97±0.20

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

Table 7: Reducing power of Fruit extracts of *Carissa carandas* L.

Sl. No	Conc. (µg/ml)	Ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	0.454±0.002	0.188±0.001	0.181±0.002	0.175±0.001	0.163±0.002	0.141±0.001	0.130±0.001	0.107±0.002	0.128±0.001
2	20	0.646±0.001	0.294±0.001	0.382±0.002	0.288±0.001	0.412±0.001	0.504±0.001	0.350±0.001	0.437±0.002	0.267±0.001
3	40	0.734±0.002	0.425±0.001	0.518±0.001	0.508±0.001	0.616±0.001	0.713±0.001	0.466±0.001	0.556±0.002	0.520±0.002
4	80	0.816±0.001	0.624±0.001	0.740±0.001	0.830±0.001	0.902±0.001	0.818±0.001	0.769 ±0.001	0.889±0.002	0.908±0.002
5	160	1.098±0.001	1.915±0.002	1.806±0.001	1.624±0.001	1.514±0.001	1.332±0.001	1.315±0.002	1.258±0.001	1.303±0.002

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

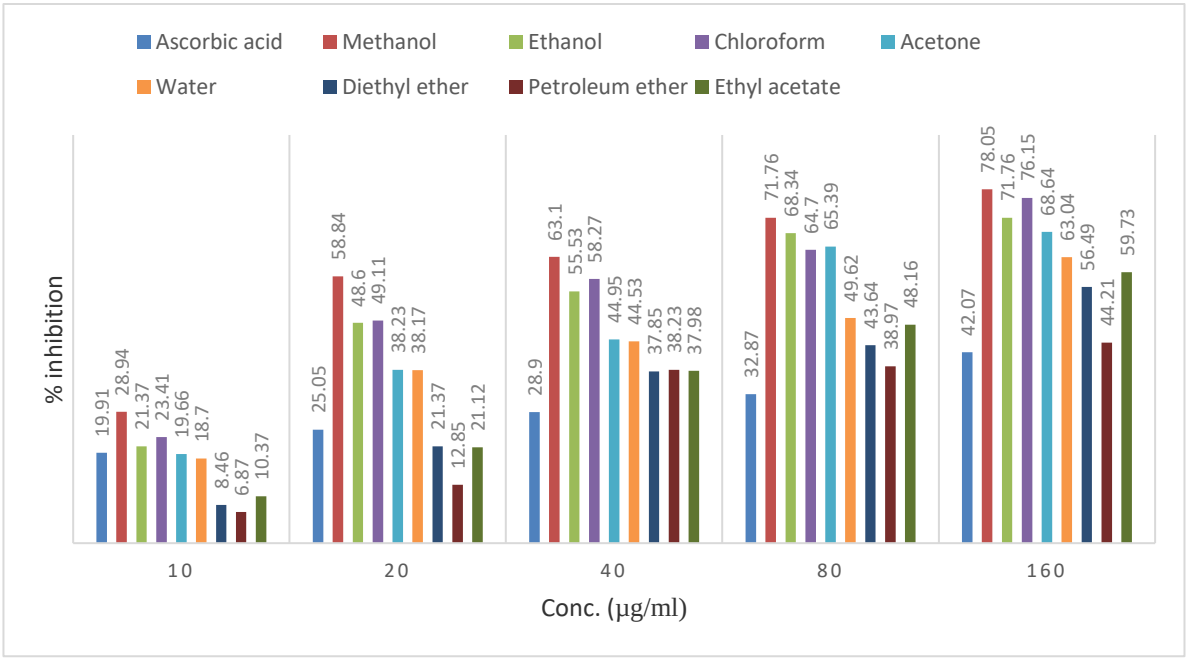


Figure 4: DPPH scavenging activity of Seed extracts of *Carissa carandas*

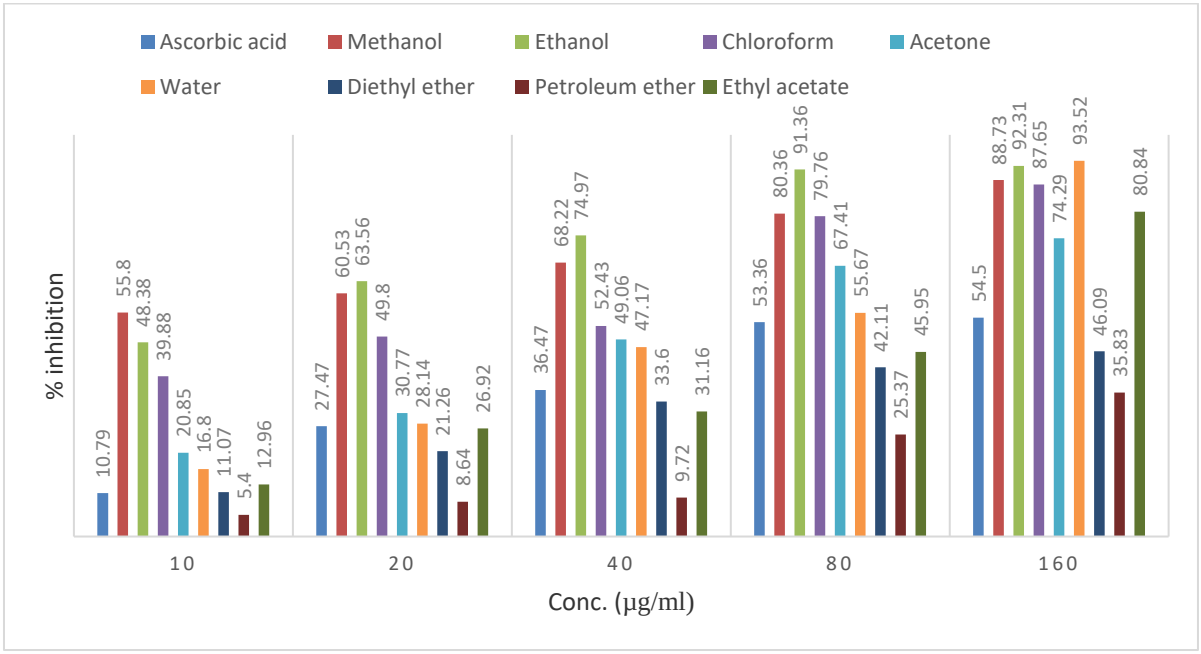


Figure 5: H_2O_2 scavenging activity of Fruit extracts of *Carissa carandas*

Table 8: Reducing power of Leaf extracts of *Carissa carandas*

Sl. No	Conc. (µg/ml)	Ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	0.454±0.002	0.167±0.002	0.128±0.002	0.162±0.001	0.105±0.001	0.096±0.002	0.086±0.002	0.085±0.001	0.092±0.001
2	20	0.646±0.001	0.252±0.001	0.426±0.003	0.313±0.001	0.214±0.001	0.357±0.002	0.244±0.001	0.396±0.002	0.108±0.002
3	40	0.734±0.002	0.394±0.001	0.552±0.001	0.405±0.001	0.315±0.002	0.473±0.002	0.350±0.002	0.567±0.001	0.568±0.001
4	80	0.816±0.001	0.820±0.001	0.915±0.002	0.620±0.001	0.728±0.001	0.916±0.002	0.619±0.002	0.915±0.004	0.796±0.001
5	160	1.098±0.001	1.574±0.001	1.497±0.001	1.572±0.001	1.402±0.002	1.357±0.001	1.241±0.001	1.213±0.002	1.341±0.001

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

Table 9: Reducing power of Seed extracts of *Carissa carandas*

Sl. No	Conc. (µg/ml)	Ascorbic acid	methanol	ethanol	chloroform	acetone	water	diethyl ether	petroleum ether	ethyl acetate
1	10	0.454±0.002	0.135±0.001	0.141±0.001	0.110±0.001	0.113±0.001	0.095±0.001	0.090±0.001	0.085±0.001	0.073±0.002
2	20	0.646±0.001	0.245±0.001	0.244±0.001	0.423±0.002	0.324±0.001	0.313±0.001	0.293±0.001	0.364±0.001	0.414±0.002
3	40	0.734±0.002	0.667±0.008	0.548±0.001	0.809±0.001	0.720±0.002	0.708±0.001	0.585±0.001	0.627±0.001	0.704±0.002
4	80	0.816±0.001	1.207±0.002	1.194±0.001	0.913±0.001	1.092±0.001	0.812±0.002	0.943±0.002	0.887±0.002	0.716±0.002
5	160	1.098±0.001	1.218±0.002	1.265±0.001	1.197±0.001	1.205±0.002	1.171±0.001	1.152±0.001	1.125±0.002	1.113±0.002

*Data are mean of triplicate measurements ± standard deviation. Each measurement were significantly different at $p<0.05$.

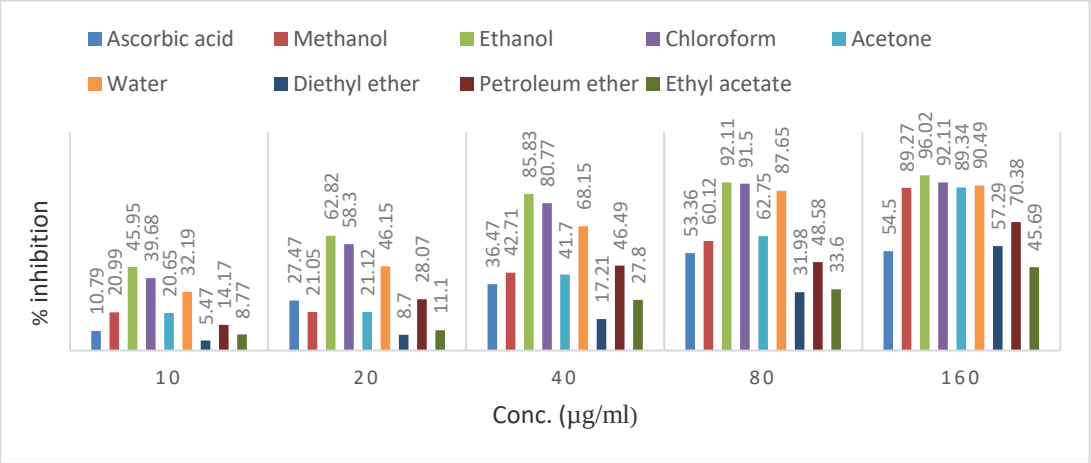


Figure 6: H_2O_2 scavenging activity of Leaf extracts of *Carissa carandas*

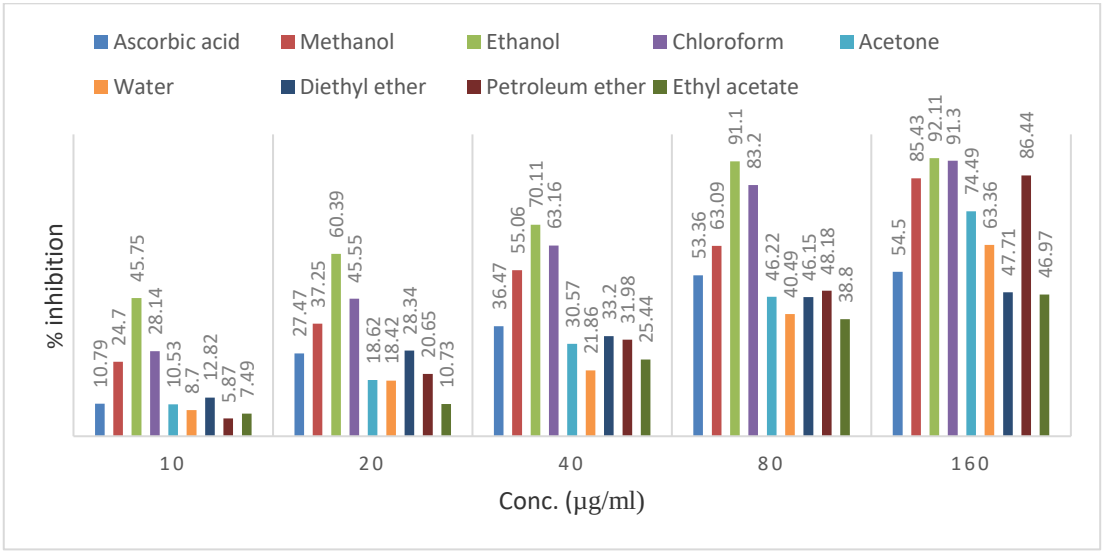


Figure 7: H_2O_2 scavenging activity of Seed extracts of *Carissa carandas*

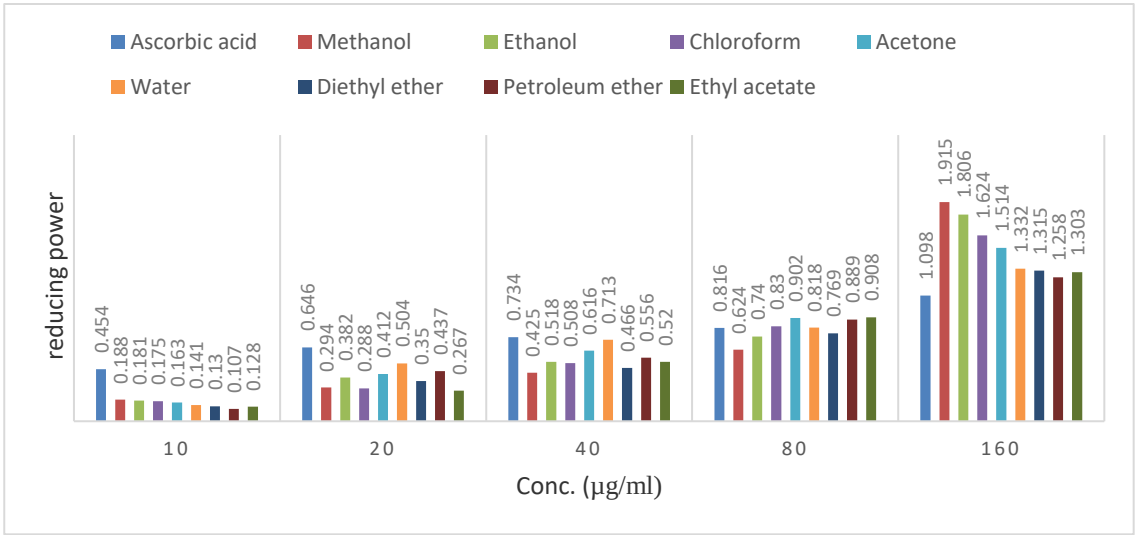


Figure 8: Reducing power of Fruit extracts of *Carissa carandas*

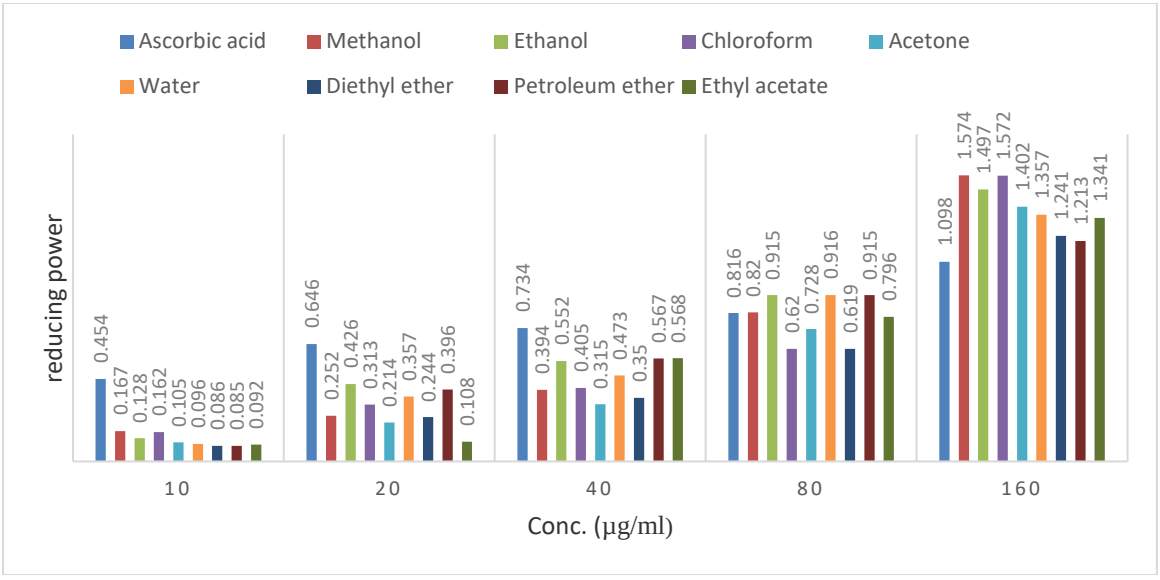


Figure 9: Reducing power of Leaf extracts of *Carissa carandas*

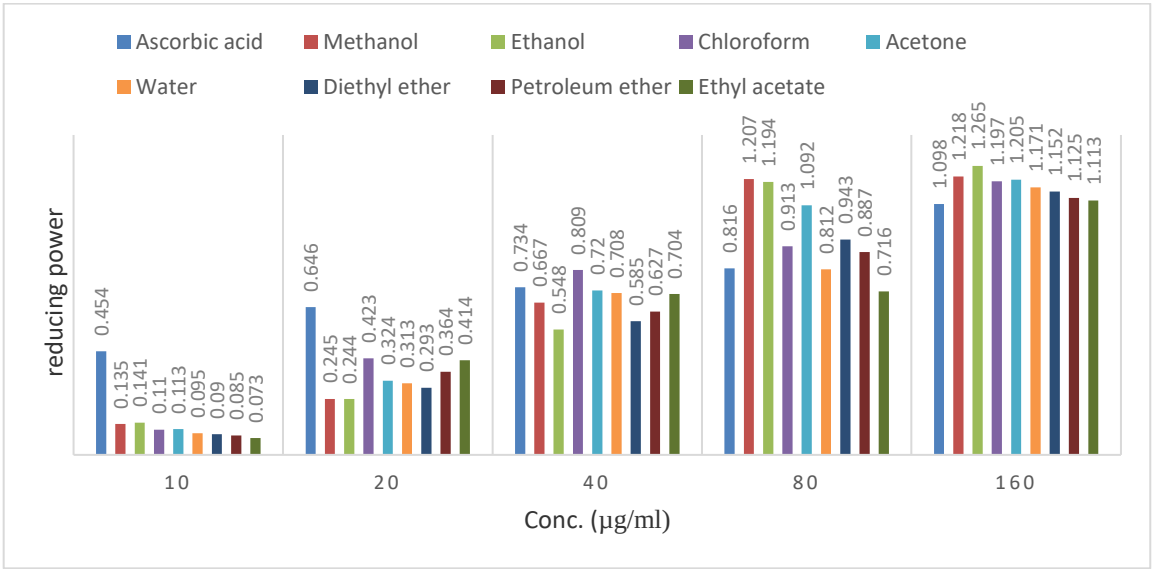


Figure 10: Reducing power of Seed extracts of *Carissa carandas*

The results revealed that DPPH and H_2O_2 radical scavenging activity was recorded in terms of % inhibition as shown in the tables and figures. It was observed that extract with the highest effective DPPH radical scavenging activity and reducing power was the methanol extract of *C. carandas* fruit while ethanol extract of fruit showed the highest effective H_2O_2 radical scavenging activity. Petroleum ether, ethyl acetate and diethyl ether showed lowest radical scavenging activity and reducing power assay. The results were compared to the standard (L-Ascorbic acid). Higher % inhibition represented better antioxidant potential of the extract. The extracts were investigated for their reducing capabilities by using potassium ferricyanide reduction method. The reducing ability may serve as a significant indicator of potential antioxidant activity [18]. The fruit, leaf and seed extracts increased in reducing powers with increasing concentration. The fruit and leaf extracts exhibited highest reducing ability than the seed extracts. The methanol extracts of fruit and leaf showed the highest activity and petroleum ether showed lowest while ethanol extract of seed showed the highest and ethyl acetate showed lowest reducing activity. Table 7-9 depicted the reducing power of the extracts.

The fruit and leaf extracts had significantly higher antioxidant properties than seed. This result was correlated with reducing power assay where fruit and leaf extracts were also found more significant than seed extracts. The antioxidant potential was determined to be in the following order: Fruit>Leaf>Seed extracts. The studies suggest that the fruits, leaves and seeds extracts of *C. carandas* possesses potent *in vitro* antioxidant activity and act as an effective free radical scavenger. Methanol extracts of *C. carandas* show exceeding good results to extract TPC and TFC and its antioxidant activity. Further study on the same can be of immense value as therapeutic drugs and thus protecting our body from various diseases. Earlier work on various other plant species was also in conformity with the present findings [1], [2], [18], [19], [20], [21], [23].In the present study, the fruit and leaf extracts of *C. carandas* showed significantly higher antioxidant properties than seed. The result was correlated with reducing power assay where fruit and leaf extracts were found more significant than seed extracts. The studies suggested that the fruits, leaves and seeds extracts of *C. carandas* possesses antioxidant ability and act as an effective free radical scavenger.

IV. CONCLUSION

From the present study, it can be concluded that solvent extracts of various parts of *Carissa carandas* exhibited potent free radical scavenging properties. The fruit extracts of *C. carandas* exhibited a higher free radical scavenging ability. The inhibition percentage of fruit methanol extract showed highest radical scavenging activity gradually increasing from 28.37% to 91.22% at 10µg/ml to 160µg/ml concentration of the extracts. Methanol and ethanol extract of fruits showed 50% and above inhibition at 40µg/ml concentration. The leaf extracts exhibited radical scavenging activity from 28.37% to 80.79% at 10µg/ml -160µg/ml.

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Development and Analysis of Sorghum Crackers

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ABSTRACT

Bakery industry is the major food processing industry in India and stands second position in the manufacture of biscuits. Bakery products are the most popular food products consumed by all age groups. The demand for bakery products is increasing in day today life because of easy availability and ready to eat convenient products having better shelf-life. Crackers are crisp baked products, chemically leavened or fermented. These are light in weight with longer shelf life. Now a day's millets are gaining popularity. In the development of sorghum crackers product, the main ingredients used are sorghum, refined wheat flour and basil leaf powder. Refined wheat flour is added in proportions to obtain soft, crispy, light fermented crackers as they cannot be made with whole sorghum flour because it is gluten free and posses less binding nature resulting in harder and heavier product. In general, the higher the gluten content in the wheat the higher the protein content of the flour. The higher the protein content of flour, the better is its ability to trap carbon dioxide gas giving lighter weight to biscuit. In the present study related to product development, sorghum crackers are developed by using sorghum flour and basil leaf powder in different variations. To acquire the beneficial properties of basil, the leaves are vacuum dried, powdered and incorporated in the product. On the whole, the nutritional aspect is increased by developing crackers with sorghum flour and basil leaves powder. Different variations are developed based on refined wheat flour and sorghum flour are 50(S):50(RWF), 60(S):40(RWF), 70(S):30(RWF) and basil powder is taken in same amount for all the variations. By laboratory evaluation of (chemical and sensory) 70(S):30(RWF) variant has got the highest acceptance.

Keywords : Sorghum, Basil leaf powder, Refined wheat flour (RWF), Ferment.

I. INTRODUCTION

In India, bakery industry is considered as one of the major food processing industry. India stands second in manufacturing of biscuits, first being USA. Bakery products are consumed by all age groups. They are gaining popularity as processed foods because of their convenience, ready to eat and good shelf life.

Crackers are a category of crisp baked products, chemically leavened or fermented. Soda crackers, or saltines are a traditional type of fermented cracker, produced from laminated dough.

Snack crackers are prepared by laminating dough with added flavouring and less fermentation time.

The term cracker can be used when the baked product has a cereal base where the proportion should be at least 60% and a low moisture content of 1–5% which is the distinguishing factor. Crackers usually have a higher fat content than other baked products and a longer shelf life. Crackers are used as a base for savoury toppings most commonly cheese and tomato but they may also have enough flavour from tasty coatings to be eaten alone.

Their low moisture content was a desirable feature for better shelf-life as there was no medium for mould growth. This property of low moisture content factor makes the crackers to have a long shelf life making them a very versatile and desirable product.

Types of crackers:

1. Fermented – For example: soda crackers, saltines and cream crackers.
2. Chemically leavened – For example: snack cracker.

As consumer demand strengthens for versatile, healthy ancient grains, sorghum's popularity is seeing resurgence. With its wonderful nutty taste, sorghum is a terrific substitute for traditional grains consumed in everyday diets. Sorghum is an excellent source of energy. The consumer food industry is a growing marketplace for sorghum. With so many healthy benefits packed in every delicious grain, consumers are finding creative ways to use sorghum in recipes for breakfast, lunch, dinner and even snacks.
In this study,crackers are developed by using 70% of sorghum flour and basil leaf powder. Due to the presence of sorghum and basil leaf powder the nutritional content of the product is increased.

Considering this nutritional profile, crackers were improved by using sorghum flour and basil powder. There is significance increase in protein, fibre and iron.

As sorghum is gluten free and it is used in larger amounts, gluten content is reduced and fibre content is also increased by adding basil powder in varying amounts for different proportions.

Different variations based on refined wheat flour and sorghum flour are 50(S):50(RWF), 60(S):40(RWF), 70(S):30(RWF). And basil powder is taken in same amount for all the variations.

Objectives:

The present study was carried out with the following objectives:

- To standardize the formulation for the preparation of product based on sensory and textural characteristics.
- To increase the nutritional value of the product.
- To make traditional food ingredients more appealing and palatable.
- To make the regular snacks healthier.

II. METHODS AND MATERIAL

Materials

Raw materials:

Sorghum, Refined wheat flour, Basil leaves, Active dry yeast, Sugar, Salt, Ammonium bicarbonate

Raw materials procurement:

Sorghum, Refined wheat flour,Active dry yeast(Blue bird), Butter(Amul),Sugar, Salt, Ammonium bicarbonate were procured from the Retail Store in Hyderabad.

Methods

Processing of Raw material:

Sorghum Flour:

Sorghum grains are milled by miller with sieve size-2, in the laboratory at Loyola academy, Hyderabad.

Basil Powder:

Basil leaves(Rama Tulasi) are collected from a rural area of Kukunoorpally village of Siddipet District which comes under Telangana state. The leaves are cleaned thoroughly and dried in vacuum oven (Food technology laboratory at Loyola Academy) where moisture is removed under vacuum without major discolouration and nutrient loss. The dried leaves are powdered using pistle and mortar and sieved.

Vacuum Oven:

The vacuum dryer is an equipment used for drying of the heat sensitive and hygroscopic food materials.

At the pressure of about 0.03 to 0.06 bars vacuum oven is operated generally. At this pressure water boils at 25 -35 degree centigrade.

Principle:

In vacuum dryer material is dried by the principle or applications of vacuum. The water boils at a lower temperature when the pressure is lowered by creating the vacuum, evaporation of water takes place faster.

FORMULATION OF CRACKERS :

Table 1

INGREDIENTS	FORMULATIONS		
	1	2	3
SORGHUM	50	60	70
REFINED WHEAT FLOUR	50	40	30
BASIL POWDER	2	2	2
YEAST	1.5	1.5	1.5
SALT	1	1	1
SUGAR	2	2	2
AMMONIUM BICARBONATE	1	1	1
BUTTER	6.5	6.5	6.5
WATER	40	40	40

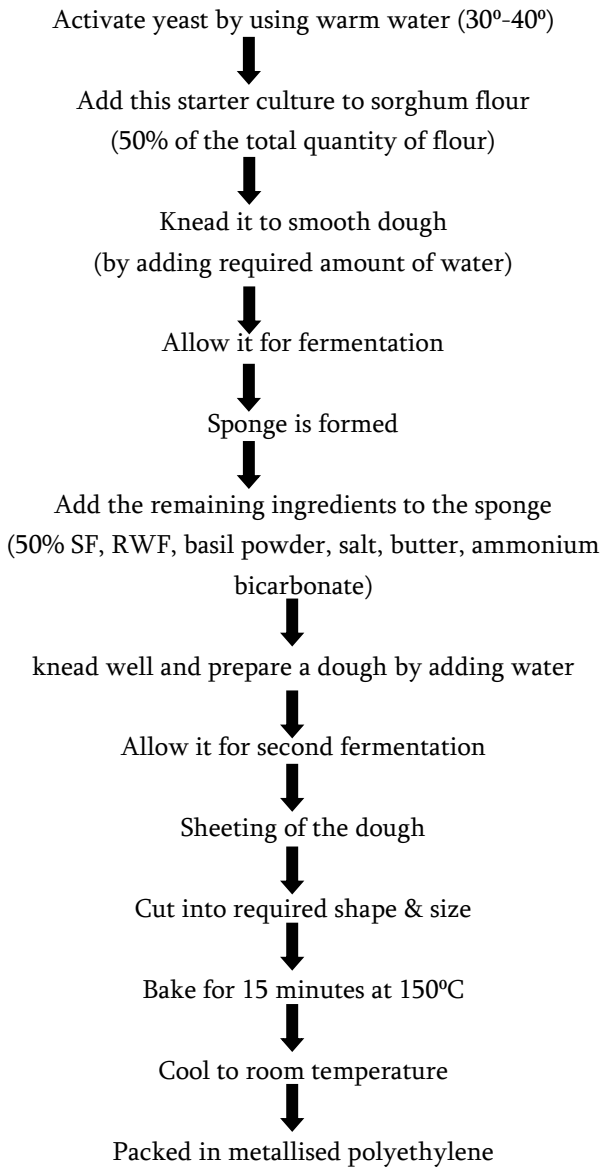
PREPARATION OF CRACKERS:

"Sponge and Dough" method is followed for the preparation of crackers. There are two stages in this method. (i) Preparation of sponge (ii) preparation of dough.

For sponge, Yeast is activated by using warm water and sugar which acts as food for yeast to grow and allow it to rest. Add this starter culture to 50% of sorghum and refined wheat flour and knead it to smooth dough with required water. Keep it aside in warm condition for the fermentation to occur.

For Dough, the sponge is added to the remaining ingredients like sorghum flour, salt, sugar, butter, ammonium bicarbonate, basil powder mixed and formed into dough and allow it for second fermentation. The fermented dough is sheeted to the thickness of about 1mm and cut into circular shape by using a mould, butter is greased and salt is sprinkled on the surface then docking is done. Baked at 150ºc for 10-12 minutes.The baked crackers are cooled to room temperature and packed in metallised polyethylene pouches.

Process flow chart:



III. RESULTS AND DISCUSSION

In contrast to the regular crackers (with RWF) the product is developed by decreasing the quantity of RWF and replacing it with sorghum flour, consisting of high nutritional value compared to other plain crackers.

The nutritional and healthy facts of basil are incorporated, hence enriching the value of the product along with nutritive aspects.

Due to the addition of sorghum and basil, the crackers obtain the fibre aspect. The fat/ butter quantity is also very less compared to regular crackers.

On the whole, the nutritional aspect is increased by developing crackers with sorghum flour and basil leaves powder.

QUALITY ANALYSIS

Results for 1st variant 50 : 50 (S : RWF)

Parameters	Result
Moisture %	3.9
Ash %	1.4
Sugars %	0.10
Carbohydrates %	38.64
Fibre %	0.42
Protein %	4.82
Fat %	10.4



Figure 1

Results for 2nd variant : 60 : 40 (S : RWF)

Parameters	Result
Moisture %	3.7
Ash %	1.6
Sugars %	0.12
Carbohydrates %	42.58
Fibre %	0.51
Protein %	6.23
Fat %	10.6



Figure 2

Results for 3rd variant 70 : 30 (S : RWF)

Parameters	Result
Moisture %	2.5
Ash %	1.2
Sugars %	0.09
Carbohydrates %	58.68
Fibre %	0.92
Protein %	7.25
Fat %	9.4



Figure 3

Carbohydrates:

The carbohydrate in crackers comes from the sucrose or sugar. It also comes from the flour. Average carbohydrate content in regular crackers is 72- 78% but in this variation it is 58% (snack crackers).

Protein:

The crackers developed with sorghum flour contains 7.25% protein (3rd variant) than other two variants ranging from 4-6%.

Fat:

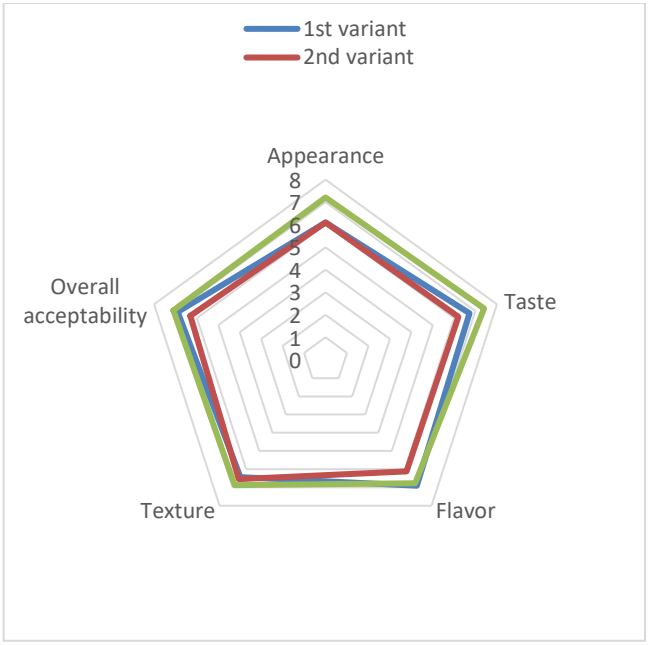
The fat content in the crackers ranges from 9- 10 % in the 3 variants. The fat used also adds to the fat percentage variation. Butter is used in the sorghum crackers.

Ash:

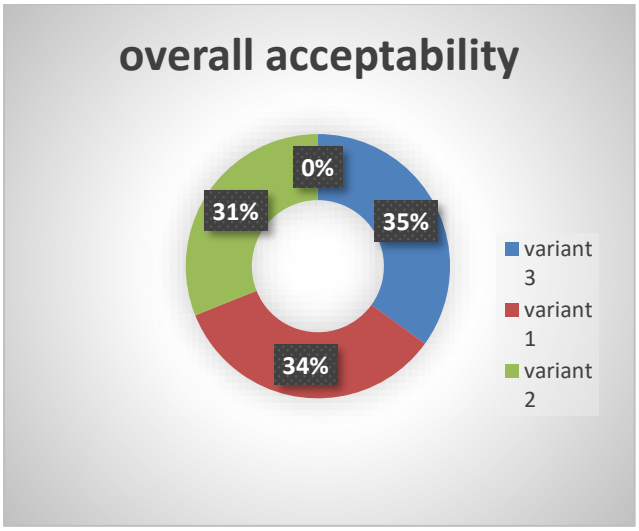
Ash indicates minerals such as mineral content and leavening agents (chemical leavening agents) used. General saltine and snack crackers averaged about 3% ash. Sorghum crackers contain about 1.2 - 1.6% ash content.

Moisture:

Crackers contain less moisture compared to other baked products. Snack crackers are fermented, proofed and baked. During baking maximum amount of moisture is evaporated hence, crackers are light, crunchy with low moisture content. Sorghum crackers contain about 2.5- 3.9 % moisture, which helps to store for long duration. Appropriate and suitable packaging which controls moisture absorption adds to increase in shelf life.



Sensory evaluation representation



Overall acceptability of the product variations.

IV. CONCLUSION

As stated in the objectives, the 3rd variant formulation 70:30 (S:RWF) is standardized based on sensory and nutritional analysis. As sorghum is in higher proportion, its grainy taste is accepted by most of the panel members. Generally sorghum and basil are not consumed because of their taste, which is not acceptable by many consumers, keeping this in mind product is formulated in an appealing way, where

product does not give any off flavour yet providing palatable flavour and nutritious. As a variant with high sorghum is accepted , traditional taste and nutritional profile are achieved making the product healthier.

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Analysis on Wheel Spoke With Aluminum Composite Materials

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ABSTRACT

Automobile parts one of the major important part is a wheel spoke because of all of the automobile parts carried by spokes. Heavy load carrying vehicles having high strength and good fatigue property spoke. In this work new spoke is designed and from five spokes to four spokes and comparing of these spokes by using new 4 aluminum composite materials LM 25, LM25TB7, LM 25TE, LM25TF. Comparing properties of stress and displacement with Magnesium Alloy (AM 60A). Model is developped in Unigraphics and analysis done in cosmos software. Finally absorbing in my project compare to all material what are the material using in this project the aluminum composite material LM25TF was good fatigue life, low stress and high displacement.

Keywords : LM 25, LM25TB7, LM 25TE, LM25TF

I. INTRODUCTION

The wheel is a device that enables efficient movement of an object across a surface where there is a force pressing the object to the surface. Early wheels were simple wooden disks with a hole for the axle. Because of the structure of wood a horizontal slice of a trunk is not suitable, as it does not have the structural strength to support weight without collapsing; rounded pieces of longitudinal boards are required. The spoke wheel was invented more recently, and allowed the construction of lighter and swifter vehicles. Alloy wheels are automobile wheels which are made from an alloy of aluminum or magnesium metals (or sometimes a mixture of both). Alloy wheels differ from normal steel wheels because of their lighter weight, which improves the steering and the speed of the car, however some alloy wheels are heavier than the equivalent size steel wheel. Alloy wheels are also better heat conductors than steel wheels, improving heat dissipation from the brakes, which reduces the chance of brake failure in more demanding driving conditions. Over the years, achieving success in mechanical design has been made possible only after years of experience coupled with rigorous field-testing. Recently the procedures have significantly improved with the emergence of innovative method on experimental and analytical analysis. Alloy wheels intended for normal use on passenger cars have to pass three tests before going into production: the dynamic cornering fatigue test, the dynamic radial fatigue test, and the impact test. Many alloy wheels manufacturing company had done numerous amount of testing of their product but their method on simulation test on alloy wheel information often kept limited.

Wheel Rim Nomenclature

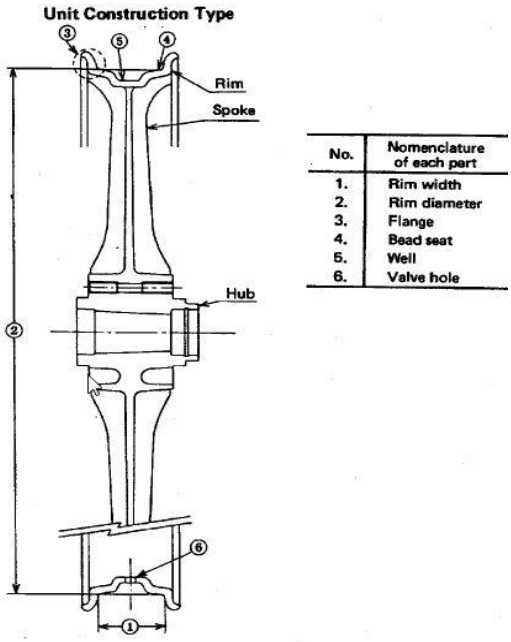


Fig 1. Wheel Rim Nomenclature

Hub: This forms the interface between the hub of the vehicle's drive train and the wheel. This part will have the bolt holes to facilitate in the fastening of the wheel to the vehicle.

Wheel disc or spokes: This is the part of the wheel that transfers all of the loads.

Rim flange or lips: These lips retain the tire and also act as a strength-rib to protect the wheel against impact loads.

Bead seat: The tire bead will rest against this area.

Humps: These humps will ensure that the tire stays against the rim flange in the deflated condition.

Rim well: This area facilitates in the assembling and disassembling of the tire.

The rim of a wheel is the outer circular design of the metal on which the inside edge of the tyre is mounted on vehicles such as automobiles. For example, in a two wheeler the rim is a hoop attached to the outer ends of the spokes-arm of the wheel that holds the tyre and tube.

Better heat conduction can help dissipate heat from the brakes , which improves braking performance in more demanding driving conditions and reduces the chance of brake failure due to overheating.

Wheel rim is the part of automotive where it heavily undergoes both static loads as well as fatigue loads as wheel rim travels different road profile. It develops heavy stresses in rim so we have to find the critical stress point and we have to find for how many number cycle that the wheel rim is going to fail.

Shape of Rim

Typical rim shape vehicles are made up of the following three types.

Drop Center Rim (DC)

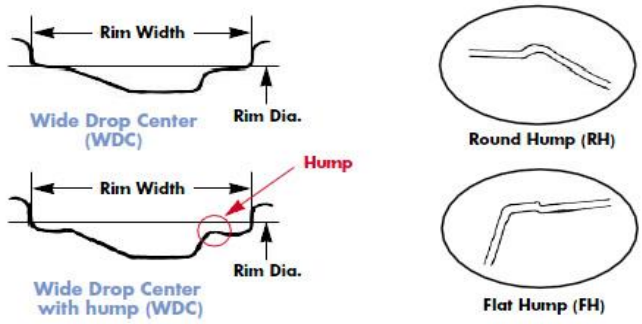
Drop Center Rim (DC Rim) is shaped so there is a well between the bead seat part which is located on both sides of the rim. This well is to make the mounting and dismounting of the tire easy. In most cases there is a taper of 5 degrees in the bead seat area.

Wide Drop Center Rim (WDC)

Wide Drop Center Rim (WDC Rim) is basically the same as DC Rim. To expand the width of the rim, with a shallower well and a lower flange height, this rim is mainly applied to low aspect ratio tires. This design is currently applied to rims for tires of most passenger vehicles.

Wide Drop Center Rim with hump (WDC)

In addition, this design has a bump, which is called a hump, on the beginning of the bead seat area. This hump is to prevent the bead slipping down and air leakage from the rim due to the horizontal force applied to the tire when a vehicle tubeless tires turns at high speed.



Fid 2. Shapes of Wide Drop Center Rim, with Hump

Wheel Material:

Magnesium Alloy

Chemical Composition limits of AM60A [9]

Element	Al	Mn	Si	Zn	Fe	Cu	Ni	Other	Mg
% of material	5.5 to 5.6	0.25	0.10	0.22	0.005	0.010	0.002	0.003	Remaining

Mechanical Properties

- Name : **Magnesium alloy AM60A**
- Yield strength : **130 N/mm²**
- Elastic modulus : **45000 N/mm²**
- Poisson's ratio : **0.35**
- Mass density : **1.8 gm/CC**

Aluminum Alloys

Chemical Composition limits of LM 25 [18]

Element	Si	Mn	Mg	Zn	Fe	Cu	Ni	Other	Al
% of material	6.5 - 7.5	0.3	0.20-0.60	0.22	0.5	0.1	0.45	0.45	remaining

Mechanical Properties

	LM25-M	LM25-TE	LM25-TB7	LM25-TF
Tensile Stress (N/mm2)*	130-150	150-180	160	230-280
Elongation (0%)*	2	1	2.5	2.5
Modulas of Elasticity(GPa)	71	71	71	71
Poisson's ratio	0.33	0.33	0.33	0.33
Density (gm/cc)	2.685	2.685	2.685	2.685

HEAT TREATMENT

- LM25-TE (Precipitation treated) - Heat for 8-12 hours at 155- 175°C and allow to cool in air
- LM25-TB7 (Solution treated and stabilized)-heat for 4-12 hours at 525-545°C and quench in hot water, followed by a stabilizing treatment at 250°C for 2-4 hours.
- LM25-TF (Fully heat treated)- heat for 4-12 hours at 525- 545°C and quench in hot water, followed by a precipitation treatment of 8-12 hours at 155-175°C.

Effects of Alloying Elements[26]

The Aluminum Association's Designations and Chemical Composition Limits for Aluminum Alloys in the Form of Castings and Ingot lists for each alloy 10 specific alloying elements and also has a column for "others". Not all of the listed elements are major alloying ingredients in terms of an alloys intended uses; and some major elements in one alloy are not major elements in another. Also, some elements, like Sr for example, can be very important to microstructure control and mechanical properties but are not specifically identified in the Aluminum Association document and are instead are merely included in the category "others". For purposes of understanding their effects and importance, alloying elements for the majority of alloys are probably best classified as major, minor, microstructure modifiers or impurities; understanding, however, that impurity elements in some alloys might be major elements in others:

- **Major elements** typically include silicon (Si), copper (Cu) and magnesium (Mg)
- **Minor elements** include nickel (Ni) and tin (Sn) -- found largely in alloys that likely would not be used in high integrity die castings.

Major Elements

Silicon: Silicon (Si) is unquestionably the most important single alloying ingredient in the vast majority of aluminum casting alloys. Silicon is primarily responsible for so-called "good castability"; i.e., the ability to readily fill dies and to solidify castings with no hot tearing or hot cracking issues.

Silicon's important role as an alloying ingredient is several-fold:

- Silicon's high heat of fusion contributes immensely to an alloy's "fluidity" or "fluid life".
- The fact that silicon has limited solid solubility (maximum 1.65%) and yet forms a eutectic with aluminum at a significantly high level (12%) means that alloys with more than a few percent silicon undergo a relatively large volume fraction of isothermal solidification, thus they gain significant strength while undergoing little or no thermal contraction - very important to avoiding hot tearing or hot cracking issues.
- The more silicon an alloy contains, the lower is its thermal expansion coefficient.
- Silicon is a very hard phase, thus it contributes significantly to an alloys wear resistance.
- Silicon combines with other elements to improve an alloy's strength and to make alloys heat treatable.
- Silicon can cause a permanent increase in a casting's dimensions (termed "growth") if the part is not thermally stabilized before being put into elevated temperature service.

Copper: Copper (Cu) has the single greatest impact of all alloying elements on the strength and hardness of aluminum casting alloys, both heat-treated and not heat-treated and at both ambient and elevated service temperatures. Copper also improves the machinability of alloys by increasing matrix hardness, making it easier to generate small cutting chips and fine machined finishes.On the downside, copper generally reduces the corrosion resistance of aluminum; and, in certain alloys and tempers, it increases stress corrosion susceptibility.

Aluminum-copper alloys that do not also contain at least moderate amounts of silicon have relatively poor fluidity and resistance to hot tearing during solidification. Although alloys with up to 10% copper were popular in the very early years of the aluminum foundry industry, they have now been replaced by silicon containing alloys, with the exception of the very-high-strength alloy 206 that is described later.

Magnesium: Magnesium's (Mg) role is also to strengthen and harden aluminum castings. As mentioned earlier in this section, silicon combines with magnesium to form the hardening phase, Mg2Si that provides the strengthening and heat treatment basis for the popular 356 family of alloys. Magnesium is also the strengthening ingredient in the high magnesium 5XX alloys that contain very little silicon; those alloys too depend on Mg2Si, but gain additionally from other magnesium-bearing phase.

Minor Elements

Nickel: Nickel (Ni) enhances the elevated temperature service strength and hardness of 2XX alloys. It is employed for the same purpose in some 3XX alloys, but its effectiveness in the silicon-containing alloys is less dramatic.

Tin: Tin (Sn) in 8XX aluminum casting alloys is for the purpose of reducing friction in bearing and bushing applications. The tin phase in those alloys melts at a very low temperature (227.7 C). Tin can exudes under emergency conditions to provide short-term liquid lubrication to rubbing surfaces if such bearings/bushings severely overheat in service. The 8XX series alloys are not generally applicable to die casting or its variations and thus are not shown among the alloys suitable for high integrity die casting.

Tests conducted on Wheel[22]

Wheels are part of a vehicle and as such subjected to a high load. The durability of the wheel is important

for the safe operation of the vehicle. Therefore, it is necessary to examine a wheel for both strength and fatigue resistance.

a. *Endurance Test in Direction of Radius of Rim*
   The tire on the test rim is rotated under high pressure condition on steel drum and the durability of the rim is examined. Sometimes, test is done giving camber angle and adding a side force.
b. *Test of Disc*
   The rim flange is tested by applying a load from an arm mounted to the hub. A bending moment is applied while the rim rotates.
c. *Impact Test*
   The case where the wheel collides with curb of the road or a large obstacle is assumed and the fall impact examination is done.
d. *Others*
   The test for welding between rim and disc and the nut seat tightening etc. are provided in the vehicle test standard. Moreover, nondestructive testing such as X ray and color check, etc. are adopted to the light alloy wheel to detect the defects in the casting process. Bead Unseating Test, provided in the tire safety standards, for a mounted tire and the rim is also applied. In addition tests are carried out in the field with the assembly mounted on a vehicle under various road surfaces.

Limiting period of Wheel

Though we think it is possible to permanently use a wheel until it rusts away there is a limit to a wheels useful life. If a rim is used in severe operations such as racing or rallying hidden damage is caused. This may result in an accident or sudden rim failure whilst damage is caused. This may result in an accident or sudden rim failure whilst the vehicle is in service. The life of a rim is varied according to using conditions. A rim normally lasts longer than a tire so at time of a tire change a rim should be checked for damage or sign of failure. If any are found the rim should be scrapped. In the case of steel wheel, cracks and corrosions by rust at the joint parts of rim and disc, nut seats, between decoration holes of the rim or the flange is bent, you should scrap the rim.

Maintaining rims

Very necessary but often overlooked, it is vitally important to inspect your motorcycle rims and clean them on a regular basis to help prevent spoke failure or corrosion weak points. You can definitely suffer flat tires if a few spokes fail on your motorcycle rims. This can happen under ordinary everyday conditions. The broken spoke pushes into the wheel and punctures the tube. So always keep your wheels clean and check them for signs of corrosion or other damage. It may only take one bad spoke to ruin your ride. The aluminum motorcycle rims are usually coated. Some chemicals used for bike maintenance of other systems (like brake fluid) can damage that coating. Once the bare aluminum on the motorcycle rim is exposed to air it can begin to corrode. Wheels can come under a lot of stress and even small areas of corrosion can become a point of failure.

Rim locks are used on wheels to prevent your tire from slipping around your motorcycle rims. This can occur if you are running your tires at very low pressures. They are quite common when bikers take to riding off road. If your tire turns on the rim it can pull the valve stem through the wheel or tear it off completely leaving you with a flat. They are fairly simple to install but it requires removal of the tires and tubes and this can be more work than the rim lock installation. The rear is the more critical of the motorcycle rims to lock as it is subjected to the forces of driving the bike forward. Install them opposite the valve stem to minimize the affect they will have on wheel balance.

Failure of a Wheel rim
Motorcycle Rim Problems

If we have been in an accident or purchased a bike with unknown history it is possible that your motorcycle wheel could be out of true. The wheel might seem to oscillate laterally (side to side) or appear to move up and down (out of round). Motorcycle rims can be casually inspected by supporting the bike on the centre stand or other stand and spinning them while viewing side on or edgewise. A really bad wobble will be obvious even to someone like us. We can secure a sharp pencil to the fork or swing arm to help measure smaller variations. If the wheel is badly out of true, especially if the cause is from an accident, we may want to let a professional motorcycle rims shop or dealer do the repair. Sometimes the cause is just from lazy spoke maintenance. The wheel can slowly drift out of true over time. This kind of thing can be repaired ourself if we are up to it.

New Tire, new wobble

If you have just had new tires installed and you feel or see a wobble it is more likely that the tire is the cause not bent rims. What can happen when mounting a new tire is the installer fails to get the new tire fully seated on the motorcycle rims. It may be close and because the tire has a tube in it there will be no leak to give it away. What you need to do is this.

- Examine the sidewall of the tire where it meets the rim to see if there is any indication that the tire is not fully seated. This might show up as a slight variation in the measurement between a mould line on the tire and the rims. This is best done on a centre stand if you have one.
- Have the installer correct any problem you find. Sometimes stock rims can be difficult to seat properly (or unseat for that matter).
- Sometimes what the tire installer will do to correct the problem is overinflate the tire to force the tire to seat. I am not suggesting you try this yourself, it can be very dangerous.
- Also make sure the tire is installed correctly, arrow pointing in the direction of travel.

II. INTRODUCTION SOFTWARES

INTRODUCTION OF CAD/CAM

Engineering drawings have been in use for more than 2000 years. However, the use of orthographic projections was formally introduced by the French mathematician Gaspard Monge in the eighteenth century.

Since visual objects transcend languages, engineering drawings have evolved and become popular over the years. While earlier engineering drawings were handmade, studies have shown that engineering designs are quite complicated. A solution to many engineering problems requires a combination of organization, analysis, problem solving principles and a graphical representation of the problem. Objects in engineering are represented by a technical drawing (also called as drafting) that represents designs and specifications of the physical object and data relationships. Since a technical drawing is precise and communicates all information of the object clearly, it has to be precise. This is where CAD comes to the fore. When it was introduced first, CAD was not exactly an economic proposition because the machines at those times were very costly. The increasing computer power in the later part of the twentieth century, with the arrival of minicomputer and subsequently the microprocessor, has allowed engineers to use CAD files that are an accurate representation of the dimensions / properties of the object.

UNIGRAPHICS

NX is one of the world's most advanced and tightly integrated CAD/CAM/CAE product development solutions. Spanning the entire range of product

development, NX delivers immense value to enterprises of all sizes. It simplifies complex product designs, thus speeding up the process of introducing products to the market.

The NX software integrates knowledge based principles, industrial design, geometric modeling, advanced analysis, graphic simulation, and concurrent engineering. The software has powerful hybrid modeling capabilities by integrating constraint based feature modeling and explicit geometric modeling. In addition to modeling standard geometry parts, it allows the user to design complex free form shapes such as airfoils and manifolds. It also merges solid and surface modeling techniques into one powerful tool set.

NX design tools are superior in power, versatility and productivity. You can work faster and more efficiently in the full range of design tasks, from 2D layout through 3D modeling, assembly design, drafting and documentation. Work Seamlessly with Data from Other CAD Systems · With synchronous technology, NX allows you to directly use models created with other CAD systems. You can import and modify CAD geometry from any source with speed, ease and efficiency. NX is the solution of choice for multi-CAD, collaborative design.

III. MODELING OF ALLOY WHEEL

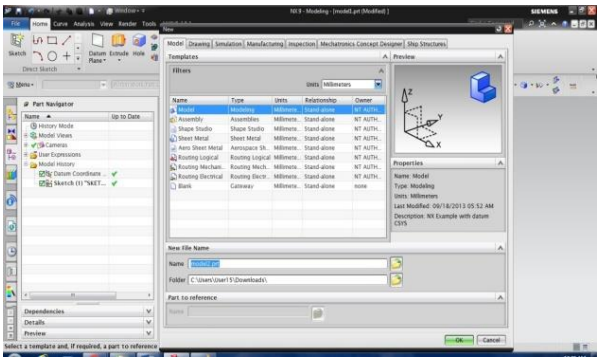
Entering In to Modelling :

Steps to be considered for Modelling of Alloy wheel :

- Selection of Datum Plane
- Selection of Curves
- Procedure of Revolve
- Extruding procedure
- Combing of features in to a single entity
- Procedure of hole
- Blend Process
- Drafting

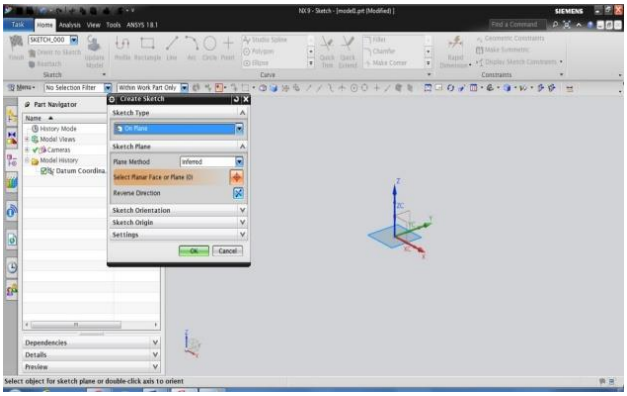
First Start up procedure of Unigraphics

- To start Unigraphics, Go to Windows Button and select the nx9.0 icon.
- Then the User Window will open.
- Select the model filter to draw the 3d model.



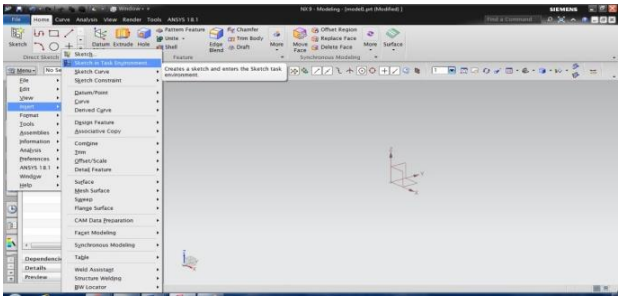
Selection of datum plane

- After entering into the model.
- Select the datum plane from draw group with respective datum co ordinate system



Sketch Environment:

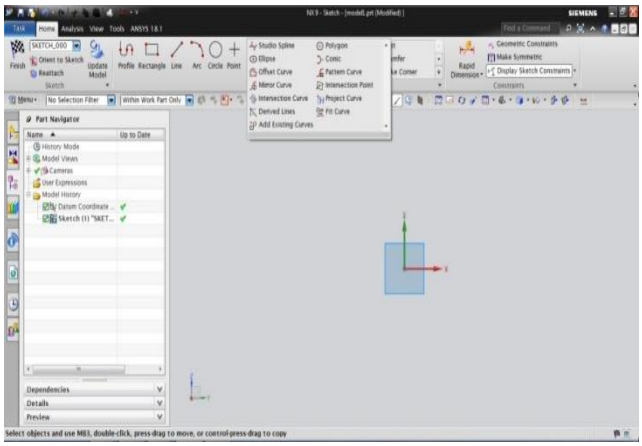
- To Draw a Sketch, we need to select the environment.



- By selecting the environment we will enter into the drawing plane which was in 2d

Selection of Curves:

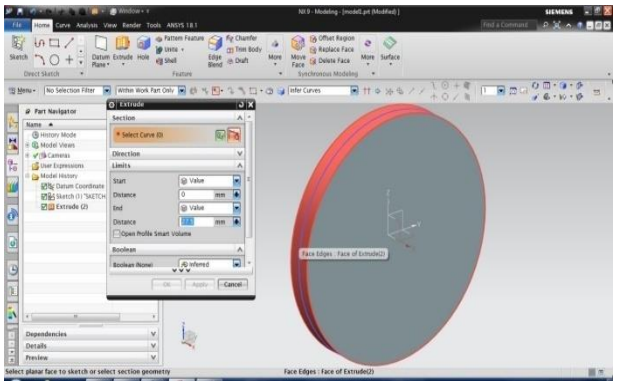
- To draw a curve, select the required curve from the draw group.



- Draw a circle and fully constrained it with the help of Geometrical and dimensional Constraints .

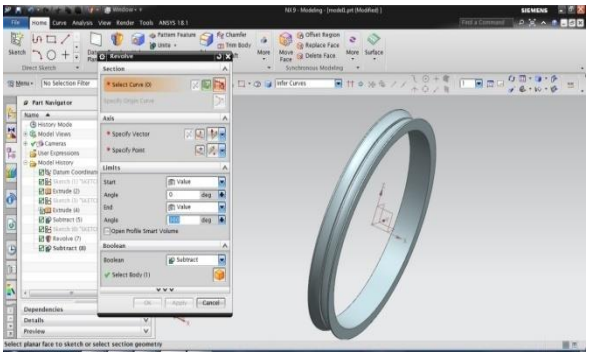
EXTRUDE Process :

- To Extrude a Sketch we need to select the sketch.
- Then Click on the Extrude Command
- New Window will appears
- It will contain some required processes we have to fill the requirements.
- Make sure the direction is in our required position.



Revolve Process:

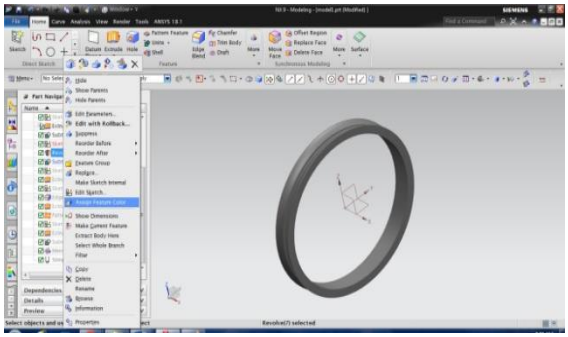
- After Extrusion process. We have to draw a revolving feature which supports the tire.
- To that process we have to draw a sketch.
- For revolving a Sketch we need to set the vector and plane direction.



- While Revolving the feature dimensions need to be checked clearly

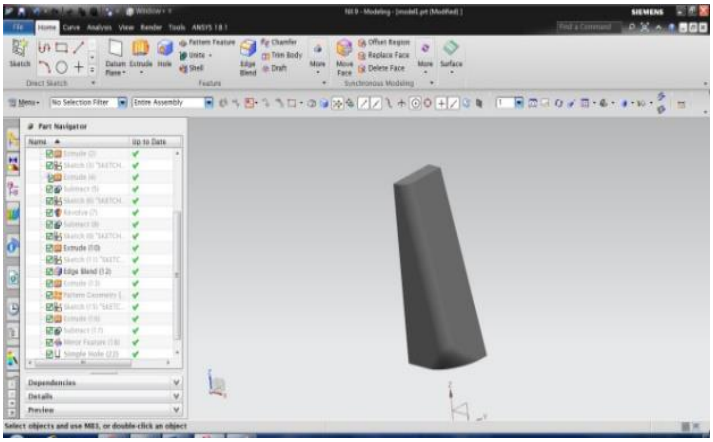
Color Assigning:

- For my better Appearance I used black color. Changing procedure is



- Select the feature and go to menu > insert > assign color
- Select the required color.

Sketching Alloy Spoke :



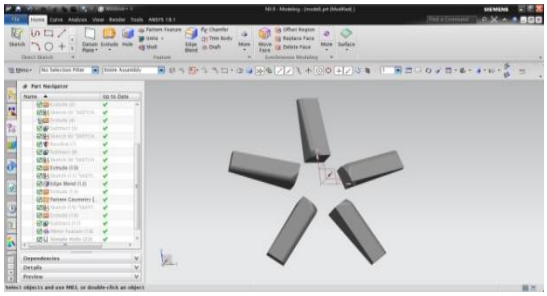
- For Alloy Spoke we have to use extra command
- Blend Command is used for spoke
- Procedure: Draw sketch with dimensionally

Extrude the sketch
Apply blend on edges
Variational blends are used in this spoke

Pattern Geometry :

- Pattern Geometry is used to place the copied features in a circular manner.
- Procedure: Select the feature

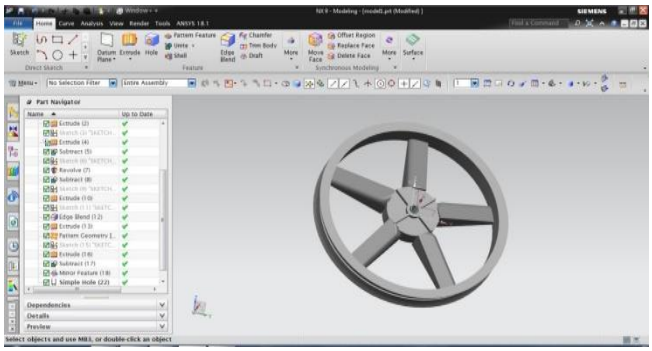
Go to > Insert > Associate copy>pattern geometry
Axis has to be selected
Number of entities
Angle of entities has to be mentioned



Combining of Features:

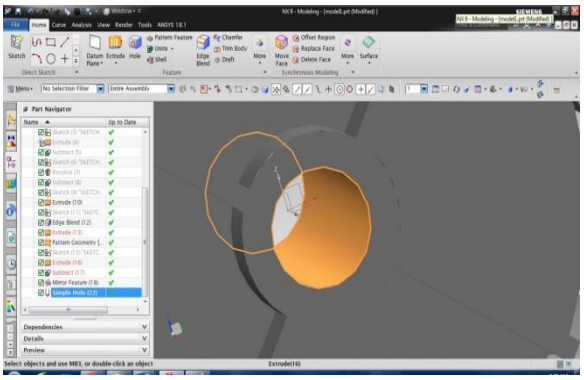
- For Combining, We use Unite Command.
- Procedure :

  Go to > Modify Command > Unite
  Select the target body
  Select the base body
  Both the features will combine.

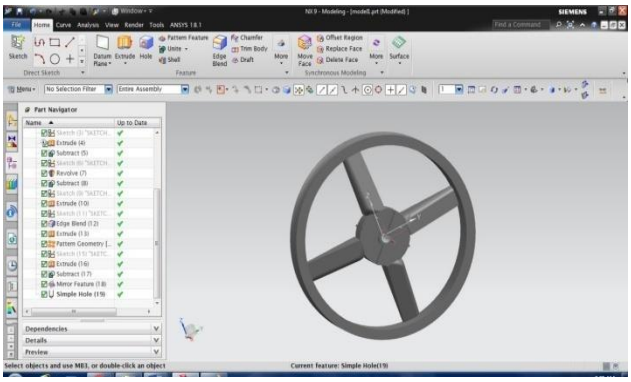


Procedure for hole :

- Select the face of the entity
- Select the center of the circular object
- Go to > Operations group > hole
- Select the type of hole
- Place the dimensions
- Diameter and depth should be given

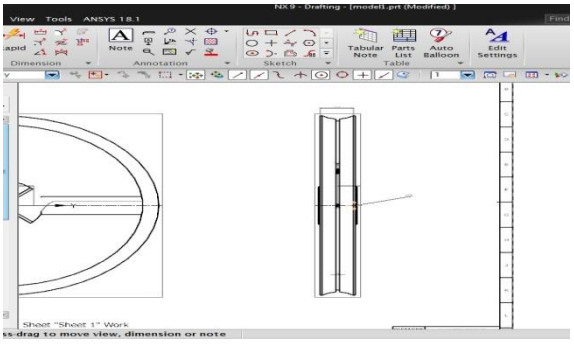


Same procedure for 4 wheel alloy also



Drafting :

The Drafting Model is a part of a complex information model describing product definition data, their applications and their representations. The definition of the information model is a central component of the development of STEP, a future international standard for the exchange of product defamation data. Here the Drafting Model particularly encloses descriptions for the representations of organizational drawing data, tolerances, dimensions and surface attributes such as surface finish symbols (a survey of the whole content is shown in the figure above).



Introduction to COSMOS

Using the COSMOS Program

Cosmos is a feature-rich control and configuration software for the Avitech line of products. It uses a GUI (graphical user interface) for configuring and editing complex Multiviewer systems. Preset configurations can be created, edited, are called. Cosmos is designed to interface with third-party hardware such a routing switchers, production switchers, and Tally management systems allowing for dynamic label changes and Tally indicators on the display. The program contains a built-in alarm and fault reporting. When Cosmos is combined with the AviNet SNMP option the result is an extremely power control solution. Cosmos will run on virtually any computer, running the windows operating system.

SolidWorks Simulation Xpress is design analysis software that is fully integrated in SolidWorks.
SolidWorks Simulation Xpress simulates the testing of your part's prototype in its working environment. It can help you answer questions like: how safe, efficient, and economical is your design.

SolidWorks Simulation Xpress is used by students, designers, analysts, engineers, and other professionals to produce safe, efficient, and economical designs.

Feature

- Add modules or groups while the system is online.
- Assign audio monitoring on any source.
- Change any window to full screen view with a single click of a but
- Configure Avitech's GPI interface. Control third-party routers, integration with multiple third-party router control systems.
- Create analog or digital clocks with ability to countdown/count up timer.
- Customize labels, borders, background colors, and fonts (color and
- Make changes to the entire border or for each individual window.

System requirements for COSMOS

The following are the system requirements to ensure smooth running of COSMOS SOFTWARE.

System unit: An inlet® core™ i3-2600 CPU @ 3.40GHz based workstation running Microsoft 2009 corporation windows7 ultimate or home basic professional edition.
Memory: 12.0 GB of RAM is minimum recommended for all application.
Disk drive: 100 GB disk drive space (minimum recommended size)
Internal /external drives: A CD-ROM drive is required for program installation.
Display: A graphic colour display compatible with the selected platform – specific graphic adapter. The minimum recommended monitors size 17 inches. Graphics adapter: A graphics adapter with a 3D OpenGL accelerator is required with minimum resolution of 1024× 768 for Microsoft windows workstations and 1280×1024 for UNIX workstations.

Description of Commands used in COSMOS[30]

Using the Interface

Starting a Program

1 Click the Start button in the lower left corner of the window. The Start menu appears. The Start menu allows you to select the basic functions of the Microsoft Windows environment.
2 From the Start menu, click Programs, SolidWorks, SolidWorks as shown below.
The SolidWorks application program is now running.

Exit the Program

To exit the application program, click File, Exit or click on the main SolidWorks window.

SolidWorks Windows

SolidWorks windows have two panels. One panel provides non-graphic data. The other panel provides graphic representation of the part, assembly, or drawing. The leftmost panel of the window contains the FeatureManager® design tree, PropertyManager and ConfigurationManager.

1. Click each of the tabs at the top of the left panel and see how the contents of the window changes. The rightmost panel is the Graphics Area, where you create and manipulate the part, assembly, or drawing.
2. Look at the Graphics Area. See how the alloy wheel is represented. It appears shaded, in color and in an isometric view. These are some of the ways in which the model can be represented very realistically.

Toolbars

Toolbar buttons are shortcuts for frequently used commands. You can set toolbar placement and visibility based on the document type (part, assembly, or drawing). SolidWorks remembers which toolbars to display and where to display them for each document type.

1. Click View, Toolbars.

A list of all toolbars displays. The toolbars with their icon depressed or a check mark beside them are visible; the toolbars whose icons are not depressed or without a check mark are hidden.

2. Turn several toolbars on and off to see the commands.

Mouse Buttons

Mouse buttons operate in the following ways:

Left – Selects menu items, entities in the graphics area, and objects in the FeatureManager design tree.

Right – Displays the context-sensitive shortcut menus.

Middle – Rotates, pans, and zooms the view of a part or an assembly, and pans in a drawing.

Stress Analysis:

SolidWorks Simulation Xpress offers an easy-to-use first pass stress analysis tool for SolidWorks users. SolidWorks Simulation Xpress can help you reduce cost and time-to market by testing your designs on the computer instead of expensive and time-consuming field tests. SolidWorks Simulation Xpress uses the same design analysis technology that SolidWorks Simulation users to perform stress analysis. The wizard interface of SolidWorks Simulation Xpress guides you through a five step process to specify material, restraints, loads, run the analysis, and view the results.

Study on Static Stress Analysis

To create a static study, click the Simulation tab in the upper-left. There should be a button labeled “Study Advisor.” Click the arrow just beneath it and choose “New Study,” as in Figure. Here you can see all the types of studies available in Simulation. Click “Static,” name the study something memorable, and click the green check mark.

Apply the material, as from the material library given. To set up the fixtures on the model, either right-click “Fixtures” in the static study pane or click the arrow beneath “Fixtures Advisor” in the Simulation tab. Choose “Fixed Geometry” as the fixture type for this study.

With the pressures and fixtures specified, we can run a finite element analysis now! SolidWorks needs to break the model into small triangular units, which together are called a *mesh*. Smaller meshes (as in meshes with smaller individual units) produce more precise results but require additional computing time. Large meshes run quickly but may produce wildly inaccurate results, especially around sharp edges. It is common to use a mesh with varying element sizes: smaller units around the areas of interest in a model, such as potential failure points, and larger units where precise results are less valuable.

In the static study pane, right-click "Mesh" and choose "Create Mesh." Accept the default mesh size and check OK. This will create a uniformly sized mesh over your entire model, which should look something like Figure shown. If you ever need a non-uniform mesh, you can do so by right-clicking "Mesh" and choosing "Apply Mesh Control" instead.

Begin the static study by clicking "Run" in the Simulation tab. You will see that even this simple problem consumes significant memory and time. If all goes well, a folder named "Results" will appear in the static study pane. Right-click the folder and choose "Define Stress Plot," then accept the default settings that appear.

Create a new result plot to show displacement. Right-click "Results" again and choose "Define Displacement Plot." In the settings pane that appears, set "Deformed Shape" to True Scale and check OK. By default the displacement is measured in URES ("resultant displacement"—U is commonly used to abbreviate displacement), which is a simple measure of displacement magnitude. Measuring displacement along the X, Y, or Z axes is also an option here, though we will stick with URES, like in Figure.

Fatigue Analysis

During design validation, a structure is exposed to both static strength tests and fatigue tests. However, once a structure is deployed, it spends the vast majority of its lifetime being subjected to smaller repeated forces that can cause cumulative damage over time. For this reason, testing the durability of a structure makes up a larger proportion of the tests that are run. Durability is one of the most important attributes that structures can posses.

Fatigue testing measures durability and is defined as the repeated mechanical loading of a structure to determine failure points. It requires complex analysis using the field of fracture mechanics, which is the analysis of material flaws to discover those that are safe and those that are liable to propagate as cracks and cause failure.

To create a fatigue study, click the Simulation tab in the bottom-left. There should be a Pop-up menu labeled as "New simulation study." Click on it and choose "Fatigue" as in Figure. Here you can see all the types of studies available in Simulation. Name the study something memorable, and click the green check mark.

Add an event as constant amplitude for a required number of cycles, with zero based condition. Then define S-N curve for the applied material, as log-log graph. The Stress-Life (S-N) or Total Fatigue Life method is widely used for HCF applications. During HCF testing, a material spends the majority of life in a state where the cracks are very small, the growth is controlled, and the structure integrity is retained. As noted earlier, the applied stress stays within the elastic range of the material. Total Life is determined by running multiple specimen tests at a number of different stresses. The objective is to identify the highest stress that produces a fatigue life beyond 10 million cycles. This stress is also known as the material's endurance limit.

Begin the fatigue study by clicking "Run" in the Simulation tab. You will see that even this simple problem consumes significant memory and time. If all goes well, a folder named "Results" will appear in the fatigue study pane. Right-click the folder and choose "Define life Plot," then accept the default settings that appear.

Solid-works Simulation

Types of analysis: Static Analysis and Fatigue Analysis.

Material Properties:

Name : Aluminum alloy LM 25 Magnesium alloy AM60A

Yield strength : 235 N/mm² 130 N/mm²
Elastic modulus : 71000 N/mm² 45000 N/mm²
Poisson's ratio : 0.33 0.35
Mass density : 2.685gm/CC 1.8 gm/CC

Applied Loads

Load1 : weight of Bike (168 kg)
Load2 : (168+50) kg
Load3 : (168+100) kg
Load4 : (168+150) kg

Analysis for strength needed[28]

Mass of Bike, Dead Weight of Bike =148 Kg
Other Loads= 20 Kg
Total Gross Weight= 148 + 20 = 168 Kg
168 * 9.81 = 1648.08 N
Tires and Suspension system reduced by 30% of Loads
W_{net} = 1648.08 * 0.7 = 1153.656 N
Reaction Forces On Bike= F_T = 1153.656 N
Number of Wheels: 2
Reaction Force on Each Wheel F_T =576.828 N
Number of spokes, N = 5
Stress on the each Rim = $\frac{F_T}{Area}$ = 0.011945 N/mm²
Area of rim at stressed parts = 48287.08 mm²
Stress on the each rim for load1= 0.011945 N/mm²

For Different Loads Stress on Each Rim are:

With Load2 on Bike (168+50)Kgs
Total Gross Weight = 218 * 9.81 = 2138.58 N
Tires and Suspension system reduced by 30% of Loads
W_{net} = 2138.58 * 0.7 = 1498.006 N
Reaction Forces On Bike: F_T = 1498.006 N
Number of Wheels= 2
Reaction Force on Each Wheel F_T =748.503 N
Number of spokes, N = 5
Stress on the each Rim = $\frac{F_T}{Area}$ = 0.015501 N/mm²
Area of rim at stressed parts = 48287.08 mm²

Stress on the each rim for load2= 0.015501 N/mm²

With Load3 on Bike (168+100)Kg
Total Gross Weight = 268 * 9.81 = 2629.08 N
Tires and Suspension system reduced by 30% of Loads
W_{net} = 2629.08 * 0.7 = 1840.356 N
Reaction Forces On Bike: F_T = 1840.356 N
Number of Wheels= 2
Reaction Force on Each Wheel F_T = 920.178 N
Number of spokes, N = 5
Stress on the each Rim = $\frac{F_T}{Area}$ = 0.019050 N/mm²
Area of rim at stressed parts = 48287.08 mm²
Stress on the each rim for load3 = 0.019050 N/mm²
Similarly Load4 Stresses induced on each Rim is
Stress on the rim for load4= 0.022611 N/mm²

Importing of Alloy Wheel

Steps to be followed for importing the model from Unigraphics

1. Open the Unigraphics in the computer, select the Unigraphics model which has to be import into the COSMOS.
2. Select File-> save a copy->select type as *.igs as shown in figure.
3. Name the file something memorable, and click the ok check mark.
4. Export the model into solid and shells, click on ok.
5. Then the Unigraphics part is saved in the *.igs format, which can be opened in the solid works for simulation.

Analysis is carried out in COSMOS

Step 1: Creating a Static Study

The first step in performing analysis is to create a study.

1. Click Simulation, Study in the main SolidWorks menu on the top of the screen. The Study Property Manager appears.

2 Under Name, type Alloy wheel.

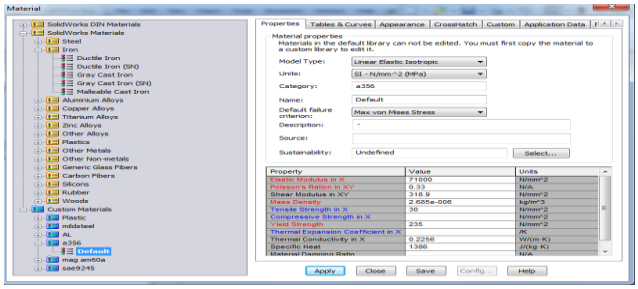
3 Under Type, select Static.

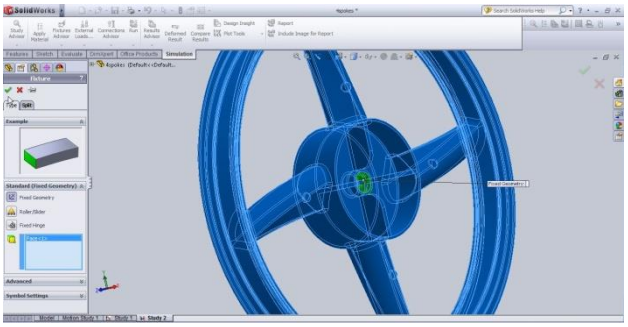
4 Click .

Step 2: Assigning Material

Assign Alloy of aluminium

Ilustrates how to Assign the Material





1. In the SolidWorks Simulation Manager tree, right-click the Alloy wheel folder and click Apply Material to All Bodies. The Material dialog box appears.
2. Do the following:
   a) Expand the SolidWorks Materials library folder.
   b) Expand the Steel category.
   c) Select Alloy of Aluminium required.

3 Click on Apply and Close.

Step 3: Applying Fixtures

You apply fixtures to prevent the out of plane rotations and free body motions.

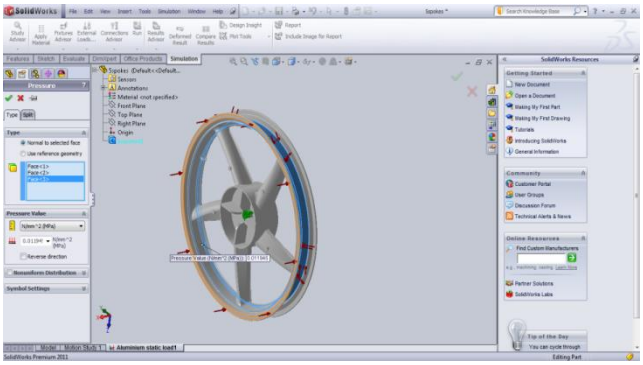
1. Press spacebar and select Trimetric in the Orientation menu. The model orientation is as shown in the figure.
2. In the Simulation study tree, right-click the Fixtures folder and click Fixed goemetry. The Fixture PropertyManager appears. click the green check mark. The fixtures are applied and their symbols appear on the selected edges.

Step 4: Applying Pressure

Apply, 0.011945MPa pressure normal to the faces as shown in the figure.

1. In the SolidWorks Simulation Manager tree, right-click the External Loads folder and click Pressure. The Pressure PropertyManager appears.
2. Under Type, select Normal to selected face.
3. In the graphics area, select the faces as shown in the figure. Face<1> through Face<3> appear in the Faces for Pressure list box.
4. Make sure that Units is set to N/mm^2 (MPa).
5. In the Pressure value box , type 0.011945.
6. Click the green check mark.

SolidWorks Simulation applies the normal pressure to the selected faces and Pressure-1 icon appears in the External Loads folder.

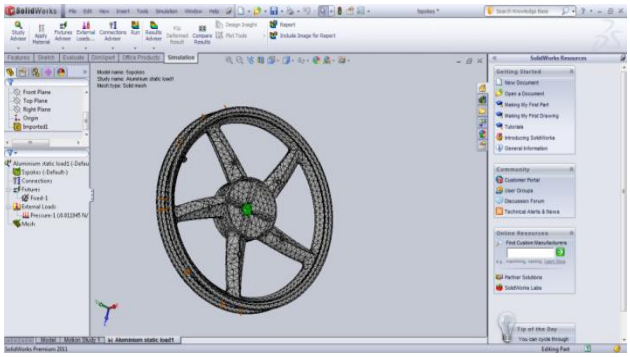


Ilustrates how to Assign the Pressure

Step 5: Meshing the Model and Running the Study

Meshing divides your model into smaller pieces called elements. Based on the geometrical dimensions of the model SolidWorks Simulation suggests a default element size which can be changed as needed.

1. In the SolidWorks Simulation Manager tree, right-click the Mesh icon and select Create Mesh. The Mesh Property Manager appears.
2. Expand Mesh Parameters by selecting the check box. Make sure that standard based mesh is selected.
3. Check Run (solve) the analysis under Options and click.



Ilustrates how to Meshing the Part model

Step 6: Creating a Fatigue Study

The next step in performing analysis is to create a fatigue study.

1. Click on Alloy wheel option on bottom-left, a pop-up menu will generate, choose New Simulation Study in the SolidWorks menu on the screen. The Study PropertyManager appears.
2. Under Name, type Alloy wheel fatigue.
3. Under Type, select Fatigue.
4. Click the green check mark.

Step 7: Assigning Event

1. In the SolidWorks Simulation Manager tree, right-click the Loading icon and select Add Event option. The Add Event PropertyManager appears.
2. Apply load, as per required number of cycles, with option zero based condition as shown in the figure.
3. Define the S-N Curve, as user defined that exists in the library.

Step 8: Run the Fatigue Study

1. In the SolidWorks Simulation Manager tree, right-click the Alloy wheel fatigue icon and select Run (or)
2. Begin the fatigue study by clicking "Run" in the Simulation tab. You will see that even this simple problem consumes significant memory and time. If all goes well, a folder named "Results" will appear in the fatigue study pane.

IV. RESULTS

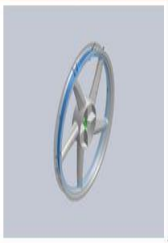
Static and Fatigue analysis for 5-spokes Aluminium alloy wheel

Material Properties

Model Reference	Properties		Components
	Name:	Aluminium Alloy wheel	SolidBody 1(Imported1)(5spokes)
	Model type:	Linear Elastic Isotropic	
	Default failure criterion:	Max von Mises Stress	
	Yield strength:	2.35e+008 N/m^2	
	Tensile strength:	3e+007 N/m^2	
	Elastic modulus:	7.1e+010 N/m^2	
	Poisson's ratio:	0.33	
	Mass density:	2.685e-006 kg/m^3	
	Shear modulus:	3.189e+008 N/m^2	

Loads and Fixtures

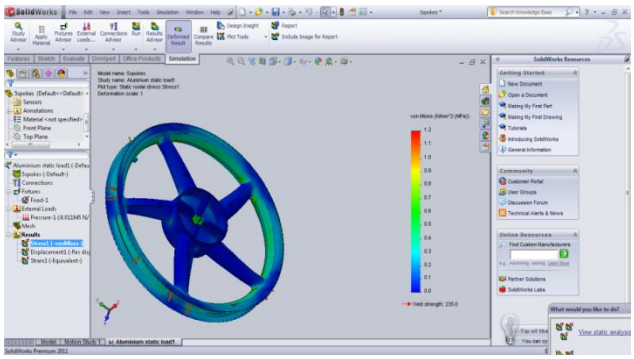
Fixture name	Fixture Image	Fixture Details
Fixed-1		Entities: 1 face(s) Type: Fixed Geometry

Load name	Load Image	Load Details
Pressure-1		Entities: 3 face(s) Type: Normal to selected face Value: 0.011945 Units: N/mm^2 (MPa)

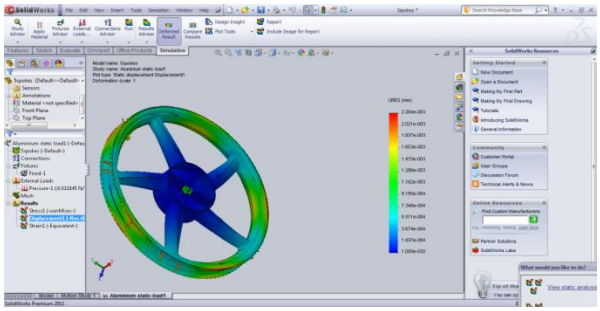
Mesh report

Mesh information for Aluminium Alloy wheel-5 spokes

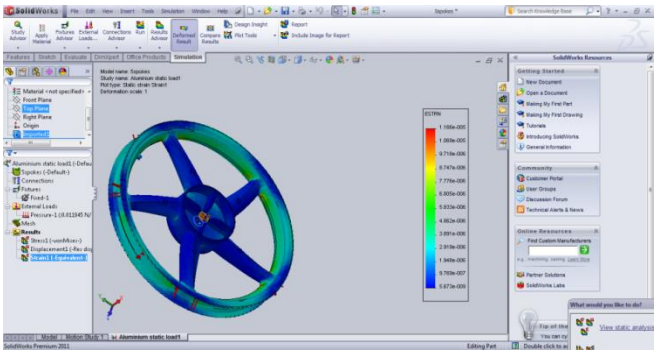
Total Nodes	41528
Total Elements	21498



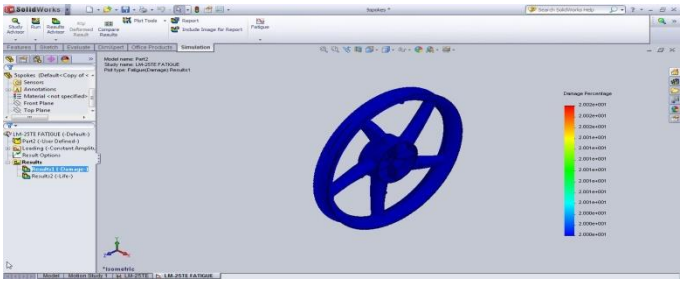
Stress results for 5-spokes Aluminium alloy wheel



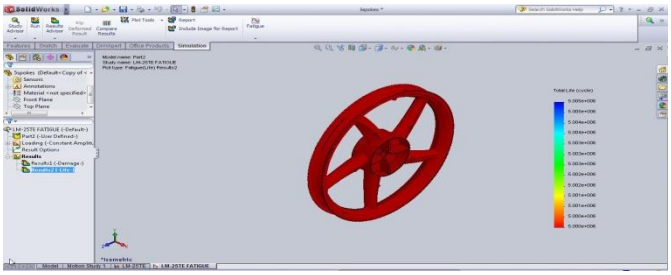
Displacement results for 5-spokes Aluminium Alloy Wheel



Strain result for 5-spokesAluminium Alloy Wheel



Damage percentage result for 5-spokes Aluminium Alloy wheel



Total Life (cycle) result for 5-spokes Aluminium Alloy wheel

Fig Shows the max stress 0.000968639 N/mm^2 and mini stress 2.35433N/mm^2 that are induced in 5-Spokes Aluminum Alloy(LM 25 TF).

Fig 5.2, Shows the max displacement 0.00417283 mm and mini displacement 0 mm that are induced in 5-Spokes Aluminum Alloy(LM 25 TF).

Fig 5.3, Shows the mini strain 1.07886e-008 and max strain 2.20737e-005 that are induced in 5-Spokes Aluminum Alloy(LM 25 TF).

Fig Shows the max fatigue life and mini fatigue 1e+007 cycle that are induced in 5-Spokes Aluminum Alloy(LM 25 TF).

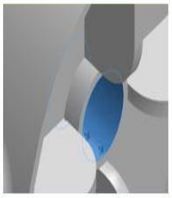
Shows the max damage and mini damage % is 10 that are induced in 5-Spokes Aluminum Alloy(LM 25 TF).

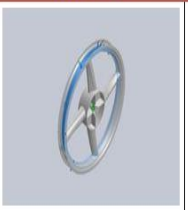
Static and Fatigue analysis for 4-spokes Magnesium alloy wheel

Material Properties

Model Reference	Properties		Components
	Name:	Magnesium aloy wheel	SolidBody 1(Imported1)(4spokes)
	Model type:	Linear Elastic Isotropic	
	Default failure criterion:	Max von Mises Stress	
	Yield strength:	1.3e+008 N/m^2	
	Tensile strength:	3e+007 N/m^2	
	Elastic modulus:	4.5e+010 N/m^2	
	Poisson's ratio:	0.35	
	Mass density:	1.8e-006 kg/m^3	
	Shear modulus:	3.189e+008 N/m^2	

Loads and Fixtures

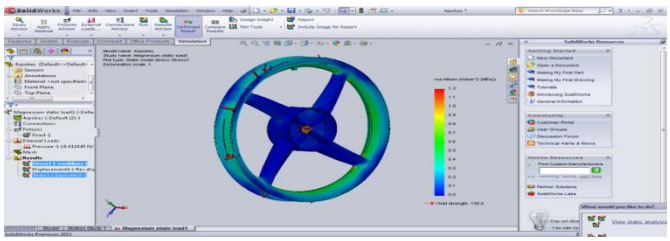
Fixture name	Fixture Image	Fixture Details
Fixed-1		Entities: 1 face(s) Type: Fixed Geometry

Load name	Load Image	Load Details
Pressure-1		Entities: 3 face(s) Type: Normal to selected face Value: 0.011945 Units: N/mm^2 (MPa)

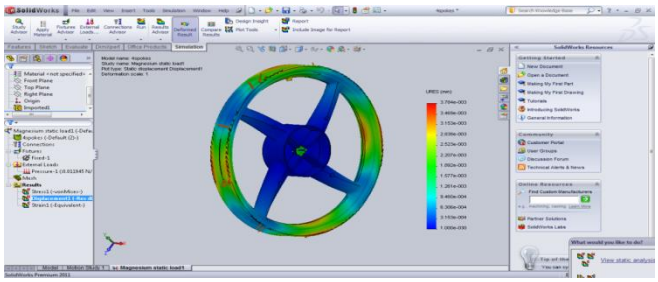
Mesh report

Mesh information for Magnesium Alloy wheel 4-spokes

Total Nodes	39450
Total Elements	20063

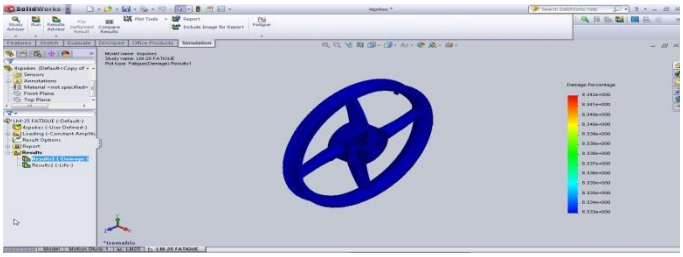


Stress results for 4-spokes Magnesium Alloy Wheel

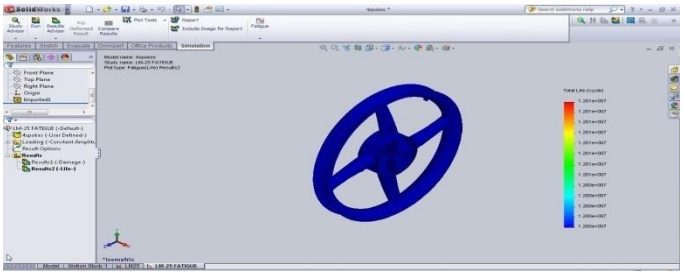


Displacement results for 4-spokes Magnesium Alloy Wheel

Strain results for 4-spokes Magnesium Alloy Wheel



Damage percentage results for 4-spokes Magnesium Alloy Wheel



Total Life(cycles) results for 4-spokes Magnesium Alloy Wheel

Fig Shows the max stress 0.000775803 N/mm^2 and mini stress 2.23756 N/mm^2 that are induced in 4-Spokes Magnesium Alloy(AM 60A).

Fig Shows the max displacement 0.00714043 mm and mini displacement 0 mm that are induced in 4-Spokes Magnesium Alloy(AM 60A).

Fig Shows the max strain 3.5419e-005 and mini strain 1.40248e-008 that are

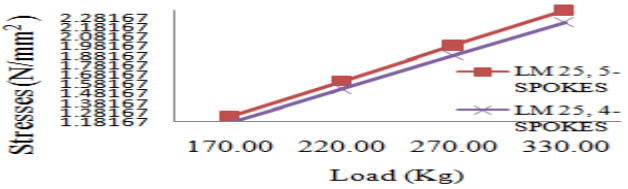
induced in 4-Spokes Magnesium Alloy(AM 60A).

Fig 5.9, Shows the max fatigue life and mini fatigue 1e+008 cycle that are induced in 4-

Spokes Magnesium Alloy(AM 60A).

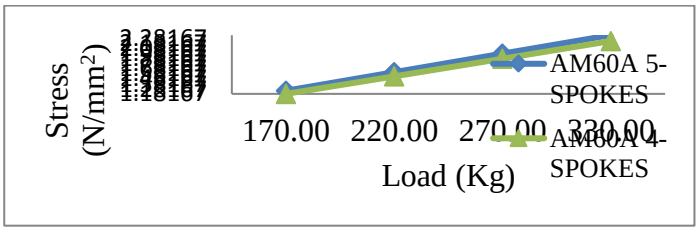
Fig 5.10, Shows the max damage and mini damage % is 1 that are induced in 4-Spokes

Magnesium Alloy(AM 60A).



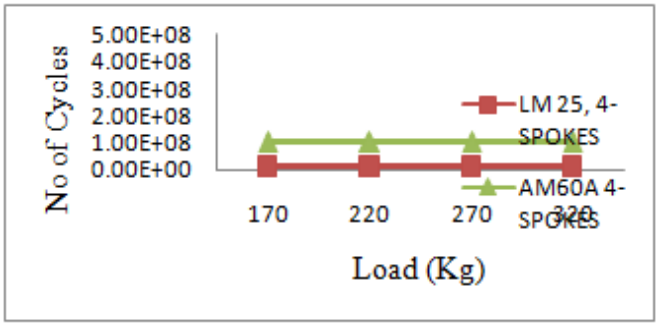
Stress Comparsion between 5-Spokes and 4-Spokes alloy wheel of Aluminum Alloy (LM 25).

Fig indicates Stresses induced in the 4-Spokes alloy wheel as less as compared with the Stress induced in the 5-Spokes alloy wheel, for the same Aluminum Alloy material (LM 25TF- U.K Standards) by 0.05%.

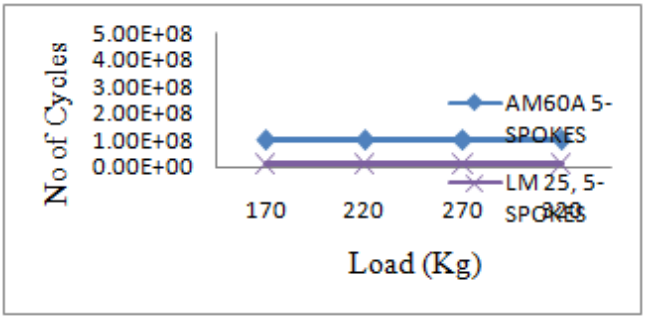


Stress Comparsion between 5-Spokes and 4-Spokes alloy wheel of Magnesium material (AM 60A).

Figure indicates that, Stresses induced in the 4-Spokes alloy wheel as less as compared with the Stress induced in the 5-Spokes alloy wheel, for Magnesium Alloy (AM 60A – ASTM Standards) by 0.05%.



Illustrates, the Fatigue Life Cycle of 4-Spokes alloy wheel of Magnesium and Aluminum material.



Illustrates, the Fatigue Life Cycle of 5-Spokes alloy wheel of Magnesium and Aluminum material.

The above two graphs indicates that, Fatigue life cycle of Magnesium alloy wheel is more as compared with the Fatigue life cycle of Aluminum alloy wheel. Due to High Strength of Mg-Alloy, Fatigue life is more compared with all Al-Alloys.

VALIDATION

Stress analysis values for 5-Spokes Mg-alloy and Al-alloys (LM 25, LM 25TB7, LM 25TE, LM 25TF).

5-Spokes	Aluminum Alloys				Magnesium alloy (AM60A)
	LM 25	LM 25TB7	LM 25TE	LM 25TF	
LOAD1	1.23366	1.23324	1.23282	1.23250	1.24426
LOAD2	1.60394	1.60349	1.60290	1.60234	1.61467
LOAD3	1.97349	1.97290	1.97236	1.97177	1.98441
LOAD4	2.34366	2.34296	2.34238	2.34163	2.35595

The Stresses induced in the 5-Spokes Aluminum Alloy wheel (LM 25TF) 2.34163MPa is less as compared with the Stresses induced in the 5-Spokes Magnesium alloy (AM60A), Al-alloys (LM 25, LM 25TB7, LM25TE) wheels.

Table 5.2: Stress analysis values for 4-Spokes Mg-alloy and Al-alloys(LM 25, LM 25TB7, LM 25TE, LM 25TF).

4-Spokes	Aluminum Alloys				Magnesium alloy (AM60A)
	LM 25	LM 25TB7	LM 25TE	LM 25TF	
LOAD1	1.16996	1.16961	1.16923	1.16881	1.18167
LOAD2	1.52037	1.51989	1.51938	1.51887	1.53389
LOAD3	1.87069	1.87016	1.86966	1.86912	1.88506
LOAD4	2.22184	2.22134	2.22802	2.22029	2.23756

The Stresses induced in the 5-Spokes Aluminum Alloy wheel (LM 25TF) 2.22029 MPa is less as compared with the Stresses induced in the 5-Spokes Magnesium alloy (AM60A), Al-alloys (LM 25, LM 25TB7, LM25TE) wheels.

Table 5.3: Fatigue Life values for 5-Spokes and 4-Spokes Mg-alloy and Al-alloys(LM 25, LM 25TB7, LM 25TE, LM 25TF).

5-Spokes and 4-Spokes	Magnesium alloy (AM60A)	Aluminum Alloys			
		LM 25	LM 25TB7	LM 25TE	LM 25TF
LOAD1	1.0E8	1.2E7	5.0E6	5.0E6	1.0E7
LOAD2	1.0E8	1.2E7	5.0E6	5.0E6	1.0E7
LOAD3	1.0E8	1.2E7	5.0E6	5.0E6	1.0E7
LOAD4	1.0E8	1.2E7	5.0E6	5.0E6	1.0E7

Due to High Strength and Hardness of Mg-Alloy, Fatigue life is more compared with all Al-Alloys.

Stress analysis values for 4-Spokes Mg-alloy(AM 60A) and Al-alloys(LM 25) with different Fillet radii.

4-Spokes	Aluminum alloy (LM 25TF) with Fillet 8 mm	Aluminum Alloy (LM 25TF) with Fillet 9mm
LOAD1	1.16881	1.16252
LOAD2	1.51887	1.51193
LOAD3	1.86912	1.86125
LOAD4	2.22029	2.21029

The Stresses induced in the 4-Spokes Aluminum Alloy wheel (LM 25TF) 2.21029 MPa is less as compared with the Stresses induced in the 4-Spokes Aluminum Alloy (LM25TF) wheels.

Aluminum Alloy (LM25) is utilized for the validation of this thesis from Deepak (2012)[25]. Due to different Heat Treatment conditions, Aluminum Alloys obtained are LM 25TB7, LM 25TE and LM 25TF. Analysis is done on the three different Al-alloys and also on an existing material of the Magnesium alloy (AM 60A).

The stresses obtained in the three different alloys are less as compared with the LM25, because if a material is heated to high temperature followed by quenching in hot water or rapid cooling,

1. Larger grains will break into small grains.
2. Hardness and Strength increases, due to Ionic bond between the molecules.

But the Stresses obtained in the Magnesium Alloy (AM 60A) is more as compare with all the three Aluminum Alloys, because an HCP structure exists in magnesium which makes magnesium more brittle because of their few active slip systems. Also magnesium is highly active in presence of Oxygen forming magnesium oxide and an improvement is needed in heat dissipation and micronization of Crystal grains of magnesium. Due to all these, the stresses obtained in Mg-alloy are more as compared with all Al-Alloys.

IV. CONCLUSION

An Al-Alloy Wheel was modeled using Unigraphics of two Spokes i.e., 4 and 5 with fillet radii (8mm and 9mm). These models were analyzed using COSMOS for five different materials, LM 25, LM25TB7, LM 25TE, LM25TF and AM60A.

From the results obtained it may be concluded that

1. The analysis results showed that the maximum stress area was located at Spoke-Rim contact. Stresses induced in 4-Spokes Aluminum Alloy (LM 25TF) are less as compared with Magnesium Alloy (AM 60A) and all the three Aluminum Alloys of 4 and 5 Spokes.
2. Fatigue life cycle is estimated based on the Equivalent Stresses induced on Al-alloys and Mg-alloy materials. Fatigue life cycle for the Mg-alloy is more as compared with all Al-alloys materials.
3. Re-model of alloy wheel, from 5-Spokes to 4-Spokes, along with small change in Fillet radius from 8 mm to 9 mm, at Rim-Spoke contact. The Stresses induced in Aluminum alloy (LM 25TF) are further reduced as compared to all the three Al-alloys.

Thus, it is clear that by adding the material at fillet edges the stress concentration will be reduced which in turn increases the fatigue life of the material and material reduction can be done by reducing number of Spokes.

Even though, the Fatigue Life of Magnesium alloy is more, by considering all the properties of Aluminum alloy like easy availability, recyclable, good heat dissipation rate. Aluminum Alloy (LM 25TF) is the better material for alloy wheels.

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Analysis Report on Attacks and Defence Modeling Approach to Cyber Security

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ABSTRACT

The researcher stated that critical analysis on attacks and defense modeling approach to cyber security which is one of the significant research issues in the computing environment. The researcher focused on some of the factors such as control the side of damage, perform forensic analysis, executive standard counter measures, perform threat detection and hunting, and gather threat intelligence. These all are the defense parameters which are stated to modeling approach in cyber security. During the research the researcher evaluated the security parameters including password strength, fraud detection system, firewall and others security parameters which are significant with respect to cyber attach and environment. The researcher shown statistical report on industries impacted by cyber-attacks worldwide as of September 2017. The researcher stated that passwords are basic cyber-security tool that people encounter nearly every day to prevent valuable data and highly sensitive information from unauthorized persons. The researcher represented an attack and defense modeling approach with the help of cyber security attributes such as information security, network security, operational security, end-user protection and application security. The researcher also stated that a case study of the 2016 Korean cyber command compromise: the victim of a prospering cyber-attack that allowed access to internal networks. Per usual with massive scale attacks against South Korean entities, the hack was straight off attributed to DPRK. Case study-2: cyber warfare conflict analysis and case studies, to analysis historical cyber warfare incidents from the past to the current and capture relevant information in a very information acquisition section.

Keywords : NIST, IS, CIS, MIA, CYBER ATTACK, DEFENSE

I. INTRODUCTION

Cyber security is that the protection of internet-connected systems, beside hardware, code and data, from cyber-attacks. In associate extremely computing context, security includes cyber security and physical security -- every are used by enterprises to safeguard against unauthorized access to info centres and various computerised systems. data security, the researcher declared that cyber security is one in all the various analysis issues in current computing environments, that's meant to require care of the confidentiality, integrity and availableness of data, could also be a group of cyber security [1].

One of the foremost problematic elements of cyber security is that the constantly evolving nature of security risks. the traditional approach has been to focus resources on crucial system elements and defend against the biggest noted threats, and to

safeguard system from the external linear unitvironments that are creating problems among the computing nut which meant exploit elements open and not protecting systems against less dangerous risks[1][2].

The researcher conferred analysis problems and analysis issues among the computing environments, to pander to this environments, consulted organizations are promoting loads of proactive and adaptation approach. The National Institute of Standards and Technology (NIST), for example, recently issued updated tips in its risk assessment framework that advocate a shift toward continuous observation and amount assessments [3]. The process of maintaining with new technologies, security trends and threat intelligence could also be a tough task among the computing environments. However, it's necessary thus on safeguard data and system security and various assets from cyber threats that take many forms [4].

1. Ransom ware could also be a method of malware that involves academic degree bad person lockup the victim's system files -- typically through cryptography and exigent a payment to rewrite and unlock them.
2. Malware is any file or program won't to harm a somebody, like worms, portable computer viruses, Trojan horses and spyware.
3. Social engineering is academic degree attack that depends on human interaction to trick users into breaking security procedures thus on succeed sensitive data that is typically protected.
4. Phishing could also be a range of fraud where dishonest emails are sent that match emails from reputable sources; however, the intention of these emails is to steal sensitive info, like MasterCard or login data.

The researcher focused on the analysis issues and necessary impact on use of cyber security can facilitate stop cyber-attacks, info breaches and fraud and should aid in risk management. Once an organization includes a sturdy sense of network security and a decent incident response prepare, it's higher able to stop and mitigate these attacks with connection computing environments. Cyber security refers to preventative ways that won't to defend data from being taken, compromised or attacked. It wants academic degree understanding of potential data threats, like viruses and various malicious code [5].

II. LITERATURE REVIEW

The research focused on "disruption of electrical power operations is ruinous on national security and jointly the economy. Will quality of wide unfold assets and jointly the interdependences among laptop computer, communication, and power infrastructures, the necessity to satisfy security and quality compliance on operations might even be a troublesome issue"(Chee-Woo 10 et. al (2010)).

The research emphasized that "the communication networks linking the massive sources of unfold all over the earth and data college field of study consultants area unit troubled to vogue the high performance hardware and coding system package that might cater the wants of today's' hi college corporations. The potential threat to secure monumental volume of data with a varied community of cyber criminals might even be a challenge within the current digital era"(Atul Bamrara et.,al(2013))

The researcher stated that "cyber-attack techniques area unit perpetually evolving and creating use of lessons learned over time. To stay pace with attackers and defend essential info systems in our ever additional connected world, defense mechanisms have to be compelled to additionally become additional refined. Usually understanding attack

techniques additional clearly is that the start toward increasing security. Intrusion detection systems (IDS) area unit around for form of years to warn of cyber strikes, however the suggests that they presently analyze data offers a restricted browse of cyber-attack activity" (Eric Goetz entail (2002)).

The researcher emphasized that "the success of a business mission is very obsessional concerning the Communications and information Systems (CIS) that support the mission. Mission Impact Assessment (MIA) seeks to help the combo of business or military operations with cyber defense, significantly in bridging the psychological feature gap between operational decision-makers and cyber defenders" Alexander Kott et. Al (2018)).

The researcher focused on " nuclear weapons systems were initial developed at a time once laptop computer capabilities were in their infancy and small thought was given to potential malicious cyber vulnerabilities. Several of the assumptions on that current nuclear ways that area unit based mostly pre-date this widespread use of digital technology in nuclear command, management and communication systems"(Beyza Unal and Patricia Lewis (2018)).

The researcher focused on " cyber-attack might even be a sensitive issue within the earth of web security. Governments and business organizations round the world area unit providing monumental effort to secure their data. Understanding attack models give additional insight into network vulnerability; that successively is employed to defend the network from future attacks. Within the cyber security world, it's difficult to predict a possible attack whereas not understanding the vulnerability of the network"(Hamad AL-Mahanadi (2016)).

The researcher focused on "the opportunities provided by the data and technology, with a special stress on the net, became associate integral a component of life. However, area unit we tend to tend to tend to sufficiently aware and ready as people, nations or the international community for the threats coming back from web or for the denial of the utilization of that dimension of communication, commerce and even warfare? Specifically, despite the growing reasonably users, the net continues to air the most side or below minimum regulation"(Duic et. al (2017)).

The researcher emphasized on " a part of Chatham House's Project on Cyber Security and area Security, a multiyear scientific research among the International section examining the protection challenges at the intersection of cyber security and area security, drawn from assume tanks, domain and business, launched into their views on their country's cyber security and area security policies"(Caroline metropolis (2014)).

The researcher focused on "the augmented dependency on the net, cyber-attacks area unit quick turning into an exquisite various for state adversaries, part thanks to the advantage of activity a perpetrator's identity. In response, governments round the world area unit taking measures to boost their national cyber defenses. However, these defenses, that area unit usually passive in nature, area unit deficient to handle the threats"(Tiong Pern Wong (2011)). It is also focused on "technology continues to evolve so else do the opportunities and challenges it provides. It tends to maneuver from a society already entwined with the net to the approaching age of automation, Big Data, and jointly the net of Things (IoT). Attack vectors like botnets, autonomous cars and ransom ware. Threats at the side of info manipulation, establish stealing, and cyber warfare. Tangential problems like info sovereignty, digital trails, and leverage technology talent"(Clive James (2016)).

The researcher emphasized that " non-public business encompasses a very important impact on economic and national security and governments should own a stake in protective essential personal infrastructure as a results of it will with totally different government assets. As nations push to spice up their cyber capabilities the flexibility of state to incentivize the personal sector to share info in an especially timely manner can greatly impact the effectiveness of cyber security management"(Bryan Watkins (2014)).

The researcher focused on a " robust U.S.A. cyber deterrence strategy can have the foremost immediate result on nation-states whose actions area unit influenced by U.S.A. instruments of national power. However, nations like D.P.R.K. And Persia have shown associate out of this world resistance to U.S.A. political and economic pressure and will be powerful to discourage whereas not credible threats of military actions.it ought to else pursue the simplest way to discourage common hackers, criminals, violent no state actors, and totally different non-nation-state actors"(Timothy M. McKenzie (2018)).

The researcher emphasize that almost all of the " cyber security analysis specialize in either presenting a specific vulnerability or proposing a specific defense formula to defend against a well-defined attack theme. To analysis the interactions between the bad person and jointly the defender as a non-cooperative security game. The key came upon is to model attackers/defenders to possess multiple levels of attack/defense ways in which area unit completely utterly totally different in terms of effectiveness, strategy prices, and attack"(Afraa Attiah et. al (2018)).

The researcher focused on " cyber warfare might even be a Brobdingnagian one, with various sub topics receiving attention from the analysis community. The researcher tend to first examine the foremost basic question of what cyber warfare is, scrutiny existing definitions to find footing or disagreements. The terms cyber war and cyber warfare don't seem to be tolerably differentiated. To handle these problems, we tend to tend to tend to gift a definition model to assist define each cyber warfare and cyber war"(Michael Robinson et.al (2015)).

The researcher focused on " the conventional network defense tools like intrusion detection systems and anti-virus specialize in the vulnerability element of risk, and ancient incident response methodology presupposes a no-hit intrusion. Associate evolution at intervals the goals and class of network intrusions has rendered these approaches insufficient sure actors. A clean category of threats, befittingly dubbed the "Advanced Persistent Threat" (APT), represents well-resourced and trained adversaries that conduct multi-year intrusion campaigns targeting sensitive economic, proprietary, or national security info"(Eric M. parliamentarian Maynard educator et. al (2005)). The research also focused on "laptop computer security has evolved from a technical discipline to a strategic conception. The world's growing dependence on a strong however vulnerable web – combined with the turbulent capabilities of cyber attackers – presently threatens national and international security. Strategic challenges wish strategic solutions. The researcher examines four nation-state approaches to cyber-attack mitigation"(Cm Kenneth Geers (2011)).

The researcher focused on "Defense, cyber resiliency ought to be incorporated across the entire capability lifecycle, and conjointly the associated policy development needs to be cognizant of this holistic would really like. The specification of cyber-resiliency requirements needs to be improved, additional importance needs to be placed on cyber security at intervals the look and magnificence phases, to realize this, a spanking new Defense organization

has been planned and its broad responsibilities created public"(Stuart Fowler (2018)).

III. PROBLEM STATEMENT AND RESEARCH OBJECTIVES

The researcher stated the some of the significant research issues in cyber security with respect to attacks and defense modeling approach.

1. To study the significant factors of cyber-attack.
2. To study the defense factors which are capable to protect cyber- attack in computing environment.

To study the current research issues on Industries and cases impacted by cyber-attacks worldwide.

IV. Attack and Defense Modeling Approach

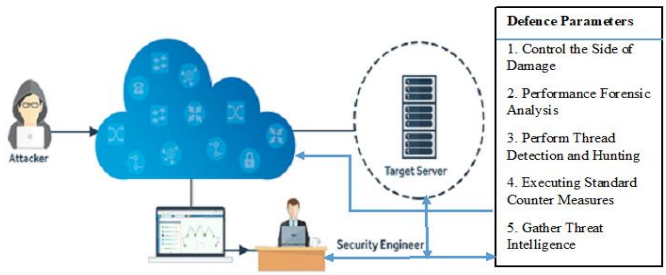


Fig 1. Adapted- Attack and Defense Modeling Approach

The researcher developed a framework of the analysis study to " identify the cyber-attack and defense modeling approach. It constitutes a fairly trade-off in terms of readability, modeling power, quality and quantification capabilities. This paper develops associated completes the theoretical foundations of such

Cyber security adaptation and presents new developments on defensive aspects. Notably, detection associated reaction modeling are fully integrated in cyber security enhanced theoretical framework. Fully completely different use-cases and quantification examples illustrate the connectedness of the final approach"(Kotenko and V. Skormin (2010)).

V. METHODS AND MATERIAL

This research study is based on the secondary data which are collected from the different sources and current research articles and the researcher emphasized on some of the significant research issues with respect to attack and defense modeling approach in cyber security. The researcher used the statistical tools to represents the Cyber-attacks on industries worldwide with multiple factors in tabular and pictorial representation. With the help of secondary data the research identify the attack and defense modelling approach of a standardized strategy document with such complicated needs ought to be supported a way which will assure consistency of the results obtained through the varied development phases and numerous stakeholders that require to participate within the strategy development method. Exploitation such technique for a method development ought to additionally afford a lot of easier thanks to sporadically update or revise the strategy with relevancy cyber-attack and defense.

VI. CASE STUDY

CASE STUDY-1: A CASE STUDY OF THE 2016 KOREAN CYBER COMMAND COMPROMISE

On Gregorian calendar month 2016 the South Korean cyber unit was the victim of a successful cyber-attack that allowed access to internal networks. " Per usual with huge scale attacks against South Korean entities, the hack was in real time attributed to Democratic People's Republic of Korea. Also, per completely different large-scale cyber security incidents, the identical kinds of 'evidence' were used for attribution functions. Disclosed ways in which of attribution provide weak proof, and so the procedure Korean

organizations tend to use for information revealing lead many to question any conclusions. The man of science analyzed and mentioned form of issues with this suggests that South Korean organizations disclose cyber-attack data to the overall public. A time line of events and disclosures area unit aiming to be created and analyzed at intervals the context of acceptable measures for cyber warfare. Finally, the man of science examined the South Korean cyber military attack in terms previously planned cyber warfare response tips. Specifically, whether or not or not any of the foundations is applied to the present real-world case, and if so, is Asian nation even in declaring war supported the foremost recent cyber-attack" (Kotenko and V. Skormin (2010)).

One issue that has to be mentioned specific to " South Korea's situation with Democratic People's Republic of Korea, is that applying law of states itself could also be problematic. Democratic People's Republic of Korea could also be a state with restricted recognition; Asian nation considers Democratic People's Republic of Korea to be an element of the identical nation and therefore the alternative method around (Scoffed, 2005). Therefore, in theory, got to associate offensive cyber operation be verified to be North Korea's doing, they could form up Korean code. However, very makes a shot to push South Korea's code to Democratic People's Republic of Korea would heaps have in all probability be harmful. Potential solutions and responses got to be found among international law; even in cases whereas not physical damages"(Aleksandar KLAIC (2018)).

CASE STUDY-2: CYBER WARFARE CONFLICT ANALYSIS AND CASE STUDIES

The first objective was to analysis historical cyber warfare incidents from the past to the present and capture relevant data in an exceedingly} very data acquisition section. the first section needed to analysis the timeline of events throughout this incident and develop the specified insight to be ready to analyze the parties involved thus on mark them as established order side or non-status-quo side. This provided a signal of motive from the no status-quo side and so the progression of change of magnitude. The second objective involved mapping the cyber-warfare incidents to MIT's CASCON framework. The CASCON mapping given {the data the knowledge the data} collected from the incidents in an exceedingly} very structured kind that's very important since its information of kinetic warfare was intensive [20].

The CASCON based totally analysis for cyber-incidents not only discovered insights into what actually happened throughout a cyber-incident, but helped answer key queries that may in all probability cowl some fateful behavior of involved states and conflicts in an exceedingly} very region. There's on the far side associate doubt an outsized amount of data that is to be learned and regarded, every from the historical purpose of scan that CASCON provides and from current affairs. The results of this thesis are not meant to be conclusive, but a study of state-sponsored cyber- cases exploitation MIT's CASCON to map and reason data for future learning regarding conflicts involving states [20]. The man of science found that variety of the next facts:

1. Reduced costs compared to plain strikes.
2. Higher efficiency in achieving the goal.
3. The uneven nature of the cyber-attacks makes defense powerful.
4. The anonymous nature of the offense permits the offensive government to bypass approval by the world community compared with a military offensive.
5. Probability to conduct cyber-attacks in amount for immediate government ends, nevertheless on steel oneself against accomplishable future kinetic attacks.

6. Chance to conduct cyber-attacks in period for immediate government ends, yet on steel oneself against doable future kinetic attacks.

VII. STATISTICS OF CYBER ATTACKS

Table 1 : Cyber-attacks on industries worldwide 2017		
Industries impacted by cyber-attacks worldwide as of September 2017		
	Share of respondents	
Energy	26	in %
Healthcare	25	in %
Retail and wholesale	25	in %
Manufacturing	22	in %
Infrastructure	19	in %
Financial institutions	17	in %
Automotive	15	in %
Professional services	15	in %
Power and utilities	14	in %
Martine	14	in %
Communications, media and technology	13	in %
Aviation and aerospace	9	in %

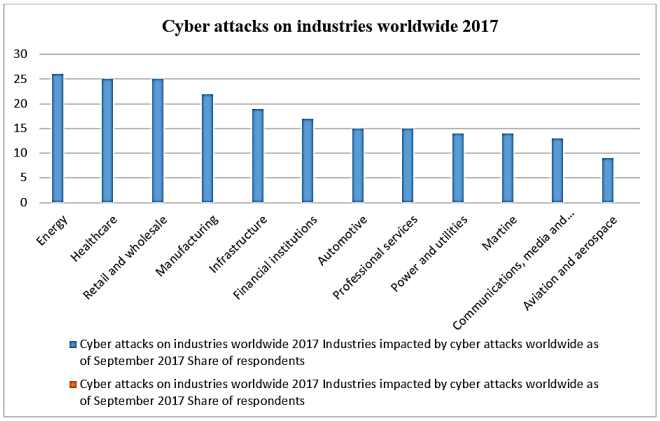


Fig 2. Cyber-attacks on industries worldwide 2017

VIII. RESULTS AND DISCUSSION

Cyber-attacks unit of measurement an unbroken threat to businesses around the world with immense sums of money being spent to protect against them. The image of some wicked character plotting in his or her sleeping room is one most folk have once puzzling over hackers and cyber criminals. Whereas in 2015, 40 the look after attacks stemmed from 'outsiders', a shocking hour were extremely perpetrated by company insiders. IBM, World Health Organization created the figures supported knowledge from over 8,000 of their purchasers devices, disclosed that the' 5.5 you look after such 'attacks' were caused unwittingly, 44.5 there have been deemed to possess been malicious.

An executive is made public as anyone World Health Organization has physical or remote access to a company's assets. IBM note that the' this can be ready to usually be Associate in Technical employee, it can also mean business partners or maintenance contractors – people you trust enough to grant system access to. Insiders not entirely have this access, they're going to even be responsive to your weaknesses and then exploit those tons of effectively than an out of doors agent will be able to.

IX. CONCLUSION

In this research paper the researcher focused on the significant research issues on attack and defense modeling approach to cyber security in computing environment. The researcher proposed a modeling approach to spot and therefore the causes of cyber-attack and providing a virtual primarily based answer that are having restricted access and value within the computing environments. The researcher additionally expressed this statistical analysis problems with cyber- attack and defense in different Industries. Through the modelling construct, the researcher planned a model to stop cyber-attack and

defense to stop the cyber-attack services within the computing environments. The researcher also analyzed and mentioned variety of problems with this means that South Korean organizations disclose cyber-attack info to the general public. A time line of events and disclosures are going to be created and analyzed within the context of acceptable measures for cyber warfare. In another cases cyber warfare incidents from the past to the current and capture relevant information in a very information acquisition section from the incidents in a very structured kind that is vital since its information of kinetic warfare were more intensive.

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Food Adulteration Awareness : A Powerful Weapon to Combat the Food Quality Contamination

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ABSTRACT

In India, food contamination has become a serious problem now-a-days. Consumer education and awareness is considered as the need of the hour. Adulteration like corruption has become rampant with alarming rate. The government knows that most of the spices, dal, ghee, milk sugar, tea etc are adulterated. The nature of contaminants is often impure, unhygienic, harmful, and detrimental to public health like adding the urea to milk, duplicate products often sold for the products of reputed brand, cold drinks like Pepsi, Coca cola etc and unhygienic substances, dal with stone bits, tea garnished by saw dust, turmeric mixed with chromate powder, chilly powder mixed with red colour and even fruits vegetables and cereals sold in market often having high level of toxic metals like lead, nickel, cadmium etc.

Adulteration of food stuffs is commonly practised in India by traders due to consumers' behaviour. They want to buy the food stuffs at lower price as possible as lower. The sellers now try to meet the needs of the buyers and their purchasing habit/tendency. This tendency of purchasing the stuffs motivates the sellers and traders to sell the adulterated food stuffs in the markets. Despite of ISI or Agmark certification mandatory for all edible items and food adulteration laws, food contamination has been rising at alarming rate especially in India. To encounter this ticklish situation, consumer awareness may play a vital role to combat the prevailing adulteration from a right perspective with the help of mass media and educational activities in school or colleges.

Keywords : Chromate Powder, Food Adulteration, Lead, Nickel, Cadmium, Weapon

I. INTRODUCTION

Food adulteration in the developing countries like India is a quite common and is getting deadlier day by day. It not only decreases the quality of food items, but also results in number of harmful effects on human health. It is the process of adding or mixing of harmful, inferior, sub-standard, unwanted substances to food, with similar appearance or colour for increasing the quantity of food items and making more profit/gain. It may spoil the quality of food stuff by the omission of some valuable constituents. So, the spoiling of actual quality of food stuffs and the removal of some vital and valuable constituents of food stuffs is known as food adulteration.

Indian kitchens has always been using a variety of ingredients in every day's cooking since the starting of civilization, but due to food adulteration problem in recent years, purity of these ingredients has become a matter of high concern ie a burning national health issue. In true sense, food adulteration in India starts from the agriculture fields where the overdose of fertilizers and pesticides are often used by the farmers. It often generates a problem of high level of pesticide residues across the all range of food. Most

of key products available in the market are adulterated like water in milk, vanspati in ghee, chalk powder in flour, chicory in coffee, papaya seeds in pepper, brick powder in chilli powder and wood powder in turmeric, dhaniya etc.

Along with it, colouring agents in spices are also generating severe problem; making the fruits ripen faster by the use of carbide has created a number of fatal health hazards. Surveys suggest that 25 to 30 per cent of food items in India are intentionally adulterated today food adulteration is a menace, which we all face on regular basis in the form of acute and chronic disease. 70% of young people death is supposed to be due to food borne origin.

Objectives of the Study

1. To highlight the concept of food adulteration
2. To classify the adulterants
3. To mention the causes of food contamination
4. To highlight the diseases borne by adulteration
5. To pinpoint the detecting and testing process
6. To mention the food adulteration laws
7. To highlight the role of mass media and schools' programmes

The Concept of Food Adulteration

An adulteration is a chemical substance which should not be contained within other substances eg food items and beverages, while deliberate addition of toxic adulterants to food products is considered as the poisoning for human consumption ie the food's original nature is substituted wholly or partially by adding or subtracting of any valuable substance to or from the food. This results in affecting the natural consumption and quality of food adversely.

Criteria of Food Adulteration

(a) Addition of inferior or harmful chemical substances
(b) Removal, Abstracting or omission of vital nutrients/constituents
(c) Imitation or copy of the original food substance
(d) Adding the colours to enhance the appearance of food items

Types of Adulterants

Any material which is employed for making the food unsafe or sub-standard accidentally and intentionally is called food adulterant.

(a) Intentional Adulterant (for financial gain)- water, sand, chalk powder etc
(b) Unintentional Adulterant- due to ignorance, carelessness, lack of facilities for maintaining the food quality
(c) Incidental Adulterant- Spill over effect from pesticide and fertilizers, inappropriate food handling and packing method ie it happens during the period of growth, harvesting, storage, processing, transportation and distribution of food.
(d) Metallic Adulteration- lead in water, mercury in effluents etc

The Causes of Food Contamination

Now-a-days, dishonest traders, importers, manufacturers, cultivators and even processing agencies are involved in such unethical practices ie food adulteration due to the following reasons:

(a) Dishonest traders, businessman etc are involved in such adulteration practices due to more profit motive. They often show it as their business strategy.
(b) To meet the increasing demand of public, traders often increase the quantity of food production by

mixing with sub-standard quality eg chalk powder in flour, vanspati in ghee etc.

(c) Illiterate consumers are not aware about their health hazards caused by food contamination. They are tempted to buy the cheaper food items. Most probably, they are likely to buy adulterated food.

(d) Lack of central and state government's initiatives towards the implications of food laws effectively. Even the health practitioners advise government to make the public aware about adulterated foods and their grave effects on health.

(e) Scarcity of testing facilities with agencies and lack of instruments and skilled manpower in laboratories

(f) Lack of public awareness towards paying attention on incorrection information on food packages, sales of the expired date products on shop etc.

The Diseases Borne By Adulteration

As per the general information regarding food risk published by WHO(2009), toxic levels as well as nutritional imbalances are suspected to be in causing cancer, cardiovascular imbalance, reproductive disorders, birth defects, sensory system development, mental health problem, urogenital diseases, old age dementia and learning disabilities. Therefore, the protection of diet from these hazardous conditions is essential to protect public health. The Daily Star(28 July, 2011) reported that the consumption of adulterated food items may cause asthma, sore throat, larynx constriction, bronchitis, skin infection, allergic reaction, diarrhoea, haematuria, circulatory failure, numbness, dizziness, kidney failure, stomach cancer, liver cancer, nervous disorders and many other diseases. Khan, M.A. (2014) reported that the long term effects are also very severe especially the incidence of renal failure, liver damage and cancer which are increasing alarming in Bangladesh. Heavy metals, such as lead, chromium and arsenic accumulate in body that might cause kidney and liver damage and develop abnormality among children. Singuluri and Sukumaran(2014) reported that in a country such as India where milk and milk products play an important role in different foodstuffs, this analysis carried out should bring about more awareness to the general public about the malpractices or negligence in milk production.

Bitter Truth: Slow Poisoning via Food Adulteration

Cancer

- Metanil yellow in Dal
- Mineral oil if added to edible oil
- Chemical milk

Brain Damage, Paralysis and Death

- Mercury contaminated fish

Anaemia, Paralysis, Brain Damage and Abortion

- Lead Chromate added to turmic powder

Foot drop, Insomnia, Constipation, Anaemia and Mental Retardation

- Lead added to water and processed food

Vomiting and Diarrhoea

- Copper , tin and zinc

Cardiac Damage

- Cobalt added to water and liquors

Allergies, Hyperactivity, Liver damage, Infertility, Anaemia, Cancer and Birth defects

- Non permitted colours to food

Food Article	Adulterant	Harmful effects
Bengal Gram Dhal and Thoor Dha	Kesai Dhal	Lathyrism cancer
Tea	Used tea leaves processed and coloured	Liver disorder
Coffee powder	Tamarind seed, date seed powder, chicory powder	Diarrhoea, stomach disorder, giddiness and joint pain
Milk	Unhygienic water and starch	Stomach disorder
Khoa	Starch and less fat content	Less nutritive value
Wheat and other food grains(Bajra)	Ergot(a fungus containing poisonous substance)	poisonous
Sugar	Chalk powder	Stomach disorder
Black powder	Papaya seeds and light berrys	Stomach, liver problems
Mustard powder	Argemone seeds	Epidemic dropsy and glaucoma
Asafoetida	Foreign resins galbanum, colophony resin	Dysentery
Turmeric powder	Yellow aniline dyes, non-permitted colourants like metanil yellow, tapioca starch	Carcinogenic and stomach disorders
Chilli powder	Brick powder, saw dust, artificial colours	Stomach problems, cancer
Sweets, juice, jam	Non-permitted coaltar dye (metanil yelow)	Metanil yellow is toxic and carcinogenic
Jaggery	Washing soda, chalk powder	Vomiting diarrhoea
Pulse(green peas and dhal)	Coaltar dye	Stomach pain, ulcer
Suapari	Colour and saccharin	cancer
Honey	Molasses sugar(sugar plus water)	Stomach disorder
Carbonator water beverage	Aluminium leaves	Stomach disorder
Cloves	Cloves from volatile oil has been extracted	Cheating, waste of money

Source: www.fnbnews/top-news/effects of food adulteration on human health

Detecting and Testing Techniques

In the recent years, the purity of consumable items has become a matter of high concern due to multiple news reports of adulteration in commonly consumed items. There are some common techniques to detect the adulterants in the dish, spices etc:

(A) Turmeric Powder

Common Adulterants- Metanil yellow, lead chromate, chalk powder

Detecting Metanil yellow in turmeric powder

Take a transparent glass with 20 ml of luke warm water and put into it a spoonful turmeric powder. Now, add a few drops of hydrochloric acid or any commonly available acid at home. Then, next shake it vigorously. If the appearance of water turns into pink colour, violet or purple; it indicates the presence of metanil yellow.

Detecting Lead chromate in turmeric powder

First, dissolve the turmeric powder in 1:7 sulphuric acid and filter. Then, add 1 or 2 drops of .1% of diphenl carbazide. A violet colour indicates the presence of lead chromate in the mixture.

Detecting Chalk powder in turmeric powder

First, take some turmeric powder in test tube and add some water into it, then few drops of hydrochloric acid to be added to find the presence of chalk powder. If the mixture gives bubbles, it means the availability of chalk powder or yellow soap stone powder.

(B) Red Chilli Powder

Common Adulterants- Artificial Colour, Brick Powder, Starch

Detecting Artificial Colour in Red Chilli Powder

To detect the artificial colour in red chilli powder, take a teaspoonful of red chilli powder, add it to glass of plain water and then stir it. If the colour of water changes, it indicates the presence of artificial colour in red chilli powder.

Detecting Brick Powder in Red Chilli Powder

To test brick powder in red chilli powder, take a glass of water and add a spoonful of red chilli powder to it. If some kind of grittiness ie gritty sediments in water at the bottom of glass is felt, it pinpoints the presence of brick powder or sand in red chilli powder.

Detecting Starch in Red Chilli Powder

Add few drops of tincture Iodine or iodine solution to the red chilli powder. If we notice a bluish colour change, it indicates the presence of starch.

(C) Black Pepper

Common Adulterant- Papaya seeds

Detecting Papaya seeds in Black Pepper

Take two or three spoonful of black pepper seeds with a glass of water. Now, put these seeds into the water. Black pepper seeds usually sink down to the bottom of glass, while papaya seeds will float on the top surface of water if the glass.

(D) Sugar

Common Adulterant- Chalk Powder

Detecting Chalk Powder in Sugar

Dissolve a little amount of sugar sample ie 10 gm in a glass of water and stir it properly. If the solution turns white and residue settles down at the bottom of test tube. It indicates the presence of chalk powder, while a clear solution is the indication of sugar purity.

(E) Milk

Common Adulterants- Water, Starch, Urea, Detergent

Detecting Water in Milk

Presence of water in milk sample can easily be detected by putting a milk drop on a polished slanting surface. If it flows slowly leaving a white trail behind it, it indicates pure milk, whereas milk adulterated with water will flow immediately without leaving a white trail mark.

Detecting Starch in Milk

Add a few drop of iodine solution. A blue coloured solution indicates the presence of starch.

Detecting Urea in Milk

First, take a teaspoon of milk sample in a test tube. Add ½ teaspoon of soybean or arhar powder. Then, mix it up thoroughly by shaking the test tube. After 5 or 6 minutes, dip a red litmus paper in the solution. Remove it after 30 seconds, if there is a change in colour from red to blue indicates the presence of urea in the milk sample.

Detecting Detergent in Milk

Shake 5-10ml of milk sample with equal quantity of water vigorously, milk adulterated with detergent will form a dense lather, a dense lather indicates the presence of detergent, while pure milk will have thin layer of foam.

(F) Ghee/Butter

Common Adulterants- Vanaspati oil , Starch

Detecting Vanaspati oil in Ghee/Butter

Take a teaspoonful of melted ghee/butter sample with equal quantity of concentrated hydrochloric acid in a stoppered test tube. Add a pinch of sugar, shake it vigorously. Leave it for 5 minutes in the stand position; the appearance of red colour at the bottom of test tube indicates the presence of vegetable oil in the sample.

Detecting Starch in Ghee/ Butter

Add a few drops of iodine to two spoons of melted ghee. Appearance of purple colour is the indication of starch (like mashed potato) adulteration in the taken sample of ghee.

(G) Mustard Oil

Common Adulterant- Argemone oil

Detecting Argemone oil in Mustard Oil

Add a few drops of nitric acid to a small amount of mustard oil in a transparent glass. Next, shake it vigorously and heat the mixture for 2-3 minutes. The appearance of red colour is the indication of the presence of argemone oil in the taken sample.

(H) Honey

Common Adulterants- Glucose/Sugar Syrup

Detecting Glucose/Sugar Syrup in Honey

Take a glass of water and add a spoonful of honey into it. If the honey disperses instantly, it means the presence of sugar syrup/glucose. Nature of pure honey is denser and will sink to the bottom instead of dissolving instantly.

Another test- take a cotton wick dipped in pure honey, light it with a match stick, its burning shows the purity of honey. If honey adulterated with water, the presences of water will not allow the honey to burn; if it allows, it will produce a cracking sound.

Food Adulteration Laws

At present, the concurrent list (III) of the Indian constitution encompasses adulteration in food stuffs and other goods. Ministry of Health and family welfare is completely responsible for controlling food adulteration and providing safe quality to consumers. Ministry of food has time to time been stipulating a number of laws to fight adulteration and to stop malpractices. Government of India enacted the following acts to protect the consumers' interest –

(a) The Prevention of Food Adulteration Act, 1954
(b) The Fruit Product Orders, 1955
(c) The Vegetable Oil Product (control) order, 1947
(d) The Edible Oil Packaging (Regulation) Order, 1948
(e) The Edible Flour(control) Order, 1967
(f) The Insecticide Act, 1968 and Insecticide Rules,1971
(g) The Meat Food Products Order, 1973
(h) The Milk and Milk Products Order 1992
(i) The food Safety and Standards(FSS)Act by FSSAI, 2006
(j) Consumer Protection Bill, 2018

The protection of the food adulteration act came into existence 1954and was amended in 1986 to empower the consumer and to make punishment more stringent. Recently, Government is planning to harsher punishment. The FSSAI has issued the draft amendments to food safety and standard act, 2006. FSSAI has proposed a new section to crack down on food adulteration. For example– any person who adds an adulterant to food so as to render it injurious for human consumption with an inherent potential to cause his death or is likely to cause grievous hurt, irrespective of the fact whether it causes actual injury or not, shall be punishable for a term which shall not be less than 7 years but which may extend to imprisonment for life and also fine which shall not be less than 10 lakh.

Role of Mass Media and Colleges to Encounter 'Food Contamination'

(a) Through newspapers, TV, and magazines etc, Food Adulteration awareness can generated among common public easily and in effective manner. They can be educated about consumer protection acts.

(b) Street plays by NSS candidates should be organised to make the people aware about food adulteration and their ill effects on health.

(c) To motivate the college students to write essays on the theme of food adulteration to arouse the curiosity towards the existing food contamination.

(d) In college/school, the seminar and debate over the theme of food adulteration should be organised time to time. So that, new findings of individual research can be discussed and communicated to other people in fast track manner.

(e) Government should motivate the young researchers to find out innovative methods to tackle with food adulteration causing serious health diseases like cancer, brain damage or paralysis etc.

(f) In parents-teacher meeting, food adulteration issues in brief can be discussed with how to detect the adulteration in food at home easily and safety measures.

(g) To enrich the college library with books and journals over food adulteration and safety measures

(h) With the help of college management, a laboratory for detecting food adulteration should be established. Government should provide grants for such works.

(i) At least, one chapter should be incorporated in college syllabus. It will definitely inculcate the food adulteration awareness into children right from their young age.

II. CONCLUSION

To be precise, it would be worth mentioning that food adulteration like corruption has become rampant. Now-a-day, it is a very serious anti-social act as it affects the lives of thousand people every day. For encountering with it, there should be co-ordination among various government bodies and scrutinising the qualities of food products along with the increase in the awareness on the part of citizens. So, instilling the accountability into concerned people like –food inspector, drug inspector, police officials, food analysts and other people involved eg traders, sellers etc. school can instil the awareness about food contamination among common public with the help of students.

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Implementation of Online Test Engine Based on Load Balancing

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ABSTRACT

Numerous expansive web locales get a huge number of hits each day. They require a versatile web server framework that can give better execution to every one of the customers that might be in various topographical locales. The regular way to deal with enhancing execution is to have completely repeated web server bunches in various topographical areas with duplicated servers. In such a domain, a standout amongst the most critical issues is choosing a server for adjusting a demand. Customer solicitations ought to be coordinated to a server with the end goal that the time taken for adjusting the demand can be limited. Diverse approaches are feasible for server determination and it is hard to decide the effect of various arrangements. A distributed framework comprises of a few self-sufficient nodes, where a portion of the nodes might be overloaded because of a substantial number of job entries while others nodes are inactive with no preparing. Load Balancing is utilized for viably dispersing the load among the nodes. Centralized load balancing plans are not adaptable as the load balancing choice relies upon a focal server. Interestingly completely distributed plans are versatile however, they do not deliver a reasonable load circulation as they utilize nearby data. In this examination, we propose a clustered load balancing arrangement for a heterogeneous distributed registering framework.

Keywords : Test Engine, Clustered Load Balancing, Distributed Systems, Workload, Response Time, Node Utilization

I. INTRODUCTION

The number of clients getting to the Internet is expanding quickly and usually to have in excess of 100 million hits every day for famous web locales. For instance, netscape.com website gets in excess of 120 million hits per day. The quantity of clients is relied upon to keep expanding at a quick rate and consequently, any website that is mainstream faces the test of serving a substantial number of customers with great execution. Full reflecting of web servers or replication of web locales is one approach to manage the expanding number of solicitations. Numerous methods exist for the determination of the closest web server from the customer's perspective. In a perfect world, the determination of best server ought to be done straightforwardly without the mediation of the client.

Huge numbers of the current plans do just load-balancing. These plans expect that the reproduced webpage has all the web servers in a single group. This is okay for medium measured destinations, however past a specific measure of traffic, the

network to this one bunch turns into a bottleneck. So expansive web locales have numerous bunches, and it is best to have these groups geologically distributed. These progressions the issue to initially choose the closest group and after that do load balancing inside the servers of that bunch. Obviously, in the event that all servers in a group are intensely loaded, another bunch ought to have been picked. Therefore, the issue is increasingly overwhelming in such a domain.

Planning such a framework includes settling on choices about how as well as can be expected to be chosen for demand with the end goal that the client gets a response in the least time and how this demand is coordinated to that server. In a few procedures, a server is chosen without considering any framework state data, e.g. irregular, round robin and so on [6]. A few approaches utilize weighted limit calculations to guide more level of solicitations to increasingly competent servers [7]. A few procedures select a server depending on the server state [7] and some others consider customer state data [7]. There is dependably a trade-off between the overhead because of the gathering of framework state data and execution gain by utilization of accessible state data. In the event that an excessive amount of state data (of server or customers) is gathered, it might result in high overheads for accumulation of data and execution gain may not be practically identical to overheads. The execution of any load balancing approach relies upon a large group of highlights like system delays, parcel misfortunes, transmission mistakes, and a rate of solicitations, server load and so forth. It is generally difficult to systematically decide the execution of an approach given a few conditions. Re-enactments additionally have constraints in that they can just consider restricted factors and with the complexities associated with this case impact of the considerable number of factors cannot be systematically decided and reproduced. Thus testing for execution by setting up a testbed is a sensible method to assess diverse methodologies.

This testing will when all is said in done require a devoted testbed on which execution studies should be possible. Such a testbed ought to be configurable for various techniques and system qualities. In that capacity a testbed is probably going to be a devoted set up with an engaged reason, it will be helpful if a web service can be made for assessing an approach. In this, all parameters will be set in the web service, which will at that point drive the testbed to acquire the outcomes. Such a service will make a devoted testbed available over the world. Such a service ought to satisfy various prerequisites. It ought to be conceivable to consider the effect of various parameters on the execution of different methodologies and to look at them. It ought to be conceivable to submit new techniques and contrast their execution and existing ones or to distinguish conditions where the arrangement performs best.

In this investigation, we portray a web service for assessing load-balancing procedures for distributed web server systems. The web service cooperates with a testbed to mechanize the procedure of accommodation of parameters, testing and result from age to enable the client to test and think about load balancing approaches through in an exceedingly configurable way. We have pre-characterized some well-known techniques, which can be assessed for various parameter settings. The service additionally enables clients to test new arrangements for load balancing and contrast their execution and that of existing ones on an assortment of parameters and under different conditions and settings.

II. REVIEW OF LITERATURE

Load balancing for distributed figuring framework is profoundly examined, for quite a while. For the most

part, there are two strategies for load balancing in a distributed situation:

i) A static load balancing approach [1,2,3] relies upon static data, for example, CPU limit, memory space and so forth in settling on load balancing choices.
ii) Dynamic load balancing arrangements [2, 4, and 5] settles on load balancing choices dependent on the present condition of the framework and consequently can additionally enhance the framework execution.

Various load-balancing approaches utilize chart calculations [12] for load conveyance. For load balancing procedure of a distributed system, the calculations require two rounds of message trades to disseminate the workload data, therefore, expanding the correspondence intricacy of the framework. In spite of the fact that the conventional goal of load circulation is to limit the general execution time called make span when managing substantial systems, the correspondence cost is likewise a basic issue. Arora et al. [13] proposed a decentralized load balancing calculation for heterogeneous Grid condition.

In spite of the fact that they endeavoured to incorporate correspondence inactivity amid activating procedure yet the genuine expense of job exchange was not considered. Zaki et al. [7] consider diverse processor speeds and appropriate the load sufficiently. Hendrickson and Devine [8] considered the distinctive measure of processor power and memory limit with respect to heterogeneous systems. They likewise stressed that organize associations with various paces must be considered for distributed load balancing technique. Kielmann et al. [9] considered an accumulation of groups as a various leveled framework and utilized a tree topology to do load balancing. Willebeek and Reeves exhibited a various leveled balancing strategy (HBM) which sorts out the framework into a progressive system of subsystems. The base of the HBM technique incorporates the worldwide data about the framework and can be a bottleneck.

Our methodology for load balancing thinks about the system as a two-dimension progression by evacuating the base of the tree. This model enhances normal response time of the framework. We have utilized the occasional status trade idea of ELISA [6].

In ELISA, load-balancing choice is taken dependent on line length as it were. Our model settles on load balancing choice by considering every single influencing factor, which are current load at processor and memory, line length and preparing limit of a node.

III. RELATED WORK

Online examination is one of the vital parts for online training framework. It is proficient, quick enough and decreases the substantial measure of the material asset. An examination framework is produced dependent on the web. Online examination will reduce the hurried control of assessing the appropriate responses given by the candidates physically. Being an organized Online examination structure it will diminish paperwork.

The primary objective of this online examination framework is to adequately assess the understudy completely through a completely computerized framework that decreases the required time as well as acquires quick and exact outcomes. Utilizing an open source dialect gives us greater adaptability, and yet it required more opportunity to be modified. The proposed Online Examination System (OES) can be effectively embraced by colleges and establishments so as to make the test progressively secure and increasingly adaptable. The framework is subdivided into two principal subsystems (understudy and head) that are intended to give the framework most

extreme advantage by exhibiting cautiously every subsystem service.

The formal paper-based examination framework is a long technique to lead an examination. The formal framework makes everything in paper-based. It gives advantageous time to go to for understudies. So the procedure winds up wild additionally the beforehand online examination process utilizes a single server because of this the test procedure is moderate or just a couple of understudies can go to the online examination at the same time.

IV. PROPOSED ARCHITECTURE

The entire system consists of three main components that interact to provide the previously described services.

The Test bed at the back end is a physical set up which can be configured to simulate a variety of network conditions, load conditions, server architectures and load balancing policies.

The web service at the front end is where the interaction with the users takes place and which automates the process from submission of test parameters by the user, configuring the test bed to follow those parameters, running tests and display of results to the users. It includes the web server, application logic, database server and the interface to the testbed.

Also an API has been designed and implemented using which new policies can be submitted for testing on the testbed. It includes standard libraries (API's) using which a set of interfaces have to be implemented by the user according to the policy he is submitting.

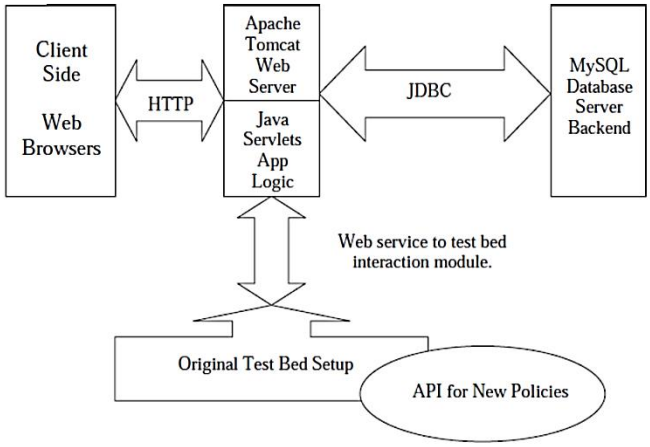


Figure 1. System Architecture

V. IMPLEMENTATION

Load Balancing: In computing, load balancing improves the distribution of workloads across multiple computing resources, such as computers,

- computer cluster,
- network links,
- central processing units,
- Disk drives.

Load balancing aims to optimize resource use, maximize throughput, minimize response time, and avoid overload of any single resource. Using multiple components with load balancing instead of a single component may increase reliability and availability through redundancy. Ally involves dedicated software or hardware, such as a multilayer switch or a Domain Name.

In our system we utilizes multiple server (server_1, server_2... server_n) to balance the workload and to improve the efficiency. For Load balancing Round Robin Algorithm is used.

In this approach, time quantum is taken as the range of the CPU burst time of all the processes. The range of the processes is the difference between the largest (maximum) and smallest (minimum) values.

A. Uniqueness of Our Approach

Let's assume that the data are sorted in increasing numerical order. It gives better turnaround time and waiting time. Generally, the performance of RR algorithm depends upon the size of static Time Quantum (TQ). If the TQ is extremely large, the algorithm approximate to First-Come First-Served (FCFS). If the TQ is extremely small, the algorithm causes too many context switches. So, our approach solves this problem by taking a dynamic TQ where the TQ is the difference between maximum and minimum CPU burst time as shown in equation (1).

TQ = MAXBT – MINBT (1)
Where MAXBT = MAXimum Burst Time
MINBT = MINimum Burst Time

B. Proposed Algorithm

In our algorithm, processes are already present in the Ready Queue (RQ). By default, Arrival Time (AT) is assigned to zero. The number of processes 'n' and CPU Burst Time (BT) are accepted as input and Average Turnaround Time (ATT), Average Waiting Time (AWT) and number of Context Switch (CS) are produced as output. Let TQ and TQnew be the time quantum and new time quantum respectively. The pseudocode for the algorithm is presented as follows and the flowchart of the algorithm is presented in Figure 2.

1. All the processes present in the ready queue are sorted in ascending order.
//n = number of processes, i = loop variable
2. while (RQ != NULL)
//RQ = Ready Queue
TQ = MAXBT – MINBT
//TQ = Time Quantum
//MAXBT = MAXimum Burst Time
//MINBT = MINimum Burst Time
(Remaining burst time of the processes)
// If one process is there then TQ is equal to BT of itself
3. if (TQ < 25)
set TQnew = 25
else
set TQnew = TQ
end if
4. //Assign TQ to (1 to n) process
for i = 1 to n
{
Pi → TQnew
}
end for
// Assign TQnew to all the available processes.
5. Calculate the remaining burst time of the processes.
6. if (new process is arrived and BT != 0)
go to step 1
else if (new process is not arrived and BT != 0)
go to step 2
else if (new process is arrived and BT == 0)
go to step 1
else
go to step 7
end if
end while
7. Calculate ATT, AWT and CS.
//ATT = Average Turnaround Time
//AWT = Average Waiting Time
//CS = number of Context Switches
8. End

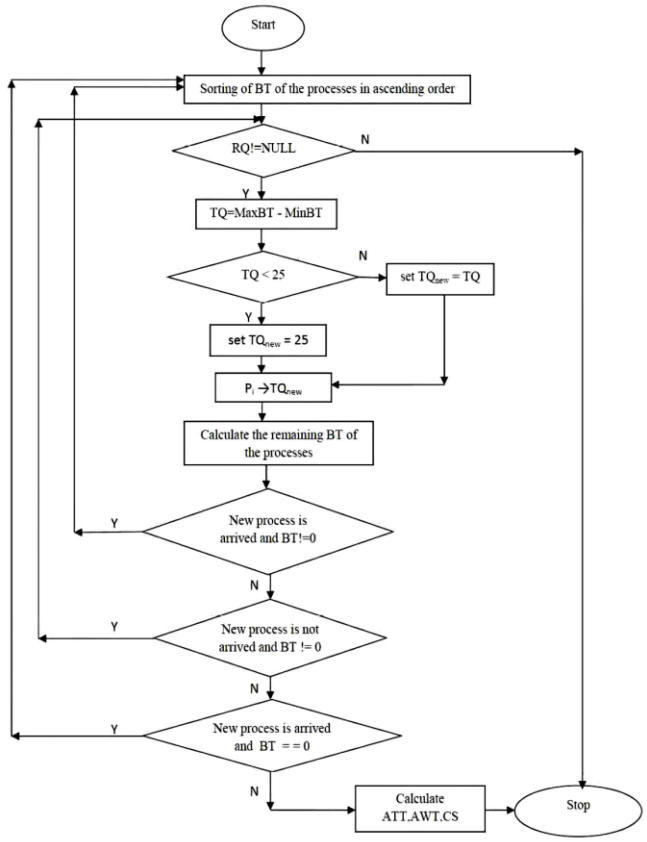


Figure 2. Flowchart of Min-Max Round Robin (MMRR) algorithm

VI. CONCLUSION

Load balancing based Online Examination System is a web application. The key idea is utilized numerous server for load balancing reason and to limit the measure of paper and convert all types of documentation to advanced shape. It can see that the data required can be gotten effortlessly and exactness in the mechanized framework. The client with least learning about PC can be capable work the framework effortlessly. The framework additionally delivers brief outcome required by the administration.

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A Review - Water Quality Monitoring System

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ABSTRACT

This paper describes the main reason for need of effective and efficient water level monitoring and control of water quality in flat system tends to keeping the human resources healthy and sustainable, and to reduce the usage of water for household purposes. Due to climate changes and variability so many huge impacts are caused by the water system to the natural environment. Incredible methods are used by collecting water samples, testing and analyses in water laboratories alone. However, It is not always easy to be captured, analyses and fast dissemination of information to relevant users for making timely and well-versed decisions. In this project Water Sensor System prototype is developed for water level and quality monitoring in society is presented. These kind of growth was introduced by the assessment of widespread atmosphere that Including accessibility of cellular network Coverage at the site of process.

Keywords : IOT Module, Level Sensor, Water Quality Mobile Phone Platforms, Sensor Nodes.

I. INTRODUCTION

The importance of maintaining good water quality is to increasing the need for advance technology to help monitor the water condition and maintain the water condition. However ,In this paper ,we are using the lake water for monitoring that provides some important service such as water for drinking, domestic purpose ,sites for recreational activity ,and important fisheries and also agricultural purpose .If pollution are involved in lake water ,then it can reduce the quality of water and so that it is unsafe to drink as well as harm organism that lives in water. The negative collisions of climate change and inconsistency are compounding the accessible challenges. As a result, increasing number of human activities has progressively speed-up contagion and damage to fresh water resources in the lakes. This traditional advance of water quality monitoring based on variety and subsequent analyses in water laboratories is exclusive, time- consuming and has a low promise both in time and space. In this paper, a planned IOT based water quality monitoring system sample is presented. The system consists of a ARM7 microcontroller, a set of water quality sensors, and a network connection module. It measures water quality parameters including Turbidity, electrical conductivity (EC) values in immediate. The experimental results showed that the system has great prospect and can be used to operate in real world environment for optimum control of aquaculture environment. Further more, the prototype is suitable for long-term outdoor environments and implement low-cost gateway module. The Smart Water Quality Monitoring System will measure the following water parameters for analysis; Conductivity and level monitoring. While monitoring these parameters, it is perceived

that one should receive a stable set of results. Therefore a continuous series of anomalous measurements would indicate the potential introduction of a water pollutant and the user will be notified of this activity with the aid of IOT technology. False positives, such as anomalous readings over a short period of time, will be recorded but not treated as an alert. Hence, with the successful implementation of this monitoring approach.

II. LITRATURE SURVEY

IOT Based Water Quality Monitoring

This paper investigates a real-time water quality monitoring system by using a proposed broker less publisher subscriber (pub/sub) architecture framework. On the system, sensors sense the water measurement metrics, including temperature, pH, and dissolved oxygen level. All collected data are stored in a database and computed stochastically for further analysis on water quality. A complementary experiment compares the proposed pub/sub architecture and MQTT, a lightweight protocol on which IoT mostly uses, to show better performance of the proposed architecture in case of network latency and throughput for diverse message payload size, thus suggesting the future IoT implementation of the system.

Author: Alif Akbar Pranata, Jae Min Lee

Publication & year: IEEE 2017

Water Quality Monitoring Using Interner of Things

The paper suggests an Internet of Things (IoT) based system implementation by embedding the Radio Frequency Identification (RFID) system, Wireless Sensor Network (WSN) platform and Internet Protocol (IP) based communication into a single platform for water quality monitoring (WQM) purpose. The suggested radio frequency for the proposed WSN communication to be deployed in vegetation area is 920MHz. The measured water parameter in this proposed system is pH level by using an analog pH sensor.

Author: Hafiz Kamaludin, Widad Ismail

Publication & year: IEEE 2017

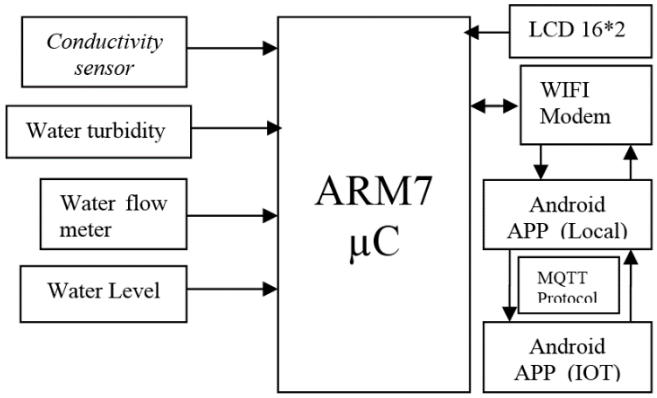
Water Quality Monitoring and Control

The main reason for need of effective and efficient monitoring and control of water quality in lakes, rivers and sea tends to keeping the human resources healthy and sustainable, and to increase population growth and urbanization. Due to climate changes and variability so many huge impacts are caused by the water system to the natural environment. Incredible methods are used by collecting water samples, testing and analyses in water laboratories alone. In this paper, Water Sensor Network (WSN) system prototype is developed for water quality monitoring in Lakes is presented. These kind of growth was introduced by the assessment of widespread atmosphere that including accessibility of cellular network coverage at the site of process.

Author: Karuppasamy M.E., Ph. D, B Abinaya

Publication & year: IRJET 2017

Figure and Table



III. Block Diagram Explanation

In today's world the water monitoring is of major concern. In majority of cases the water which is supplied is contaminated. For this a robust method

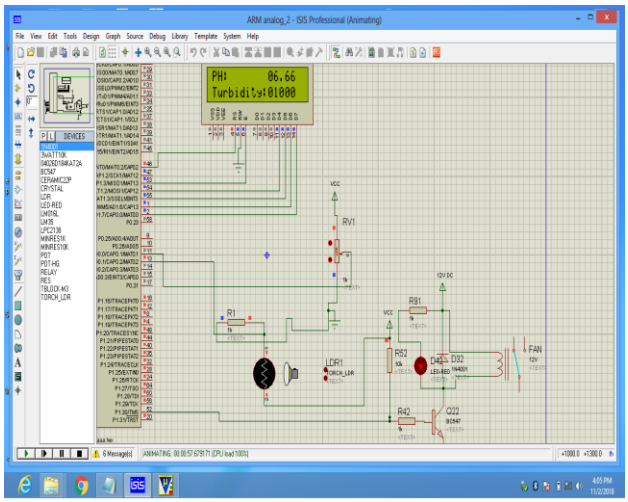
for water quality monitoring is required. Keeping this in mind we have designed a Embedded hardware which will monitor the quality of water and display the results on android APP. In our project we have considered the scenario of Society based water tank which is situated below the ground. The water is then pumped into the overhead water head tank for use of people. Here the μC will continuously monitor the water quality by measuring the water turbidity to check for impurities suspended in water and conductivity sensor to check content of water. If both the parameters are within set limits then the water is certified to for drinking. Here we are also designing a system for water management. The watchman will have a local APP which is connected to embedded hardware via WIFI. The user can request to turn on Motor. The μc will check whether water in the base tank is more than set point. If the water is less then motor is stopped. Also the water allotted to the society tank is limited. We have interfaced a water flow sensor. The μC will continuously sense the water quantity released. If the water released is more than set point then water is stopped. In this way we are managing the water distributed to societies using water flow meter. Here if the water is purity is high the μC will send all the sensor data to APP over WIFI. The APP will compare the sensor readings with internal set points and display the output to be fit for drinking.

The Local APP will send all the data to IOT based APP once in a day to log the water quality and water quantity released every day. Local app is used to develop to send the data to the end user. MQTT is a **machine-to-machine (M2M)**"Internet of Things" connectivity protocol. In the proposed system water quality parameters are measured by different sensors. So in order to meet all these requirements and technologies is used such as MQTT which allows publishing and subscribing of data between the sensors and end device. And with the help of MQTT algorithm there will be simultaneous flow of data between sensors and the server.

IV. Algorithm

1. Start
2. Init LCD
3. Display project name
4. "A"
5. Select channel 1
6. Read ADC
7. Store and display Turbidity on LCD
8. IS Turbidity>= High? N→"B"
9. Y→ Send Indication to IOT server
10. "B"
11. Select channel 2
12. Read ADC
13. Store and display conductivity value on LCD
14. IS Conductivity >= 85% or Conductivity <= 15%? N→"C"
15. Y→ Send Indication to IOT server
16. "C"
17. Select channel 3
18. Read ADC
19. Store and display Water Level on LCD
20. IS WL <= 20%? N→"D"
21. Y→ Send Indication to IOT server
22. "D"
23. Count Pulses
24. Store and display Water flow on LCD
25. Is Send Motor ON Button ON Pressed? N→"A"
26. Is Water Level>20% && Conductivity= normal? N→ Motor OFF →"A"
27. Y→ Motor ON →"A"

V. Simulation Circuit Layout



VI. Protocol Used (MQTT protocol)

MQTT is a **machine-to-machine (M2M)**/"Internet of Things" connectivity protocol. It is an extremely **lightweight publish/subscribe** messaging transport. It is useful for connections with remote locations where a small code footprint is required and/or network bandwidth is at a premium. MQTT is a **publish/subscribe** protocol that allows edge-of-network devices to publish to a broker. Clients connect to this broker, which then **mediates** communication between the two devices. Each device can subscribe, or register, to particular topics. In the proposed system water quality parameters are measured by different sensors. So in order to meet all these requirements and technologies is used such as MQTT which allows publishing and subscribing of data between the sensors and end device. And with the help of MQTT algorithm there will be simultaneous flow of data between sensors and the server. The main purpose of using IOT approach to monitor water quality using MQTT algorithm is to develop a system which provides end user a useful data used. Conventionally, the water sample are collected from different places and tested rigorously by scientist in the laboratory using many techniques to determine the water quality. Therefore older method where time consuming process but now IOT has the potential to modernize the water production, as more and more of its technology is connected to the web. This IOT approach is far better than conventional methods since it is cost friendly, faster and easy to use. Security is an essential factor for any system security at both the device and network level is critical to the operation of IOT.

VII. Android APP

The Water Quality mobile app is a water-monitoring data-collection and learning tool designed for use by educators and their students, citizen scientists, and researchers. The app helps users log and share data they collect in the field, interpret the data through learning pop-ups, and export it to create databases. Available for an Android (phones and tablets) mobile devices, this app includes data entry, identification, and learning features about chemical (e.g. turbidity), physical (e.g. water temperature, turbidity) water-quality parameters. Mobile phone applications are discussed, together with advantages and disadvantages of different technologies.

VIII. Specifications

a) Project Specifications:

- Project board: 10cm x 10cm
- Project Enclosure: 1feet x 1 feet
- Project supply: 230V, 1Ampere
- Power specifications: 12V x 500ma = 6 Watt

b) Hardware Specifications:

Microcontroller: LPC2138 ARM7 Microcontroller, 32K RAM & ROM, 40 I/O, 2 serial Ports

- Turbidity sensor: LED+LDR
- PH: Electrode sensor
- Water level: Float sensor
- Water flow meter: Rotating pulse output meter

- Display: LCD16*2, Voltage→5V, Current→10ma
- WIFI Module: ESP8266 module, 30meters range, 5V, 50ma
- Relay: 230V, 5A
- Buzzer: 5V, 10ma

c) Software Requirements:

- Compiler: KEIL3
- Programming Language: Embedded C
- Programming Platform: Flash Magic
- Android APP: Basic for Android Software

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BIOGRAPHIES



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Design and Construction of a Device for Free Form Surfaces 3D Reconstruction Using Microsoft Kinect

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ABSTRACT

There is an increasing need for geometric 3D reconstruction models in the Reverse engineering which is ones of computer Vision applications, reconstruction from a sequence of 2D images is much cheaper than 3D scanners and coordinate measurement machine and also been able to take advantage of the developments in digital cameras and the increasing resolution and quality of images. This work aims to develop a concept of 3D free form surface reconstruction rig and generate the dimension of the surface depending on proposed image processing technique. Through the results obtained is observed that. The overall of calibration accuracy the Root mean square (RMS) value of the point was produced the residuals value in the image space was (0.2830 mm) in the IR images.

Keywords : Range Camera, IR Sensor, Stepper Motor, Imaging, Arduino and Matlab

I. INTRODUCTION

Reverse Engineering (RE) plays a fundamental role in industrial Computer Aided Engineering systems (CAE). With RE, objects can be digitized, three dimensional (3D) reconstructed and assimilated as computerized models. Digitizing systems in RE are founded on three major technologies

a) Coordinate measuring machines (CMMs).
b) 3D laser scanners.
c) Digital photogrammetry systems.

A. A contact measuring instrument such as plumb-line is used. Since this method is adequately strong and accurate, it is generally used to sample points as part of the RE process. However, its advantages are highly diminished by the slow rate of data taking. In increased, the object's surfaces may be superfine or adaptable and require non-contact measurement . Figure (1-1) illustrate a coordinate measuring machine..



Figure 1: CMM [1]

B. Laser-based range sensors are non-contact sensors and therefore are very rapid. The scanned data give straightforward 3D points from that a 3D model can be reconstructed. However, the 3D data generated by 3D laser scanners is not appropriate for direct integration in CAD systems: the scanned data is irregular and sprinkled and requires heavy processing in order to rebuild the

surface of the object. Laser scanner systems provide a massive amount of digitized point data, therefore requiring a time- exhaustion data lowering process. In order to get better 3D reconstruction processing, some scanned systems provide range image instead of scattered points. A sampled surface (z) function of (xy) is represented as a 3D image where each pixel contains a height [1,2]. Figure (1-2) illustrate a laser scanning.

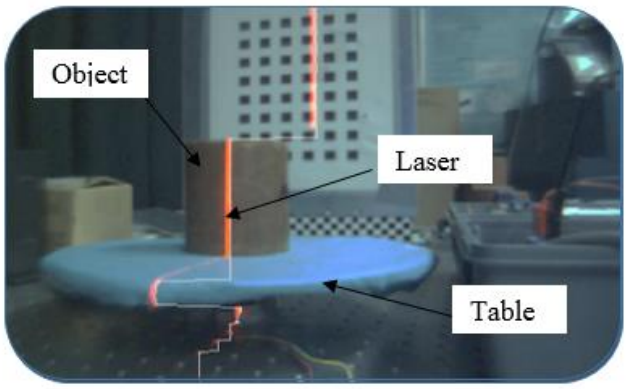


Figure 2: Laser scanner [2]

C. Digital Photogrammetry Systems

3D models are reconstructed from an arrangement of 2D pictures. Utilizing a triangulation strategy, the scope of focuses in the scene can be figured by applying a coordinating procedure. This procedure, in any case, is tedious and experiences merging issues. The data is not finished since a few focuses are not "seen" in both pictures. In addition, when different pictures are utilized, camera adjustment is expected to rectifying geometric mistakes and to representing the camera parameters. PC vision procedures can be connected to range of images alone to gather geometric and topological structure, yet precision issues happen on the limits [1,4].

II. EXPERIMENTAL WORK

In this proposed 3D reconstruction technique the shape and dimension of the lasted object are captured and separated with a specific end goal to get duplicate of the same objects and creating information that can be utilized for several engineering applications.

The Adopted rig included implementation of measurement rig based on image processing technique to get measured data of the existing objects. The calculated circular path of specific camera and definite the distance between the engineering part who want to measure and the camera are main items to be studied to have accurate results with assume the other parameters are constant like lighting system. The measurement system was built, and some parts were manufactured in this work. After system assembly, tests and calibrations were carried out to obtain the system performance and results. Figure (1-1) illustrate the Adopted rig.

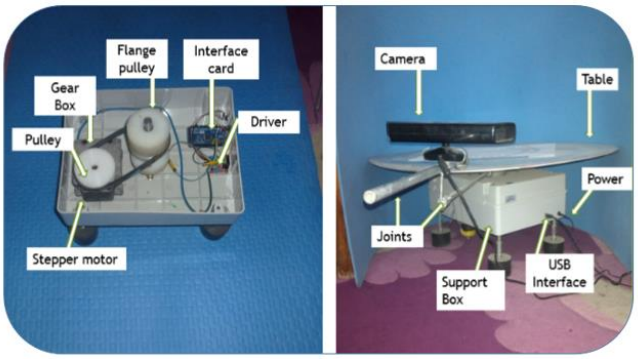


Figure 3: Adaptive System

III. IMPLEMENTED THE RIG

The adopted rig consist of asset of subsystems and there subsystems in turn consist of a set of parts as illustrated in figure (1-2).

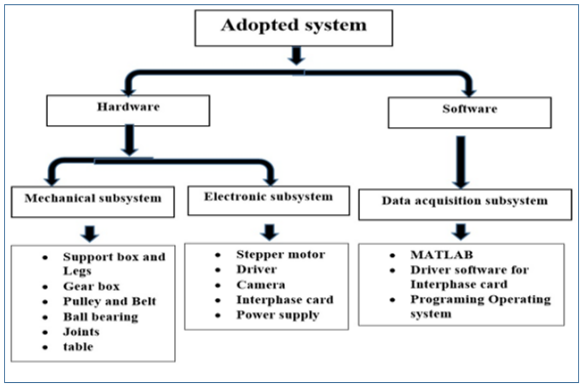


Figure 4: adopted instrument parts

A. Code for rig operation

The block diagram shown in Figure (4) illustrate the steps of programs work

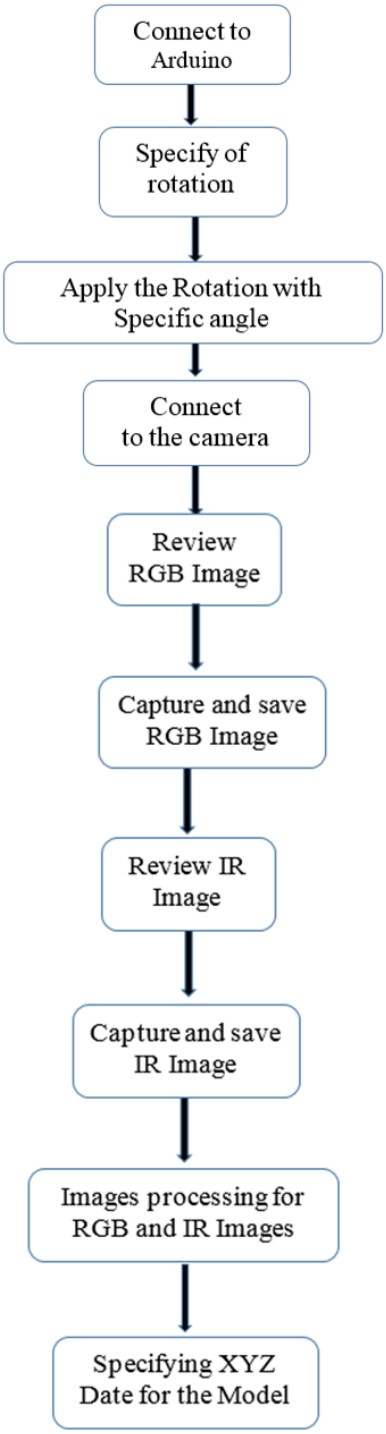


Figure 5: Flow chart

IV. RESULTS AND DISCUSSION

An accurate stepped objected has been machined using CNC milling machine with predefined dimension to be used as a tested object to calibrate the adoptive instrument . Figure (1-4) illustrated the tested object front and side view of the tested first part

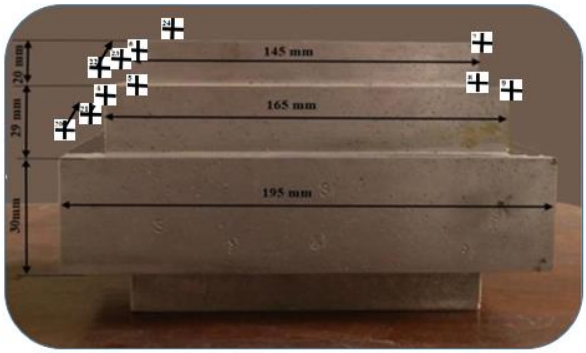


Figure 6: front view of the tested part with control point

Table 1. Control Point of the First Tested Part

CP	X(mm)	Y(mm)	Z(mm)
1.	100	100	100
2.	100	130	100
3.	115	130	115
4.	115	159	115
5.	125	159	125
6.	125	179	125
7.	170	179	125
8.	170	159	125
9.	180	159	115
10.	180	130	115
11.	295	130	100
12.	295	100	100
13.	295	100	195
14.	295	130	195
15.	180	130	180
16.	180	159	180
17.	170	159	170
18.	170	179	160
19.	100	100	195
20.	100	130	195
21.	115	130	180
22.	115	159	180
23.	125	159	170
24.	125	179	170

Table 2

listed the RMS value of each IR images of first tested part, and figure (7) indicates the residual value in all capturing IR images of the first part.

Image No.	angle (◦)	RMS (mm)
1.	0◦	0.0057
2.	45◦	0.0048
3.	90◦	0.1216
4.	135◦	0.1690
5.	180◦	0.4700
6.	225◦	0.0339
7.	270◦	0.1735
8.	315◦	0.3906

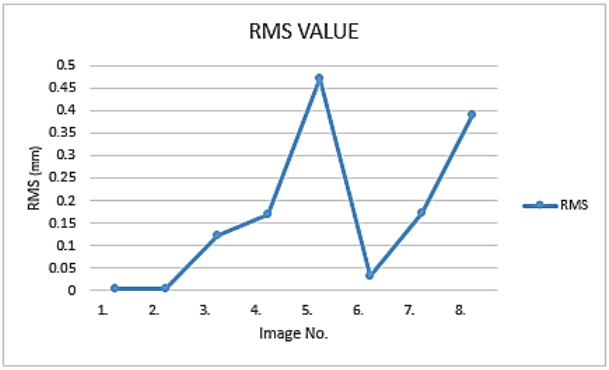


Figure 7: The Residuals value in all capturing IR images of the first tested part

Through the results obtained is observed that .The overall of calibration accuracy the Root mean square (RMS) value of the point was produced the residuals value in the image space was (0.2830 mm) in the IR images. that is mean the error in 3d reconstruction was (0.2830 mm) in total length.

V. CONCLUSION

3D models Reconstructing from existing part is a prime issue in numerous computer vision research like Pattern recognition, Reverse engineering and Industrial investigation. The automatic instrument for creating 3D models was implemented. In this 3D Reconstruction technique the shape and dimension of object are captured and separated with a specific end goal to get a duplicate of the same part in this manner creating information that can be utilized for CAD/CAM purposes.

From the results of this research the following most conclusions can be listed.

1. The adapted 3D reconstruction instrument is a low cost portable compound Comparison with not portable alternative expensive laser scanners (LS) and Coordinate measuring machines (CMMs) in 3D reconstruction and measurement application
2. The cloud point of the properly was calibrated Kinect sensor camera did not contain large systematic errors.
3. The IR camera didn't effect with how much light in room when the captured images hence the 3D reconstruction and measurement instrument work in any condition didn't required tough light condition and we could classified the images
4. The value of error of depth data measurements has been increases quadratic with increasing distance from the camera.
5. The 3d reconstruction instrument didn't effect with how much Wight of the object because the table didn't have any movement
6. There is limitation of the object size for this instrument the size should not exceed 500 mm circle diameter
7. 7. The density of extracted points would be decreases with increasing the distance to the camera. It is influencing factor of the depth image resolution.

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Assess the Knowledge Regarding Pap Smear Among Women

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ABSTRACT

Background: Cervical cancer screening is an essential part of women's routine health care. The Pap smear test is the way to detect abnormal cervical cells including precancerous cervical lesions as well as early stage cervical cancer.
Objectives: 1.To assess the level of knowledge regarding Pap smear among women. 2. To find out the association between level of knowledge regarding Pap smear among women with their selected socio demographic variables.
Methodology: Cross sectional descriptive research design was used to conduct research study. 30 women residing at Kamakshi Nagar in Nellore were selected by using non probability convenience sampling technique.
Result: The result reveals that,out of 30 women, 17 (57%) had in adequate knowledge, 10 (33%) had moderately adequate knowledge and only 3(10%) had adequate knowledge regarding pap smear.
Conclusion: The study concluded that majority of women had inadequate knowledge on pap smear test .hence there is a need to conduct awareness programme in community to raise the level of awareness on pap smear test.
Keywords : Knowledge, Pap smear, Women.

I. INTRODUCTION

Cervical cancer is the fifth most common cancer in humans, the fourth most common cancer in women worldwide. It is the most common cancer related deaths among women in the developing countries. Based on the World Health Organization (WHO) stated that, 22% of female deaths are caused by malignant tumors, out of these 18% of them are due to cervical cancer. Five screening methods namely; naked eye visual inspection of the cervix with application of diluted acetic acid (VIA), examination with Lugol's Iodine (VILI) or with a magnifying device (VIAM), the Pap smear and Human Papilloma Virus (HPV) testing with high-risk probe of the Hybrid Capture-2 assay (HC2) is used to detect the cervical cancer in precancerous stage. Several conventional methods have been proposed for the early diagnosis of cervical cancer and its secondary prevention, out of these Pap smear test is the most effective method for screening of cervical cancer.

Pap smear test is a simple and inexpensive diagnostic method and is therefore useful especially in areas with limited resources. The diagnostic utility of cervicovaginal cytology (Pap test) as a first line of investigation has assumed importance in screening of cervical cancer. Hence the investigator selected the

present study to identify the level of knowledge among women.

STATEMENT PROBLEM

A Study to Assess the Knowledge Regarding Pap smear among Women in Kamakshi Nagar At Nellore.

OBJECTIVES

- To assess the level of knowledge regarding pap smear among women
- To find out the association between level of knowledge regarding pap smear among women with their selected socio demographic variables

II. METHODS AND MATERIAL

A quantitative research approach and Cross sectional descriptive research design was used to assess the knowledge regarding Pap smear among Women in Kamakshi Nagar at Nellore. The sample includes all women who are residing in Kamakshi Nagar. 30 women were selected by using non probability convenience sampling technique.

Criteria for Sample Selection

Inclusion criteria

The women in NTR Nagar, Nellore

Who are willing to participate

Who are available at the time of data collection

Who knows Telugu or English.

Exclusion criteria: Women who are

Having acute illness

Not willing to participate in the study

DESCRIPTION OF THE TOOL:

The tool consists of 2 parts.

PART-I: It deals with the socio demographic variables like age, educational qualification, occupation, income per month, religion, marital status, type of family.

PART-II : It deals with structured questionnaire comprise 26 questions based on pap smear

Score interpretation: Score of one and zero were awarded respectively to each correct and wrong answer.

Level of knowledge	Percentage
Inadequate knowledge	<50%
Moderately adequate knowledge	51-70%
Adequate knowledge	>71%

Content validity was obtained from nursing academic researchers and reliability of the tool was tested by using test and retest method .The reliability coefficients for all the tool was 0.8.

DATA COLLECTION PROCEDURE:

Prior formal permission was obtained from the institutional ethical committee, Narayana Medical College Hospital, Nellore and permission obtained from the village sarpanch. The samples were informed by the investigator about the purpose of the study and the written consent was obtained. The data collection was carried out 2 weeks. Data was collected by using socio demographic variables and a structured questionnaire was used to measure the level of knowledge regarding Pap smear. It took 10-15 minutes to collect the data from each participant. The data was analyzed and tabulated by using descriptive and inferential statistics based on objectives of the study.

DATA ANALYSIS

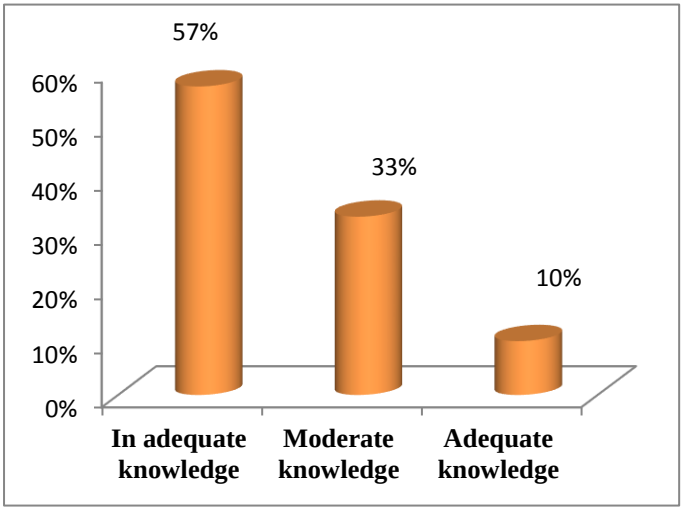
The data analyses were performed using IBM Statistical package for social sciences (SPSS) version 20.0. Descriptive and inferential statistics were used. Socio Demographic variables are analyzed in terms of frequencies and percentages. Knowledge score about the pap smear was presented using , Mean and standard deviation. Chi square test used to determine the association between the socio demographic variables and level of knowledge among the study group.

III. RESULTS AND DISCUSSION

Section-I: Frequency and percentage distribution of socio demographic variables.

Majority of patients In relation to age 13 (43.3%) women are between 30-40 years, In context to education 15(50%) of women had intermediate, In view to occupation 25 (83.3%) are house wives, In context to income per month 18 (60%) are in between 7001-9000 rupees, In relation to religion 23 (76.6%) are Hindu religion, In context to marital status 30(100%) women are married, in context to type of family 15 (50%) are belongs to joint family.

Section-II: Percentage distribution of level of knowledge regarding Pap smear among women



Section-III: Mean and standard deviation of knowledge regarding Pap smear among women

Criteria	Mean	Standard deviation
Level of knowledge	11.5	2.03

Section-IV : Association between the level of knowledge and socio demographic variables of women.

The Study finding reveals that there is an association between the level of knowledge regarding Pap smear test with socio and socio demographic variables like, education qualification and remaining variables has shown non significant association.

Recommendations for Further Research: On the basis of finding of the study the following recommendations are be suggested in the future research:

- A similar study can be conducted at different setting in different population
- Structured teaching programmes can be conducted to increase the awareness of women.

IV. CONCLUSION

The study concluded that, majority of the women are having inadequate knowledge about the Pap smear. Hence there is a need to conduct awareness programmes in community to improve knowledge level among public. It helps to decreases the morbidity and mortality associated with late presentation of disease.

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Study of Query Optimization in Cloud

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ABSTRACT

Cloud computing in very simple terms, is basically where a company uses someone else's computing services (usually over the internet) instead of having to run that software on their own computers. Today, cloud computing plays an important role in service-oriented technologies. The main purpose of cloud computing is, it allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access and it allow users to easily and efficiently calculate and save resources. The recent approach is to process data expression and search. To improve cloud performance, it is necessary to optimize the processing time. Our research provides a comprehensive overview of the different models and methods used to optimize queries to reduce execution time and improve resource utilization. We conducted various query optimization research activities for the classic SQL and Map Reduce platforms.

Keywords : Cloud Computing, Map-Reduce, Service Level Agreement, Query optimization, Conventional SQL.

I. INTRODUCTION

Cloud computing is a very successful paradigm for service-oriented computing [1]. The most popular cloud services are Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). Expanding this concept is a Database as a Service (DBaaS) or Storage as a Service. Cloud computing improves common computer and storage capacity for a number of database applications. "The observed number of applications that have affected multiple platforms in the clouds has greatly increased the amount of data generated and used by these applications" [2]. "Cloud is the basis for cloud computing applications and search algorithm and cloud organization and search algorithm." The new research topic was how to organize and manage this huge amount of data. Get users useful information about cloud computing "it's the core of the cloud application" [3] How to get data fast, accurate and secure Play an important role in a successful job data model in the cloud. In cloud computing, resources need to be automatically and quickly acquired and released during business hours to provide Service Level Agreements (SLAs) between the client and the cloud provider [4]. Using virtual machine clusters, cloud computing users can rent large amounts of resources for a short period of time to effectively execute large-scale complex queries [5]. Lease duration can be further reduced by using better query optimization techniques [6]. Therefore, it is necessary to investigate effective query optimization techniques to reduce query time and response time. It will also improve the use of computing resources in the cloud. "Query optimization leads to optimization of resource lease time in the cloud environment". Query optimization techniques in centralized and distributed platforms are extensively researched in conventional SQL and Map Reduce methods. An example of processing a request in the cloud is shown

in Figure 1. In our work we looked at the field of this research and analysed different query optimization methods.

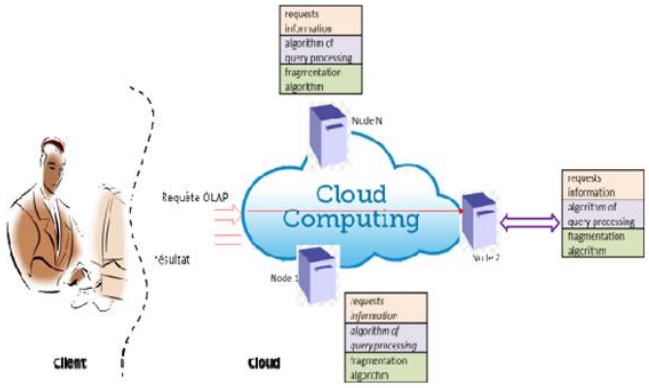


Fig 1. Cloud query processing

II. RELATED WORK

Arduino In this article, we have analysed query optimization techniques. Understand theoretical analysis of optimization methods. We have classified various methods used to optimize the query.

1.1 Spatial Query Optimization

Spatial On-Line Analytical Processing [7] performs operations in data cubes integrating both spatial and multidimensional operations. Spatial operations and multidimensional operations are performed using Spatial Data Warehouse data using multidimensional data views and pre-data counting data. Multidimensional data views are provided with multidimensional operations. Spatial operations are functions that make important elements of a model that measure position data, then analyse and provide output information. These processes are known as the Spatial On-Line Analytical Process.

1.2 Selectivity Using Histograms

1) Histogram Structure: The histogram contains the values of different cubes. In digital data, we can determine a certain range, then the appropriate group. In the case of categorical data, we need to divide the data into a ranking relative to the letters.

2) Gradual maintenance of histograms: Here we find the error of evaluation of each attribute; if the error is above a certain threshold, then we need to update the histogram; otherwise we will use the same old histogram to provide a selectivity assessment.

3) Diagram of error estimation method: Here we find error estimation using standard deviation between old data value and value of data restored in histogram groups.

1.3 Data Flow Style

In this approach [8], Data Integration System (DIS) uses the data flow query execution mode. This data flow execution model has four types of elements.

1) Query Plan: Contains a set of sub-queries for data sources and operators that indicate how the sub-query result is combined.

2) Query: The processing group is generated after the query plan and sent to the μ Engine.

3) Sender: sends the request to the μ Engine.

4) μ Engine: application process.

Therefore, all sub-queries can get their results and overall overhead costs can be reduced. The results of the study show that when the DIS executes a set of parameter queries, this new calculation can reduce the normal request processing time from 39 to 58% if the DIS executes an unwanted query group, the time for normal consultation can be reduced from 28 to 38%.

III. NAVIGATION OF QUERY OPTIMIZATION METHODS

To improve the high performance of large-scale data systems, the use of centralized or distributed platforms with traditional SQL or MapReduce

technology query optimization is required. Query optimization is done in two phases in the first phase, creating a search space, and selecting the optimal search space scheme in the second phase [9]. Researchers discover many approaches that complement one or more query optimization techniques, such as removing surplus estimation, continuous or repetitive processing, queries or intermediate capture results, materialization, and pipeline. Some of these techniques reduce the cost of communications; others focus on reducing query execution time and others on the proper use of system resources in the cloud.

a) Continuous or Iterative Processing

The continuous query optimization method differs from the traditional method that focuses on compiling and disseminating data statistics before executing a query. Bruno N et al. [10] proposed a method to continuously monitor query execution, collect real-time execution statistics and adjust execution plans when needed during execution of the request. Query Optimization is enabled when new runtime statistics are available. If a better plan is found, the proposed technology intelligently adjusts the current execution plan with minimal change. Optimization methods are based on accurate data statistics to select the best execution plan.

b) Pipelining

In the cloud environment used by MapReduce, the total cost of data processing for heavy load increases simultaneously. Anyanwu K et al. [3] introduced a Nested Triple Group Data Model and Algebra (NTGA), which reduces total processing costs by reducing the number of MapReduce cycles. Based on MapReduce, enters the cost of storing intermediate results. The task is divided into different tasks. The task reads the result of the previous task to continue processing. The AQUA (Automatic Query Analyzer) for MapReduce reduces the amount of intermediate results generated to reduce storage and network costs. Adopt a two-step optimizer: Step 1 creates a group of association operators to reduce the total number of MapReduce jobs to assess the query. Phase 2 is added to group interim results to get final query results.

IV. CONCLUSION

In the submitted survey, we conducted different approaches on both the centralized platform and distributed query optimization based on the usual SQL and MapReduce techniques. Cloud computing platforms must have a standalone solution to extract and release resources during work to provide a secure service to the customer. However, traditional query optimization strategies do not determine the future availability and release of resources; therefore its performance may be poor compared to the MapReduce strategy.

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Intelligent Traffic Management Service Using Fuzzy Logic Controller in High Speed Networks

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ABSTRACT

Network traffic management is a core area of research that is of great importance in the field of communication. This paper proposes a new scheme for controlling router side traffic in networks by updating source sending rate according to its IQ size. A new fuzzy controller is to be modelled to implement the proposed system. Simulation results and comparisons has verified the effectiveness and showed that our proposed scheme can achieve better performances than the existing protocols.

Keywords : Traffic Management, Fuzzy Logic Controller, IQ size, BDP, XCP, RCP, XCP

I. INTRODUCTION

Network traffic management can prevent a network from severe congestion and degradation in throughput-delay performance. Congestion in a network may occur when the load on the network is greater than the capacity of the network. Congestion control is 'adapting speed of transmission to match available end-to-end network capacity'. In order to make use of the bandwidth those high-speed networks offers, we need to have a proper and efficient mechanism to control congestion in these nodes. There are mainly two classes of approaches: implicit congestion control and explicit congestion control. Historically, TCP (Transmission Control Protocol) is a widely deployed congestion control protocol that tackles the Internet traffic. It has the important feature that the network is treated as a black box and the source adjusts its window size based on packet loss signal.

However, as an implicit control protocol, TCP encounters various performance problems (e.g., utilization, fairness and stability) when the Internet BDP (Bandwidth-Delay Product) continues to increase. Explicit congestion control protocols has been proposed to signal network traffic level more precisely by using multiple bits. these protocols have their controllers reside in routers and directly feed link information back to sources so that the link bandwidth could be efficiently utilized with good scalability and stability in high BDP networks.

II. METHODS AND MATERIAL

EXISTING SYSTEM:

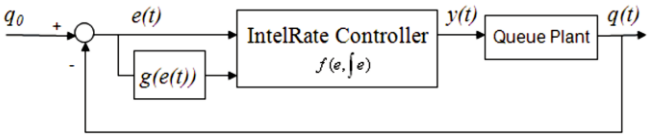
The algorithm begins in the slowstart state. In this state, the congestion window size is doubled for every window of packets acknowledged. Upon the first congestion indication, the congestion window size is cut in half and the session enters into the exponential congestion control state.

In this state, the congestion window size is increased for each new acknowledgement received. The

algorithm reduces the window size when congestion is detected.

PROPOSED SYSTEM

To achieve the new proposed system, our new scheme pays attention to the following methodologies as well as the merits of the existing protocols. Firstly, in order to keep the implementation simple, like TCP, the new controller treats the network as a black box in the sense that queue size is the only parameter it relies on to adjust the source sending rate. Secondly, the controller retains the merits of the existing rate controllers such as XCP and RCP. XCP feeds back the required increment or decrement of the sending rate, while RCP directly signals sources with the admissible sending rate according to which sources pace their throughput Thirdly, we rely on the fuzzy logic theory to design our controller to form a traffic management procedure.



Intel rate closed loop control system

Intel-rate Controller Design:

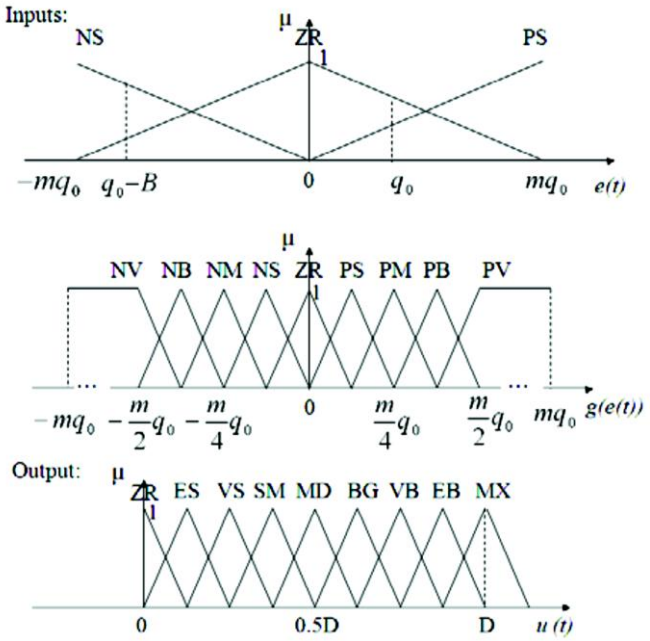
The queue deviation e(t)= $q0$-q(t) is one of the two inputs of the controller.In order to remove the steady state error, we choose the integration of e(t) as the other input of the controller,i.e. g (e (t)) =$\int e(t)\,dt$
The aggregate output is y (t)=$\Sigma ui(t-Ti)$ .Under heavy traffic situations, the IntelRate controller would compute an allowed sending rate u(t) for flow i according to the current IQSize so that q(t) can be stabilized around $q0$. In our design, IQSize q(t) is the only parameter each router needs to measure in order to complete the closed-loop control.

Implementing Intelrate controller using fuzzy logic theory

Since e(t) is bounded by the physical size of a queue, we have the boundaries according to the limits $q0$–B≤e(t)≤ $q0$.

The absolute values of both the upper and lower limits of g(e(t)) set to m$q0$.

The output $u(t)=\sum_{j=1}^{k} c_j s_j \,/\, \sum_{j=1}^{k} s_j$



Controlling Procedure

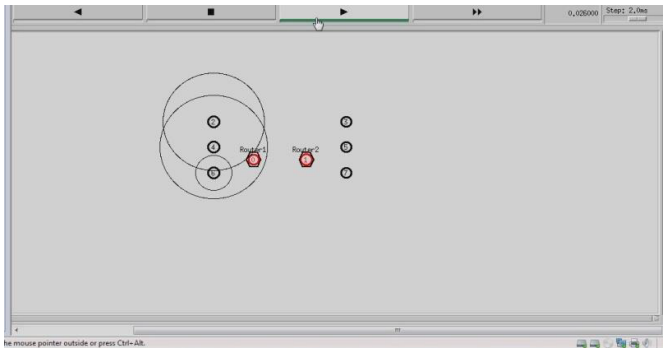
Upon the arrival of a packet, the router extracts *Req_rate* from the congestion header of the packet.
1)Sample IQSize q(t) and update e(t) and g(e(t)).
2)Compute the output u(t) and compare it with *Req_rate*.

a) If u(t) < *Req_rate*, it means that the link does not have enough bandwidth to accommodate the requested amount of sending rate. The *Req_rate* field in the congestion header is then updated by u(t).
b) Otherwise the *Req_rate* field remains unchanged.

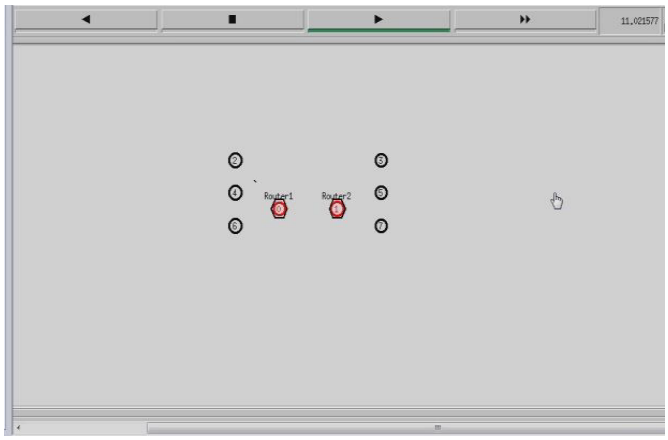
3) If an operation cycle d is over, update the crisp output u(t) and the output edge value of D.

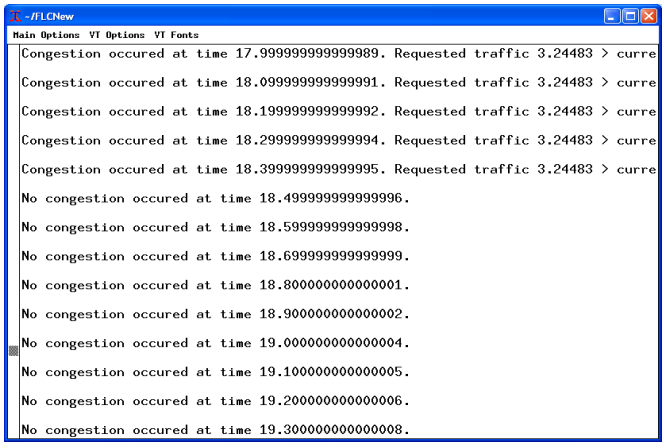
III. RESULTS AND DISCUSSION

Existing System



Proposed System

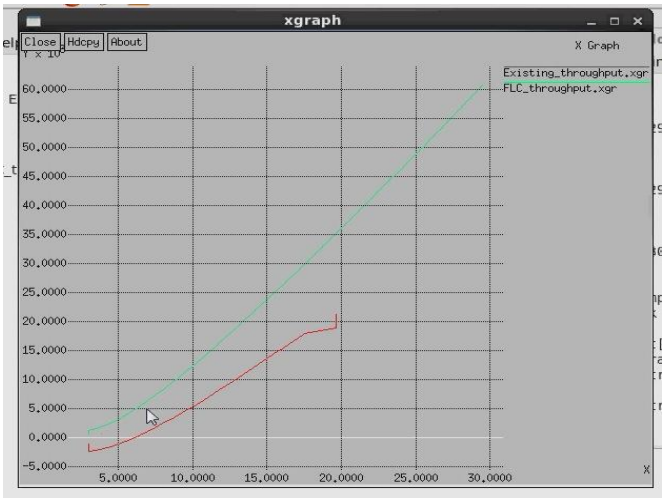




For Two Flows



For Three Flows



For Five Flows



Comparison Table

Throughput:

No.of flows	Existing system(kbps)	Proposed system(kbps)
Two	817.93	1327.96
Three	778.67	1302.48
Five	696.65	1292.03

Time taken for congestion occurrence

No.of flows	Existing system(ms)	Proposed system(ms)
Two	5.99	6.21
Three	3.64	3.98
Five	1.07	1.73

A novel traffic management scheme, called the IntelRate controller, has been proposed to manage the Internet congestion for different flows. The controller is designed by paying attention to the disadvantages as well as the advantages of the existing congestion control protocols.I n addition to the feature of the FLC being able to intelligently tackle the nonlinearity of the traffic control systems, the success of the IntelRate controller is also attributed to the careful design of the fuzzy logic elements.

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A Prospective Study to Investigate the Placement of Setup Skin Markings for Larger Breasted Women Undergoing External Beam Radiotherapy (RT) for Breast Cancer

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ABSTRACT

Background: The technique of placing all three skin marks (reference skin marks) on a single position during CT simulation for setup of patients undergoing conventional breast radiotherapy becomes a challenge when presented with larger breasted women (bra cup size ≥ D). A new way of using skin marks in setting these patients up has been developed where three skin marks are made on the patient (one on the sternum and two lateral skin marks more inferiorly beneath the breasts) for setup as against the departmental standard of using only a single skin mark on the sternum, and employing an SSD (Source to Skin Distance) technique.

This study therefore reviewed the placement of the skin markings for larger breasted women undergoing external beam radiotherapy for breast cancer by quantifying treatment field alignment errors and setup errors between the two different setup techniques.

Method: 36 patients were used in this study. Out of this number, 18 were setup using three reference skin marks and the remaining 18 were setup using one reference anterior skin mark. With an acceptable patient treatment field alignment error of 2 degrees, portal images (AP and lateral) of the different skin mark techniques were analysed for field alignment errors using an Iview GT system. More so, portal images (AP and lateral) of setup for both techniques were analysed for systematic (Σ) and random (σ) errors.

Results: The AP images of the single skin mark setup and the three skin mark setup yielded no significant difference as they recorded a p- value ($p<0.05$) of 0.089 and 0.110 respectively when compared to the treatment field alignment threshold error of 2 degrees. The lateral images of the three skin mark also yielded no significant difference as a p- value ($p<0.05$) of 0.091 was recorded. The lateral images of the single skin mark yielded a significant difference with a p- value ($p<0.05$) of 0.026.

Secondly, mean comparisons of the field alignment errors between the two setup techniques yielded no significant difference in the AP images as a p- value ($p<0.05$) of 0.089 was detected. On the contrary, a p- value ($p<0.05$) of 0.026 was recorded in the field alignment errors of the lateral images. This difference is significant.

Lastly, random errors were reduced in all directions (AP- anterior-posterior, SI- superior-inferior and LR- Left-right) in the three skin mark setup (4.5mm AP, 4.9mm SI and 2.4mm LR) as compared to the single skin mark setup (4.7mm AP, 5.2mm SI and 2.6mm LR). Systematic errors were also reduced in the three skin mark setup (1.7mm AP and 1.8mm SI) compared to the single skin mark setup (2.0mm AP, 2.1mm SI). Systematic errors in the LR direction on the other hand increased from 2.0mm in the single skin mark to 2.2mm in the three skin marks.

Conclusion

For setup of larger breasted women undergoing external beam radiotherapy for breast cancer, the three skin mark setup technique is superior to the single skin mark setup technique.

Keywords : Skin Markings, Beam Radiotherapy, Breast Cancer, tumor, BMI, TPRP

I. INTRODUCTION

Breast cancer is the most frequently diagnosed cancer in women. It accounts for nearly one-third of cancers diagnosed in females. Most breast cancer cases are diagnosed in postmenopausal women, with an average age of around sixty years (Cancer facts and figures, 2017).

Detection of breast cancer at the early stages increases the cure rate up to almost 90% (Cancer facts and figures, 2017). Hence, the constant efforts by organizations and medical outfits worldwide to create breast cancer awareness. The emphasis on early detection as well as improvement in imaging procedures has tremendously increased the incidence of patients presenting with non-invasive breast cancer and as a result has increased the percentage of breast conservative treatment, radiotherapy inclusive (Linder and Schiska, 2015)

Years of clinical studies have proven that breast conservation therapy offers the same cure rate as mastectomy and that adjuvant radiotherapy to the breast is now considered part of the standard care in breast conserving therapy (Veronesi et. al. 2002). In addition, results from randomized clinical trials in early stage breast cancers have shown improved local control in breast radiotherapy after breast conserving surgery (Fisher et.al. 2002).

Most early stage breast cancer patients receive radiotherapy as part of their treatment (Clarke et al., 2005). The reason behind breast conserving therapy is to give patients the same cure rate if treated with mastectomy and to leave the breast intact with an appearance and texture as close to what was there before (Radiology Info.org, 2016). The authors further explained that, the long-term complications following conservative surgery and radiation therapy for early stage breast cancers are low.

Radiotherapy for breast cancer patients (candidates for breast conserving therapy) requires rigid immobilization and accurate positioning. According to Lakosi et. al (2015), the standard treatment for women with early breast cancer following breast conserving surgery is radiation therapy in the supine position. Varga et. al (2009), further emphasized the advantage of supine setup as resulting in increased accuracy of setup repositioning.

Traditionally, because of the nature of the chest well, patients are made to lie supine on a breast board which is usually inclined at about an angle of 10-20 degrees in order for the chest wall to be parallel to the surface of the couch and to also bring the lateral and inferior part of the breast anteriorly, to help with the treatment setup. Skin marks or tattoos are also made in the same plane on the thoracic region and are aligned with laser lights (midline and lateral) during immobilization for the radiotherapy process (Dobbs, Barrett, Morris and Roques, 2009).

II. METHODS AND MATERIAL

Method

Study Design

This study is a research which investigates and compares two different setup techniques for a

category of patients undergoing external beam radiotherapy. This study used a positivist paradigm which is one of the theoretical framework which influences the way knowledge is studied and interpreted (Mertens, 2005).

The positivist theoretical perspective aims at testing a theory or describing an experience through observation and measurement in order to predict and control the situation at hand (Dash, 2005). According to the author, it reflects a concept in which cause determines effect and perceives the world as being atomistic in nature where the world is made up of discrete, observable elements which interact in an observable and regular manner.

This paradigm allowed the researcher to follow a well-defined structure which does not allow for huge changes in variables as well as gave the researcher the platform to use objective mathematical and scientific tools in the analysis of the study (Creswell, 2003).
More so, the positivist experimental approach used by the researcher in gathering data provided the researcher with information which could be used to make further scientific assumptions as far as radiotherapy setup for larger breasted patients are concerned (Essays, UK, 2014).

This paradigm also helped the researcher to maintain minimal interaction during the study (Wilson, 2010).

Non-positivists on the other hand perceive this as impossible because human behavior comes naturally with emotional responses. Non- positivists believe that, although positivism encourages researchers to maintain minimal interaction during the study, there is no guarantee that this will occur at all times during studies (Cram, 2014). This according to non-positivists confirms the inflexible nature of positivists.

In summary, the positivists' paradigm was chosen for this study because, it gave the researcher the opportunity to test a procedure in order to provide a basis for knowledge. It is objective, has a high level of precision, transparent and free from personal prejudices.

According to Creswell (2003), if the experimental process is followed and statistical analysis done in the right manner, this framework is always likely to produce a valid and reliable outcome.

RESEARCH METHOD

This study is a prospective cohort study and a quantitative approach was used to evaluate the treatment setup techniques for larger breasted patients (cup size ≥ D) undergoing breast radiotherapy. This study categorized one group (patients with one skin mark on the sternum and two more inferior ones) as the test group and the other with only one anterior skin mark on the sternum as the standard in my department for larger breasted patients. This approach helped the researcher to be objective in the employment of statistical models to attempt to answer the primary research question as well as explain what is observed (Steber, 2017).

In order for this approach to be effective, a pilot study was conducted in the department, prior to the commencement of the main study. The pilot study helped to determine whether there were any potential problems with the proposed method. Three participants (larger breasted patients) with various cup sizes of D and above, were recruited for the study. All participants met the inclusion criteria stated and they did not take part in the main study. The pilot study was conducted under the same test conditions as the study. The outcome of the pilot study was not included in the final analysis of this study.

Participants

Participants selected for this study were all larger breasted patients (cup size ≥ D) who had been diagnosed of breast cancer and were due for radiotherapy treatment to the breast.

The procedure was explained to all the participants and their consent was obtained at the time of initial assessment. Thirty-four of the participants were clients who had been referred to the facility for treatment and two of them were 'walk ins' who came to the centre on their own. In addition to the researcher, there were two female staff who were trained through youtube videos on how to measure bra cup sizes of patients selected to be part of this study.

Sample Size

Devane, Begley and Clarke (2004) suggested that it is almost impossible to work with an entire population during a clinical study or trial though that would have been ideal. Calculation of a sample size therefore helps a researcher to bring to the fore a strong conclusion which can be generalized from a limited amount of information (Gotgay, 2010). The study recruited thirty- six (36) participants through the adoption of the sample size formula by Cochran (1963) as seen below.

$$n = \frac{(Z_{\frac{\partial}{2}})^2 p(1-p)}{d^2} \ldots\ldots\ldots\ldots\ldots (1)$$

Where:
n: sample size
p: the proportion of intact breast cancer patients seen monthly at the SGMC out of the total number of cancer cases per year, p=10.7% (SGMC cancer registry, 2017).

d: margin of error, 10% was used instead of 5% due to the limited duration of the study. The 5% precision would have given a bigger minimum sample size which could not have been achieved within study duration. However, the 10% gave a minimum but a sufficient sample size needed for the study.

$Z\alpha/2=1.96$ since $\alpha=5\%$ at 95% Confidence Level
Inputting the above into equation (1), the minimum sample size for participants required for this study was given by

$$n = \frac{(1.96)^2 \times 0.107(1-0.107)}{(0.1)^2} = 36.70687216$$

Therefore, n is approximately **36.**
Therefore, the final minimum sample size for the participants was thirty- six (36).

This formula was employed to achieve a number which represents the target population and also to achieve a clinical and statistical significant result (Gogtay, 2010).

Inclusion Criteria

- Larger breasted women (cup size ≥ D) who had been diagnosed with breast cancer.
- Larger breasted women (cup size ≥ D) who have been diagnosed with breast cancer with no age or status specifications
- Larger breasted women (cup size ≥ D) who have been diagnosed with breast cancer and were due for 3D conformal breast Radiotherapy

Exclusion Criteria

- Larger breasted men (cup size ≥ D) who have been diagnosed with breast cancer
- Larger breasted women (cup size ≥ D) who had been diagnosed with breast cancer but have had mastectomy.
- Larger breasted women (cup size ≥ D) who had been diagnosed with breast cancer but were not receiving 3D conformal Breast Radiotherapy

Method of Recruitment

A non- probability sampling method (purposive sampling) was used in this study because of the deliberate choice of participants by the researcher. The researcher decided on what needed to be known and as such together with a team of trained staff set out to find people who fit the criteria by virtue of their gender, diagnosis and size of their breasts (Saunders, Lewis and Thornhill, 2012).

The type of purposive sampling used was a homogeneous sampling technique and according to Etikan, Musa and Alkassim (2016), the main goal of this technique is to focus on particular characteristics of a population that are of interest, like a group of people that are similar in terms of age, gender, background, occupation, clinical history to mention but a few. For example, larger breasted women with a bra cup size of D and above who were diagnosed of breast cancer were chosen for this study.

The homogenous non- probability sampling method (purposive sampling) used in this study significantly helped the researcher in producing the desired number of primary data to contribute to this study as the primary research question being addressed is specific to the characteristics of a particular group of people (larger breasted women diagnosed with breast cancer who were undergoing Radiotherapy) (Laerd.com, 2012)

Procedure

A sealed envelope system which consisted of shuffled opaque envelopes were used to conceal prior knowledge of treatment setup techniques from the researcher and the participants (Hewitt, Hahn, Torgersen, Watson and Bland, 2005). A double blinding system was therefore used to eliminate performance bias (Kim and Shin, 2014).

Thirty-six envelopes were numbered 1 to 36. Letters corresponding to the indicated treatment setup techniques (**S** for a single skin mark and **T** for three skin marks) were then inserted into the envelopes equally (**18 of S and 18 of T**)

The researcher after explaining the procedure to the patient and consent signed, randomized the participants into the two setup arms by presenting each participant with shuffled envelopes for them to pick any of their choice. The researcher opened the envelopes in the presence of participants to determine which treatment setup technique would be used for each of them. This method helped in removing selection bias between the two groups (Juni, Altman and Egger, 2001).

Out of the total number of thirty-six (36) larger breasted patients (cup size ≥ D), eighteen (18) of them were marked with a single reference anterior skin mark placed on the sternum only, which is the departmental standard for larger breasted patients during CT scanning for simulation. The remaining eighteen (18), were also marked with an anterior skin mark placed on the sternum and two lateral skin marks placed more inferiorly on the sides just beneath the breast during their CT simulation procedure.

To find the bra cup sizes of patients involved in this study, the band sizes of patients during the CT simulation procedure was measured and recorded. This was measured around the patients' body just beneath the breast as seen in figure 3. After that, the bust size was also measured and recorded. The bust size was determined by measuring around the fullest part of the breast and the figure rounded up to the nearest inch. This can be seen in figure 2.

The bra cup size was therefore calculated by subtracting the band size value from that of the bust size and viewing the result on the Bra size guide and

converter in appendix 3 (Hanesbrands Incorporation, 2018 and Seize guide, 2017). This value was then recorded for all cup sizes D and above (D, E, F, G, H, I).

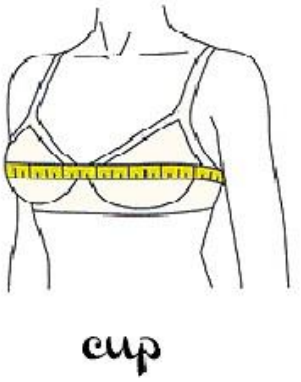


Fig. 1 Bust Size

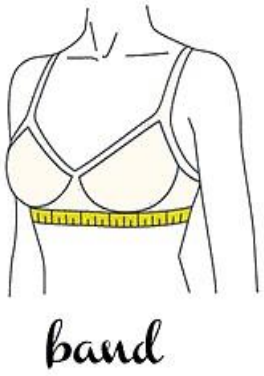


Fig. 2. Band Size

The bra cap measurement was taken by two female nursing staff in my facility who were trained through the watching of an online video session on bra cup measurement by the University of Iowa (University of Iowa Breast Health Centre, 2013). They rehearsed severally prior to the commencement of the study to perfect the performance of the procedure. The fact that they were females also made the patients feel very comfortable around them, during the procedure.

To prevent further bias, both nurses trained on the bra cap measurement were always in the room during the procedure to second check each other and okay the procedure. More so, measurements were taken with patients standing straight so as to be able to measure the circumference around the body (Dundas, Atyeo and Cox, 2007). In addition, patients were politely asked to remove their shirts whilst still wearing brassiere so as to prevent inaccurate measurements in the case of thick clothing (Seize guide, 2017).

Lastly, the bra straps on the shoulders of the patients were lengthened by pulling it up and also pulling the bra band down halfway between the shoulder and the natural waist of the patient. This helped push the weight of the breast back unto the chest wall for effective measurement (University of Iowa Breast Health Centre, 2013).

Data Analysis

Data collected on the patients age, body mass index (BMI), stage of cancer and site of tumor (right or left) were recorded in Microsoft excel data collection sheet.

More importantly, patient treatment field alignment errors in relation to external skin marks (in degrees) provided by the Iview GT system for both AP and lateral images before correction were recorded in Microsoft excel for all patients from the first day of treatment to treatment completion. Patient treatment field alignment errors greater than two degrees (2º) were corrected by repositioning patients and verifying before treatment.

A total of 410 images were analysed for the single skin mark setup whereas a total of 320 images were analysed for the three skin mark setup. The numbers varied due to the different doses prescribed for each of the thirty-six participants used in this study as well as the frequency with which images were taken.

Data transferred from Microsoft excel were analysed using the Statistical Package software for the Social Sciences (SPSS), version 17.0. Cleaning of data was done by running frequencies of the variables. This checked inconsistently coded data. Inconsistently

coded data were also double checked with raw data from our electronic system.

One sample t-test method was used to test for significant difference between the true mean, 2º (the default value per the protocol of the centre) and the comparison value/mean (the means obtained from each patient's alignment measurement over the treatment period) for both the control and the intervention arms. Independent sample t-test was used to compare the mean of the control arm (single marker) to the mean of the intervention arm (three markers).

Additionally, systematic and random set up errors were calculated for the anterior-posterior (AP), superior-inferior (SI) and left-right (LR) directions of the single marker setup and compared with that of the three marker setup.

Variables which were not normally distributed were transformed before analysis. A confidence interval of 95% ($p<0.05$) was also used to show significant relationships.

Moreover, descriptive analysis was run for variables such as age (in years), BMI, stage of the disease and site of the disease (left or right).

ETHICAL CONSIDERATIONS

The proposed study was submitted to my line manager as well as the research and ethics committee of my facility for ethical approval.

After permission was granted, the nature and purpose of the study was first explained to participants who were recruited, irrespective of their race, colour or nationality.

None of the patients received an inferior form of treatment because setup was done appropriately and verified before treatment. Departmental protocols on imaging were applied to patients on both arms of research where the departmental threshold monitor unit was not exceeded.

Those who agreed to participate were given an informed consent form to sign before the bra cup sizes were measured. Participant information sheets were also provided to patients under the guidance of the researcher to help answer any questions pertaining to their role in the study.

Again, participants were made aware of the voluntary nature of the procedure and their right to withdraw at any point in time without explanation or penalty as well as assured of privacy and confidentiality.

III. RESULTS AND DISCUSSION

Descriptive analysis

Table 1. Demographic characteristics

Variable	**Frequency**	**Percentage** (%)
Tumor Site		
Left	22	61.1
Right	14	38.9
Stage		
1	16	44.4
2	15	41.7
3	5	13.9
4	0	0
Age		
30-40	4	11.1
41-50	10	27.8
51-60	16	44.4
Above 60	6	16.7
BMI (kg/m^2)		
Underweight	0	0
Normal	4	11.1
Overweight	15	41.7
Obese	17	47.2

From the table above, 22 patients representing 61.1% of the population were left breasted whilst 14 patients representing 38.9% were right breasted.

Secondly, 16 patients representing 44.4% of the population and 15 patients representing 41.7% of the population were diagnosed of stage 1 and stage 2 breast cancers respectively, resulting in a total of 86.1%. The rest of the population representing 13.9% were stage 3 breast cancers. None of the population was a stage 4 diagnosis.

Thirdly, 4 of the patient representing 11.1% of the population were aged between 30- 40 years, whereas 10 patients representing 27.8 % of the population were within the age range of 41-50 years. A large number of patients (16) representing 44.4 % of the population were between the ages of 51 – 60 years, whereas 6 patients representing 16.7% of the population were above the age of 60. A total of 61.1% of the population were between the ages of 51-60 years and above 60 years.

Additionally, the reference values used for the body mass index (BMI) recorded for patients involved in this study were 18.5 kg/m^2 and less (Underweight), 18.5 kg/m^2 to 24.9 kg/m^2 (Normal weight), 25 kg/m^2 to 29.9 kg/m^2 (Overweight) and more than 30 kg/m^2 (Obese) (American Cancer society, 2018). There were no patients recorded for underweight. Out of a total of 36 patients, 4 representing 11.1% of the population were within the normal weight whereas 15 participants representing 41.7% were overweight. The highest number of the population (17) representing 47.2 % were obese.

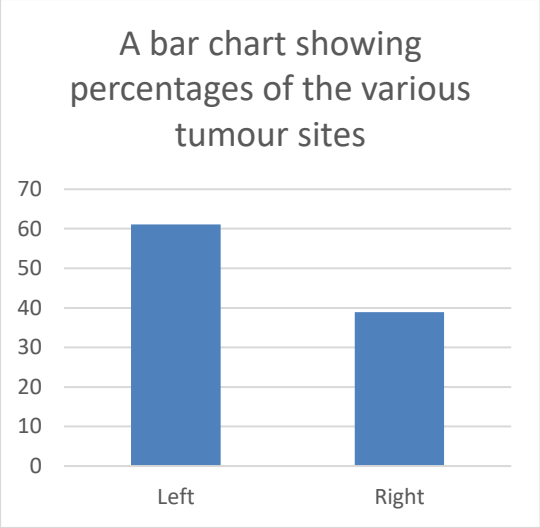


Fig. 3

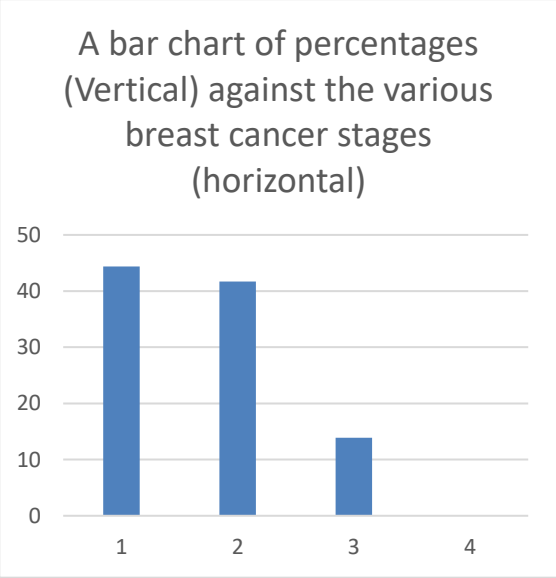


Fig. 4

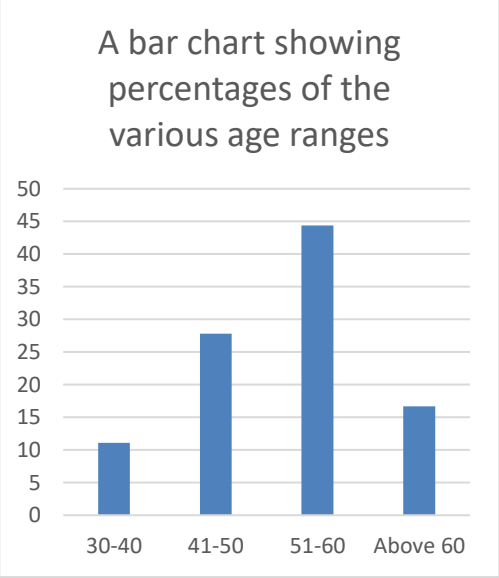


Fig. 5

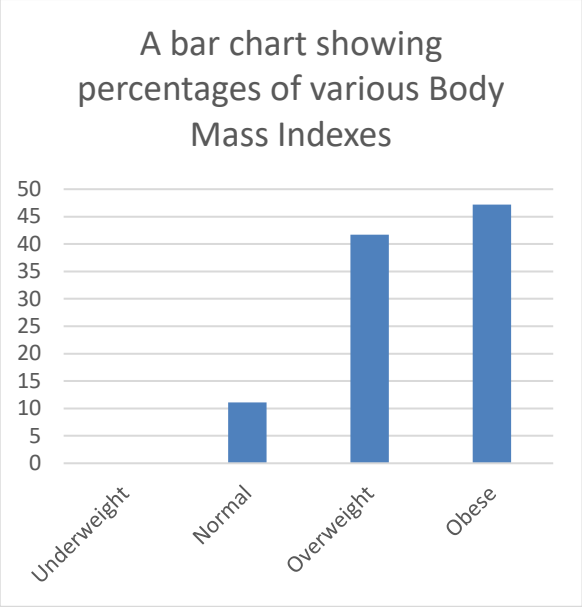


Fig. 6

The tables above show a bar graph of the descriptive analysis for the various demographic characteristics. Fig.1 shows the percentages (vertical axis) as against the tumour sites (horizontal axis) of the left and right, whereas Fig. 2 shows the percentages (vertical axis) as against the various breast cancer stages (horizontal axis) of 1 to 4. Fig.3 shows the percentages (vertical axis) as against the various age ranges (horizontal axis) of 30-40, 41-50, 51-60 and above 60 years. Finally, Fig. 4 shows the percentages (vertical axis) as against the various body mass indexes (horizontal axis) of underweight, normal, overweight and obese.

A. SUMMARY OF MEAN COMPARISONS BETWEEN BOTH ARMS (AP AND LATERAL FIELDS OF SINGLE AND TRIPPLE SKIN MARKS) AND TRUE MEAN.

Table 1. Anterior Images of Single Skin Mark Versus Departmental threshold

Variable	Sample	Mean ± SD	MEAN DIFFERENCE	T-test	p-value
Single Mark	18	0.00 ± 0.01	0.004	1.801	0.089
Threshold	18	2.00 ± 0.00			

Table 2.

Table 2 compares the average displacements in terms of field alignment (in degrees) in the anterior images of the single skin mark technique in all 18 patients with the departmental threshold of 2 degrees.

In all 18 patients, an average field displacement error of 0 degrees and a standard deviation of 0.01 degrees were recorded. A p- value ($p<0.05$) of 0.089 was detected when compared to the accepted departmental field alignment threshold of 2 degrees.

Lateral Images of Single Skin Mark Versus Departmental threshold

Variable	Sample	Mean ± SD	MEAN DIFFERENCE	T-test	p-value
Single Mark	18	0.02 ± 0.037	0.021	2.448	0.026
Threshold	18	2.00 ± 0.00			

Table. 3

Table 3 compares the average displacements of field alignment (in degrees) in the lateral images of the single skin mark technique in all 18 patients with the departmental threshold of 2 degrees. In all 18 patients, an average field displacement error of 0.02 degrees and a standard deviation of 0.037 degrees were recorded. A p- value ($p<0.05$) of 0.026 was detected when compared to the accepted departmental field alignment threshold of 2 degrees.

Anterior Images of three Skin Mark Versus Departmental threshold

Variable	Sample	Mean ± SD	MEAN DIFFERENCE	T-test	p-value
Three Skin Marks	18	0.00 ± 0.011	0.004	1.686	0.110
Threshold	18	2.00 ± 0.00			

Table. 4

Table 4 compares the average displacement of field alignment (in degrees) in the anterior images of the three skin mark technique in all 18 patients with the departmental threshold of 2 degrees. An average field displacement error of 0.00 degrees and a standard deviation of 0.011 degrees were recorded. A p- value ($p<0.05$) of 0.110 was detected when compared to the accepted departmental field alignment threshold of 2 degrees.

Lateral Images of Three Skin Mark Versus Departmental threshold

Variable	Sample	Mean ± SD	MEAN DIFFERENCE	T-test	p-value
Three Skin Marks	18	0.00 ± 0.011	0.005	1.791	0.091
Threshold	18	2.00 ± 0.00			

Table. 5

Table 5 compares the average displacements of field alignment (in degrees) in the lateral images of the three skin mark technique in all 18 patients with the departmental threshold of 2 degrees. An average field displacement error of 0.00 degrees and a standard deviation of 0.011 degrees were recorded. A p- value ($p<0.05$) of 0.091 was detected when compared to the accepted departmental field alignment threshold of 2 degrees.

A. SUMMARY OF MEAN COMPARISONS BETWEEN CONTROL ARM (SINGLE MARKERS) AND INTERVENTION ARM (THREE MARKERS)

Table 6.

A p- value ($p<0.05$) of 0.089 was realized when the anterior images of the three skin mark setup was compared to the anterior images of the single skin mark setup.

		MEAN ± SD		MEAN DIFFERENCE		T-TEST		P-VALUE	
	Sample(n)	ANT	LAT	ANT	LAT	ANT	LAT	ANT	LAT
SINGLE MARKS	18	0.00 ± 0.01	0.02 ± 0.037	0.004	0.021	1.80	2.45	0.089	0.026
THREE MARKS	18	0.00 ± 0.011	0.00 ± 0.011	0.004	0.005				

Additionally, a p- value ($p<0.05$) of 0.026 was realized when the lateral images of the three skin mark setup was compared to the lateral images of the single skin mark setup.

B. SUMMARY OF SYSTEMATIC AND RANDOM ERRORS FOR SINGLE AND THREE SKIN MARKS.

	SINGLE SKIN MARKER			THREE SKIN MARK		
ERRORS	**AP (mm)**	**SI (mm)**	**LR (mm)**	**AP (mm)**	**SI(mm)**	**LR(mm)**
RANDOM	4.7	5.2	2.6	4.5	4.9	2.4
SYSTEMATIC	2.0	2.1	2.0	1.7	1.8	2.2

Table 7

Table 7 is a summary of mean systematic and random errors for single and three skin marker setups. The single marker recorded random errors of 4.7mm in the Anterior-posterior plane (AP), 5.2mm in the superior-inferior plane (SI) and 2.6 mm in the left-right plane (LR). The three skin marker setup on the other hand recorded random errors of 4.5 mm in the Anterior-posterior plane (AP), 4.9 mm in the superior-inferior plane (SI) and 2.4 mm in the left-right plane (LR).

More so, the single marker recorded systematic errors of 2.0 mm in the Anterior-posterior plane (AP), 2.1 mm in the superior-inferior plane (SI) and 2.0 mm in the left-right plane (LR) whereas the three skin marker setup recorded systematic errors of 1.7 mm in the anterior-posterior plane (AP), 1.8 mm in the superior-inferior plane (SI) and 2.2 mm in the left-right plane (LR).

DISCUSSION

Accuracy, reproducibility and comfortability of larger breasted (cup size ≥ D) cancer patients' during setup for CT simulation are critical throughout the treatment period as it goes a long way to affect treatment field alignment and outcome. (Hurkmans, Remeijer, Lebesque and Mijnheer, 2001).

Skin marks on fixed immovable points on the body has been used extensively for patient alignment before treatment in most radiotherapy centres and has been proven to be effective (Rathod, Munshi and Agarwal, 2012). In this study, patient treatment field alignment errors have been evaluated in thirty-six breast cancer patients. The novel part of this study is the evaluation of the placement of three skin marks in different planes on the skin of larger breasted (cup size ≥ D) women undergoing external beam radiotherapy of the breast. This new way of setting larger breasted patients up requires patients to lie supine on a breast board, with arms above head and aligned with lasers. The difference in this setup from the conventional setup is placing a skin mark on the sternum and two more skin marks inferiorly beneath the breast to help with lateral patient alignment. During treatment planning of this setup, the treatment planning reference point (TPRP) is placed on the skin mark on the sternum since it's the most stable point among the three skin marks. During treatment setup of this new technique, the two inferior skin marks are used for lateral patient alignment only. The patient is then moved to the skin mark on the sternum and the various shifts in all directions are made from the sternum to the isocentre. After that, images are taken to verify field alignment and patient setup before treatment.

The errors in setup and treatment field alignment of this new technique was compared to that of the standard treatment setup in the department where larger breasted (cup size ≥ D) patients are setup with only one skin mark preferably on the sternum and employing a source to skin distance (SSD) technique.

The first part of the results in this study focused on the descriptive analysis for the demographic characteristics. Bar graphs were also used to show differences among the demographic factors. Secondly, a summary of mean comparisons of the treatment field alignment errors of the anterior-posterior (AP) and lateral images were made between the single and three skin marks as against the true mean threshold of 2 degrees. Thirdly, a summary of mean comparisons of the field alignment errors of AP and lateral images were made between the single skin markers and the three skin markers. Additionally, systematic and random errors were calculated for the anterior-posterior (AP), superior-inferior (SI) and left-right (LR) directions of the single marker setup and compared with that of the three marker setup.

The demographic section of this study revealed a higher percentage (61.1%) of the population diagnosed with cancer in the left breast as compared to that of the right (38.9%) breast. This shows a higher prevalence of cancer in the left breast than in the right breast of patients who were involved in this study (Jardines, Goyal, Fischer, Weitzel and Royce, 2015). More so, 86.1% of the population were early staged breast cancers (Stage 1 and stage 2). No member of the population was a late stage diagnosis. A total of 61.1% of the population were between the ages of 51-60 years and above 60 years, suggesting that age is an important risk factor for breast cancer (Chen, Zhou, Tian, Meng and He, 2016). Lastly, the BMI revealed that, a total of 88.9% of the population of larger breasted patients involved in this study were within the overweight and obese range. This conclusion can be made because the patient selection criteria used for this study was partly randomized where participants were presented with shuffled envelopes containing letters corresponding to the

indicated treatment setup techniques for them to pick any of their choice.

Wittmer, Pisansky, Kruse and Herman (2005) suggested the importance of treatment field alignment in terms of accurate patient setup during radiotherapy. The authors in this work reviewed a number of portal images, where uncertainties in field alignment was eventually disclosed. This resulted in the proposal of a pre-treatment imaging protocol to improve the accuracy and consistency of the field alignment. Jung et. al (2015), reiterated the importance of treatment field alignment and its role in ensuring accuracy and reproducibility in intact breast patients. According to the authors, it is necessary to confirm the field alignment errors through verification before patient treatment. It is in this regard that this current study sought to examine which of the skin mark placement techniques (single or three skin marks) is superior in ensuring accurate patient setup in terms of treatment field alignment during radiotherapy for larger breasted patients.

Murthy et al. (2008), in their study of setup error verification in breast, head and neck and pelvic patients undergoing external beam radiation therapy using electronic portal imaging recorded rotations for each treatment field to study the patient setup errors. The findings revealed that, in all the cases, 80% of the treatment field rotational errors were less than 1 degree, 95% of the errors were less than 2 degrees, and only 5% of the errors were within the range of 2 degrees to 3degrees. It was observed that the treatment field rotational differences were less than 3 degrees and any value greater than 3 degrees was termed significant. This is similar to the field alignment threshold used in this current study.

Langmack (2001) quantified patient displacement in a two dimension (2D) projection of a three dimension (3D) structure by image registration where portal image field edges were aligned with the reference image field boundary to determine rotational errors in treatment fields during radiotherapy. A rotational field error of less than 2 degrees similar to that of this study was used to emphasize the threshold for a good image registration algorithm. Remeijer et al. (2000) suggested that, when using a 2D registration method, the treatment field rotational errors should not be greater than 3 degrees. Plattard et al. (2000) evaluated the feasibility of a 2D registration for portal and simulator images to correct patient's position during radiotherapy. The accuracy of careful visual checking of treatment field rotational error in this study was evaluated at 2 degrees which is not out of place when compared to that used in this current study. Matsopoulos (2004) and Zheng and Ding (2017) evaluated a proposed methodology for patient set-up verification in the clinical environment and the inter-observer variability of image alignment during proton therapy respectively. A threshold of less than 1 degree was used by the former and a range from 0.6 to 1.3 degrees in rotational displacements were recorded by the latter.

First and foremost, when compared to the departmental threshold, it was noted that the AP images of the single skin mark setup detected a p-value ($p<0.05$) of 0.089. This concludes that the difference in mean displacement errors in terms of field alignment between the anterior images of the single skin mark technique and the departmental threshold of 2 degrees is statistically insignificant. This is probably because of the use of an anterior skin mark for the setup which together with the lasers aligned patients very well in the AP plane.

Secondly, the lateral images of the single skin mark technique when compared with the departmental threshold detected a p- value ($p<0.05$) of 0.026. This concludes that the difference in mean displacement of the treatment field alignment between the lateral images of the single skin mark setup technique and the departmental threshold is statistically significant.

Thirdly, the treatment field alignment error of the AP images for the three skin mark technique recorded a p- value ($p<0.05$) of 0.110 when compared with the departmental threshold of 2 degrees. This concludes that the difference in mean displacement errors in terms of field alignment between the AP images of the three skin mark setup and the departmental threshold is statistically insignificant.
Additionally, the lateral images for the three skin mark technique detected a p- value ($p<0.05$) of 0.091 when compared to the departmental field alignment threshold of 2 degrees. This difference is statistically insignificant.

More so, mean comparisons of the field alignment errors between the control arm (single skin markers) and the intervention arm (three skin markers) yielded no significant difference in the AP images as a p- value ($p<0.05$) of 0.089 was detected.

On the contrary, a p- value ($p<0.05$) of 0.026 was recorded for the comparison between the field alignment errors of the lateral images of the single marker setup and the three marker setup. This difference is significant.

The results obtained by comparing field alignment errors (in AP and lateral images) of both the single skin mark setup and the three skin mark setup to the departmental threshold (2 degrees) as well as comparing the field alignment errors (in AP and lateral images) of the single skin mark setup to the three skin mark setup revealed significant differences only in the lateral images. This can be attributed to the absence of the lateral skin marks at the sides of the patient. Glassy, Glassy and Aldasouqi (2012) suggested that these lateral skin marks are used to align with the transverse lasers in order to level the patient to allow for field monitoring and precision of radiation delivery as well as reproducibility of tilt. More so, according to the International Atomic Energy Agency (IEAE) (2018), an accurate alignment setup system in a radiotherapy department should consist of at least three lasers to provide a sagittal line and two lateral crosses from the sides which can be used in conjunction with appropriately placed skin marks. Huppert, Jozsef, Dewyngaert and Formenti, (2011) also reiterated the importance of setting breast cancer patients up with skin marks at the sides together with an anterior skin mark on the sternum in order to establish a triangulation of skin marks for levelling the patient on a daily basis.

Furthermore, Rathod, Munshi and Agarwal (2012) suggested that skin marks or tattoos should be traditionally placed medially and on both lateral sides of the patient. Probst, Dodwell, Gray and Holmes (2006) revealed that, the combination of the two lateral skin marks or tattoos allows for a three-point localization of the initial isocenter of the treatment field, hence the need to always have them to help with treatment field and patient alignment.

This study also measured the systematic and random setup errors in the X, Y, Z plane. Systematic errors (Σ) were calculated as the standard deviation of mean errors, calculated for each individual patient in the group. Random errors (σ) on the other hand were calculated as the mean of individual random errors (CPL, 2011 and The Royal College of Radiologists, London, 2008).

Several works in the past have been conducted in this regard. Kirby et al. (2011) in their study to compare standard supine position in women undergoing whole-breast-radiotherapy (WBRT) in terms of feasibility and set-up errors, recorded systematic errors of 1.3mm LR, 1.5mm SI, 1.8mm AP and random errors of 2.8mm LR, 3.2mm SI and 2.4mm AP. Topolnjak et al. (2008) recorded systematic errors of 2.4mm LR, 2.3mm SI and 1.5mm AP and random errors of 2.8mm LR, 4.1mm SI and 3.6mm AP in their study on breast conserving radiotherapy using external skin markers. White et al. (2007)

investigated setup error reduction methods in accelerated partial breast irradiation (APBI) where systematic errors for skin-mark setup were 2.7mm LR, 2.4mm SI and 1.7mm AP and random errors were 2.4mm LR, 2.9mm SI and 2.2mm AP.

The results of this current study were also similar to those recorded by Chang et al. (2012), Chung et al. (2015), Harris et al. (2016), Lozano et al. (2011), and Adamczyk, Piotrowski and Adamiak (2012), which were all based on setup error in relation to skin marks in early breast cancer patients using an imaging system with weekly IGRT.

Comparing the two setups in this study, systematic and random errors were reduced relatively in participants with three skin marks as compared to participants with only a single skin mark. Random errors were reduced from 4.7mm AP, 5.2mm SI and 2.6mm LR to 4.5mm AP, 4.9mm SI and 2.4mm LR. Systematic errors on the other hand were also reduced from 2.0mm AP, 2.1mm SI to 1.7mm AP and 1.8mm SI. Systematic errors in the LR direction increased from 2.0mm in the single skin mark to 2.2mm in the three skin marks. The above suggests more reduced setup errors for the three skin mark setup as compared to the single skin mark setup.
The errors detected in this study were relatively high as compared to previous studies probably because this current study used only skin marks and lasers as well as a 2D imaging system, whereas most of the previous studies used skin marks together with surface imaging systems which have been shown to be of a higher precision (Alderliesten et al., 2012, Deantonio et al., 2011 and Padilla et al., 2014).The differences could also be attributed to the sample size, patient characteristics like breast size and weight of patients involved in this study as compared to previous studies. From this current study, it was observed that, even though the single skin mark technique was inferior when compared to the three skin mark technique, it reduced the number of skin marks that were made on the patient skin which is critical in departments where skin marks are not visible enough and as a result the use of needles have to be employed to create permanent skin marks (Rafi, Tunio, Hashimi and Ahmed, 2009). These permanent skin marks are known to have a psychological impact on breast cancer patients as a reminder of cancer treatment (Billingsley, 2001). One possible solution to this problem in current practice is the use of ultra violet (UV) tattoos that are not visible on the patient under normal conditions but highly visible during treatment settings (David, Castle and Mossi, 2006). According to Landeg et al. (2016), UV tattoos offer better setup accuracy compared to that of conventional dark ink and may improve patient experience of breast radiotherapy.

It was also observed that all patients regardless of the techniques used for setup recorded relatively high values of setup errors during the first few fractions of treatment but got stabilized due to departmental correction strategies factored into patient setup in the course of their treatment (Herman, 2005 and Mileusni, 2005). This could be as a result of patients being extremely nervous as well as radiation therapist not being used to individual patient setups during the first week of treatment. The setup errors also reflect how patients adapt to the environment with time from their first treatment fraction (Furuya et al., 2012).

Another observation made from this study was time for patient setup and verification during treatment. It was observed that a longer time was used to acquire an image and perform image registration for setup and verification in the single skin mark setup as compared to that of the three skin mark setup especially during the first few days of treatment. This resulted in patients having to lie on the couch for longer times, which is very critical for larger breasted patients because the longer they stay on the couch,

the more likely they are to move (Essapen, Knowles, Norman and Tait, 2002).

Limitations of the study

The outcome of this study suggests that skin marks are important for patient treatment field alignment as well as setup errors. They do fade away with time (Cancer research, 2014) and as such have to be made permanent through the use of tattoos. Further studies need to be conducted in this area to suggest alternative ways to be used in order to have good skin marks which are non-invasive and can last throughout an entire treatment schedule.

More so, this work only concentrated on treatment field alignment errors and setup errors associated with skin marks in larger breasted patients. There are other clinical factors which may also affect treatment accuracy and reproducibility (Beltran, Krasin and Merchant, 2011) like immobilization devices and patient compliance with setup procedures (Pisani et al., 2000). Further investigations have to be done for other factors especially patient compliance with the two setup techniques described in this study.

Implications for future practice and research

The findings of this study although may be applicable locally, also suggests areas of future exploration.

The findings will help educate and also serve as a source of information for the radiotherapy staff and interns who are undergoing clinical rotations. It will also help update the departmental protocol on setup procedures for larger breasted patients (cup size ≥D) undergoing radiotherapy for breast cancer.

More so, findings from this study will improve patient setup and will also be a basis for future research and possible changes to breast cancer treatment setup.

Lastly, the findings of this study will be a source of information for other radiotherapy centres within and outside the country who have the same resources and are seeking to improve setup of larger breasted cancer patients in their facility.

IV. CONCLUSION

Field alignment errors in patients during a course of radiotherapy represents a systematic difference between patient simulation and treatment, hence setup techniques are critical especially in the setup of larger breasted patients during breast cancer irradiation.

Compared to the use of a single skin mark for setup of larger breasted patients, the outcome of the three skin mark setup is superior in terms of treatment field alignment for both the AP and lateral images with respect to the departmental threshold of 2 degrees.

Additionally, the three skin mark setup technique recorded relatively small systematic and random setup errors when compared to the single skin mark technique. It is important to note that these were shift values obtained before correction and as long as the departmental protocols on imaging frequency and threshold were followed, patient setup errors were reduced to the minimum especially in the three skin mark setup technique.

Finally, it is evident from this study, that the three skin mark setup technique is superior in terms of treatment field alignment as well as recorded relatively small patient setup errors when compared to the single skin marker setup technique.

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APPENDIX 1

Timeline	2nd Quarter 2018			3rd Quarter 2018			4th Quarter 2018			2019
	April	*May*	*June*	*July*	*August*	*Sep*	*Oct*	*Nov.*	*Dec*	*Jan*
Supervisor allocation, permission from line manager and timeline negotiation.										
Select and analyse appropriate research literature										
Write up for introduction, review of literature and method (proposal)										
Undertake pilot study and prepare for main study										
Begin recruitment process and gain ethical approval										
Undertake study and collect data										
Data analysis										
Result and Conclusion (Complete write up)										
Proofreading and Submission										

APPENDIX 2

Cup size calculator

Bust size – Band size:	Cup size
1	A
2	B
3	C
4	D
5	E
6	F
7	G
8	H
9	I
10	J

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Performance Analysis of Mobile Wireless Sensor Network with Energy Efficient and Reliable Routing

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ABSTRACT

In this paper author describing the concept of throughput and limited energy consumption while routing data to base station and will use multiple routes to forward data to base station. Wireless sensor networks (WSNs)remains resource constrict. Energy is one of the most essential resources in such networks. Hence, optimal use of energy is significant. In existing scheme sensor nodes are movable, base station is fixed and energy consumption is more. To overcome this, we are using the E2R2 protocol in which both sensor nodes & base station are mobile. The proposed protocol is hierarchical along with cluster based. All clusters contain one cluster head (CH) node, dual deputy CH nodes, also a few of ordinary sensor nodes. The reclustering time along with energy requirement has been decreases by introducing the concept of CH panel. All things Considered the reliability aspect of this protocol, it brings leading effort to provide a detailed throughput level by the BS. Topology of mobile wireless sensor networks with more no of nodes which is formed as clusters and transmission of packets between the sensor nodes is done to the base station [BS].Which is routed using E2R2 PROTOCOL, parameters such as throughput, energy spent. The simulation displays a certain proposed design successfully decreases the energy consumption among the nodes, and thus significantly improves the throughput compared to the existing protocol.

Keywords : Mobile Nodes, Energy Efficient, Mobile Base Station, Routing Protocol, Reliability, Wireless Sensor Networks (WSN).

I. INTRODUCTION

Wireless sensor networks (WSN) is widely used for gathering data in the distributed fashion Wireless sensor networks are extremely energy constrained within the terms of resource, also the topology of corresponding networks remains very dynamic. Sensor nodes are strictly energy constrained and entire the tasks like sensing, data processing, communication as well as both transmission and reception about signals etc, are to be broadcast over utilizing the usable limited energy. After the successful and efficient deployment as well as process of the wireless sensor network, there are many protocols and several algorithms are to be application specific. These sensor nodes transmit sensory data towards the resourceful base station (BS). Wireless sensor networks have large range of applications in civil and military domains. Several application areas of WSN are as follows: Battlefields, monitoring and alarming systems for supermarkets, intrusion detection, hostile zones, wildlife monitoring systems and disaster affected area and various safety and security related applications. The sensed data are eventually forwarded toward the BS for more processing and decision making with consider to the control for meeting the objectives of the system in place. Depending upon the application

type, the sensor nodes and the BS can be static or mobile. Reliable and successful data delivery at the BS is desired. Energy efficiency is an important aspect of any application of WSN. In multi-hop communication, the major issue may be the selection of the intermediate nodes in the route. The intermediate nodes are to be selected in such a way that the energy requirement is minimized. At the same time, the data are to be delivered at the BS reliably and successfully.

In the hierarchical routing, certain higher-energy nodes can be used to process and send the information to the base station when lower energy nodes can operate the sensing in the target domain. The total network is broken into layers. Hierarchical routing is studied to be energy efficient as well as scalable approach and there are various hierarchical routing protocols proposed for WSN. All the following protocols consider the WSN with static sensor nodes. These protocols are not suitable to manage mobility of the sensor nodes and the BS. Although Ad-hoc on demand distance vector (AODV) routing, destination-sequenced distance vector (DSDV) routing, dynamic source routing (DSR), temporally ordered routing algorithm (TORA), and zone routing protocol are some routing protocols that exist for mobile ad hoc networks, these are not well suited for WSN setup. This is so, due to different features of WSN and the unique constraints WSN suffers from. Moreover, the WSN applications have different sets of requirements. Routing in a WSN setup in which both the sensor nodes and the BS are mobile is a challenging problem.

Existing protocol do not study the mobility in both base station (BS) and sensor nodes. These are not well suitable for the mobile WSN. The communication links may regard of the connectivity issue and also in such a WSN setup. Data packets are to be routed fetching this connectivity issue into consideration. On the other hand, there will be significant loss of data packets due to failed links away from all other reasons corresponding to the frequent death of sensor nodes or else noise of the wireless links.

Here we are proposing the mobile wireless sensor network for energy efficient and reliable routing. This is a hierarchical one. The main objective is to attain energy efficient and to produce connectivity to the nodes. The mobility of the nodes are designed when routing decision are made.

II. Existing System-Modified Low Energy Adaptive Clustering Hierarchical protocol (M-Leach).

Modified Leach protocol (M-LEACH) is extended version of LEACH. Before to study M-Leach let us know about the LEACH Protocol In Leach protocol every CH sends the total data to the BS directly. Low Energy Adaptive Clustering Hierarchy (LEACH) protocol uses hierarchical network topology using which the data is combined and the same is sent to the BS. This is self-adaptive and self-organized. The nodes are divided into clusters or groups with uniform size, and a CH is selected for every cluster. The nodes accumulate physical occurrences related data and send the same to their respective CHs accepting TDMA schedule. If a node continues to last as a CH, its energy is drained and the node dies sooner. In order to avoid such a situation, the CH role is rotated after each round of operation. A node forwards the data to its CH and the CH gathers the data from each node supported by it and the CH computes the aggregate of the collected data and the same is forwarded to the BS.

LEACH considers homogeneous nodes in a network with respect to energy which is not realistic approach. In particular round, uneven nodes are attached to

multiple CHs. In this case, CH with large number of member nodes drains their energy as compared to CH with small number of associated member nodes. Furthermore, mobility support is another issue with LEACH routing protocol.to overcome this problem here we are going with M-LEACH Protocol.

To avoid such a situation, using multi-hop LEACH (M-LEACH),a CH can create use of one of its neighboring CH nodes towards the BS can carry node to forward its aggregated data. In the corresponding manner, a multi-hop communication path could be established so as to forward the data of a distant CH. All the relay nodes involved are CHs themselves; M-LEACH protocol is approximately the same as LEACH protocol, only it will form communication mode from single hop to multi-hop between cluster heads and base station. Its multi-hop routing algorithm within one round is shown in figure. Routing of multi-hop-LEACH protocol

In cluster formation, initially each node selects their CH based on residual energy and distance from the BS. The routing mechanism process is divided into two different phases:

- Route discovery and
- Distance calculation.

In route discovery, the source node checks its route cache before sending the data to the destination node; if there is no path in the route cache then it will accomplish a source route to the destination using this routing mechanism. To discover the route from source to the BS and other nodes,

The distance D is calculated using the formula Where, (a1, b1) are the coordinates of the source node and (a2, b2) are the coordinates of the node from which the distance is calculated.

$$D = \sqrt{(a2 - a1)^2} \quad + \sqrt{(b2 - b1)^2}$$

The node with residual energy greater than the threshold value is considered the relay node for multi-hop communication. Route maintenance detects broken links along the source node to the destination node. The damaged routes are maintained by substituting some new paths in the existing route. CH selection is based on mobility of nodes. A node with minimum mobility and lowest attenuation power is selected as CH in M-LEACH. Then selected CHs broadcast their status to all nodes in transmission range.

Member nodes compute their willingness from multiple CHs and select the CH with maximum residual energy.

Algorithm(shortest path distance based clustering algorithm)

1. Assigning initial energy to all the nodes.
2. Choose BS, CH, and DCH on the energy basis.
3. Arrange BS, CH and DCH in the hierarchy form as stated in the protocol.
4. BS and all other nodes participate in communication to receive and transmit the data packets
5. During the communication, if any CH node lost the energy concerned DCH will be placed at CH and CH will be moved to DCH place, and perform usual communication.
6. We consider the CH and DCH and all other sensor nodes have mobility in network.
7. The protocol ensures reliability in terms of data delivery at the BS it is achieved through use of multiple routes and switching of the route as decided by BS.
8. We adopt *mathematical* based **'Distance formula'**

$$D = \sqrt{(a2 - a1)^2} \quad + \sqrt{(b2 - b1)^2}$$

That can be used for identifying the most suitable path for data forwarding

9. Send data packets to the reliable path through multiple hops.

In modified Leach protocol for BS is fixed and sensor nodes are mobile. By using this M-Leach protocol BS is static. Sensor nodes are sending data to the BS directly it will consume more amounts of data. Then energy will be loss and live span of the nodes will die soon. Depending upon the situation we are introducing the Energy efficient and reliable routing for mobile wireless sensor networks (E2R2) protocol.

Drawbacks:-

- In existing system BS is fixed.so energy consumption will be more because of far neighborhood node.
- As the size of the network grows various performance metrics begin decreasing.
- Low throughput
- High energy consumption

III. Implemented protocol (E2R2)

The implemented protocol is a wireless network in which both the base station (BS) and the sensor nodes are mobile. The implemented protocol, which is called E2R2 protocol, achieves fault tolerance by contributing some alternate routes to forward data in the presence of any fault in the actual route. The main theme of the project is to extend the lifetime of the sensor nodes in the network. The protocol provides some appropriate alternate routes for packet deliver in presence of node or link failure in the present route. This arrangement does not provide the throughput level at the BS, in terms of packet delivery, to degrade drastically. The protocol attends the energy efficiency and the reliability of the routes. The data packets are routed throughout multiple hops in order to reduce the transmission energy demands at the sender nodes. In addition, some sensor nodes are intelligently arranged for dormant state, whatever is a low-power state. Those nodes are arranged for dormant state, whose services are not required at a particular time. Later stage, these nodes may operate state transition and get active while needed. The state transition is decided by the BS. This saves substantial amount of energy at the nodes. Hence, the battery lives of the sensor nodes become prolonged.

Architecture of wireless sensor network

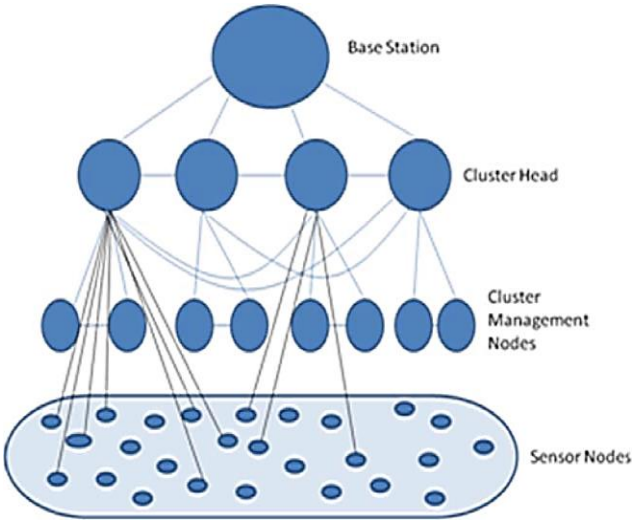


Fig 1.

After the arrangement of the sensor nodes, the BS creates groups of dissimilar sensor nodes in order to arrange clusters. Each cluster contains a CH node and two DCH nodes. The BS selects a set of suitable sensor nodes from each cluster, which can act as CH or DCH at a later stage. This set of nodes is also called CH panel. The cluster members i.e.; the sensor nodes, forward data to the respective CH node. The CH nodes do the data aggregation to remove redundancy and then forward the aggregated data toward the BS. The DCH nodes do several cluster management tasks that include mobility monitoring also. Other cluster management tasks are, for example, collecting location information of cluster members regularly and communicating this location information to the BS. They also remain ready to act as intermediate hop in presence of faults in some CH nodes. Therefore,

the DCH nodes are also called cluster management nodes. The CH nodes do not transmit data directly to the BS, unless it is the nearest one to the BS.

The communication pattern or the route for the CH nodes is determined by the BS and distributed to the respective CH nodes. It is assumed that the BS has an idea about the expected number of data packets (i.e., the volume of data) to be arrived in it during a specified time interval. Therefore, the BS keeps on monitoring the actual volume of data arrived from different clusters in the network. If the BS observes less arrival of data packets from some clusters in comparison with a prespecified threshold level, then it informs the respective CH nodes to check their connectivity with their cluster members. The CH considers this as feedback from the BS and accordingly checks the current connectivity with its cluster members. If the connectivity status of the cluster members with the respective CH is very poor, the BS decides to shift the charge of cluster headship to another suitable member from within the CH panel. Depending on the connectivity scenario, the cluster headship may be transferred to one of the two DCH nodes also. The routing decisions are made at the BS and then communicated to the sensor nodes. Since the sensor nodes are resource constrained and, moreover, the nodes are also committed to data processing and communication apart from sensing activities, it is always advantageous to offload the routing decision making process from the sensor nodes. Therefore, this protocol exploits the resourcefulness of the BS by shifting routing and some cluster management activities to the BS.

Self –organization phase

After random arrangement of sensor nodes in the sensor field. In this phase clusters are formed. The present CH and two DCH nodes are preferred by the BS. At first, the BS collects the present location information map. Sensor nodes can sense the geographic location information through some GPS-free solutions. Based on the velocity of a sensor node, the BS can prepare a rough estimate of the zone in which the sensor node is going to be in the next time interval. The next time interval is a specific time period for which a particular setup of the network remains valid. The value of the next time interval can be set manually depending on the type of the application, and this value is critical because most of the computations, e.g., cluster setup validity period and medium access slot, are dependent on the next time interval.

At the initial stage of the self-organization phase, each node should be satisfies three parameters.

- Geographic location information
- Residual energy level
- Mobility level or average speed of the nodes

The CH node can be elected based on these parameters in which it is having more residual energy then it will be elected as CH & DCH nodes. Here clustering can be formed **"K-means clustering algorithm" Implemented Algorithm (K-Means clustering):**

Let X={x1,x2,x3,……, x_n} be the set of data points and V={v1,v2,……, v_c} be the set of centers.

Step 1: Randomly selects 'c' cluster centers.

Step2: Calculate the distance between each data points and cluster centers.

Step 3: Assign the data point to the cluster center whose distance from the cluster center is minimum of all the cluster centers.

Step 4: Recalculate the new cluster center using:

$$v_{i=(1/c_i)} \sum_{j=1}^{c_j} x_i$$

Where 'C_j' represents the number of data points in the i_{th} cluster

Step 5: Recalculate the distance between each data point and new obtained cluster.

Step 6: If no data point was reassigned then stop, otherwise repeat from step (3).

Here in this implemented protocol we are using two protocols. The one is shortest path clustering algorithm and anther one is K-means algorithm. Here, K- means no of clusters.

IV. NETWORK OPERATIONS

In this section, we illustrate the network procedures utilized in E2R2 protocol.

Function of sensor nodes:

The sensor nodes are randomly deployed in the field, with some dimension. Sensor nodes sends data to the cluster Head (CH).Sensor node moves random direction with a random value of speed.

Clustering:

It is a bunch of nodes in a network that are grouped together to reduce energy consumption in data transmission.

Role of CH:

The CH node is responsible for gathering sensed data from the cluster members, aggregate those and forward toward the BS either directly or in a multi-hop fashion.

Role of DCH:

The DCH nodes keep monitoring the sensor nodes' mobility pattern. DCH nodes are also called "**cluster management nodes.**

The reason behind selecting two DCH nodes is the necessity to maintain connectivity between the clusters.

Role of BS:

It is an information processing center where a high energy node processes all its data that are sensed by the sensors in the network. Base station also handles sensor network routing or node configuration.

DCH-BS Network Creation: Similar to the CH-BS network creation process, the BS also creates the DCH-BS networks. In this situation, only the DCH nodes in the sensor field are considered. Alternate routes are also created for the DCH and switched intelligently by the BS.

Current Cluster Setup Cycle Length: An important and critical issue is how long a particular cluster setup will remain valid. Depending on the initial energy level of the sensor nodes and the kind of application, the optimal time duration is fixed. This optimal time duration is called as cycle length, and the current cluster setup remains valid until the end of the cycle length. However, exception may always occur. For example, due to mobility of the nodes, severe link failures may occur, and nodes may die out due to depletion of energy, which may together cause network partition. In such situations, current cluster validity time, i.e., cycle length, may become outdated, and reclustering may get initiated by the BS before expiry of the cycle length.

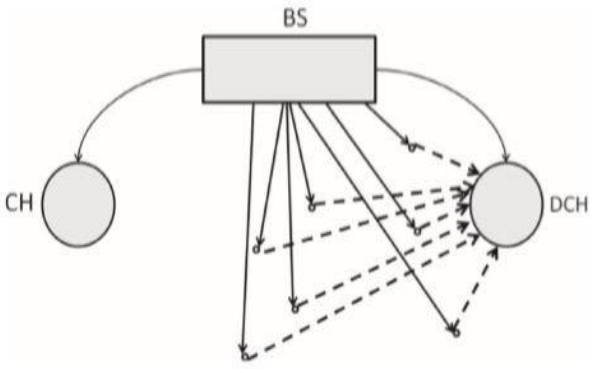


Fig 2. Cluster headship gets shifted to DCH

Scheduling and MAC Information Computing Phase

The sensor nodes can be in either of the two states active and dormant. Some sensor nodes are scheduled

for dormant state, which is a low-power state. A node dormant state does neither any sensing task nor any relaying task.

Operational Phase

During this phase, actual sensory data transmissions take place. The sensor nodes forward data toward the CH node according to their respective medium access time slots. The CH nodes remove the redundancies in the data sent by the sensor nodes by the process of data aggregation and finally forward the aggregated data toward the BS as per the communication pattern distributed by the BS. DCH nodes do only cluster management tasks such as monitoring the mobility of the nodes and exception handling.

Exception Handling Phase

This phase is an occasion alone. Due to the node mobility and the sudden death of some sensor nodes, the CH node may lose enough links with its cluster members. This may significantly degrade the throughput level in terms of packet delivery at the BS.If there is significant loss of connectivity with its cluster members, then the CH is asked to relinquish the charge of cluster headship, and a new one is selected either from the CH panel or one from within the two DCH nodes already selected. If a DCH node becomes the CH

Table 1. Simulation Parameters

Channel type	wireless channel
Propagation model	Two ray ground propagation model
Antenna type	omnidirectional antenna
Max packet in inq	55
No of mobile nodes	100,200,300,400
Routing algorithm	M-Leach,E2R2 protocols
BS Mobility type	Probability based mobility model
X dimensional topology	1960
Y dimensional topology	1400
Stimulation Time	10,20,30,40

V. SIMULATION RESULTS

In this section, we are going to compare the Energy and Throughput of M-LEACH Protocol and E2R2 Protocol through simulation results as follows:

Existing Architecture

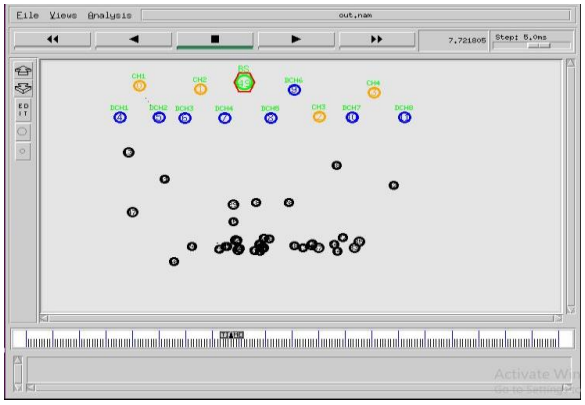


Fig 3. Existing architecture

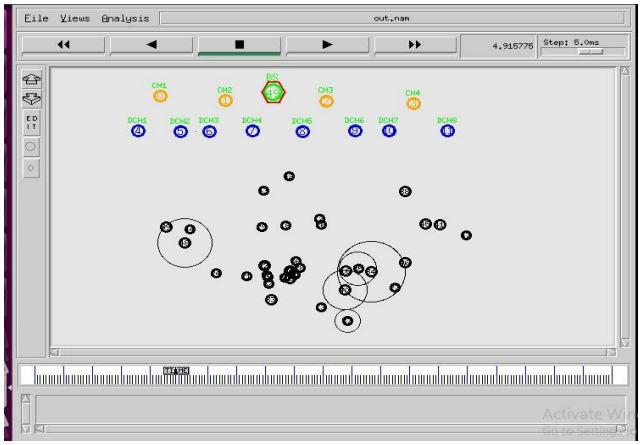
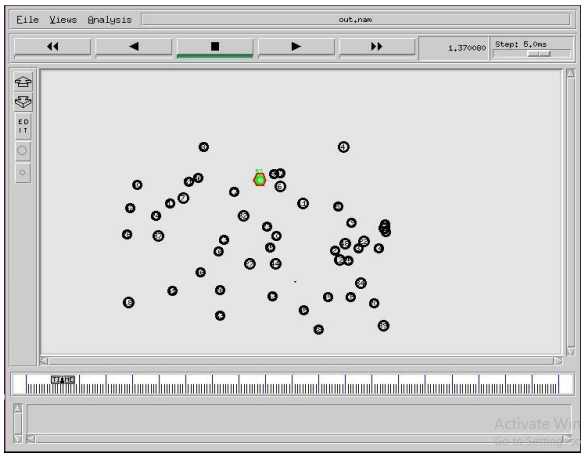


Fig 4. communication between the nodes

Here sensor nodes are communicating with BS.In this M-Leach Protocol the BS is fixed and sensor nodes are mobile.it will consume lot of energy when compare to the E2R2 Protocol, because the sensor field away from the BS. Then it will take more time to send the data then at that situation the sensor nodes will die soon. To overcome this we are implementing the E2R2 protocol.

In that both BS and sensor nodes are mobile. It will consume less Energy consumption. Then sensor nodes live life will be increased

Implemented Architecture



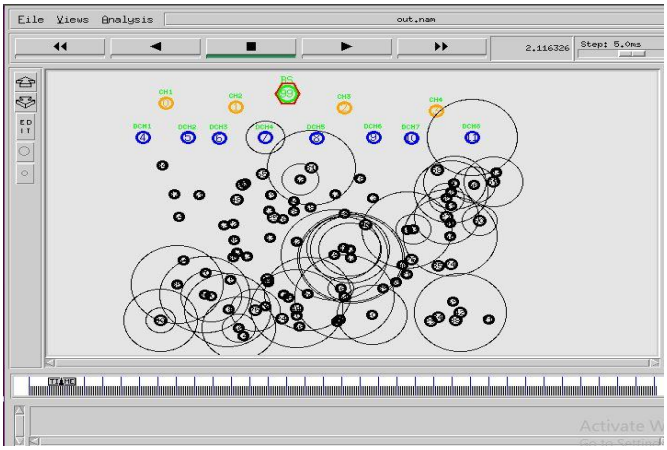


Fig 5. Data transmission from the sensor nodes to CH

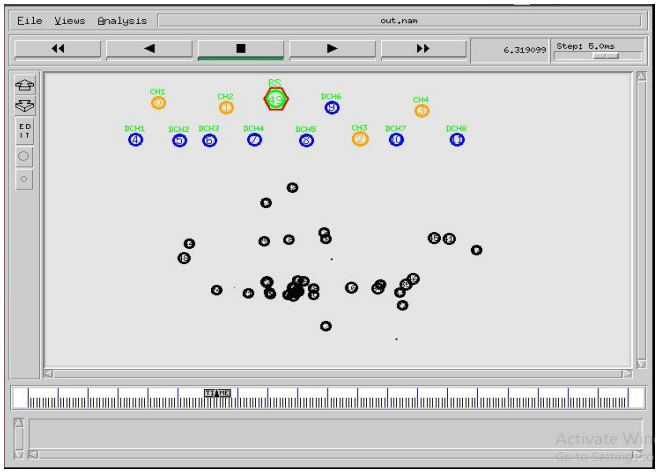


Fig 6. Cluster head shifted to DCH

In this above figure when sensor node energy losses the CH node will replace the highest residual energy of the DCH node. The CH becomes the DCH. The data send to the sensor nodes to BS through the multiple routes of the network.

Drop tails occurs: The sensor nodes send the data to the BS in which information will be losed.Due to the packet drop probability range is 0.0-0.2

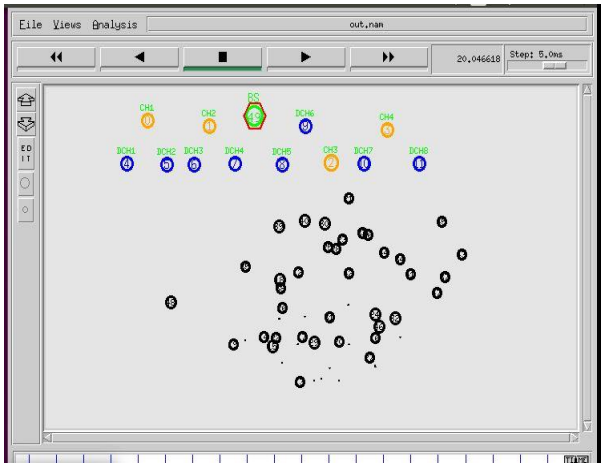


Fig 7. drop tail occurs

Energy consumption

Here we evaluate the overall average Energy of the M-LEACH Protocol and compare it to that of E2R2 Protocol. We are taking different sensor nodes at different energy level, and we are comparing it with the M-LEACH Protocol. For Energy graph on x-axis we are taking sensor nodes and on y-axis taking Energy. Energy Consumption comparison table.

N=400 nodes at x axis and y- axis Energy

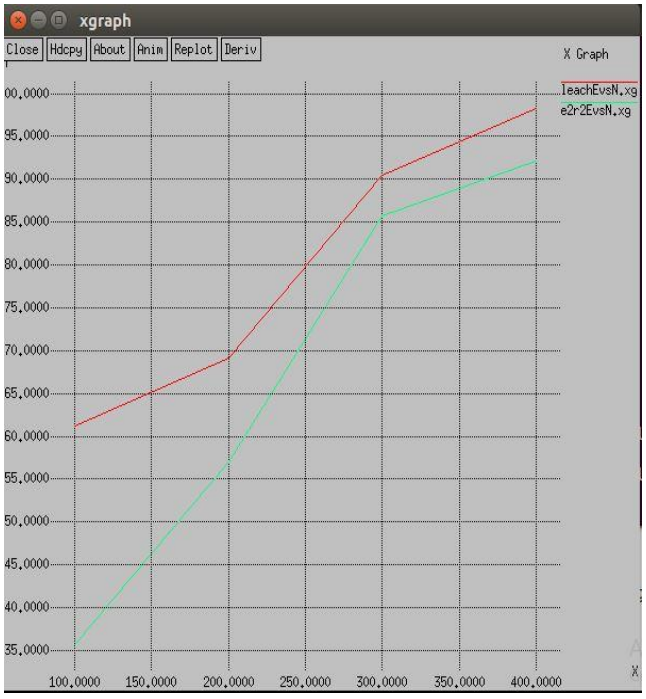


Fig 8. comparison graph energy vs sensor nodes

SENSOR NODES	M-LEACH PROTOCOL (Joules)	E2R2 PROTOCOL (Joules)
100	161.195	135.733
200	169.075	157.029
300	190.469	185.742
400	198.209	192.105



Fig 9. comparison graph throughput vs sensor nodes

Throughput:

The throughput is defined as the average number of data packets received effectively from all groups per unit time. Here we evaluate the overall average per-node Throughput of the M-LEACH Protocol and compare it to that of E2R2 Protocol. We are taking different sensor nodes at different mobility level, and we are comparing it with the M-LEACH Protocol. For throughput graph on x-axis we are taking sensor nodes and on y-axis taking Throughput.

N=400 nodes at x-axis and y-axis Throughput

By comparison of both protocols sensor nodes are increases throughput will be decreases the implemented protocol improved 15% throughput when compared to the M-Leach protocol. The throughput is improved.

Comparison of Energy Consumption

Mobility (meters/ sec)	M-LEACH PROTOCOL (Joules)	E2R2 PROTOCOL (Joules)
5	96.04	84.4657
10	133.84	123.985
15	158.289	150.211
20	160.123	154.023

Mobility on x axis and y axis Energy

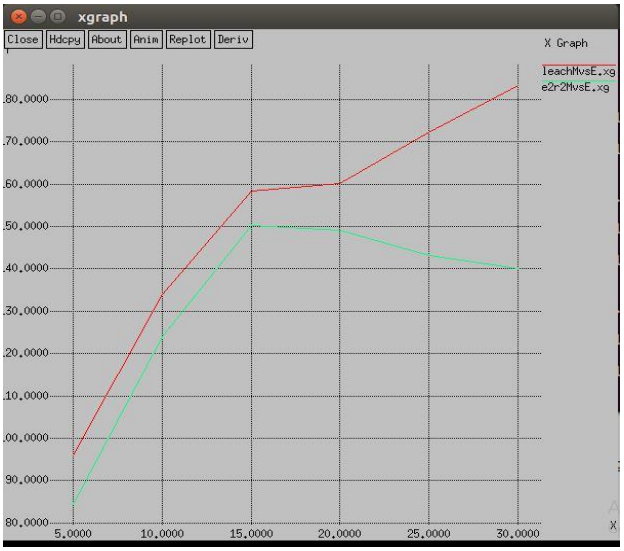


Fig 10. comparison graph Mobility vs Energy

The implemented E2R2 protocol taking mobility on x-axis and y-axis Energy consumption.Here we are increasing the mobility energy consumption will be increases.

Comparison of Throughput :

Mobility (meters/ sec)	M-LEACH PROTOCOL (Kpbs)	E2R2 PROTOCOL (Kpbs)
5	828.21	840.21
10	814.98	830.98
15	797.37	814.37
20	797.12	800.37

Mobility on x axis and y axis Throughput

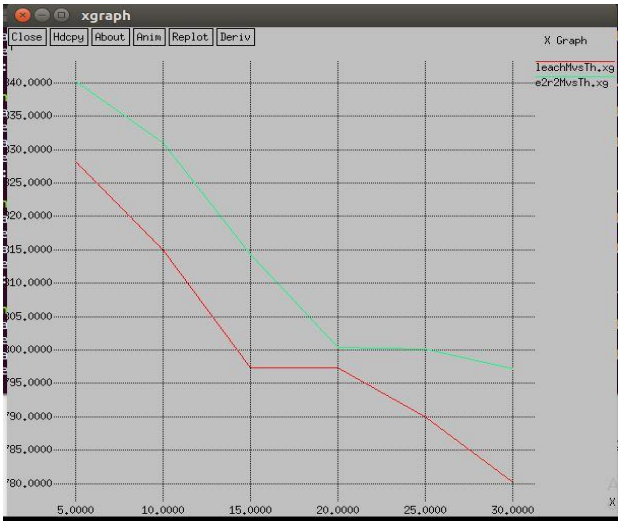


Fig 11. comparison graph Mobility vs Throughput

Here taking the mobility on x-axis and y-axis throughput. The protocol is efficient when it is compared with the M-LEACH protocol. The mobility is increases throughput will be decreses.Here we can observe on the above graph mobility E2R2 protocol is better efficient when compared to existing M-LEACH protocol.

VI. CONCLUSION

The effectiveness of the implemented routing Protocol approach is validated through simulation experiments. In this section various performance metrics used for evaluation of the protocol, simulator architecture, simulation environments and

experimental results and analysis are reported. The results of the implemented Protocol approach are also compared with another energy efficient routing approach for mobile wireless sensor networks, MLEACH. Energy consumed for E2R2 protocol is 18% less than M-Leach protocol. Throughput improved for E2R2 protocol is 15% more than M-Leach protocol.

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Prevalence of Myofascial Trigger Points of Gastrocnemius in Dancers

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ABSTRACT

Myofascial trigger points are hyperirritable spot which is usually a taut band of skeletal muscle, which is painful on compression and give rise to musculoskeletal dysfunction. Gastrocnemus muscle being the main muscle of mobility and stabilty in dancers. Due to this constant use of this muscle in various dance forms and the fatigue caused, it may cause trigger points.

Objective

1. To study the occurrence of trigger points in dancers.
2. To study prevalence of trigger points in various dance forms and finding out which dance form dancers have high prevalence for trigger point.
3. To study the correlation of presence of trigger point and strength of the gastrocnemius muscle.

Materials and Methodology

This is an observational study comprising of 100 samples who were trained dancers. Dancers of bharatnatayam, kathak and contemporary form were included and were palpated for trigger points, which were then presented in tabular and graphical manner.

Results and Conclusion

Results showed 52 % have trigger point in gastrocnemius and 48% did not have trigger point in gastrocnemius. Out of the 3 dance forms selected, bharatnatayam dancers showed more prevalence of trigger point of gastrocnemius.

Keywords : Trigger Points, Gastrocnemius, Dancers, Bharatnatyam, Kathak, Contemporary Dancers.

I. INTRODUCTION

Dance is a form that is generally referred to movement of the body, usually rhythmic and to music, used as a form of expression, social interaction or presented in a spiritual or performance setting. It not only involves flexibility and body movement, but also physics of the body. If proper physics is not taken into consideration, injuries may occur.

World Health Organization (WHO) defined dance injuries as “a physical condition that causes pain and discomfort resulting in limitation, restriction or cessation in participation in dance.”

Dance related injuries are usually a result from inherent biomechanical factors, environmental and training issues as well as technical competence. Overuse injuries account for 60-76% of all dance injuries affect the lower extremities. The most common locations for injuries are ankles, lower leg/

calves, usually caused by overuse, muscle strains and sprain. Due to overuse of gastrocneumius and soleus muscle (calf muscles) in dancers as they are the chief muscles in the lower limb prevalence of injury, pain, cramps etc. are very common. One of the main cause of calf pain and cramps are the myofascial trigger point. Trigger points are classified as being active or latent, depending on their clinical characteristics. An active trigger point causes pain at rest. It is tender to palpation with a referred pain pattern Trigger points are common in gastrocnemius muscle due to physical overload and mispositioning of the foot. In ballet dancers due to on pointe position, demi pointe position there is constant plantarflexion. In Bharatanatyam, the constant tapping of the feet and constant pressure on the muscle causes strain and cramps. In kathak, there is constant tapping of the feet for prolonged time may cause strain, pain and cramps In contemporary dancers, constant jumping, fast movements may also cause pain and cramps.

II. METHODS AND MATERIAL

Study location : Dances Classes around Pimpri was taken as the study place.

Sampling method : Purposeful sampling was done.100 dancers were selected for palpation of calf. Age group selected were 18-40 years old. People with recent lower limb fracture, ankle sprains, knee injuries, lumbar radiculopathy, lower limb metal implants were excluded from this study.

Data collection: Dancers of three dancers (Bharatanatyam, kathak, contemporary dancers) with history of calf cramps were selected and where palpated for trigger points on both medial and lateral heads for gastrocnemius. Along with palpation of trigger point, strength was assessed using manual muscle testing of gastrocnemius muscle.

III. RESULTS AND DISCUSSION

In this study, out of 100 dancers, 52 dancers showed the presence of trigger points of gastrocnemius muscle in dancers of various dance forms.

TRIGGER POINT	PREVALENCE
PRESENT	52
ABSENT	48

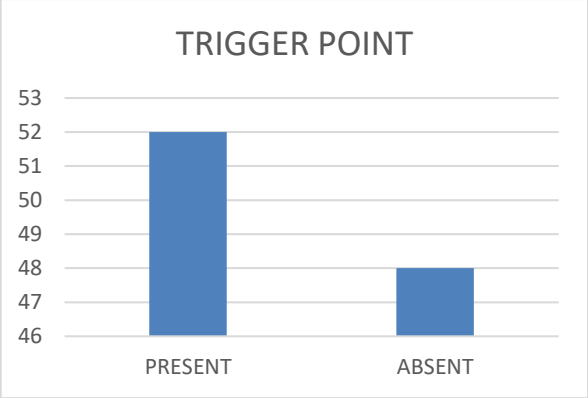


Fig 1. shows the prevalence of trigger points in gastrocnemius in dancers.

Out of the 100 dancers from all the three forms, there was a high prevalence of trigger points in bharatanatyam dancers (n=20), followed by contemporary dancers (n=18) and then kathak dancers (n=14).

DANCE FORM	TRIGGER POINT PRESENT IN NO. OF DANCERS
BHARATNATYAM	20
KATHAK	14
CONTEMPORARY	18

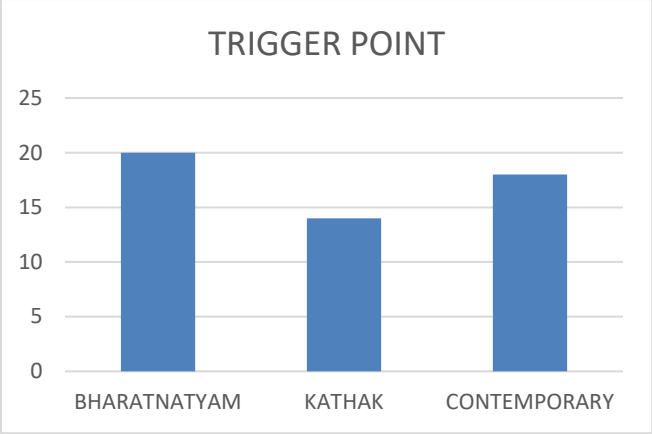


Fig 2. shows the prevalence of trigger point in all the three dance forms

According to our study, the dancers felt maximum pain at intensity of 5.(n=18) . The pain ranged from 2-7 on the VAS

PAIN ON VAS	NO OF STUDENTS
2	6
3	13
4	5
5	18
6	8
7	2

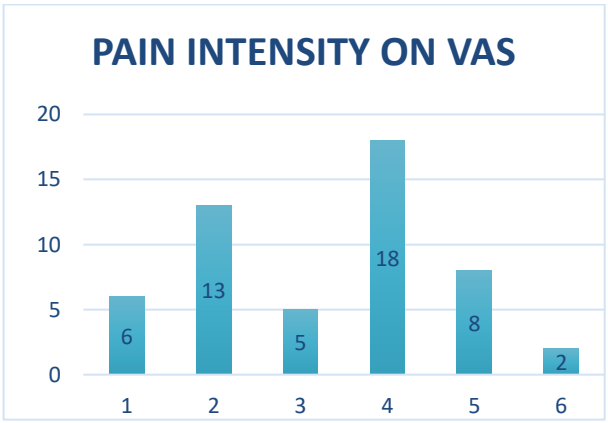


Fig 3. shows the pain on VAS

In our study, there was no significant correlation between strength and trigger point presence. Most of the dancers showed the muscle strength 4+.

MMT	NO. OF DANCERS
4	14
4+	54
5	32

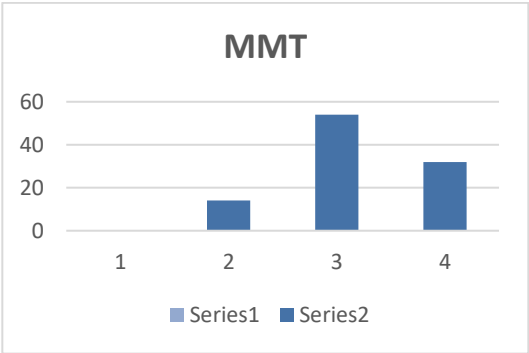


Fig.4 shows the MMT in all dancers.

IV. DISCUSSION

The aim was to study the prevalence of myofascial trigger point in gastrocnemius muscle in dancers who practice regularly. Overuse injuries account for 60-76% of all dance injuries affect the lower extremities. The most common locations for injuries are ankles, lower leg/ calves, usually caused by overuse, muscle strains and sprain. [1] Due to overuse of gastrocnemius and soleus muscle (calf muscles) in dancers as they are the chief muscles in the lower limb prevalence of injury, pain, cramps etc. are very common. One of the main cause of calf pain and cramps are the myofascial trigger point. In Bharatanatyam, the constant tapping of the feet and constant pressure on the muscle causes strain and cramps. In kathak, there is constant tapping of the feet for prolonged time may cause strain, pain and cramps. In contemporary dancers, constant jumping, fast movements may also cause pain and cramps. [3] In dancers, gastrocnemius is the main muscle for mobility as well as stability. Due to this continuous overloading on the muscle causes

fatigue. Fatigue has shown to be a contributing factor for trigger points. Overuse injury that often leads to calf pain in dancers. There is evidence that musculoskeletal injury is an important health issue for dancers at all skill levels. There is a high prevalence and incidence of lower extremity, with soft tissue and overuse injuries predominating. [5] Studies have shown that trigger point is developed when the muscle has been in continuous shortened state, with the knee bent and foot plantar flexed. In Bharatanatyam and contemporary dance form it is seen that the above-mentioned position of the leg is assumed for long durations. This study also shows that Bharatanatyam dancers have more prevalence of gastrocnemius trigger points followed by contemporary and kathak dancers. Studies show that on identification of trigger point shows 4 major sign and symptoms: taut band, hypersensitive spot, local twitch response and jump sign. In this study majority of the samples with trigger point gave positive sign for local twitch response. This local twitch response is caused because the damaged tissue releases bradykinin, serotonin, protons and prostaglandins. Due to this continuous stimulation of nociceptors and release of the above substances causes persistent pain. [6] Studies have shown that there is rarely any presentation of muscle weakness associated with the presence of trigger points. This study also confirms that there was no presentation of weakness of the gastrocnemius muscle in all the three forms of dancers. Muscle weakness is caused due to accumulation of inorganic metabolites at the muscular level that inhibits cross bridge formation causing muscle fatigue and muscle weakness. [7].

V. CONCLUSION

The study shows that there is 52% of dancers who have trigger point present. Amongst the three type of dancers, Bharatanatyam dancers showed more present of prevalence of trigger point of the gastrocnemius. There was no change in the muscle strength in relation to the presence of trigger point.

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Fenvalerate Induced Changes in Histological Structure of Gonads of Freshwater Teleost Fish Barbus Carnaticus

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ABSTRACT

In the present study freshwater teleost fish Barbus carnaticus used as a specimen to observe the concentration based effects of Fenvalerate on the Ovary and Testicular structure, Concentration mediated histopathological lessions were observed in the Ovary and Testis of Barbus carnaticus exposed to LC 50 concentrations of Fenvalerate for 24, 48, 72 and 96 hours. Conclusion drawn from the study is that the structure of Ovary and Testis is highly damaged at LC 50 concentration for 96 hours duration. Damage of germinal epithelium inflammation, contraction, condensation in the cells of Ovary and Testicular tubules are observed.

Keywords :- Barbus carnaticus, Fenvalerate, Histology, Ovary, Testis

I. INTRODUCTION

Fish is highly nutritive food for human beings. Enough water bodies are available in our country which is used consistently for fishery. It is possible to increase aquatic food production by adopting aquaculture practices even at small scale. But the production of fish is being adversely affected due to non sustainable activities of man that exert both direct and indirect effects upon aquatic fauna including fish. Changes in the physico chemical status of the aquatic environment is done by releasing untreated industrial and domestic effluents. The polluted water destroys the suitable conditions needed for healthy fish population and it also cause damage to the metabolism of fishes leading to large scale mortality. Indiscriminate use of pesticides and chemical fertilizers leads to pollution of water bodies. It leads to the decrease in the population as the gonads are exposed to pesticides in various lethal concentrations. Gonads have a series of developmental changes with the onset of maturation which are closely accompanied by conspicuous cellular, biochemical, molecular and endocrinological changes. (Nagahama, 1983, Guraya, 2000). Polluted aquatic environment cause decrease in the population of fish species.

II. METHODS AND MATERIAL

The toxicity tests were conducted as per the recommendations of APHA (1998). Fish *Barbus carnaticus* (approx.wt. 100 g.) were collected from the Girna Dam, constructed on Girna river in Dist: Nasik, Maharashtra and acclimated to the laboratory conditions for a period of 15 days in a large tank of 1000 liter, previously washed with potassium permanganate and water temperature was 26 ± 35 0c and pH 7.0 – 7.2 maintained in aquarium. At the termination of the experiment both control and treated fish were dissected in Ringers solution. Ovaries and Testis were excised, quickly separated

from the adjoining tissues and sections were taken 8 micron with the help of rotary microtome, then stained in Haematoxylene , Eosin and mounted in DPX for microscopic examination.

III. RESULTS AND DISCUSSION

The ovary of normal *Barbus carnaticus* reveals that it is surrounded by an ovarian wall which is differentiated into an outer thin peritoneum a thicker tunica albuginea, made up of connective tissue, muscle fibers and blood capillaris.

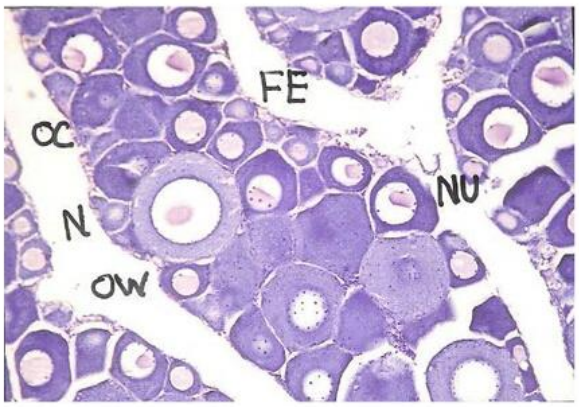


Fig 1 - T. S. of ovary from *Barbus carnaticus* (Control). OC- Oocyte, NU - Nucleolus, N - Nucleus, OW - Ovarian Wall.

The innermost layer is the germinal epithelium which joins with the tunica albuginea at several places and projects into the central lumen of the ovocoelom show finger like projections called ovigerous lamellae (Fig 1).

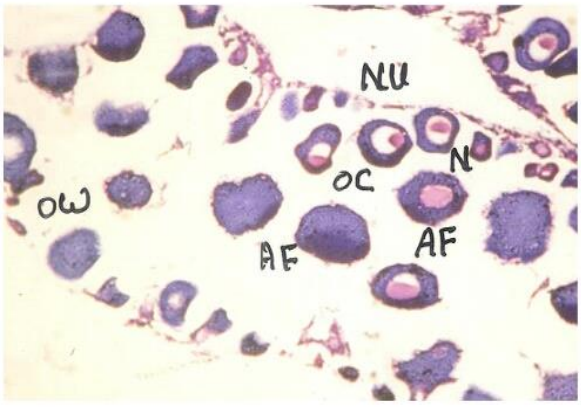


Fig 2 - T .S. of ovary from *B. carnaticus* (Exposed to Fenvelarate for 96 h).

OC - Oocyte, NU - Nucleolus, N - Nucleus, OW - Ovarian Wall, AF-Atretic Follicle.

The histology of experimental fish ovary showed disrupted follicular epithelial cells. Nucleolus showed condensation of crescent shaped dark granules at one side. Degeneration of epithelial cells causes vacuolization, breakdown of germinal vesicles, many disrupted oogonia (Fig 2).Most of the workers have shown that the fishes exposed to pesticides led to lowered steroid genesis Kapur et al;1978. Stopage of development of advanced oocyte stages and thus reducing the number of viable oocytes (Saxena & Garg 1978, Yasuno et al ; 1980, Mani & Saxena 1985). The increase in follicular atresia was obvious due to effect of pesticides on fish ovary. Both inhibited the growth of oocytes and raised incidences of follicular atresia were evident in ovary of *Channa orientalis* exposed to Nuvan Dimecron as have been observed in the case of certain fishes (Shukla et al ;1900, Mani & Saxena 1985, Ghosh 1986, Singh & Sahai 1986, Khillare & Wagh 1987, Patwardhan & Gaikwad 1990, Dutta et al; 1994.The histological abnormalities in ovaries may be due to factors like ionizing radiations, electric current, parasitic infections. Xenobiotic toxicants. Sarojini and Victor (1985) and by variety of effluents and aquatic pollutants (Shukla et al; 1984

Saxena & Garg1978 Johnson et al ; 1988 Mc Comic et al 1989 Kumar et al; 2000.) Almost all similar histopathological findings were reported by Hossain et al; 2002 in the ovaries *Anabas testudineus.*

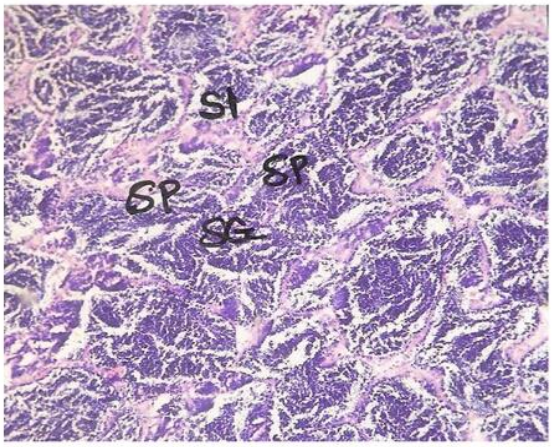


Fig 3. T. S. of testis from *B. carnaticus* (control). SL-Seminiferous Lobule, SG- Spernatogonia, SP-Spermatids.

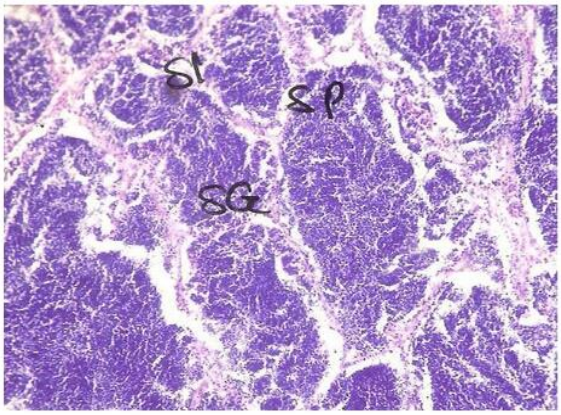


Fig 4. T.S .of Testis from *B. carnaticus* (Exposed to Fenvalerate for 96 h).

SL-Seminiferous Lobule, SG- Spernatogonia, SP-Spermatids

Testis of *Barbus carnaticus* are paired organs found in abdominal region and each is enclosed in a peripheral connective tissue sheath. The inner layer of connective tissue called tunica propria projects into the lumen of testis to produce seminiferous tubules. These seminiferous tubules are lined by spermatogonic epithelium which gives rise to spermatocytes. Spermatocytes are converted into the spermatids and then into the spermatozoa. Masses of spermatozoa can be seen lodged in seminiferous tubules. This tubular part is made up of somatic and germinal cells. The central portion of the testis is made of glandular tissue consisting of large and spherical interstitial glandular cells, fibroblasts, blood and lymph vessels. The histology of fish testis under control is given in (Fig.3). Testicular inflammation was documented as one of the common responses in both aquatic and terrestrial animals exposed to environmental toxicants (Sokal et al; 1985 Ruby et al; 1986 1987. Testis of *Barbus carnaticus* shows significant changes like disrupted seminiferous tubules and immature spermatogonia and general inflammatory response (Fig.4). when exposed to sublethal concentrations of Fenvalerate for different exposure periods. Cellular damage, inflammation and other histological damages are quite primitive. Inter tubular vacuoles clearly seen in all four sets of exposure (24, 48, 72 and 96 hours). . Exposure of Fenvalerate is responsible for histopathological damage of fish testis and vacuolization of tubular cells and distortion of seminiferous tubules, enlarged interstitial and haemorhage in inter tubular area in albino rats exposed to pesticides have been reported. Dutt and Dikshith 1973, Nigm et al; 1979 and Baronia & Sahai 1993 Katti & Sathyanesan 1985 observed exposure dependent on concentration mediated changes in testis of *C. batrachus* treated with lead . Degree of histological damage as is evident by the presence of large number of both inter and intra tubular vacuoles was maximum at 96 hours of exposure period. Gross condensation of spermatogenic cells which is evident by clump formation and appearance of inflammatory lesions are also quite prominent. Inflammatory cells seen in the testicular tissues of every treated fish, their number increases as the concentration of Fenvalerate

increases i.e. the effect is exposure dependent and concentration mediated. Shrinkage of interstitial cells and vacuolation of tubular cells.is observed. Kinnberg, et al (2000) have also documented concentration dependent effects of Nanylphenol on testicular structure of the fish *Xiphophorus maculatus*.. Zutshi (2005) observed, the effect of Fenthion on the testis of *Glossogobious giuris*. They have observed reduction in size with spermatids and sperms in degenerative condition. Present study thus suggests that Fenvalerate is highly toxic to the fish *Barbus carnaticus* and cause damage to the internal structure of testis can result in decreased fertility potential in male *Barbus carnaticus*.

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Bioactive Compound (Phenolic, Anthocianin, and Antioxidant) in Black Rice (Oryza sativa var. Pare Ambo) South Sulawesi

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ABSTRACT

Cereals are widely found in Indonesia and used as foodstuffs. Nutrient content of cereals vary from quantity and quality. Rice, one kind of cereals is commonly consumed by Indonesian community. There are some various types of rice such as brown rice, black rice and red rice. One type of rice, namely black rice is widely known as antioxidant source, for example black rice. This research be focused on the analysis of bioactive compound in black rice (Oryza sativa var Pare Ambo). This research using laboratory experiment methods to analyze total phenolic content, anthocianin, and antioksidan (free radical scavenging activity DPPH) black rice using spectrophotometer UV-vis. This research using complete random design (rancangan acak lengkap, RAL), thus obtained data were analyzed using statistic. Significant difference between groups were analyzed using ANOVA with $p<0,05$. The results showed that brown rice extract possess to total phenolic content (TPC) 3,97 mg/kg gallic acid, free radical scavenging activity 52,30%, anthocianin content 118,33 mg/kg ($p>0,05$). Black rice possess to total phenolic content10,26 mg/kg gallic acid, free radical scavenging activity 62,67%, anthocianin content 122,3mg/kg, red rice possess to total phenolic content(TPC) 7,48 mg/kg gallic acid, free radical scavenging activity 54,78%, and anthocianin content 120mg/kg. Antioxidant activity from black rice caused by it phenolics compound that act as antioxidant. Spectra XRD Analysis for Determination of Vitamin B (Percentage of Vitamins) (B3, B5, B6) niacin, pantothenic acid and Riboflavin results showed the highest percentage of vitamin B5 (40,45). The results of the research were 88,21% carbohydrates, 8.36% protein, 1.74% fat, 11.17% water, 1.15% ash which amounts to 0.395 mg calcium (Ca), 1.98 mg / ml Magnesium (Mg) and 0.387 mg / ml iron (Fe). In conclusion from this study, black rice has antioxidant activity and nutrient content, these products are expected to be native functional foods.

Keywords: Phenolic Content,Anthosianin, free radical scavenging activity, Vitamins, Black Rice, XRD

I. INTRODUCTION

Rice (Oryza sativa) is one of the most important cereal crops for human consumption in the world. The quality of rice affects consumers' acceptance and market value. The quality traits encompass physical appearance, cooking and eating properties and, more recently, nutritional value (Fitzgerald et al., 2009). The importance of nutritional quality can be viewed in two ways. On the one hand, micronutrient deficiency has been recognized in developing countries where rice is the main food, and fortification of nutrients by processing or biofortification by transgenic engineering to address

particular deficiencies has emerged (Bouis et al., 2003; Welch and Graham, 2004). On the other hand, the frequency of life style related diseases such as diabetes, hypertension and obesity has increased over the last few decades in developed countries (Takaiwa et al., 2008). Many epidemiological studies have provided evidence that reduced risk of these diseases and some cancers is associated with the intake of whole grain including rice (Seal, 2006; Vitaglione et al., 2008). Whole grains have become popular in western countries, but more gradually accepted in developing countries with the improvement of living standards.

Black rice is a type of rice which contains more nutrients and active compound due to its color. Black rice contains anthocyanin pigments, such as cyanidin and peonidin in the bran layer. Anthocyanins are widely present in fruits, vegetables and red wine. Anthocyanins have been recognized as health-enhancing functional food ingredients due to their antioxidative activity (Jang and Xu et al., 2009; Kamiyama et al., 2009), anticancer activity (Spormann et al., 2008; Longo et al., 2008) and prevention of arterial sclerosis (Miyazaki et al., 2008). It has been also reported the characteristics of alcoholic beverages drunk through tubes in Thailand, Uganda, and Bahrain (Teramoto,2007).

Black rice is colored rice which is considered a health food (Park et al., 2008) which has been shown to have bioactive properties (Kong and Lee, 2010). Black rice contains anthocyanin which is a natural dye that is included in flavonoids and is used as an antioxidant Antioxidants are compounds or molecules that can prevent the oxidation process caused by free radicals (Chen et al, 2006). Based on previous research, an analysis of bioactive components in the form of total phenolic content (TPC), free radical scavenging activity (DPPH), anthocyanin and vitamins (niacin, Pantothenic Acid and Riboflavin) with XRD (Percentage of Vitamins), with other additional data namely physical and chemical content (Contents water, protein, carbohydrate, fat and ash content, and mineral components in the test sample.

II. MATERIALS AND METHODS

A. Materials

Raw material used in this research are black rice (*Oryza sativa* var Pare Ambo), red rice, and brown rice. Rice samples will be bought from the farmer in Makassar and black rice in Tana Toraja Sout Sulawesi. Other materials are chemicals for laboratory analysis and will be bought in chemicals distributor in Makassar. The materials used in product analysis are quads, K2S04, HgO, H2SO4, H3BO4, NaOH- Na2S2O3 solution, HCL 0.02 N, HCl 0.1N, NaOH 0.1 N, paper filter, red and blue metal indicator, and hexane.

Tools

The tools required in the making of black rice are the basin, stirrer spoon, gas stove, make a pan, large size stove, dryers and plastic packaging, silica gel, 100 and 80 mesh sieves, bowls, plates, small spoons and 1000 ml measuring cups. The tools used in the analysis are pipette, volumetric pipette, desiccator, distillation equipment, Kjeldahl flask, Erlenmeyer, analytical balance, magnetic stirrer and hot plate cup, aluminum saucer, porcelain cup, petri dish, measuring cup.

The voltages input is 40kV and currents input is 30mA. Observation angle from are 200 to 800, appliance type of x-ray diffraction is Shidmadju X-RD 7000. MAUD applications using standards data. After adjustment of diffraction pattern with standard data has been completed in MAUD application, then

determine distance betwen atoms using Gaus View5.0 applications.

B. Sample Preparation

Extraction procedure to determine the antioxidant properties

Each rice flour (1.5 g) was weighed accurately and extracted at room temperature with 85% aqueous methanol under agitation using a magnetic stirrer for 30 min. The mixtures were centrifuged at 2500g for 10 min and the supernatants were collected. The residues were re- extracted twice under the same conditions, resulting finally in 50 ml crude extract. All extracts were used as they were after centrifugation to determine TPC and antioxidant capacity.

DeterminationofDPPHradicalscavenging ability

Theantioxidant activity wasdetermined according toBrand- Williams, Cuvelier, and Berset (1995), with slight modifications. KineticassaysofDPPHwithdifferentconcentrationsofth e extracts were carried outtodetermine the reaction time. A total of 1.5 mL of an ethanolic solution of DPPH (2.2316104 molL1), 200 lL of sample, and 1.8 mL of ethanol were added to a test tube toafinal volume of3.5 mL.Thetubes were sealed, shaken and incubated for60 min in the dark at room temperature (25 ± 1C). Theabsorbance wasrecorded at k = 517nmandtheability of extracts toscavenge the DPPHwascalculated using Eq. (3).

The percentage of radical-scavengingability was calculated by using the formula:

Scavengingability(%)

= [Absorbance517 nm of control_Absorbance517 nm of sample/Absorbance517 nm of control] x 100

Analyses of anthocyanins and total phenolics

Anthocyanins from the black rice were quanti- fied by UV–Vis spectrophotometry (Shimadzu UV-1800), at k = 374 nm and k = 535 nm, respectively. The content of flavonoids and anthocyanins were determined using Eqs. (1) and (2), respec- tively (Lees & Francis, 1972).

Total phenolic content was determined using the Folin–Ciocalteu method (Huber & Rupasinghe, 2009; Singleton, Orthofer, & Lamuela-Raventos, 1999), with slight modifications. To a 5.0 mL flask, 3.0 mL of ultrapure water, 250 1L of Folin–Ciocalteu reagent 0.2 N and 250 1L of properly diluted sample were added. The solution Total phenolic content was determined using the Folin Ciocalteu method (Huber & Rupasinghe,2009; Singleton, Orthofer, & Lamuela-Raventos, 1999), with slight modifications. Toa5. 0mL flask,3.0mL of ultra purewater, 2501L of Folin–Ciocalteu reagent 0.2N and 2501L of properly diluted sample were added. The solution wasstirred for 5min and 2501L of a 10% Na_2CO_3 solution (w/v) were added, and the volume was completed with ultra pure water. The mixture was incubatedat25Cina waterbath (99-20MQBTC) for 60min. The absorbance wasre cordedat761nm using as pectrophotometer (Shimadzu1800, Japan). The content of phenolic compounds was determined from the standard curve of gallicacid (10–701molL^{1}, y=0.01816x0.01015;R^2=0.9982). The results were expressedin mg of gallic acid equivalents per 100g dry weight sample(mgGAE100g^{1}DW).

Proximate Composition Analysis (AOAC, 2005)

The proximate composition was determined according to AOAC (2005) methods. Crude protein content analyzed using the Kjeldahl method; crude lipid content referred to the Soxhlet method; while ash content through ash samples over-night at 550°C. Moisture content was by drying samples overnight at

105°C until constant weight was achieved,as well as carbohydrate content was calculated by differences.

Water content of oven method (AOAC 1996)

Determination of water content based on the difference in weight for example before and after dried. At first the empty cup is dried in the oven for 30 minutes at 105 ° C. then cooled in the eksikator for 15 minutes, Then weighed. 3-5 gram of sample inserted into the cup then dried in 105°C oven for 6 hours. Cup cooled in eksikator for 30 minutes, then weighed. The water content determined by the formula

$$\text{Water Content (\%)} = \frac{B-C}{B-A} \; x \; 100\%$$

Protein Content (Sudarmadji, 1984)

Take 10 ml of protein solution and diluted to 100 ml with the distilled water in the flask, the solution is then put into a 500 ml Kjeldahl flask and 10 ml of H_2SO_4 (93% - 98% free N) add5 grams of a mixture of H_2BO_3, Na_2SO_4-HgO for catalyst.Boil until clear and continued for another 30 minutes. After a cold washed in a Kjeldahl flask with distilled water then boiled again for 30 minutes.

Once cool add 140 ml of distilled water, and added 35 ml NaOH-Na2S2O3 and a few grains of zinc. Then it was distilled, 100 ml of distillate accommodated in an erlenmeyer containing 25 ml of boric acid saturated solution and a few drops of PP indicator. Solution obtained with 0.02 N HCl.

Ash content of gravimetric method (AOAC 1996)

3-5 grams of sample weighed and put into the cup, then burned in the Bunsen until no smoke. After it inserted in a furnace, burned to gray ash. Ash carried out in two stages, first at a temperature of 400°C and then a temperature of 550°C. After the weight of the cup is constant, the cup then cooled in a desiccator and weighed. Ash content determined by the formula:

$$\text{Ash Content}(\%) = \frac{A}{B} \; x \; 100\%$$

Fat Content (Metode Soxhlet), Sudarmadji,1997.

The mash sample was weighed as much as 10 g and added to the thimble. Then the thimble is inserted into the Soxhlet extraction tube. The sample was extracted using sufficient petrolli ether solvent for + 4-6 hours. Petrolium ether containing fat extract is a weighing bottle that is clean and has heavy weight and is evaporated over the rice bath until it is not thick. Oven dry at a temperature of 1000C to constant weight. The residual weight in the bottle is weighed and declared heavy.

carbohydrate content (By Difference)

carbohydrate (%) = 100 % - (water content + ash content + fat content + protein content)

Statistical analysis

Data analysis using variance analysis (ANOVA). The results of the data that showed a significant effect (α = 0.05), the real difference test was performed using Duncan's multiple distance difference test.

III. RESULTS AND DISCUSSION

A. Bioactive Compound

The results showed thatblack rice extract possess to total phenolic content3,84 mg/kg gallic acid, free radical scavenging activity 52,30-62,67%, anthocianin 118,33-123,33 ppm (p>0,05). Brown rice possess to total phenolic content3,97 mg/kg gallic acid, free radical scavenging activity 52,30%, and Anthocianin 118,33mg/100 g sample, Black rice possess to total phenolic content10,26 mg/kg gallic acid. The phenolic content varied statistically (P < 0.001) 123.33 mg100g.linear regressionanalysis showed that the model wassignificant (P < 0.001)

Table 1. Total Phenolic Content (TPC), Anthosianin and Free radicalscavenging activity (DPPH)

Sampel	Phenolic (mg/Kg) GA	Anthocianin (mg/kg)*	Free radical scavenging activity(%)*
BR1	3,97 ± 0.02	118,33 ± 0.58	52,30 ± 0.69
RR2	7,48 ± 0.07	120,33 ± 0.58	54,78 ± 0.80
BR3	10,26 ± 0.03	123,33 ± 1.53	62,67 ± 0.58

Description :Valueswith different letters in the same column show significantly different ($p < 0.05$)
Brown Rice (BR1) ; Red Rice (RR2) ; Black Rice (BR3)

The results of research on antioxidant activity of black rice extract. The antioxidant activity of the average black rice extract extracted with ethanol had the highest antioxidant activity of 62.67%, the total phenol obtained had a positive relationship with antioxidant activity. This has been supported by Walter and Marchesan (2011) that the higher the total phenol, the higher antioxidant activity. Muntana and Prasong (2010) also reported higher antioxidant activity of black rice than brown rice and brown rice. According to Itani et al. (2002); Goffman and Bergman (2004); Zhang et al. (2006) in Walter and Marchesan (2011) state that the total phenol concentration in rice seeds has a positive contribution to antioxidant activity and is important in antioxidant activity in rice grains. Apart from a large amount of antioxidants, concentrated in larger quantities, the more the composition, the more antioxidant content increases. A similar thing was published by Poumorad et al. (2006) that extracts with the highest content of phenolic compounds showed the highest antioxidant activity. This antioxidant activity is involved by hydroxyl groups in phenolic compounds which act as free radical catchers. Determination of a solution of black rice free radical capture can be used by testing 1,1-diphenyl-2-pikrillhidrazil (DPPH) radicals. The color reduction level of the resolution adds radical antidote efficiency. Testing the DPPH free radical prevention activity using a spectrophotometer was carried out by only looking at the extract with the DPPH solution. Sorbance is needed at λ 517 nm.

The anthocyanins derive from the flavylium cation, and contain oneor morehydroxyl substituents Similarly, Kimetal. (2014) studied the chemical composition and antioxidant activity (ABTS, FRAP, and DPPH) nine varieties of pigmented rice (O. sativa L.) and verified that cyanidin-3-glucoside, peonidin-3-glucoside, pro anthocyanidin dimers, proanthocyanidin trimers, and catechin presented a high and significant correlation with the antioxidant data. Inarecent study conducted by Jun, Shin, Song, andKim (2015).

Antioxidant activity from black rice caused by it phenolics compound that act as antioxidant. As conclusions of this research, black rice possess an antioxidant activity. Then black rice extract possess high antioxidant activity. including otherfunctionalgroups (sugars, forexample). Thepresence ofhydroxyl groups provides antioxidant properties forthe donation ofhydrogenatomsfor reactive species, with the formation of stable products. Therefore, the higher the anthocyanin content, the higher the antioxidant activity(Zhang, Shao,Bao,& Beta,2015). Important for the body due to the maintenance of healthy skin, proper functioning of the nervous system and secretion of bile and stomach normal.

B. XRD (Percentage of Vitamin)

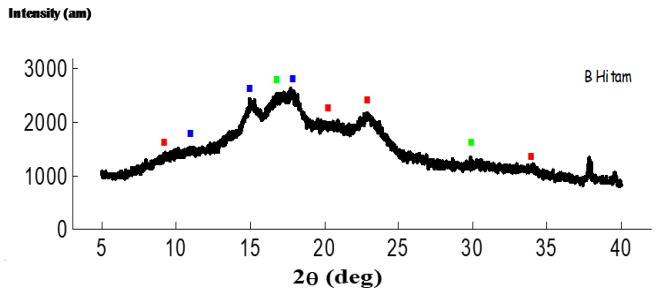


Figure 1. XRD data in study (diffraction peak assignment)

Figure 1 show, the percentage of vitamin B3 (Niacin) in black rice (6.42) shows that black rice has the main function as a nutrient that is very

Percentage of vitamin (B5) pantothenic acid in black rice (40.45). Vitamins are organic nutrients that function specifically and importantly in the human body's system and are very important for maintaining optimal health. Water-soluble vitamins include the B-complex group Niacin, also known as nicotinic acid, and niacinamide (nicotinamide) is a form of vitamin B3. In the release of energy and transfer of fat, protein and, proper circulation, maintenance of healthy skin, proper functioning of the nervous system and secretion of bile and gastric fluid. Vitamin B3 deficiency causes a condition called pellagra (Chand and Savitri, 2016).

C. Proximate Composition

Table 2 shows the proximate composition of Black rice. There was no significant difference (P>0.05) in protein, lipid, moisture content and ash content of black rice. Water is an important component in foods that can affect the appearance, texture, and flavor of food. The water content in foodstuffs in determine acceptability, freshness and durability of food (Winarno, 1989). The analysis results, water content of black rice ranges from 11,00-11,14%.

Table 2. Proximate Composition Black Rice

Sampel	Black Rice(%)*
Watercontent	11,17 ± 0.76^{b}
Protein	8,36 ± 0.35^{b}
Carobhydrate	88,21 ± 0.39^{b}
Fat	1,74 ± 0.27^{b}
Ash Content	1,15 ± 0.06^{a}

Description :Valueswith different letters in the same column show significantly different (p <0.05)
Brown Rice (BR1) ; Red Rice (RR2) ; Black Rice (BR3)

Protein is an essential nutrient for the body, since this substance is either serves as fuel and as builder substance and regulator. Protein is a source of amino acids that contain elements C, H, O, and N, which are not by fat or carbohydrates (Winarno, 1989). Analysis result shown black rice protein content ranged from 8,01-9(%) and fat content ranged from 1,5-1,9%.

The carbohydrate main source of black rice carbohydrate content. Determination of carbohydrates contents calculated by difference, by calculating the difference between 100% total moisture, ash, protein, and fat. Analysis result shown black rice carbohydrate content ranged from 88,00-88,6%.

Most of foodstuff, approximately 96% consisting of organic materials and water, the rest is mineral elements. Mineral elements also known as an inorganic substance or ash. In the burning process, organic material burnt but not inorganic substances, therefore called ash (Winarno, 1989). Analysis result shown black rice ash content ranged from 1-1.45% bk.

D. Mineral

Table 3. MineralComposition Black Rice

Variable	Result (mg/ml)
Calcium (Ca)	0,395
Magnesium(Mg)	1,98
Iron(Fe)	0,387

Table 3 showsMineral composition black rice of Calcium (Ca) 0.395 mg/ml, Magnesium (Mg) 1.98 mg/ml and Iron (Fe) 0.387 mg/ml, the highest mineral content is variable Magnesium (Mg) with a value of 1 , 98 mg / ml.

IV. CONCLUSION

The results of this study show that there are significant diferences in phenolic content, antioxsidant (Free radicalscavenging activityDPPH) and anthosianin content.This antioxidant activity is involved by hydroxyl groups in phenolic compounds which act as free radical scavenging activity.In conclusion from this study, black rice has antioxidant activity and nutrient content, these products are expected to be native functional foods.

V. ACKNOWLEDGMENTS

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Fatigue Life Prediction of Aircraft Engine Bracket

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ABSTRACT

The purpose of this project is to optimize the design, dimensions along with changing in material of the bracket structure to ensure the structural fatigue life increase along with reduction in stress and displacement of the component. Optimization study of components gives a great opportunity for material saving which leads to save cost and man power. The major bracket design parameters were explained in detail and the bracket configuration has been described. Different types of loads acting on the aircrafts bracket are determined and the moments, displacements, etc., are also determined. The bracket structure was also explained and functions of each component and their arrangement are also studied. The methodology of finite element method and the detailed description about various FEM tools have been studied and implemented in this work. The procedure of finite element method was followed to analyse the model. The analysing part of this project is done using CAE tool package and the results were discussed. In this Project, we designed Aircraft engine bracket using CATIA V5 and carried out linear static analysis using MSC Software. For Pre-Processing used MSC PATRAN and MSC NASTRAN for solving followed by Fatigue calculations.

Keywords : PATRAN, Ailerons, rolling motion, Fuselage, Turbofan Engine, Turbojet Engine, Turboprop Engine

I. INTRODUCTION

Introduction to Aircraft

Aircraft is a machine which is supported for flight in the air by buoyancy or by the dynamic action on its surfaces. The airframe is the basic structure of an aircraft and is designed to withstand all aerodynamic forces, as well as the stresses imposed by the weight of the fuel, crew, and payload. In an aircraft, there are 4 parts namely Fuselage, wing, empennage and landing gear system. Forces acting on Aircraft are Thrust, Drag, Lift and Gravity. Control surfaces are changing the attitude of Aircraft during flying. The main control surfaces are Ailerons (rolling motion), Elevator (pitching motion) and Rudder (yawing motion).

Aircraft Working Principle

The aircrafts are mainly working on the principle of Bernoulli's theorem and Newton laws of motion which deal with the motion of air and the forces acting on a body moving relative to that air. A propulsion system is a machine that produces thrust to push an object forward. On airplanes, thrust is usually generated through some application of Newton law of action and reaction. A gas, or working fluid, is accelerated by the engine, and the reaction to this acceleration produces a force on the engine.

II. METHODS AND MATERIAL

Aircraft Parts

The airframe of an aircraft consists of the following major units:

1. Fuselage
2. Wings
3. Stabilizers
4. Flight controls surfaces
5. Landing gear
6. Empennage

Fuselage

The fuselage is the main structure, or body, of the aircraft. It provides space for personnel, cargo, controls, and most of the accessories. The power plant, wings, stabilizers, and landing gear are attached to it. It has a sharp or rounded nose with sleek and tapered body so that the air can flow smoothly around it.There are two general types of fuselage construction,

1. Welded steel truss
2. Monocoque designs.

Wings

Wings develop the major portion of the lift of a heavier-than-airaircraft. Wing structures carry some of the heavier loads found in the aircraft structure. The particular design of a wing depends on many factors, such as the size, weight, speed, rate of climb, and use of the aircraft. The wing must be constructed so that it holds its aerodynamics shape under the extreme stresses of combat manoeuvres or wing loading.

Wing construction is similar in most modern aircraft. In its simplest form, the wing is a framework made up of spars and ribs and covered with metal. The construction of an aircraft wing is shown in figure.

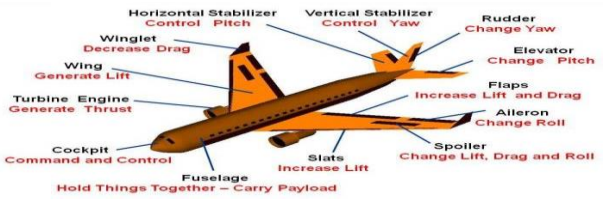


Fig 1. Parts of Aircraft

Stabilizer

The stabilizing surfaces of an aircraft consist of vertical and horizontal air foils. They are called the vertical stabilizer (or fin) and horizontal stabilizer. These two air foils, along with the rudderandelevators, form the tail section. For inspection and maintenance purposes, the entire tail section is considered a single unit called the empennage.

Landing gear

The landing gear system is placed in bottom surface of Aircraft. It carries the weight of an aircraft during landing and taxing conditions. It is one of the complicated part in an Aircraft. There are 3 types of landing gear apply to the surfaces are water, earthed and snow or ice (skis type). During landing impact load absorbed by shock absorber (vertical load), when tire touches the ground drag load generated and side load due to the aircraft body.

Empennage

Commonly known as the "tail section," the empennage includes the entire tail group which consists of fixed surfaces such as the vertical fin or stabilizer and the horizontal stabilizer. The movable surfaces including the rudder and rudder trim tabs, as well as the elevator and elevator trim tabs. These movable surfaces are used by the pilot to control the horizontal rotation (yaw) and the vertical rotation (pitch) of the airplane.

Aircraft Engines

Introduction

Aircraft engine means an engine that is used for propelling aircraft. A propulsion system is a machine that produces thrust to push an object forward. On airplanes and spacecraft, thrust is generated through some application of Newton's third law of action and reaction. A gas, or working fluid, is accelerated by the engine, and the reaction to this acceleration produces a force on the engine.

Types of Engines

1. Internal Combustion (Piston) Engines
2. Types of Turbine Engines
3. Turbojet Engines
4. Turbofan
5. Turboprop Engines
6. Afterburning Engines
7. Ramjet and Scramjet Engines
8. Ion Engines

1. Internal Combustion Engine

Airplanes used internal combustion engines to turn propellers, which generate thrust. As the name implies, the combustion process of an internal combustion engine takes place in an enclosed cylinder where chemical energy is converted to mechanical energy. Inside the cylinder is a moving piston which compresses a mixture of fuel and air before combustion and is then forced back down the cylinder following combustion. On the power stroke the piston turns a crankshaft, which converts the linear (up and down) motion of the piston into circular motion. The turning crankshaft is then used to turn the aircraft propeller. The motion of the piston is repeated in a thermodynamic cycle called the Otto Cycle.

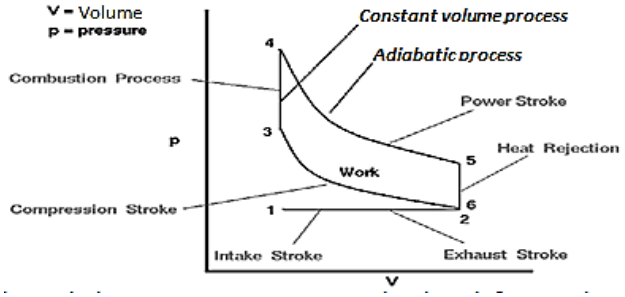


Fig 2. P-V Diagram of Ideal Otto Cycle

Ideal Otto Cycle compression, or forcing more air into the cylinder (supercharging) are all ways this can be accomplished. With aircraft engines these changes cause some problems. Increasing the number or size of the cylinders adds weight to the engine and creates more heat that must be dissipated. Some aircraft engines are air-cooled to save weight, and radial arrangements of cylinders as shown below allow for more cooling but increase drag. Others are water cooled, requiring the additional weight of a radiator and water. Raising the pressure in the cylinders creates more heat, stresses metal, and requires special fuel to prevent knocking. Engineers are always trying to maximize the balance between the positive and negative forces in any processes. Also note that the Otto cycle to the left is labelled "ideal." In actual operation, gasoline engines are in the range of 30 percent efficient because gases don't burn instantly at constant volume, there are losses due to friction, and much of the heat generated goes to waste in the radiator and exhaust rather than to power.

2. Turbine Engines

In turbine engines, air is drawn in and compressed, fuel is added and burned, and the hot gases expand out the rear of the engine, pushing the aircraft forward. Some of these exhaust gases turn a turbine, which drives the compressor. A number of different types of gas turbine engines have been developed for

use depending upon the specific needs of a particular type of aircraft.

a. Turbojets

All the thrust of these engines comes through the turbine and nozzle, which is called the core of the engine. These are what people commonly refer to as jet engines.

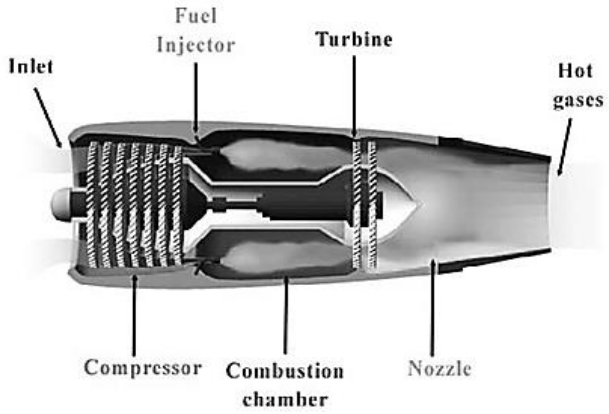


Fig 3. Cutaway view of Turbojet Engine

The turbojet engine, developed for aircraft in the years prior to World War II, was a departure in thinking from the standard piston engine. Instead of burning fuel in a confined space that is dependent upon precise timing of ignition, the turbojet engine is essentially an open tube that burns fuel continuously. According to Newton's Third Law, as hot gases expand out from the rear of the engine, the engine is accelerated in the opposite direction. The engine consists of three main parts, the compressor, the burner, and the tur- bine, along with the inlet, shaft, and nozzle, as shown above.

b. Turbofans

These engines have a central engine core that uses about 10 percent of the intake air while a large turbine powered fan pushes about 90 percent of the intake air around.

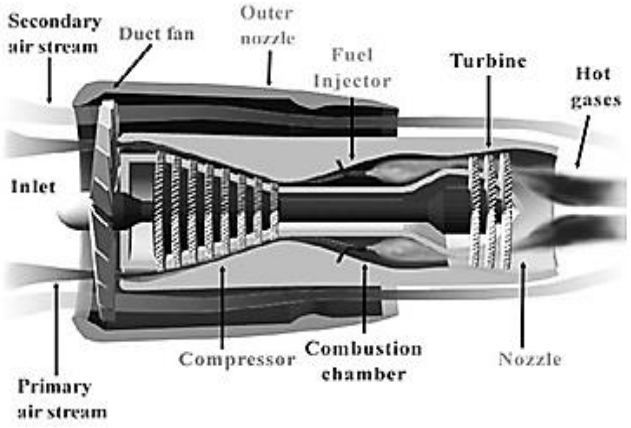


Fig 4. Cutaway view of Turbofan Engine the outside of the core to produce most of the thrust.

These are used on most commercial passenger aircraft because they make more thrust for every pound of fuel burned in the core.

c. Turboprop Engines

Turboprop engines are aircraft engines with a turbine hot section turning a propeller

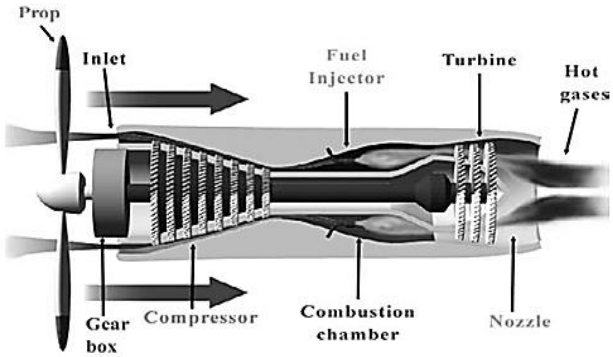


Fig 5. Cutaway view of Turboprop Engine

or rotor. The guts of a turboprop are the same as a jet engine. Turboprop engines allow are used in aircraft similar to those using piston engines, just a few noches bigger and faster. Turboprop engines are used in single, twin and even four engine aircraft like the C-130 Hercules.

d. Afterburning Turbojets

Afterburners are used only on supersonic fighter aircraft and only for short

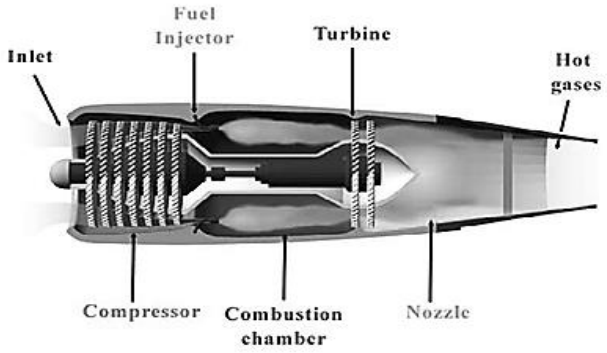


Fig 6. Cutaway view of after burning Turbojets Engine periods of time.

Fuel is injected into the hot exhaust stream to produce additional thrust, allowing for high speed at a cost of high fuel consumption.

Additive Manufacturing

Additive Manufacturing refers to a process by which digital 3D design data is used to build up a component in layers by depositing material. The term "3D printing" is increasingly used as a synonym for Additive Manufacturing. However, the latter is more accurate in that it describes a professional production technique which is clearly distinguished from conventional methods of material removal. Instead of milling a workpiece from solid block, for example, Additive Manufacturing builds up components layer by layer using materials which are available in fine powder form. A range of different metals, plastics and composite materials may be used.

Working Principle

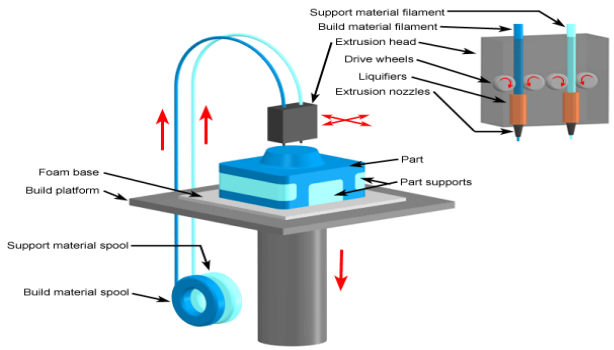


Fig 7. Working principle of 3D printing

The system starts by applying a thin layer of the powder material to the building platform. A powerful laser beam then fuses the powder at exactly the points defined by the computer-generated component design data. The platform is then lowered, and another layer of powder is applied. Once again the material is fused so as to bond with the layer below at the predefined points. Depending on the material used, components can be manufactured using stereo lithography, laser sintering or 3D printing.

Additive Manufacturing (AM) Applications in Aircraft

AM applications in aerospace include turbine engine blades, heat exchangers, pumps, structural brackets and a fuel nozzle. Here, metal AM may be effectively applied for novel designs as well in the Maintenance, Repair and Overhaul (MRO). The aerospace specific applications involve rapid and large fluctuations in thermal and mechanical conditions. Therefore, resistance to crack initiation and propagation and resistance to creep are crucial for aerospace applications. The benefits of metal Additive Manufacturing are especially suitable to aerospace, with increased demand on fuel efficiency, greenhouse emissions and buy-to-fly ratios.

Materials used in Additive Manufacturing

The following materials are commonly used for AM in aircraft:

1. Ti-6Al-4V
2. Co-28 Cr-6 Mo
3. Nickel-based alloys
4. Aluminum-based alloys
5. Stainless Steel alloys

Additive Manufacturing provides an opportunity for production with difficult to machine materials, such as Titanium and nickel based alloys. However, Selective Laser Melting and Electron Beam Melting are powder-bed fusion technologies and traditionally powder is used very little in the aerospace industry. Therefore, maintaining a high quality standard proves difficult, as the powder material is one of the main factors to consider when high quality standards are important.

Aircraft Bracket

Brackets are connector type elements widely used as structural supports to carry hydraulic and electrical lines used in engines, wings and landing gear links. Failure of brackets may lead to the catastrophic failure of the whole structure.

Bracket is a small fitting or support used to attach system parts as duct, bundle, cable, and blanket keeping them in the intended positions. Generally, the brackets are made from steel sheet strip slit and are cut to size before configured to the required shape by bending operation. The brackets are heat-treated to obtain the desired surface properties.



Fig 8. Aircraft Bracket

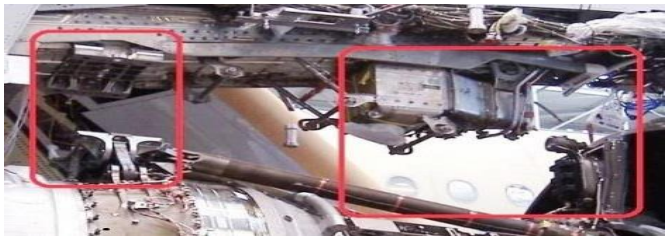


Fig 9. Location of bracket in aircraft engine

Bracket Design Requirements

The brackets are to be designed such that they will not damage system, structure and insulation brackets during the life span of aircraft. Their weight shall be minimized asmuch as possible thus reducing the overall aircraft weight leading to indirect cost savings. Brackets are designed for their intended use within the operating temperature of the aircraft. The unique feature of the brackets is that they shall be easy to install with a quick-fix mechanism by one technician, thus saving phenomenal time for the installation and disassembly. The number of feature elements constituting the brackets shall be minimized optimally.

Materials Selection Criteria

Materials selection is quite frequently a compromise involving various considerations and the more important considerations have historically been those associated with mechanical properties. A list of selection criteria for materials is as follows:

- Static strength efficiency.
- Fatigue.
- Fracture toughness and crack growth.
- Corrosion and unbrittlement.
- Environmental stability.

Other important criteria associated with producing the basic material in the forms required and fabricating the end product at a responsible cost. These criteria are as follows:

- Availability and reducibility.
- Material costs.
- Fabrication characteristics.

All of the criteria listed above are important to the selection of structural materials. In addition to these, the following are a few considerations that are more frequently related to specialized requirements.

- Erosion and abrasion.
- Wear characteristics.
- Compatibility with other materials.
- Thermal and electrical characteristics.
- Hard coatings to improve wear resistance.
- Metallic plating to provide galvanic compatibility.

Materials used for Brackets

Two materials play major roles in modern aerospace: Aluminum alloys for airframes and skin, and composites for structures.

Alloys

An alloy is composed of two or more metals. The metal present in the alloy in the largest amount is called the base metal. All other metals added to the base metal are called alloying elements. Adding the alloying elements may result in a change in the properties of the base metal. For example, pure Aluminum is relatively soft and weak. However, adding small amounts or copper, manganese, and magnesium will increase Aluminum's strength many times. Heat treatment can increase or decrease an alloy's strength and hardness. Alloys are important to the aircraft industry. They provide materials with properties that pure metals do not possess.

Aluminum Alloys

Aluminum alloys are widely used in modern aircraft construction. Aluminum alloys are valuable because they have a high strength-to-weight ratio. Aluminum alloys are corrosion resistant and comparatively easy to fabricate. The outstanding characteristic of Aluminum is its lightweight. Though lightweight, commercially pure Aluminum has a tensile strength of about 13,000 psi. Cold working the metal approximately doubles its strength. Aluminum is usually alloyed with elements such as manganese, silicon, copper, magnesium, or zinc to further increase strength.

Titanium Alloys

Titanium is a lightweight, strong, corrosion- resistant metal. Recent developments make Titanium ideal for applications where Aluminum alloys are too weak and stainless steel is too heavy. Additionally, Titanium is unaffected by long exposure to seawater and marine atmosphere. Titanium is used in engine applications such as rotors, compressor blades, hydraulic system components and nacelles. Titanium 6AL-4V alloy accounts for almost 50% of all alloys used in aircraft applications.

Steel Alloys

Steels are widely used as structural materials for fatigue application as they offer high fatigue strength and good process-ability at relatively low cost. Alloy steels used in aircraft construction have great strength, more so than other fields of engineering would require. These materials must withstand the forces that occur on today's modern aircraft. These steels contain small percentages of carbon, nickel, chromium, vanadium, and molybdenum.

Types of aircraft loads

- The loads typically include Vertical loads Such as the weight of the engine itself,
- Axial loads due to the thrust generated by the engine,
- Lateral loads Such as those due to wind buffeting, and
- Roll loads or moments due to rotary operation of the engine.

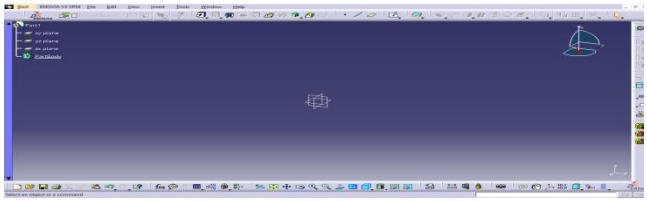
III. DESIGN OPTIMIZED 3D MODEL OF ENGINE BRACKET

Computer Aided Design

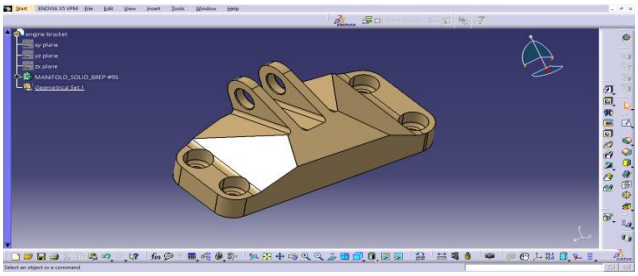
Computer aided design helps to assist in the creation, modification, analysis, or optimization of a design using cad software. CAD software is used to increase the productivity of the designer, improve the quality of design, improve communications through documentation, and to create a database for manufacturing.

About CATIA

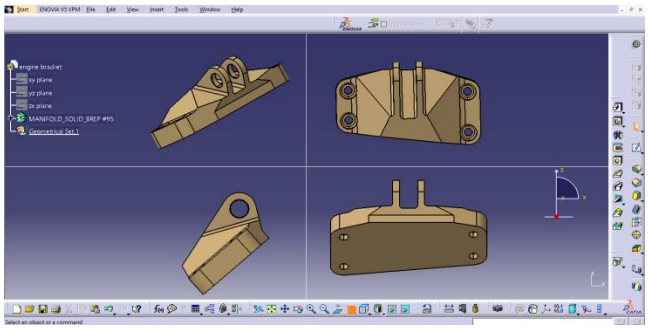
CATIA means Computer Aided Three Dimensional Interactive Application. CATIA is a 3D product Lifecycle Management software suite developed by the French Company Dassult Systems. CATIA facilitates collaborative engineering across disciplines with its 3D experience platform. CATIA allows the user to create parts in highly productive and intuitive environment. CATIA enriches existing product design with basic part and surface design tools, easily establish assembly constraints, automatically positions parts and check assembly consistency.



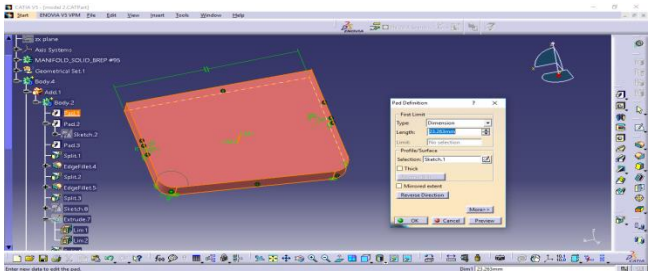
CATIA V5 graphical user interface



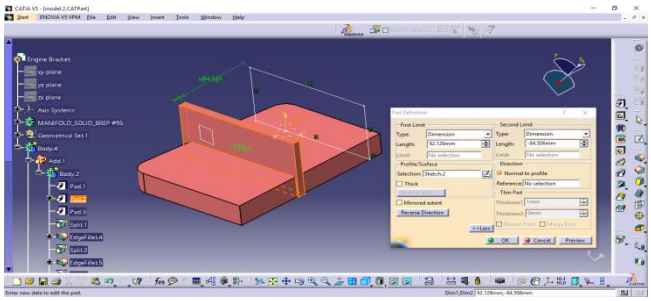
Original 3D model of engine bracket



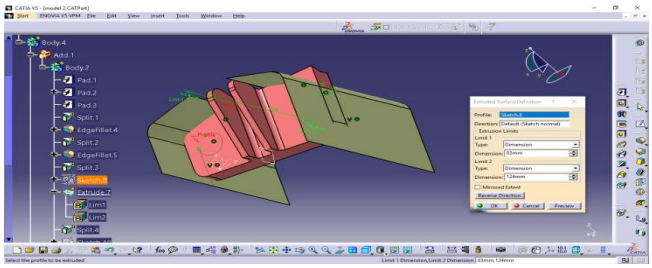
ISO view of original 3D model of engine bracket



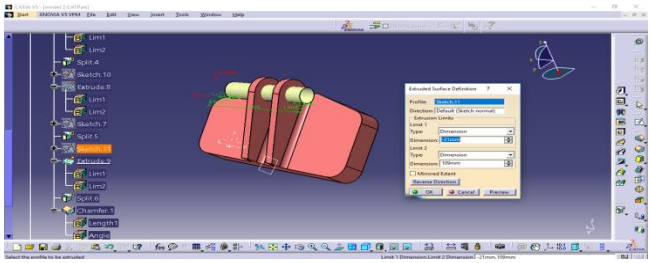
Procedure for design optimization of engine bracket



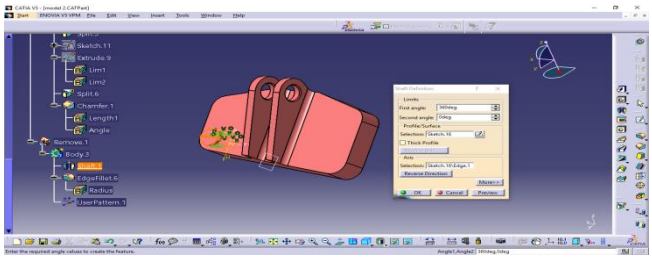
Procedure for design optimization of engine bracket



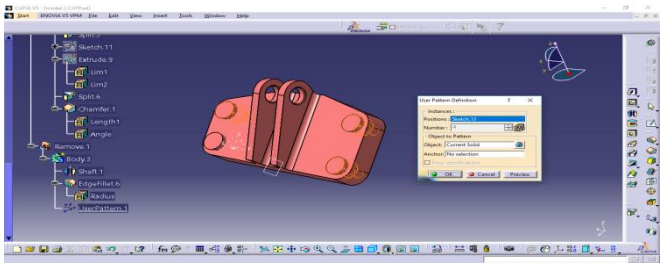
Procedure for design optimization of engine bracket



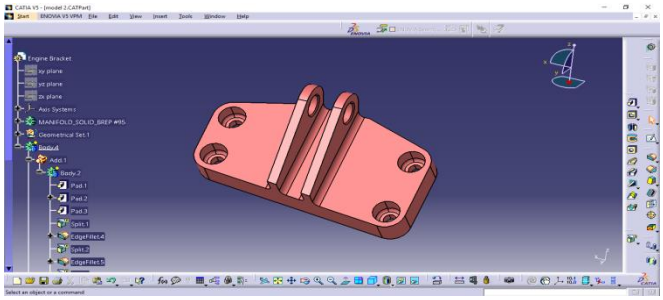
Procedure for design optimization of engine bracket



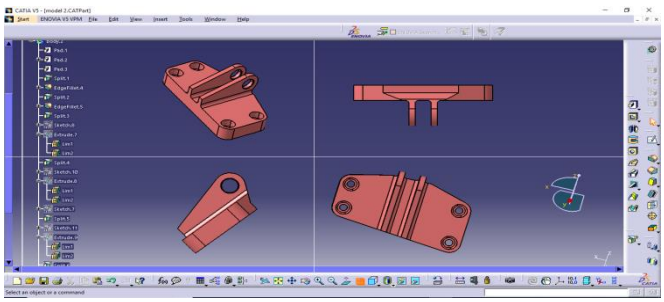
Procedure for design optimization of engine bracket



Procedure for design optimization of engine bracket



Design optimization 3D model of engine bracket



ISO view of Design optimization 3D model of engine bracket

Fig 10. Models

We changed the nonparametric model in to parametric model. The above figures shows the step by step procedure of Design optimization 3D model of engine bracket. Here we are importing this model in to MSC Patran for Linear Static Analysis.

IV. INTRODUCTION TO FEA

Engineering analysis can be broadly divided into two categories: classical methods and numerical methods. Following tree diagram shows various methods for solving engineering problems. As shown below, the finite element method is one of several methods for solving engineering problems.

Classical Methods

- Closed-form solutions are available for simple problems such as bending of beams and torsion of prismatic bars
- Approximate methods using series solutions to governing differential equations are used to analyse more complex structures such as plates and shells
- The classical methods can only be used for structural problems with relatively simple geometry, loading, and boundary conditions.

Numerical methods

Numerical methods address a broad range of problems. Boundary Element Method: Solves the governing differential equation for the problem with integral equations over the boundary of the domain. Only the boundary surface is meshed with elements. Finite Difference Method: Replaces governing differential equations and boundary conditions with corresponding algebraic finite difference equations.

Finite Element Method (FEM)

- Capable of solving large, complex problems with general geometry, loading, and boundary conditions
- Increasingly becoming the primary analysis tool for designers and analysts
- The Finite Element Method is also known as the Matrix Method of Structural Analysis in the

literature because it uses matrix algebra to solve the system of simultaneous equations.

Finite Element Analysis

Finite element method is a method of investigating the behaviour of complex structures by breaking them down into smaller, simpler pieces. These smaller pieces of structure are called (finite) elements. The elements are connected to each other at nodes. The finite element method offers virtually unlimited problem generality by permitting the use of elements of various regular shapes. These elements can be combined to approximate any irregular boundary. In similar fashion, loads and constraints of any type can be applied. Problem generality comes at the expense of insight a finite element solution is essentially a stack of numbers that applies only to the particular problem posed by the finite element model. Changing any significant aspect of the model generally requires a complete reanalysis of the problem.

Types of Finite Elements

Finite elements have shapes which are relatively easy to formulate and analyse. The three basic types of finite elements are beams, plates, and solids.

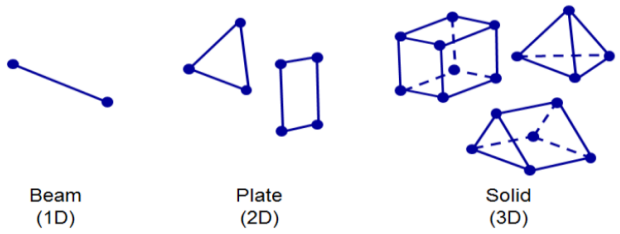


Fig 11. Finite element geometries

Elements are known geometry entities having global equations for calculating its characteristics under working conditions. Based on structural geometry and behaviour we can categorise it into 3 types as shown in the figures.

One Dimensional Elements

A one-dimensional element is one in which the properties of the element are defined along a line or curve. Typical applications for the one-dimensional element include truss structures, beams, stiffeners, and many others.1D beam elements are used to model long, slender structural members as demonstrated in this communications tower finite element model.

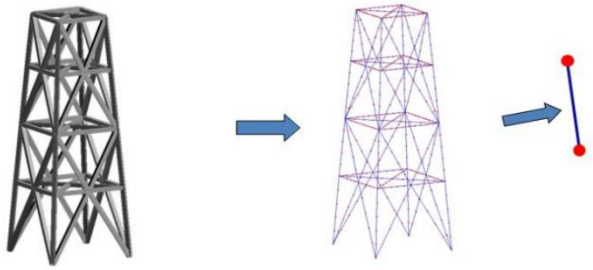


Fig 12. 1D elements example-Tower

Two Dimensional Elements

Two-dimensional elements, commonly referred to as plate and shell elements, are used to represent areas in your model where one of the dimensions is small in comparison to the other two. 2D plate elements are used to model thin structural members such as aircraft fuselage skin or car body. In the finite element field, the membrane stiffness of the two-dimensional elements can be calculated using one of two theories: “plane stress” or “plane strain.” In the plane strain theory, the assumption is made that the strain across the thickness t is constant. Note that a two-dimensional element can be in either plane stress or plane strain, but not both.

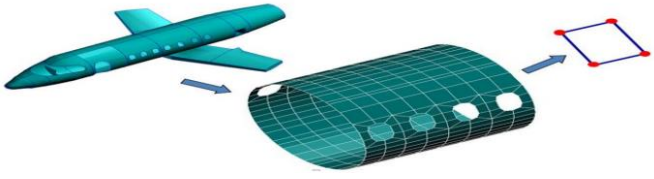


Fig 13. 2D Elements example-plane structure

Three-Dimensional Elements

Whenever you need to model a structure that does not behave as a bar or plate structure under the applied loads, you need to use one or more of the three-dimensional elements. The three-dimensional elements are commonly referred to as solid elements. Typical engineering applications of solid elements include engine blocks, brackets, and gears.

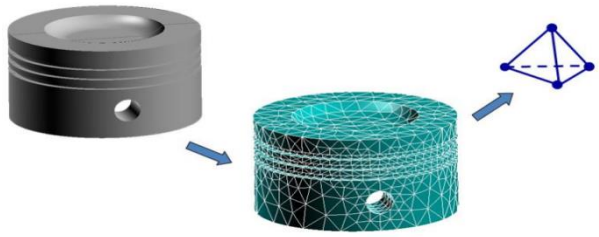


Fig 14. 3D Elements example-piston

As a final comment on all of the elements, the purpose of this chapter is to discuss the commonly used elements and their applications to typical engineering problems. The elements are discussed in order of their size in terms of the number of degrees-of-freedom they are not discussed in order of importance.

About MSC PATRAN, NASTRAN

NASTRAN is a finite element analysis (FEA) program that was originally developed for NASA in the late 1960s under United States government funding for the Aerospace industry. The MacNeal-Schwendler Corporation (MSC) was one of the principal and original developers of the public domain NASTRAN code MSC. Software is pleased to introduce you to the exciting new technologies in MSC Nastran, the premier and trusted CAE solution for aerospace, automotive, medical, defence, and manufacturing industries worldwide. This release includes new features and enhancements in Contact, High Performance Computing, Acoustics, Aeroelasticity, and Explicit Nonlinear SOL 700.

MSC nastran does not have any graphical user interface like other software. It completely communicates by using scripting language or any other pre and post software like Patran, Simxpert and Hypermesh. It has the following capabilities include

- Linear static analysis
- Static analysis with geometric and material nonlinearity
- Transient analysis with geometric and material nonlinearity
- Normal modes analysis
- Buckling analysis
- Direct and modal complex eigenvalue analysis
- Direct and modal frequency analysis (including random analysis)
- Direct and modal transient analysis (including response spectrum analysis)
- Linear cyclic symmetry (including static, normal modes, buckling, and direct frequency response)
- Linear and nonlinear steady state heat transfer
- Linear and nonlinear transient heat transfer
- Aero elasticity
- Substructure analysis (super elements)
- Design sensitivity and optimization
- Acoustics
- Composite Material Analysis
- p-elements

The following figurer shows pre-processing, solver and post processor steps and functions of solver and pre & post processor.

Meshing a model consists of several tasks:

- Create appropriate geometry
- Parametric or non-parametric
- Remove unneeded features, e.g. small corners
- Specify the element topology (e.g. parabolic) and size
- Specify a mesher, e.g. Paver, for each region

- Specify how the meshers will be controlled
- Nastran has several meshing algorithms:
  - IsoMesh (mapped mesher)
  - Paver (free mesher)
  - TetMesh
  - Sweep mesh
- The iso-mesher (IsoMesh) is used to mesh
  - All curves (parametric) (yellow)
  - Simple (parametric) surfaces (green)
  - Simple (parametric) solids (blue)
- Geometry must be parametric
  - Nodes are placed at the intersection of curves of constant parametric value, and of surfaces
  - If geometry is not parametric, IsoMesh cannot place nodes

Figurer shows deferent mesh patterns,

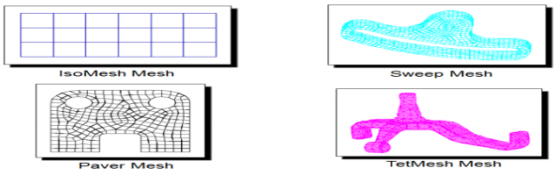


Fig 15. Mesh patterns

Loads & Boundary conditions

A constraint is the enforcement of a prescribed displacement (i.e., component of translation or rotation) on a grid point or points. There are two basic types of constraints in MSC Nastran:

- Single point constraints (SPCs)
- Multipoint constraints (MPCs).

A single point constraint is a constraint applied to an individual grid point. Single point constraints can enforce either zero displacement or nonzero displacement.

A multipoint constraint is a mathematical constraint relationship between one grid point and another grid point (or set of grid points). User defined multipoint constraints are beyond the scope of this book we will concentrate on single point constraints. The boundary conditions of a static structure (fixed, hinged, roller support, etc.) typically require that various degrees of freedom be constrained to zero displacement. For example, consider a grid point fixed in a rigid wall. All six displacement degrees of freedom three translational directions and three rotational directions must be constrained to zero in order to mathematically describe the fixed boundary condition. Rigid Body Motion and Mechanisms describes how boundary conditions are used to prevent rigid body motion-the presence of rigid body motion in an MSC Nastran static analysis will cause the run to fail.

Linear Static Analysis

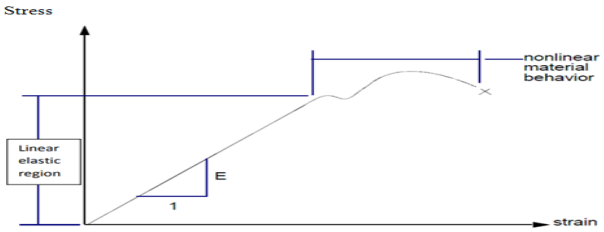


Fig 16. Stress-Strain relationship for linear static analysis

Linear means straight line.**σ = e E**is equation of straight line(y=mx) passing through origin. "E" Elastic modulus is slope of the curve & is a constant. In real life after crossing yield point material follows non-linear curve but software follows same straight line. Component break into two separate pieces after crossing ultimate stress but software based analysis never show failure in this fashion.

Linear static problems are solved in one step-a single decomposition of the stiffness matrix. Nonlinear problems of any type require iterative solution methods and incremental loading to obtain (converge to) a solution, and are generally far more computationally intensive than linear problems.

V. ANALYSIS OF BRACKET

Material and Element Properties

We assume that the material is a continuum (contains no gaps or voids) and that all material properties remain constant.

In this project we are doing analysis using three different materials. These material properties are taken from MSC Software material library,

1. 2024-T3 Aluminum alloy,
2. Titanium 6AL-4V and,
3. 15-5PH (H1025) Stainless steel.

Chemical Composition of Materials

1. Chemical Composition of 2024-T3 Aluminum alloy

Component	Weight %
Al	93.50
Cu	4.4
Mg	1.5
Mn	0.6
Cr	Max 0.1
Si	Max 0.5
Ti	Max 0.15

Table 1. Chemical Composition of 2024-T3 Aluminum alloy

2. Chemical Composition of Titanium 6AL-4V alloy

Component	Weight %
Al	6
Fe	Max 0.25
O	Max 0.2
Ti	90
V	4

Table 2: Chemical Composition of Titanium 6AL-4V alloy

3. Chemical Composition of 15-5PH (H1025) Stainless steel

Component	Weight %
Fe	75
Cr	14.48
Cu	3.5
C	0.07
Ni	4.5
Mn	Max 1
Si	Max 1

Table 3. Chemical Composition of 15-5PH (H1025) Stainless steel

Material properties of different metals

Titanium 6AL-4V alloy			
Youngs Modulus	E	1.10E+05	Mpa
Shear Modulus	G	4.40E+04	Mpa
Poissons Ratio	Mu	0.342	
Density	Rho	4430	Kg/m^3

Table 4. Material properties of Titanium

2024-T3 Aluminum alloy			
Youngs Modulus	E	7.00E+04	Mpa
Shear Modulus	G	4.40E+04	Mpa
Poissons Ratio	Mu	0.3	
Density	Rho	2780	Kg/m^3

Table 5. Material properties of Aluminum

15-5PH (H1025) Stainless steel			
Youngs Modulus	E	2.10E+05	Mpa
Shear Modulus	G	4.40E+04	Mpa
Poissons Ratio	Mu	0.3	
Density	Rho	7.8	Kg/m^3

Table 6. Material properties of Steel

Meshing For Engine Bracket

A. Original Geometrical model

Model Summary:

Number of nodes= 59502
Number of elements= 280218
Number of Rigid Element = 5
Number of RBE2 element = 4
Number of RBE3element = 1
TETRA4: 280213

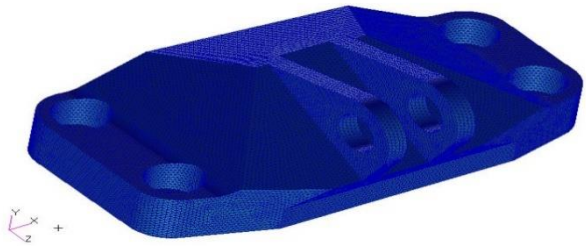


Fig 17. Original meshed model of engine bracket

B. Optimized Meshed Finite Element Model

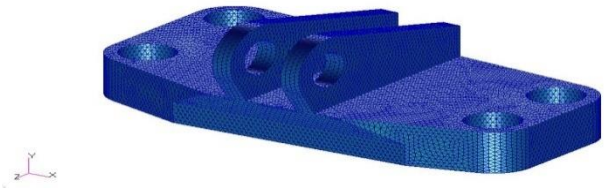


Fig 18. Optimized meshed model of bracket

Model Summary:
Number of nodes= 32385
Number of elements= 147000
Number of Rigid Element = 5
Number of RBE2 element = 4
Number of RBE3element= 1
TETRA4: 146995

Loads and boundary conditions

Load conditions taken from below reference 1.For this Linear Static Analysis the following boundary conditions are applied.

Load Case	Applied Load	Units
Vertical	35586	N
Horizontal	37810	N
Angle of 42^0 from vertical	42258	N

Table 7: Load conditions for analysis

Here RBE2 elements for four bolts and those are constrained. RBE3 element for apply load.

The below figure shows the positions of Loads and boundary conditions. The force value of 35586 N applied at center in downward direction is shown in figure.

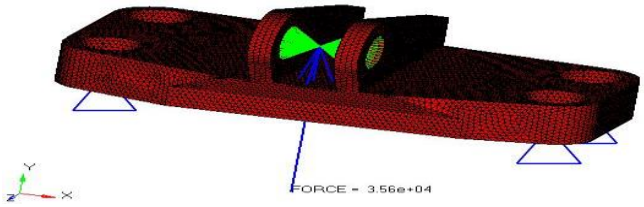


Fig 19. Loads and boundary conditions of Vertical load case

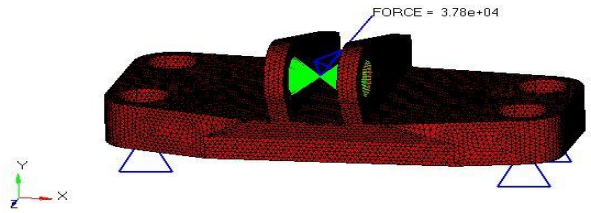


Fig 20. Loads and boundary conditions of Horizontal load case

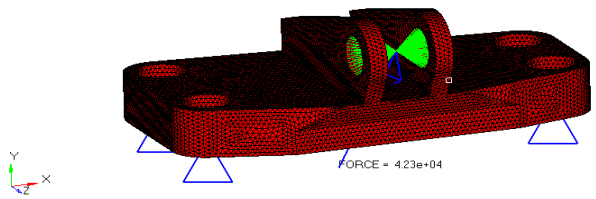


Fig 21. Loads and boundary conditions of Angle of 42^0 from vertical load case

Linear Static Analysis of Bracket

Note: In this project we solved for three load conditions with three different materials such as

2024-T3 Aluminum alloy, Titanium 6AL-4V and 15-5PH (H1025) Stainless steel. Below discussed results for 2024-T3 Aluminum alloy for three load cases of Vertical, Horizontal, and Angle of 42^0 from vertical.

(A) Original Geometrical model

Material type: 2024-T3 Aluminum

Load case1: Vertical

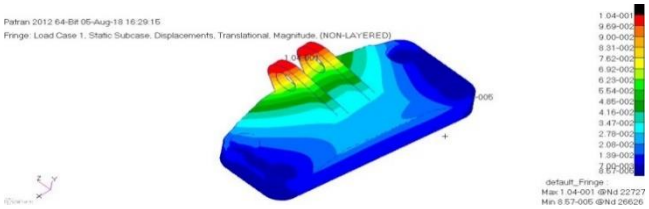


Fig 22. Displacements for vertical load

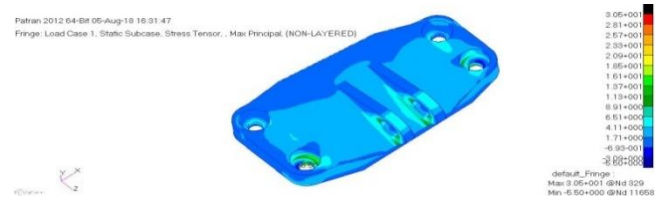


Fig 23. Max Principal Stress for vertical load

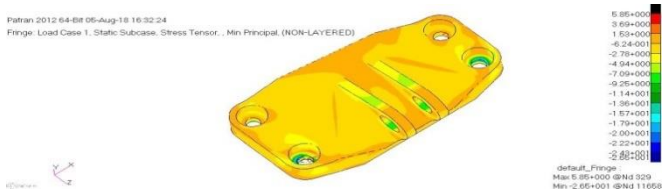


Fig 24. Min Principal Stress for vertical load

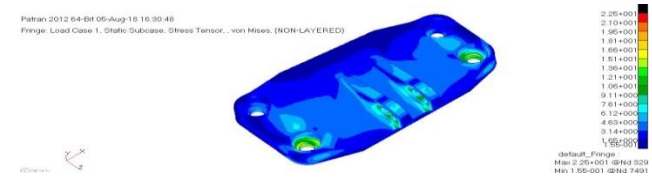


Fig 25. Equivalent (Von-Mises) stress for vertical load

Load case 2: Horizontal

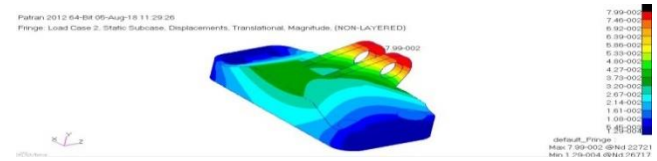


Fig 26. Displacements for Horizontal load

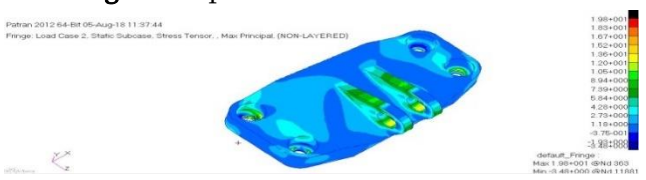


Fig 27. Max Principal Stress for Horizontal load

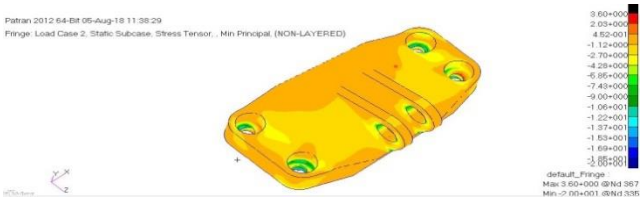


Fig 28. Min Principal Stress for Horizontal load

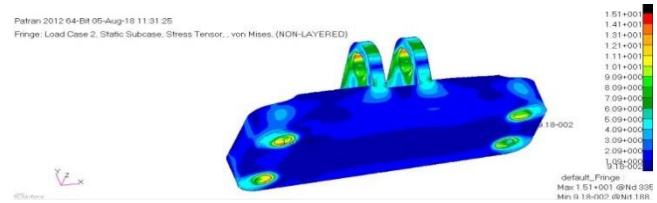


Fig 29. Equivalent (Von-Mises) Stress for Horizontal load

Load case 3: Angle of 42^0 from vertical

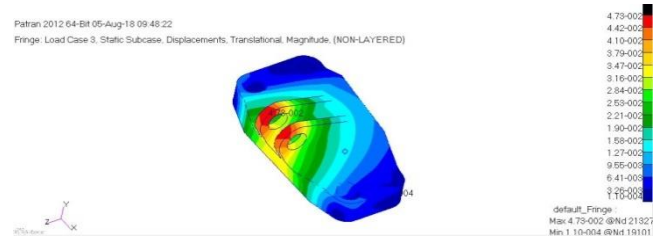


Fig 30. Displacement for Angle of 42^0 from vertical

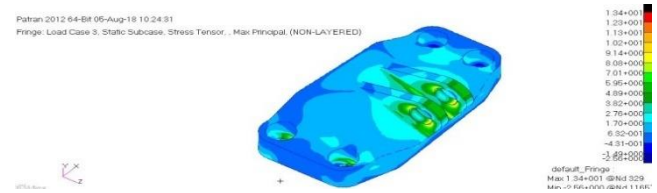


Fig 31. Max-principal Stress for Angle of 42^0 from vertical

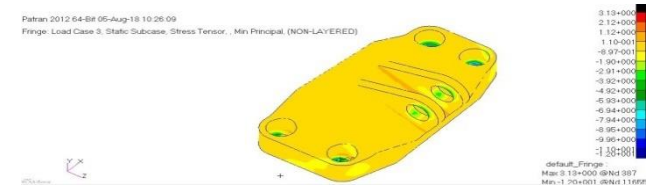


Fig 32. Min-principal Stress for Angle of 42^0 from vertical

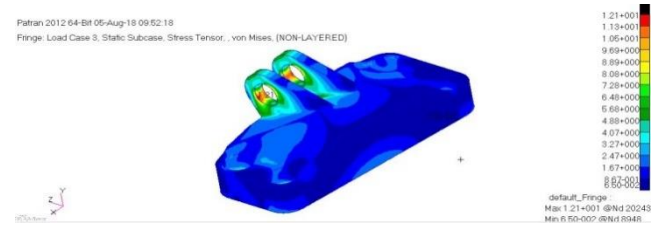


Fig 33. Equivalent (Von-Mises) stress for Angle of 42^0 from vertical

(B) Optimized model

Load case1: Vertical

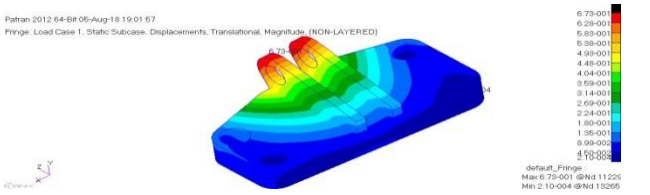


Fig 34. Displacements for vertical load

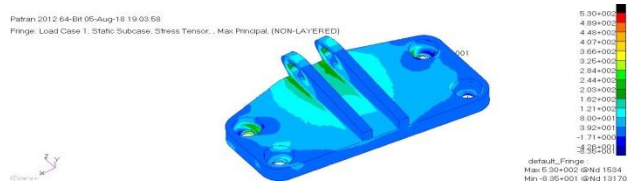


Fig 35. Max-principal Stress for vertical load

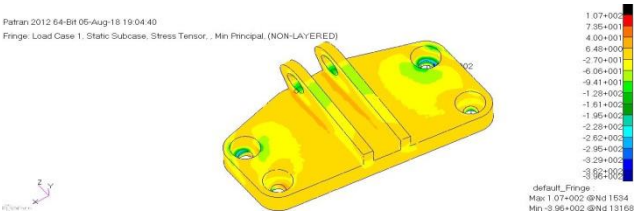


Fig 36. Min-principal Stress for vertical load

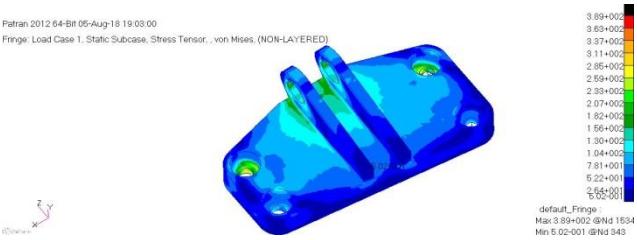


Fig 37. Equivalent (Von-Mises) stress for vertical load

Load case 2: horizontal

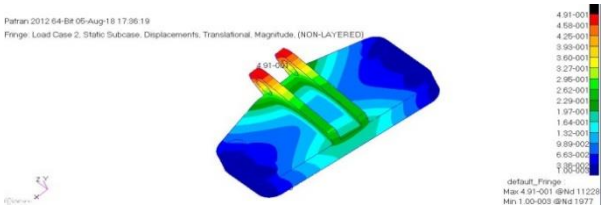


Fig 38. Displacements for horizontal load

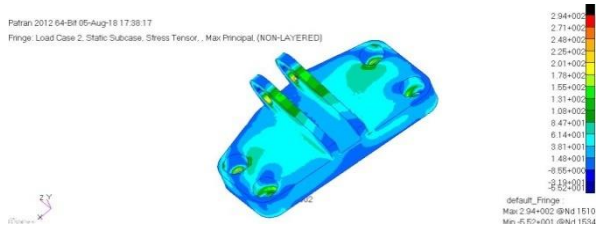


Fig 39. Max-principal stress for horizontal load

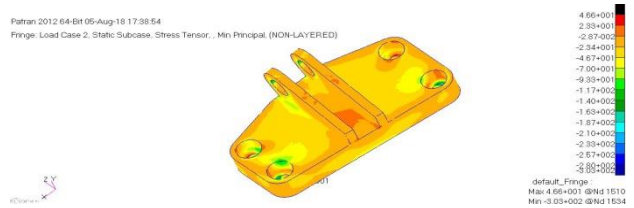


Fig 40. Min Principal Stress for horizontal load

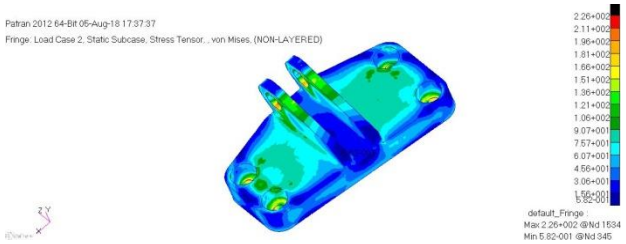


Fig 41. Equivalent (Von-Mises) stress for horizontal load

Load case 3: Angle of 42^0 from vertical

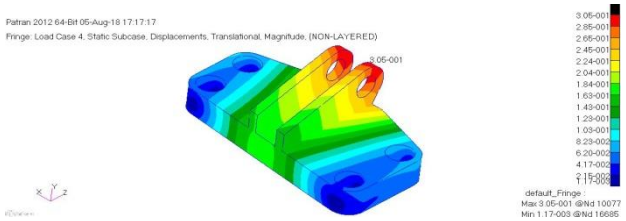


Fig 42. Displacement for Angle of 42^0 from vertical

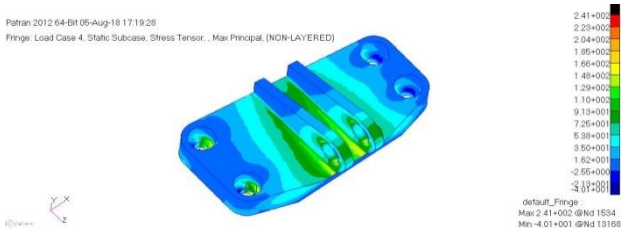


Fig 43. Max-principal Stress for Angle of 42^0 from vertical

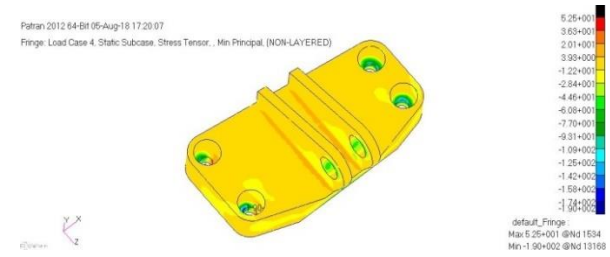


Fig 44. Min-principal Stress for Angle of 42^0 from vertical

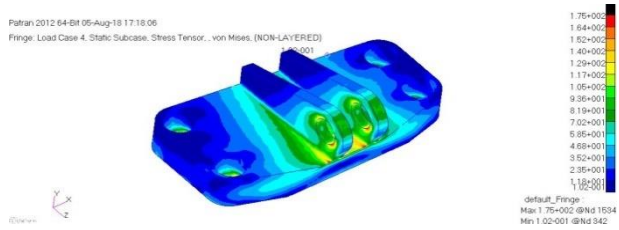


Fig 45. Equivalent (Von-Mises) stress for Angle of 42^0 from vertical

VI. INTRODUCTION OF FATIGUE

Fracture Mechanics

Fracture mechanics is the field of mechanics concerned with the study of the propagation of cracks in materials. It uses methods of analytical solid mechanics to calculate the driving force on a crack and those of experimental solid mechanics to characterize the material's resistance to fracture.

In modern materials science, fracture mechanics is an important tool in improving the mechanical performance of mechanical components. It applies the physics of stress and strain, in particular the theories of elasticity and plasticity, to the microscopic crystallographic defects found in real materials in order to predict the macroscopic mechanical failure of bodies. Fractography is widely used with fracture mechanics to understand the causes of failures and also verify the theoretical failure predictions with real life failures. The prediction of crack growth is at the heart of the damage tolerance discipline.

There are three ways of applying a force to enable a crack to propagate:

Mode I fracture – Opening mode (a tensile stress normal to the plane of the crack),
Mode II fracture – Sliding mode (a shear stress acting parallel to the plane of the crack and perpendicular to the crack front), and
Mode III fracture – Tearing mode (a shear stress acting parallel to the plane of the crack and parallel to the crack front).

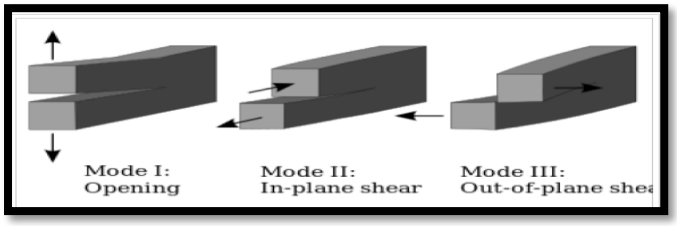


Fig 46. Modes of failure

Fatigue

Fatigue is the failure caused by application of repetitive load by the process of initiation of cracks and growth.

Fatigue cracks are most frequently initiated at sections in a structural member where changes in geometry, e.g. holes, notches or sudden changes in section, cause stress concentrations. Designers seek to eliminate such areas by ensuring that rapid changes in section are as smooth as possible. At re-entrant corners for example, fillets are provided as shown in Fig

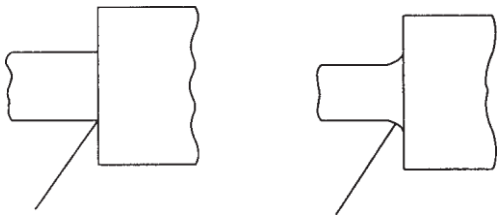


Fig 47. Location of stress concentration

Provision of fillet minimizes stress concentration
Stress concentration locations

The value of S_{alt} is the most important factor in determining the number of cycles of load that produce failure. The stress S_{alt} that can be withstood for a specified number of cycles is called the fatigue strength of the material. Some materials, such as mild steel, possess a stress level that can be withstood for an indefinite number of cycles. This stress is known as the endurance limit of the material; no such limit has been found for Aluminum and its alloys. Fatigue data are frequently presented in the form of an S–n curve or stress–endurance curve as shown in Fig.

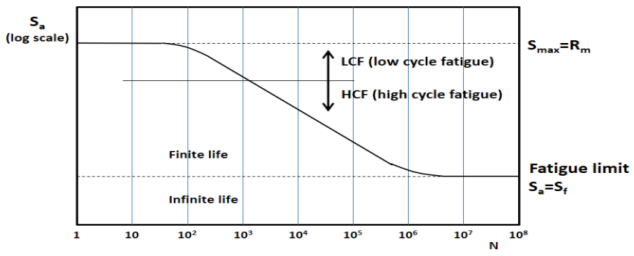


Fig 48. S-N Curve

Fatigue properties of materials are often described using the fatigue limit or the S-N curve (fatigue curve, Wohler curve). The S-N curve describes the relation between cyclic stress amplitude and number of cycles to failure. The figure below shows a typical S-N curve. On the horizontal axis the number of cycles to failure is given on logarithmic scale. On the vertical axis (either linear or logarithmic) the stress amplitude (sometimes the maximum stress) of the cycle is given. S-N curves are derived from fatigue tests. Tests are performed by applying a cyclic stress with constant amplitude (CA) on specimens until failure of the specimen. In some cases the test is stopped after a very large number of cycles ($N>10^6$). The results are then interpreted as infinite life.

High Cycle Fatigue (HCF): component subjected to less sever loads and life > 10^5 cycles. In this region the material behaviour is fully elastic. On log-log scale the S-N curve can be considered to be linear.

Low Cycle Fatigue (LCF): life of component is less than 100000cycles, applicable for heavy duty application loading. If the maximum stress level in a cycle is exceeding the yield strength, the material behaviour in the net section will be predominantly plastic. Number of cycles to failure will be very small. Usually a strain-life curve instead of the S-N curve is used to describe the fatigue behaviour.

That the actual distinction between HCF and LCF is not defined by a certain number of cycles but by the amount of plasticity in the net section, i.e. the stress level.

Infinite Life: Stress level below whichmaterial never fails known as endurance limit or fatigue limit. Never fails or infinite life is a relative term. For steel, test is stooped after $2*10^6$ cycles (in case if till then failure is not detected) and said to have infinite life. This is the point where the S-N curve slop changes and it becomes parallel to x-axis.

Unlike steel, non-ferrous alloys have no specific endurance limit (S-N curve never become parallel to x-axis.The level of the fatigue limit depends on many factors, such as geometry (stress concentration factor Kt), mean stress (stress ratio), surface conditions, corrosion, temperature, and residual stresses.

Different Phases of fatigue Life

The crack starts as a slip band within a grain. The cyclic slip occurs as a result of cyclic shear stress, this slip leads to formation of slip steps, in the present of oxygen, the freshly exposed surface of the material in slip steps get oxidized, which prevents slip reversal. The slip reversal in this case occurs in some adjacent slip plane, thereby leading to formation of extrusions and intrusions on the surface of the material as shown in the figure below.

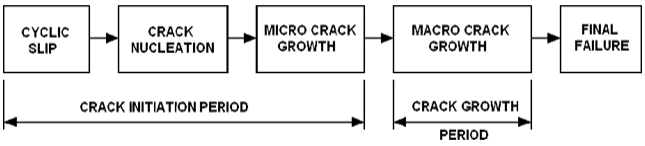


Fig 49. Different phases of the fatigue life

The fatigue life (N_f) of a component is defined by the total number of stress cycles required to cause failure. Fatigue life can be separated into three stages where:

$$N_f = N_i + N_p$$

Crack initiation(N_i)

This is the number of cycles required to initiate a crack. It generally results from dislocation pile-ups and imperfections such as surface roughness, voids, scratch etc. hence; in this period fatigue is a material surface phenomenon.

The stress concentration factor, K_t is another factor to be considered in crack initiation prediction.

Crack growthN_p

This is the number of cycles required to grow the crack in a stable manner to a critical size, generally controlled by stress level. Since most common material contains flaws, the prediction of crack growth is the most studied aspect of fatigue. Crack growth resistance, when the crack penetrates the material, depends on the material as a bulk property. It is no longer a surface phenomenon. The stress intensity factor is an important factor for fatigue growth prediction.

Rapidfracture

Very rapid critical crack growth occurs when the crack length reaches a critical value. Since rapid fracture occurs quickly, there is no rapid fracture term in the fatigue life expression.

The fracture toughness K_{IC} of the material is the primary factor for rapid fracture prediction or design against fracture.

VII. FATIGUE CALCULATIONS OF AIRCRAFT ENGINE BRACKET

Note: Here we discussed the calculations for 2024-T3 Aluminum alloyof three load conditions.

(A) Original Model

Fatigue life Equation for 2024-T3 Aluminum alloy:

Load case 1: Vertical

$$S_{eq} = S_{max}(1-R)^{0.56}$$
$$S_{eq} = 30.50(1-0.1)^{0.56}$$
$$S_{eq} = 28.75 \text{ Mpa}$$
$$\text{Log } N_f = 11.1 - 3.97\log (S_{eq} - 15.8)$$
$$\text{Log } N_f = 10\text{^}5*(10 \text{ ^ } (11.1-3.97*\text{Log } (28.75 -15.8)))$$
$$\text{Log } N_f = 4.83E+11 \text{ N}$$

Load case 2: Horizontal

$$S_{eq} = S_{max}(1-R)^{0.56}$$
$$S_{eq} = 15.10(1-0.1)^{0.56}$$
$$S_{eq} = 14.23 \text{ Mpa}$$
$$\text{Log } N_f = 11.1 - 3.97\log (S_{eq} - 15.8)$$
$$\text{Log } N_f = 10\text{^}5*(10 \text{ ^ } (11.1-3.97*\text{Log } (14.23-15.8)))$$
$$\text{Log } N_f = 2.13E+15 \text{ N}$$

Load case 3: Angle of 42^0 from vertical

$$S_{eq} = S_{max}(1-R)^{0.56}$$
$$S_{eq} = 12.10(1-0.1)^{0.56}$$
$$S_{eq} = 11.41\text{Mpa}$$
$$\text{Log } N_f = 11.1 - 3.97\log (S_{eq} - 15.8)$$
$$\text{Log } N_f = 10\text{^}5*(10 \text{ ^ } (11.1-3.97*\text{Log } (11.41-15.8)))$$
$$\text{Log } N_f = 3.53E+13\text{N}$$

(B) Featured Model

Fatigue life Equation for 2024-T3 Aluminum alloy:

Load case 1: Vertical

$$S_{eq} = S_{max}(1-R)^{0.56}$$
$$S_{eq} = 530(1-0.1)^{0.56}$$
$$S_{eq} = 499.63\text{Mpa}$$
$$\text{Log } N_f = 11.1 - 3.97\log (S_{eq} - 15.8)$$
$$\text{Log } N_f = 10\text{^}5*(10 \text{ ^ } (11.1-3.97*\text{Log } (499.63-15.8)))$$
$$\text{Log } N_f = 2.77E+05\text{N}$$

Load case 2: Horizontal

$$S_{eq} = S_{max}(1-R)^{0.56}$$
$$S_{eq} = 294(1-0.1)^{0.56}$$
$$S_{eq} = 277.16\text{Mpa}$$
$$\text{Log } N_f = 11.1 - 3.97\log (S_{eq} - 15.8)$$
$$\text{Log } N_f = 10\text{^}5*(10 \text{ ^ } (11.1-3.97*\text{Log } (277.16-15.8)))$$
$$\text{Log } N_f = 3.19E+06\text{N}$$

Load case 3: Angle of 42^0 from vertical

$$S_{eq} = S_{max}(1-R)^{0.56}$$
$$S_{eq} = 241(1-0.1)^{0.56}$$
$$S_{eq} = 227.19\text{Mpa}$$
$$\text{Log } N_f = 11.1 - 3.97\log (S_{eq} - 15.8)$$

Log N_f = 10^5*(10 ^ (11.1-3.97*Log (227.19-15.8)))

Log N_f = 7.40E+06 N

Fatigue life Equation for 2024-T3 Titanium 6AL-4V alloy

Log N_f = 11.75 – 4.45log (S_{eq} - 15.0)

$S_{eq} = S_{max}(1-R)^{0.62}$

Fatigue life Equation for 15-5PH (H1025) Stainless steel

Log N_f = 8.72 – 2.56log (S_{max} – 34.9)

VIII. RESULTS AND DISCUSSION

Analysed Results

Convergence study for different material for original engine bracket.

Materials	Load Case	Displacemet	Stress					High Cycle Fatigue (N)
			Von-mises stress	Max Principal stress	Min Principal stress	Max Stress (Smax)	Seq	
		(mm)	(Mpa)	(Mpa)	(Mpa)	(Mpa)	(Mpa)	
Aluminum	Vertical	0.01	22.50	30.50	5.85	30.50	28.75	4.83E+11
	Horizontal	0.08	15.10	2.79	-7.64	15.10	14.23	2.13E+15
	Angle_42	0.05	12.10	11.90	-0.09	12.10	11.41	3.53E+13
Steel	Vertical	0.03	22.50	30.50	5.85	30.50	-	1.18E+12
	Horizontal	0.03	15.10	1.29	-9.15	15.10	-	2.51E+10
	Angle_42	0.02	12.10	11.90	0.01	12.10	-	1.75E+10
Titanium	Vertical	0.07	22.10	32.60	8.12	32.60	30.54	2.81E+11
	Horizontal	0.05	14.80	2.50	-7.66	14.80	13.86	3.19E+16
	Angle_42	0.03	12.10	12.10	0.27	12.10	11.33	1.74E+14

Table 8 : Analysed results of original engine bracket

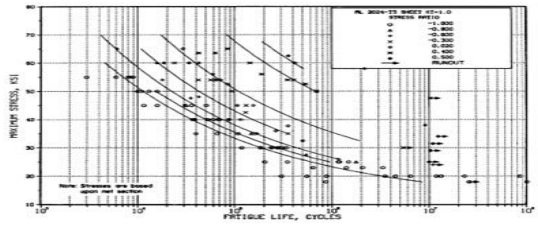
Convergence study for different material for optimized engine bracke

Materials	Load Case	Displacement	Stress					High Cycle Fatigue (N)
			Von-mises stress	Max Principal stress	Min Principal stress	Maximum Stress (Smax)	Seq	
		(mm)	(Mpa)	(Mpa)	(Mpa)	(Mpa)	(Mpa)	
Aluminum	Vertical	0.67	389.00	530.00	107.00	530.00	499.63	2.77E+05
	Horizontal	0.49	226.00	294.00	46.60	294.00	277.16	3.19E+06
	Angle_42	0.30	175.00	241.00	52.50	241.00	227.19	7.40E+06
Steel	Vertical	0.22	389.00	530.00	107.00	530.00	-	6.63E+06
	Horizontal	0.16	226.00	294.00	46.60	294.00	-	3.48E+07
	Angle_42	0.10	175.00	241.00	52.50	241.00	-	6.25E+07
Titanium	Vertical	0.43	376.00	561.00	149.00	561.00	525.52	5.00E+04
	Horizontal	0.32	218.00	313.00	71.10	313.00	293.21	7.46E+05
	Angle_42	0.19	173.00	256.00	71.40	256.00	239.81	1.92E+06

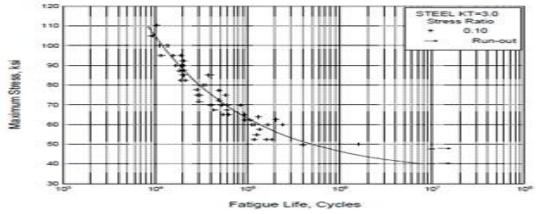
Table 9 : Analysed results of optimized engine bracket

The above tables show the summary of the results for engine mounting Bracket for the various materials, and the observed results are within the allowable limits. Hence the design is safe.

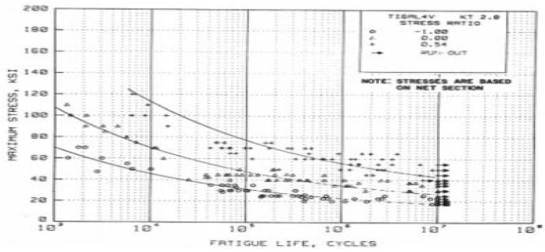
Graphs



Graph: S-NCurve for 2024-T3 Aluminum alloy



Graph : S-N Curve 15-5PH (H1025) Stainless steel



Graph : S-N Curve for Titanium 6AL-4V

IX. CONCLUSION

The engine mount bracket is key important structural member in order to proper functioning of the engine. Various analyses carried out on the mounting bracket to check its strength and stability for different loadings comes from engine and supporting structure. The study was done using various materials which are 2024-T3 Aluminum alloy, Titanium 6AL-4V and 15-5PH (H1025) Stainless Steel. Objective is to study the strength and fatigue life of the bracket with geometry and material change. Based on the study and analysis, in three load cases (Vertical, Horizontal and Angle of 420from vertical) with three materials the life of bracket is> 105 cycles. By comparing of mechanical properties, cost and applications, Aluminum is better than all other two materials. In future studies I am planning to produce my final optimized model and conduct live experiments to understand the quality and stability of the bracket.As we know that engine components must made up of most heat resistant metals as it create more temperature. I am extending this study for thermo-structural analysis future used case.

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Privacy-Preserving of Data using Bio-Metric in Cloud Storage

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ABSTRACT

Cloud computing is the practice of using a network of remote servers, hosted on the Internet to store, manage, and process data, rather than a local server or a personal computer. One of the significant difficulties in Cloud computing is Security. Biometric frameworks give the response to guarantee that just a legitimate client or an approved client and nobody else gets to the rendered administrations. Biometric frameworks perceive clients based on behavioral or physiological qualities. Additionally, information honesty support is the significant goal in cloud storage. Our proposed work ensures the safety of information and recovery of information on the off-chance that somebody misuses it. This activity is allotted to a Proxy server. The information of the clients will be put away in public and private zone of the cloud.

Keywords : Cloud Computing, Data Security, Regenerating Codes, Public Audit, Privacy Preserving, Finger Print Authentication.

I. INTRODUCTION

Cloud computing is perceived as another option to customary data innovation because of it is inborn asset offering to low upkeep qualities. In cloud computing, the cloud specialist organizations (CSPs, for example, Amazon) and others can convey different support of cloud clients with the assistance of capable server farms. By moving the neighborhood information, administration frameworks into cloud servers and clients may appreciate top-notch administrations and spare critical ventures on them nearby foundations. A standout amongst the most crucial administrations offered by cloud suppliers was information storage. How about we consider a constrained information application the organization permits its staffs in a similar gathering or office to put away and shared documents in the cloud. By using the cloud that the staffs could be totally discharged from the troublesome neighborhood information storage facility and support [1]. Nevertheless, it is additionally representing a critical hazard to the secrecy of those put away records. Particularly the cloud servers are overseen by cloud suppliers isn't completely trusted by clients while the information documents put away in the cloud may be secret and delicate, for example, marketable strategies. To jelly information privacy is essential answer for scramble information documents and after that transferred the encoded information into the cloud [2]. Sadly, the planning of the effective and secure information sharing plan for bunches in the clouds is not a simple assignment because of the accompanying testing issues.

As a matter of first importance personality the privacy is being a standout amongst the hugest limitation for the wide organization of cloud computing. Here not holding the ensured of character privacy client might be unwilling to attach in cloud computing frameworks in light of the fact that their genuine personalities can be effectively uncover to cloud suppliers and furthermore assailants. Then again, its genuine personality privacy may bring about the manhandling of privacy for instance the wrongdoing staff could mislead others on the organization to sharing false documents without being traceable. In this manner, traceability and which are empowers the TPA to uncover the genuine character of a client's are likewise exceedingly alluring. Second, it is very suggested that any part in the gatherings should ready to completely appreciate the information putting away and in addition sharing administrations gave by the cloud which are characterized as the different proprietor way [3]. Contrast and the single proprietor way where just the gathering director could store and adjust information in the cloud, the numerous proprietor conducts are more adaptable in viable applications.

All the more solidly, every client in the gatherings cannot just read information and furthermore alter his or her piece of information in the whole information record shared to the organization. Last yet not the minimum with the goal that gatherings are ordinarily powerful by and by, e.g., new staff collaboration and current representative repudiation in the organization. The progressions of enrolments make secure information sharing to a great degree dangerous. On one hand, the unknown frameworks can challenge present day conceded clients can take in the substance of information records put away before their participation, since it isn't feasible for new allowed clients to contact with mysterious information proprietors and access the relating unscrambling keys. Then again, the effective enrolments cancel component without refreshing the grouped keys of the rest of the clients wants to limit the intricacy of key administration. Numerous security plans for information sharing on untrusted servers had been proposed. In these methodologies, information proprietors can store the scrambled information documents in doubtful storage with disseminated the comparing unscrambling keys are just for verifying clients. In this way, unapproved clients and in addition storage servers could not take in the substance of the information records since they do not know about the unscrambling keys.

In any case, the unpredictability of client investment and nullification in these plans are straight expanding with the quantities of information proprietors and the quantity of repudiated clients, individually. By setting the gathering with a solitary characteristic, we proposed a safe provenance plot is set up on the figure content approach property built up encryption system, which are enables any part in a gathering to impart information to others.

In any case, the issue of client repudiations is not tended to in their plan. We displayed an adaptable and fine-grained information get to control conspire on cloud computing based on the key arrangement properties based on by encryption system with the usage of Proxy Server. Lamentably, the single proprietor way ruins the appropriation of theirs plan into the case, where all clients are allowed to store and offer information. Subsequently we are executing a gathering based Data proprietor framework.

This paper concentrates on a cloud-based structure for taking care of the subtle elements of any element: in the cloud in a more secured way utilizing enhanced biometric picture handling procedures. The utilization of cloud benefits by an association or an

individual client lessens the capital speculation cost also the repeating costs. Since the cloud client does not claim any assets; rather utilize the administrations from the cloud on pay/utilize premise or generally alluded as membership premise. When we do not claim any physical assets, the association is assuaged of support of assets as well; in this manner, an association may focus on its standard business; instead of IT framework.

The significance of biometrics-based confirmation frameworks that are intended to withstand security issues when utilized in basic applications, particularly in autonomous remote applications [4], for example, internet business, keeping money is to be unmistakably tended to. Our concentration is towards utilizing such biometric validation frameworks in cloud condition where a venture's business information is put away in remote servers.

II. LITERATURE REVIEW

Jian Liu, Kun Huang, Hong Rong, Huimei Wang and Ming Xian in [1] proposes a public auditing plan for the regenerating-code-based cloud storage framework, where the information proprietors are special to appoint TPA for their information legitimacy checking. To secure the first information privacy against the TPA, they randomize the coefficients in the first place as opposed to applying the visually impaired method amid the auditing procedure. Existing remote checking techniques for regenerating-coded information just give private auditing, requiring information proprietors to dependably remain on-line and handle auditing, and in addition repairing, which is some of the time unreasonable. Accordingly, an intermediary is utilized who works without information proprietor for tackling the recovery issue of fizzled authenticators. Consequently, information proprietor has no compelling reason to depend online. A few keys produce a novel public obvious authenticator, which secure unique information privacy against the outsider evaluator and safeguard the privacy in cloud storage.

M. Li, S. Yu, K. Ren, and W. Lou in [3] proposed a patient-driven structure and a suite of instruments for information get to control to PHRs put away in semi confided in servers. To determine fine-grained and versatile information get to control for PHRs, they affect credit-based encryption calculation to encode every patient's PHR document. They isolate the clients in the PHR framework into various security spaces that significantly lessens the key administration many-sided quality for proprietors and additionally clients. A high level of patient's privacy is guaranteed at the same time by misusing multi expert ABE. Individual wellbeing record is a patient-driven system for wellbeing data trade, which is constantly outsourced to be put away at outsider cloud storage. Nevertheless, there is a wide privacy worry as individual wellbeing data could be presented to those outsider cloud servers and to unapproved parties. This plan gives adaptable and secure sharing of individual wellbeing records in cloud computing utilizing Attribute-Based Encryption.

H. Chen and P. Lee plan and actualize a down to earth information respectability assurance conspire [4] for a particular regenerating code, while preserving its central properties of adaptation to non-critical failure and repair-movement sparing. Plunge conspire is outlined under a portable Byzantine antagonistic system, and empowers a customer to check the uprightness of arbitrary subsets of outsourced information against malevolent defilements. It works under the straightforward suspicion of thin-cloud storage and enables

distinctive parameters to be tweaked for an execution security exchange off. This executes and assesses the overhead of DIP conspire in a genuine cloud storage test bed under numerous parameter decisions. This further examines the security qualities of DIP plot through scientific models. It shows that remote uprightness checking can be plausibly incorporated into regenerating codes in pragmatic sending. This assess the running circumstances of various fundamental operations, for example, Upload, Check, Download, and Repair, for various parameter decisions.

C. Wang, Q. Wang, K. Ren, and W. Lou [5] proposes a powerful and adaptable appropriated storage check strategies with unequivocal dynamic information support to guarantee the accessibility of client's information in the cloud. It relies upon eradication adjusting code in the record circulation readiness model to supply redundancies and confirmation about the information steadfastness against Byzantine servers, where a storage server can be flop in irregular ways. This development exceptionally limits the correspondence and additionally storage overhead when contrasted with the old replication-based document circulation display. By utilizing Homomorphic token with appropriated confirmation of eradication-coded information, this accomplishes the accuracy of storage protection and in addition information mistake restriction, when the information debasement has been distinguished amid the check of storage rightness. This plan can give the assurance of synchronous limitation of information mistakes and the distinguishing proof of the getting rowdy servers.

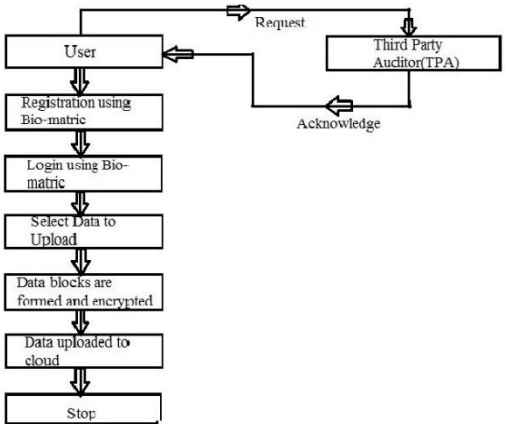
J. He, Y. Zhang, G. Huang, Y. Shi, and J. Cao [6] gives speculations to settling the Finding an Optimal Spanning Tree in a Complete Bidirectional Directed Graph (FOSTCBDG) issue through tallying all the accessible ways that infections assault in clouds organize condition. Likewise, this assistance the cloud clients to accomplish proficient different copies information ownership checking by an inexact calculation for handling the FOSTCBDG issue, and the adequacy is exhibited by a test ponder. This paper, give a novel productive Distributed Multiple Replicas Data Possession Checking (DMRDPC) plan to beat the two burdens of focus arranged checking. The DMRDPC plot initially finds an ideal spreading over tree to characterize the halfway request of planning numerous imitations information ownership checking. This is an exceptionally complex errand, since transfer speeds have topographical decent variety on various connections of various imitations and the data transmissions between two reproductions are unbalanced, and subsequently it is important to locate an ideal traversing tree with the verifier as the root in a Complete Bidirectional Directed Graph (CBDG), which associates the verifier and every one of the copies. At that point, as per the planning halfway request, the information ownership checking from the verifier, who checks the majority of its kids, is begun. On the off chance that a few copies flop in the checking, they can get one duplicate from its parent before they keep checking the information ownership of their own youngsters.

The objective of Fox, R. Grifth, A. Joseph, R. Katz, A. Konwinski, G. Lee, D. Patterson, A. Rabkin, and I. Stoica [7] to clarify different terms, gives straightforward equations to measure connection between of cloud and ordinary Computing, and recognize the best-specialized and non-specialized obstructions and chances of Cloud Computing. IT associations have communicated the worries of major basic issues, for example, security that exist with the far-reaching usage of cloud computing. These sorts of concern originate from the way that information is put away remotely from the client's area; it can be

put away at any area. Security is most contended about issues in the cloud-computing field; many ventures take a gander at cloud computing carefully because of anticipated security dangers.

III. PROPOSED SYSTEM

The framework is comprised of cloud server and numerous clients. This framework is helpful for business applications. Cloud server enables clients to store their encoded squares of documents and regarded hash. For this encryption of record obstructs, there is a disseminated KDC. Framework utilizes disseminated KDC, in light of the fact that in the event that one KDC is occupied another will be utilized. Along these lines, the heap on KDC is dispersed and execution in made strides. By utilizing key, client can scramble the squares of record. Before putting away the piece documents on cloud storage, client produce the hash of square records and store it on server.



Client can demand to TPA for record piece honesty checking, store at cloud server. TPA stores the hash of squares. It asks for hash of specific record asks for by client for respectability checking. It looks at the got hash of record obstruct with hash store in its database. On the off chance that the hash is matches, it sends the message to client, which demonstrates that the documents store on server is not defiled. On the off chance that the record is defiled, TPA asking intermediary to rectify it. Intermediary having recovery code. By utilizing this recovery code, intermediary recoups the records undermined on server. In addition, after that TPA again confirms that, regardless of whether those documents are recuperated or not. Finally, TPA advises the client that the document is recouped.

IV. CONCLUSION

To keep up the viability and to keep up information defilement from data debasement in information storage reinforcement system are question undertakings. Putting away information pieces on various servers diminishes the odds of data misfortune however these information part storage on different server for data reinforcement grows storage space. This information squares may be adulterated store on cloud server. To recuperate the ruined information obstructs, our proposed framework actualizes regenerating coding procedure at intermediary, if any pieces is misfortune or degenerate. Additionally, to reduce the figuring cost, framework utilizes cloud servers for putting away the data, since cloud server has a few advantages, for example, security, minimal effort, high accessibility, and so on. Framework utilizes disseminated KDC, to limit the heap at single KDC. In this, if any one KDC is occupied, client asking for key to another KDC. To compute the execution of our framework, different testicles completed on dataset including number of records. The document measure shifts from 1 kb to 100 mb. The test outcomes demonstrate that, our framework is performed best than existing one, as far as, storage space, cost, accessibility of information, limit over-burden at KDC and recuperation of documents.

V. RESULTS



Fig-1: Login Page: login is must to use cloud storage.

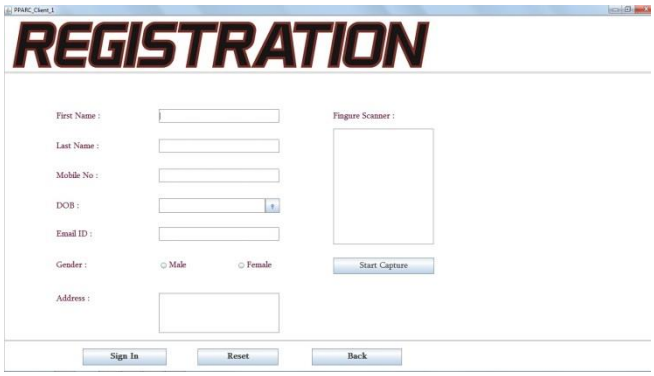


fig-2: Registration Page: If you don't have account you need to create one first.



fig-3: Home Page: After you log in, you will be taken on this page.

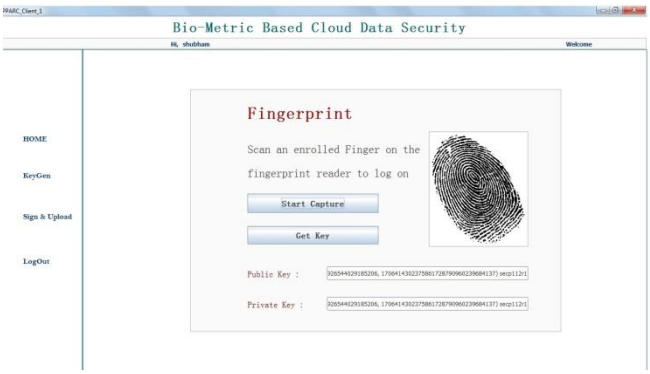


fig-4: Key Generation: Keys need to be generated for encryption process.



fig-5: File Selection: Select file to encrypt and upload

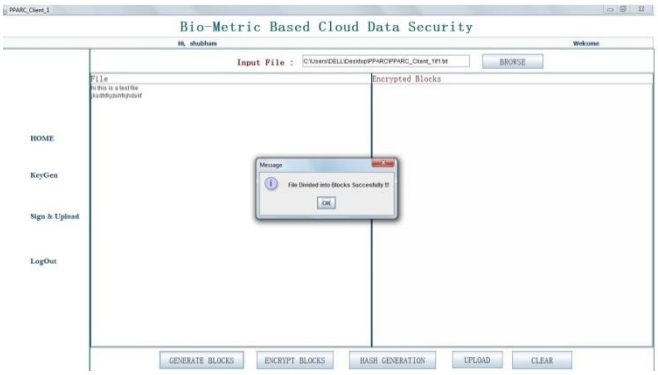


Fig-6: Block Generation: Selected file is broken into pieces before encryption and uploading.

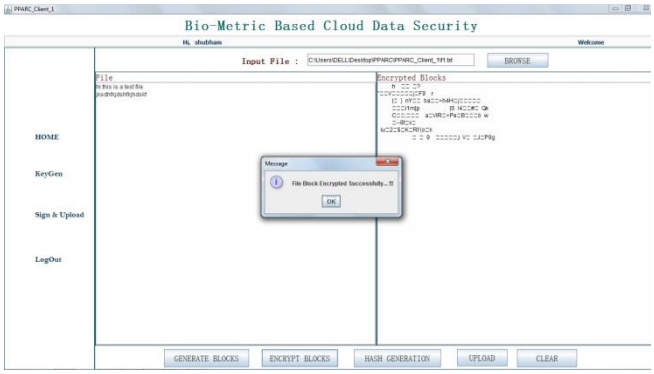


fig-7: Block Encryption: Each block is then individually encrypted and uploaded.



fig-8: Key Generation: Keys need to be generated for encryption process.



fig-9: File Selection: Select file to encrypt and upload



Fig-10: Block Generation: Selected file is broken into pieces before encryption and uploading.

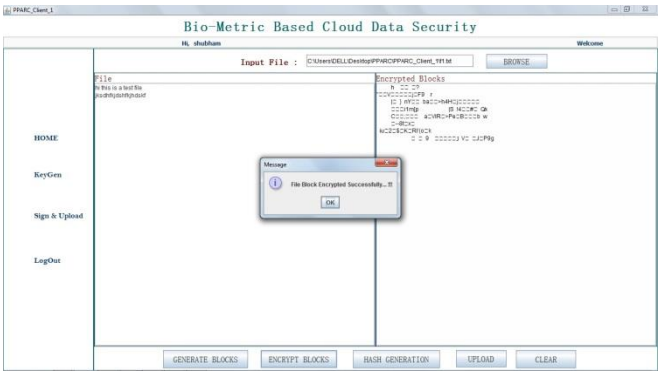


fig-11: Block Encryption: Each block is then individually encrypted and uploaded.

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Analysis of Physicochemical Parameters and Heavy Metals In Drinking Water from Boreholes and Wells in Dutse district, Jigawa State, Nigeria

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ABSTRACT

The levels of some physicochemical parameters and some selected heavy metals from boreholes and wells water were assessed in Dutse District area of Jigawa. Samples were collected randomly from different sampling sites and were analyzed using standard methods of analysis. The result shows that pH had a mean level of 7.8 ± 1.45, conductivity mean level was 532.4 ± 28.64 MSCM-1. The mean total hardness was 160.5 ± 0.7, Turbidity had a mean level of 1.7 ± 0.22 NTU, chloride had a mean level of 69.91 ± 21mg/l and total dissolve solid TDS had a mean of 292.9 ± 21.14mg/l. heavy metals analyzed include copper, chromium, lead, nicked and zinc using Hitachi Z – 8100 Atomic absorption spectrometer and their mean levels are 0.31 ± 0.2mg/l, 0.11± 0.01mg/l, 0.14 ± 0.007mg/l, 0.20 ± 0.007mg/l and 0.09 ± 0.002mg/ls respectively. The result indicates that the physicochemical parameters and the heavy metals are within the maximum allowable levels set by WHO and NDWQS 2011.

Keywords : Physicochemical Parameters, Heavy Metals, Borehole Wells, Dutsedistrict.

I. INTRODUCTION

Water is one of the most important and abundant natural resources in which all living organisms on the earth depends for their normal survival and growth.[1] Different types of harmful contaminants find their ways into the water and make it unsuitable and unsafe for both drinking and domestic purposes, and this is as a result of increased human population, industrialization, agricultural practices and manmade activities. Therefore, it is necessary that the quality of drinking water should be checked at regular intervals, because continuous use of contaminated water causes the spread of varieties of water borne diseases. [1]

Water pollution is a major global problem which requires ongoing evaluation and revision of water resource policy at all levels [2]. It has been suggested that it is the worldwide cause of deaths and diseases and that it accounts for the deaths of more than 14000 people daily [2].

The availability of good quality water is an indispensable feature for preventing diseases and improving quality of life. Natural water contains different types of impurities which are introduce into aquatic system by different ways such as weathering of rocks and leaching of soils, dissolution of aerosol particles from the atmosphere and from several human activities including mining and other activities from processing industries. [3].

II. METHODS AND MATERIAL

All the reagents used in this research are of analytical analar grade and all the glass wares were cleaned and rinsed with detergents and immersed in 25% nitric acid and finally rinsed with deionized water.

2.1Sampling

A total of 10 samples of water were collected out of which 6 samples were from boreholes and 4 from wells in different areas of Dutse District of Jigawa State. The samples were collected in triplicate in clean polyethene plastic containers. The pH and conductivity were determined immediately after sampling and the samples were stored at a temperature below 4^{0c}. The sampling was conducted in between 20^{th} – 204^{th} April, 2017.

2.2 Study Area

Dutse is a city in north western Nigeria, it is the capital city of Jigawa State and it is located in Nigerian map between latitude: $11^{0}45'$ 22.5"N and longitude: $9^{0}20'$, 20.26"E. Dutse has a population of 153,000 (2009 census) with a 3 digit postal code prefix of 720. [18]

III. Methodology

3.1pH Measurement

The pH was measured using – pH meter (Model HI 4358) after the pH meter was switched on and allowed to warm for about 5minutes and standardized with a buffer solution, it was then immediately introduced into the water sample and the measurement was taken. The electrode was then rinsed with deionized water before another measurement [4].

3.2Conductivity Measurement

Conductivities of the water samples were measured using a digital conductivity meter. The meter was switched on and then standardized using 0.1N kcl at 25^{0c}. The electrode was then immersed into the water sample and conductivity reading of each sample was recorded [5]

3.3Turbidity Measurement

The turbidity of the water samples was measured using a digital turbidity meter (). The meter was standardized with clean deionized water. The turbidity reading of each sample was then recorded. [6]

3.4The Determination of Total Dissolved Solid

The total dissolved solid was determined using a conductivity meter, the programming of the conductivity meter, the programme menu of the conductivity meter was switehed to total dissolved solid, $100cm^3$ of the sample was measured into the beaker and the electrode was introduced into the sample. The 3.5Determination results of to dissolved solid were displayed and recorded [4]

3.5 Determination of Total Hardness

$10cm^3$ of water sample was pipetted into a conical flask. 1cm3 of buffer solution (NH_4CL) of PH=10 and 3 drops of erichrome black T indicator were added to the flask. The mixture was then titrated with 0.01M EDTA (ethylene diammine tetra acetic acid) until the colour changed from wine red to blue the procedure was repeated two more times to obtain the average litre value [7]

3.6Determination of Chloride

50ml of the water sample was taken in a clean conical flask and 0.5ml of potassium chromate was added followed by shaking and the mixture was titrated with silver nitrate as a titrant [8]

3.7Determination of Heavy Metals

About 5ml of concentrated hydrochloric acid was added to 250ml of each water sample and evaporated to 25ml. the concentrate was filtered using a cellulose membrane (0.45mm)and transferred to a 50ml flask

and diluted to mark with distilled water.[7] Heavy metals (Cu, Cr, Pb, Ni and Zn) ware determined using atomic absorption spectrometer (Hitachi Z - 8100) . The values obtained were expressed in mean ± standard deviation.

IV. RESULTS AND DISCUSSION

The results of the selected physiochemical parameter and some of the heavy metals analyzed in both the boreholes and wells drinking water from the various sampling site in Dutse district have been presented in table 2, 3 and 4 respectively, in the form of mean ± standard deviation.

Table 1: Sampling sites and their ID

S/N	Sampling Sites	I.D Code
1	RafinSanyi	A
2	GidaDubu	B
3	Bokkoto	C
4	FUD Male Hostel	D
5	Tsohuwar Cinema	E
6	Takur	F
7	Garu	G
8	Zai	H
9	Limawa	I
10	FUD Female Hostel	J

Table 2: Mean levels for PH, conductivity and Turbidity for water samples

S/N	Sampling Sites	PH	Conductivity ($ms/(cm^2)^1$)	Turbidity (NTU)
1	RafinSanyi	7.4±0.14	758±14.5	2.20±0.011
2	GidaDubu	7.6±0.10	640±42.3	2.10±0.012
3	Bokkoto	6.8±0.15	420±32.3	3.35±0.016
4	FUD Male Hostel	7.6±0.17	400±29.5	1.74±0.013
5	Tsohuwar Cinema	7.1±0.12	620±39.2	1.40±0.015
6	Takur	6.1±0.11	600±21.2	1.30±0.002
7	Garu	6.3±0.13	346±22.3	1.22±0.013
8	Zai	7.2±0.16	480±42.3	1.30±0.021
9	Limawa	7.3±0.17	560±21.5	0.67±0.021
10	FUD Female Hostel	7.2±0.16	500±22.3	1.68±0.014

Table 3. Mean Levels for total hardness, chloride and TDS for water samples.

S/N	Sampling Sites	Total Hardness	Chlorides mg/l	TDS (mgl)
1	RafinSanyi	171±15.3	96.1	220.3±14.5
2	GidaDubu	164±13.2	48.1	200.2±2.5
3	Bokkoto	160±15.3	57.6	423.2±12.4
4	FUD Male Hostel	182±2.4	73.6	400.2±13.5
5	Tsohuwar Cinema	196±0.32	44.8	240.2±23.4
6	Takur	154±0.11	48.4	320.1±32.2
7	Garu	142±2.23	112.3	230.3±12.5
8	Zai	119±11.03	67.7	452.3±30.1
9	Limawa	132±3.04	60.3	132.4±20.1
10	FUD Female Hostel	184±14.2	70.2	320.3±30.2

Table 4. Mean levels for copper, chromium, lead, nicked and zinc of the water samples

S/N	Sampling Site	Cu	Cr	Pb	Ni	Zn
1	RafinSanyi	0.18±0.002	0.04±0.013	0.18±0.002	0.23±0.001	0.08±0.002
2	GidaDubu	0.27±0.011	0.07±0.023	0.18±0.015	0.08±0.012	0.05±0.004
3	Bokkoto	1.18±0.023	0.11±0.007	0.17±0.003	0.30±0.023	0.11±0.003
4	FUD Male Hostel	0.27±0.045	0.14±0.010	0.03±0.012	0.15±0.004	0.19±0.002
5	Tsohuwar Cinema	0.18±0.023	0.03±0.032	0.15±0.003	0.23±0.003	0.08±0.001
6	Takur	0.36±0.032	0.07±0.014	0.16±0.012	0.15±0.006	0.09±0.003
7	Garu	0.09±0.026	0.13±0.001	0.17±0.004	0.23±0.004	0.05±0.001
8	Zai	0.18±0.013	0.20±0.003	0.09±0.012	0.34±0.003	0.12±0.005
9	Limawa	0.31±0.014	0.14±0.002	0.16±0.005	0.15±0.002	0.08±0.001
10	FUD Female Hostel	0.14±0.011	0.13±0.002	0.04±0.003	0.13±0.007	0.06±0.002

V. DISCUSSION

The results of PH levels in the various water sample were presented In table 2, the result showed that all the sampling sites had PH level Falling within the W.H.O, N.P.W.D.R and NSDWR recommended range value of 6.5-8.5 [9][10]. With exception of sampling sites at Takur and Garu in which the PH level was found to be 6.1 and 6.3 which are slightly below the recommended level set by WHO. This could be attributed to acid rain, sewage, industrial waste dumping through leaching into the soil which ultimately increases the soil acidity and consequently lowered the pH. [11]

In general, the conductivity measurements showed that all the sampling sites have conductivity lower than the maximum level of 1200mscm^{-1} set by the W.H.O. [9] and 2500mcm^{-1} set U.S.EP.A. This could be attributed to less accumulation and leaching of dissolved inorganic solid materials. [12]
The highest and lowest conductivities are 758$\pm$14.5 and 346 $\pm$ 22.3 recorded in Rafinsanyi and Garu respectively.

Higher level of turbidity is associated with disease causing bacteria, suspended materials due to soil run off etc. [14]. The turbidity recorded in all the water samples are within the recommended level of 5 NTU as set by WHO and NDWQS for drinking water [15, 16]

Based on the classification of water by [13] in terms of softness and hardness i.e. 0 – 60mg/l soft, 60 – 120mg/l moderately soft, 121 – 180mg/l moderately hard and above 180 is hard, the water samples analysed are considered to be hard but safe for drinking and other domestic purposes. But the hardness could be removed by simple boiling or addition of chemical e.g. washing soda, or sodium hydroxide etc.

Total dissolve solid is due to the presence of dissolve salts which consequently causes undesirable taste, gastrointestinal irritation etc. According to the result all the sampling sites have TDS levels lower than maximum allowable level set by W.H.O and NDWQS of 1000mg/l [16]. The highest TDS value of 452mg/l and the lowest TDS value of 132mg/l correspond to samples from Limawa and Zai respectively [Table 3]
The chloride ions determined in all the samples from the sampling points are below the maximum level of 250ppm set by WHO, Indian standards and US, EPA guidelines. [17] The highest chloride values of 112.3mg/l and the lowest chloride values of 44.8mg/l were recorded for samples from Garu and Tsohuwar Cinema respectively [Table 3].

5.1Heavy Metals

The presence of heavy metals in drinking water higher than a certain concentration especially the well-known set standards can cause a serious health hazards to human beings and other living organisms. Therefore, the analysis of heavy metals in drinking water is very important in order to ascertain the quality of drinking water. The results of heavy metals analysis of Cu, Cr, Pb, Ni and Zn [Table 3] indicate that their concentrations are within the safe limits set by WHO and NDWQS, which indicate that both the boreholes and wells are not polluted with heavy metals. The heavy metal concentrations are in the order Cu>Ni>Pb>Cr>Zn.

VI. CONCLUSION

The values of the physicochemical parameters determined (pH, conductivity, Turbidity chloride and TDS) from all the water samples i.e. both the boreholes and wells water in the sampling site in Dutse district were found to be within the recommended limits of WHO and NDWQS. The concentrations of the heavy metals (Cu, Cr, Pb, Ni and Zn) were also measured and found to be well below the standard maximum concentrations. Therefore, the water in the sampling sites are safe for both drinking and other domestic purposes.

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Design and Implementation of Precise Fuel Meter

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ABSTRACT

In today's world reality has moved toward becoming digitized, on the off chance that we make fuel meter in the vehicle as digital it will help know the accurate measure of fuel present in the fuel tank. In our task, we have made a digital fuel meter. Here, we are showing the measure of fuel present in the tank digitally. Fuel robbery is additionally an issue in everywhere throughout the world. In our undertaking at whatever point there is fuel burglary happens, because of the commotion of thief alert individuals know about fuel robbery and furthermore amid fuel robbery an instant message is conveyed on portable to the proprietor of the bicycle. This is the constant happening process. The past vehicle framework doesn't have such usefulness that there is no presentation gear level whatever might be the condition through the bicycle is running or not. In any case, in our framework, we can defeat the above issue by utilizing the digital meter which demonstrates the rigging level in the enduring state or running condition of the vehicle.

Keywords : Fuel Tank, Mileage, Arduino, Digital Meter, Fuel Meter

I. INTRODUCTION

Digital fuel meter is additionally executed in a bike, yet they don't demonstrate the definite fuel level which is available in the tank, for example, they demonstrate the measure of fuel as far as bars and not in numbers or digits like a liter or milliliter. That is the reason we don't get legitimate thought regarding fuel present in our tank. We get just surmised dimension of fuel. So this issue is contemplated for our venture work of building up the Digital (numeric) fuel pointer framework for bikes which indicates the careful measure of fuel as far as a liter or milliliter. This undertaking fundamentally thinks about the sign of fuel level in bike tanks. Different highlights like the separation can be made a trip to the comparing fuel, is included with this course of action which will clarify the reasonable execution of the vehicle to the relating fuel. In the ongoing occasions, we are continually finding out about petroleum burglary. The vast majority of the petroleum bunks today have misrepresentation the general population with the end goal that it shows the sum as entered yet the amount of fuel filled in the client's tank is a lot lesser than the showed esteem. However, the siphons are altered to serve the oil bunks proprietor. These outcomes in immense benefits for the petroleum bunks and yet the clients are deceived. Every one of the vehicles in India comprises of analogy meters subsequently it is unimaginable to exactly know the measure of fuel right now in the vehicle and furthermore it is beyond the realm of imagination to expect to cross check the

amount of fuel filled in the petroleum bunk. In this undertaking, we center around making a digital showcase of the careful measure of fuel contained in the tank of the vehicle and furthermore help in cross-checking the amount of fuel filled at the petroleum bunk.

The Existing framework comprises of analog meters. In everywhere throughout the world, all the vehicle are having analogy fuel meter. This meter demonstrates three conditions of fuel level which are unfilled, Half and Full. So we can't pass judgment on the real fuel present in the fuel tank. In Fig1 we can see analogy meter, which demonstrates the fuel level by utilizing the needle. However, because of this, we don't get legitimate thought regarding fuel level present in the fuel tank. Because of ill-advised information of fuel present in the tank, we can experience stuck in an unfortunate situation because of low fuel. As considering past analogy framework we are going to actualize propelled framework. In our framework, we are doing digital fuel meter and robbery discovery. In digital fuel meter, we are demonstrating the measure of fuel in the tank in liters. This incentive in liters will be in numerical digits.

The fundamental issue emerges in the analog meter is fuel burglary. There is a serious issue of fuel robbery everywhere throughout the world. Burglary is negligence which incorporates expulsion of the fuel pipe without proprietor and abusing the fuel from the bicycle. The proprietor of the bicycle ignorant of fuel burglary and he will come to think about it just when he needs to ride his bicycle on whenever. This is because of nonattendance of any robber caution or bell framework. The general population didn't know about fuel robbery. To defeat this issue we have put this thought of digital fuel meter and fuel robbery. Utilizing PIC microcontroller, in our undertaking at whatever point there is fuel burglary, because of the clamor of robber caution individuals know about the fuel robbery and furthermore amid fuel robbery an instant message is conveyed on portable to the proprietor of the bicycle. This is an ongoing happening process. As of late the lock framework for the pipe guaranteed the least measure of fuel burglary however it kept going just for the little span of time. The inconveniences of this lock framework are cheat can break the framework by utilizing copy key and expel fuel from the bicycle. The majority of the petroleum bunks today have cheated the general population with the end goal that it shows the sum as entered however the amount of fuel filled in the client's tank is a lot lesser than the showed esteem. Every one of the vehicles in India comprises of analogy meters consequently it is absurd to correctly know the measure of fuel as of now in the vehicle. Likewise, it is beyond the realm of imagination to expect to cross check the amount of fuel filled in the petroleum bunk.

Thus, in this paper we put an effort to overcome the running out of the fuel in the vehicles fuel tanks, Prevention from fuel theft and accurate meter readings. This system is implemented to detect the fuel level in the vehicle tank as the input and the percentage of the tank from its full capacity will be displayed on the LCD screen. This eventually should ease the user to estimate the fuel that they need to have for their journey. At the same time this type of product will save the fuel from being wasted and in another way consume the cost of the user itself. As for now it may seem useless but this product is somehow will benefits the user in the future as the value of fuel is unstable and that will affect the amount that we used every day as it will not be the same as before.

II. LITERATURE REVIEW

Authors in [1] propose that, with the expansion of vehicle use over the world, fuel fundamental has turned into a colossal issue. Structure and usage of burden cell-based fuel estimation estimate the precise dimension of fuel including while fuel filling process. There is a substantial assortment of strategies for estimating fuel level, running from those utilizing mechanical buoys and capacitive and optical sensors to ultrasound techniques. These days all fuel bunks having kinds of digital showcases unit so as to show the estimation of fuel adding to the vehicle. In any case, the weakness of utilizing load cell is that it can't be utilized for estimation of exceedingly responsive material, for example, petroleum. So we chose to utilize an ultrasonic strategy for petroleum level estimation as it is a non – contact type estimation technique.

Authors in [2] propose that in everywhere throughout the world all the vehicle are having an analog fuel meter. This meter shows three conditions of fuel level which are unfilled, half and Full. So we can't pass judgment on the real fuel present in the fuel tank. In Fig1 we can see the analog meter, which demonstrates the fuel level by utilizing the needle. Be that as it may, because of this we don't get appropriate thought regarding fuel level present in the fuel tank. Because of inappropriate learning of fuel present in the tank, we can experience stuck in an unfortunate situation because of low fuel. As considering past analog framework we are going to actualize propelled framework. In our framework, we are doing digital fuel meter and robbery location. In digital fuel meter, we are showing the measure of fuel in the tank in litres. This incentive in litres will be in numerical digits (Ex: 1 lit, 1.5 lit, 2 lit).

III. PROPOSED WORK

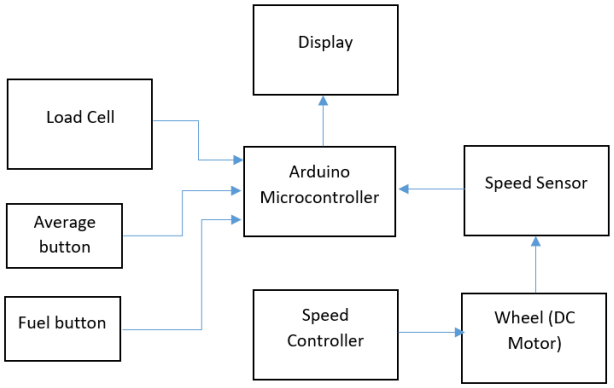


Figure 1. Block Diagram for Proposed System

To make a controller work, a power wellspring of 9V is expected to control up the Nano Arduino. In this way, a 9VDC power supply is developed utilizing the current from the power connector. The power connector is picked to supplant the transformer work. This is a direct result of wellbeing reason and materials uses. At the point when a connector is utilized as a power source to create 5V control supply, the likelihood of the circuit to harm or detonated is diminishes as power connector is more dependable than the transformer that is known as its entanglement to stable the execution. Adjacent to that the consumptions that should be determined when a transformer detonated is a lot higher while a connector only occasionally experienced such an issue. Figure 2 is the power source circuit that has been tried and worked legitimately.

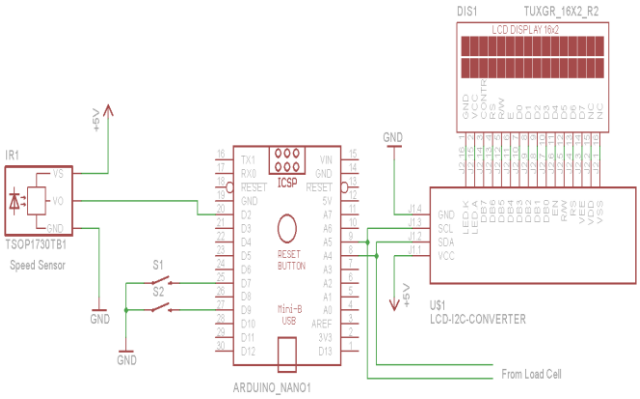


Figure 2. Circuit for Fuel Meter

The main components used for the implementation of the system are as follow:

A. LM393 Motor Speed Measuring Sensor

Widely used in motor speed detection, pulse count, the position limit, etc. The DO output interface can be directly connected to a micro-controller IO port, if there is a block detection sensor, such as the speed of the motor encoder can detect. DO modules can be connected to the relay, limit switch, and other functions, it can also with the active buzzer module, compose alarm.



Figure 3. LM393 Speed Sensor

- Main technical characteristics:
- Dimensions: 32 x 14 x 7mm.
- The sensor reading slot has a width of 5mm.
- Two outputs, one Digital and one Analog.
- LED power indicator.
- LED indicator of the output pulses of pin D0.

Features

- Using imported trough type optical coupling sensor, groove width 5 mm.
- The output state light, lamp output level, the output low level light.
- Covered: output high level; Without sunscreen: the output low level.
- The comparator output, signal clean, good waveform, driving ability is strong, for more than 15 ma.
- The working voltage of 3.3 V to 5 V
- Output form: digital switch output (0 and 1)
- A fixed bolt hole, convenient installation
- Small board PCB size: 3.2 cm x 1.4 cm
- Use the LM393 wide voltage comparator Module

B. HX711 Weighing Sensor (Load Cell)

Experimental electronic scales, postal electronic scales and kitchen scales, etc. generally adopt dual-hole strain weighing sensor with cantilever parallel beam, which features with high precision, easy processing, simple and compact structure, strong anti-unbalancing-load capacity and high natural frequency, whose typical structure is shown in Figure 4.

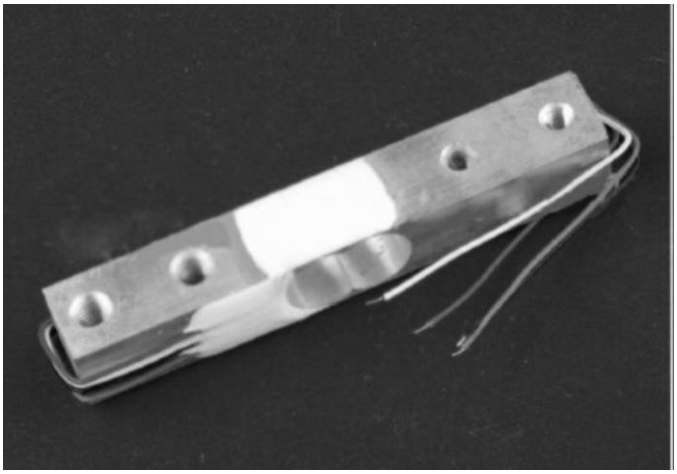


Figure 4. Load Cell

Stressing operation principle of strain sensor is shown in Figure 5.

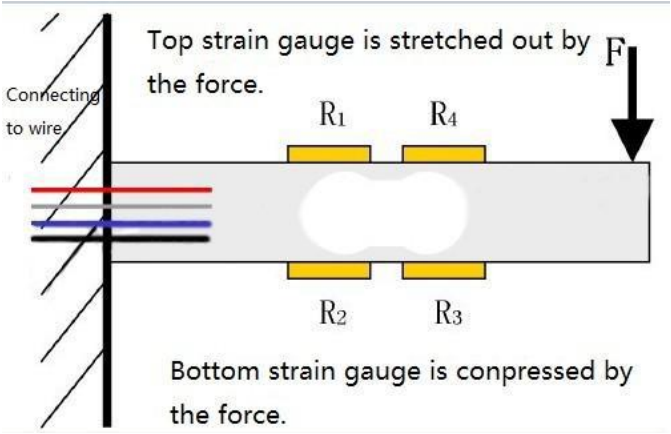


Figure 5. Stressing Operation Principle of Strain Sensor

Attach the strain gauge to the stressed pressure-sensitive element, when the elastic element is deformed by the force, the corresponding strain generated by the strain gauge will be transformed into resistance changes. Connect the strain gauges as a bridge, the resistance changes caused by force is converted to voltage changes of measurement circuit, and the weight of the measured object can be obtained by converting the output voltage value.

Relay: A relay is an electrically operated switch. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

IV. CONCLUSION

The smart digital fuel indicator is very advance type indicating system. The main advantage of this system is that it can gives accurate value of remaining fuel as well as the vehicle running capacity in km. The operation time taken is very less. All the equipment's have long life, durable & quality material. This project is able to show that simple available hardware and technology can be used to construct a robust fuel level monitoring system.

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IOT Based Smart Agriculture System

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ABSTRACT

Technological significance has been an extraordinary help for settling on choices in different fields particularly in agriculture. The improvement of agriculture has been on a work in progress for as far back as couple of years because of absence of Agriculture information and ecological changes. Here, it principally concentrating on the enhancement of rustic and farming improvement through cutting edge data and correspondence forms. It stretches out the agriculture association's capacity to address the issues of its ranchers. By utilizing IoT, it upgrades the simple access monitoring framework to lessen the human worry in agriculture. The monitoring got, through Arduino Uno and send to the controller in case of crisis, he can ready to see the factual study report by independent of area and engine has been ON/OFF consequently if the water level is diminished. This examination gives the ideal data at any moment of time from any piece of world and review their concern quickly at any piece of the area.

Keywords : Internet of Things, Soil Sensor, pH Sensor, Motor pump

I. INTRODUCTION

Agriculture has been the most imperative practice from soonest reference purpose of the human advancement. It has seen various cycles of enhancement in advancement with time. A not too bad cultivating practice is so far workmanship. Natural parameters, for instance, soil clamminess, temperature, stickiness, pH, sun put together radiation thus with respect to accept crucial part when all is said in the done enhancement of the plant. Temperature impacts countless activities, for instance, treatment, germination, etc. It is watched that, at the higher temperature, breath rate extends that result in reducing of sugar substance of nourishments developed starting from the earliest stage. At cut down temperatures photosynthesis activity is supported off [1].

Humidity is responsible for moistness incident and temperature organization of the plant. For high damp condition, evaporation will be less and more water will be submerged in the leaf an area. This results in expansion and improvement of life form in the porous domain of the leaf. Moistness is essential for seed germination and take-up of enhancements by the plant. Excess water may stop vaporous exchange among soil and the air which diminishes root breath and root improvement. The perfect dimension of clamminess ensures the strong improvement of the root and general progression of the plant [2]. A supportable methodology is required to keep up alter between these parameters and condition. In this way, there is a need of successful monitoring and control structure. In the present time, the standard systems that are used for irrigation, for instance, overhead sprinkler and flood form, isn't that much benefit. They realize a significant proportion of wastage of water and can similarly propel ailment, for instance, development improvement due to over sogginess in the earth. Automated irrigation structure is crucial for assurance of the water and by suggestion

possibility of the farm since it is a basic item. Around 85% of total available water resources over the world are solely used for the irrigation reason [3].

Generally, most of the irrigation structures are physically worked one. These standard techniques are being been displaced with semi-automated and automated strategies proposed an automated thought of irrigation to use the water capable and satisfactorily Automated Drip Irrigation system is executed either in perspective of the earth moisture or in light of the customer contribution through SMS teaching structures. The past methodology is a disengaged irrigation structure where the agriculturist doesn't revive with the irrigation status and later slacks in savvy utilization of water in light of customer arrange without pondering the condition of the soil. From that reliably creating need of the people, present day techniques are familiar with control of the structure.

To give proper thought with respect to the land arranged a long way from the human settlement, supervisory modified control structures like multi-terminal control systems are used since in various strategies, factors like soil, saltiness, irrigation, temperature, light power, etc needs repeated endeavors and need to work in uncommon natural conditions of the earth and to crush the deformities in the present system here we are flooding the land in perspective of the earth dampness and meanwhile the status of the irrigation is revived remotely to Server through sequential

In this framework, we utilize different sensors for estimating the status of the dirt. The Temperature sensor, Water level sensor, and moisture sensor are the sensors which estimate the status of the dirt. The moisture sensor is utilized to quantify the volumetric water content in the dirt with the goal that dirt is Dry or Wet can be distinguished. The temperature sensor estimates the temperature sensor. The water level sensor estimates the water level.

II. LITERATURE REVIEW

We have dissected a few papers beneath.

This paper [4] has genius represented a framework that is extremely essential and doesn't convey anything new to the table. It utilizes a framework that has sensors for moisture, temperature, and humidity, and utilizations Arduino to execute its capacities. It is halfway automated as the client needs to keep a mind the water dimension of the framework. This framework utilizes a GSM module for correspondence.

This paper [5] proposes a strategy that utilizes various sensors i.e Temperature, moisture, humidity and light to make a savvy irrigation framework. The information is sent to a web server for information dissecting and preparing, it is put away in JSON design. The light sensor detects the light, to expand the working of the plant, light is conveyed too. They intend to utilize keen calculations to improve the framework. It publicizes that it has 92% productivity than the rest.

This paper [6] IoT is utilized for irrigation in this task as the moisture sensor identifies the substance of water inside the dirt and in like manner educates the client through the PC it is associated with by means of warnings. The framework contrasts the moisture and the limit esteem and begins the water siphon in agreement and stops the siphon in like manner. The framework has constrained range as it is utilizing a PC to associate with the Arduino board through USB link since it isn't plausible to use for a homestead. The framework makes utilization of an Arduino board, moisture sensors, and a water siphon.

The framework [7] proposes a technique in which it will utilize an ace and slave design where the raspberry pi will control different Arduino gadgets with Zigbee convention. The raspberry pi will continue searching its email for any directions which will be as "Turn on the siphon for Y minutes." This order will turn on the transfer to the water siphon

for the said Y minutes. There is an ultrasonic sensor that continues monitoring the water tank level and it will advise the client with an email as it were.

The framework [5] proposes a strategy to execute a technique for brilliant irrigation with an Arduino and a Raspberry Pi. The framework utilizes Zigbee as a specialized strategy between the two. The framework can be controlled through cherry py with the IP address of the raspberry pi board, i.e it has a short range. In this framework, the raspberry pi does every one of the estimations and guides the aftereffect of it to Arduino's through ZigBee.

III. PROPOSED WORK

The proposed system will detect the moisture, salinity and pH level of soil by using the sensors like moisture Sensor, Salinity detector, pH detector which will be connected to the Arduino board (ARDUINO UNO R3). In this system pH of soil and Salinity will be tested on that basis the farmer can choose the fertilizers for crops. After that one can test the moisture of soil by using Moisture sensor, if the moisture of soil is less than the threshold value, then it sends the alert to the micro-controller and Micro-controller switches ON the power supply of the water pump. After full filling the requirement of water for soil then again it will generate an alert and micro-controller will switch off the system.

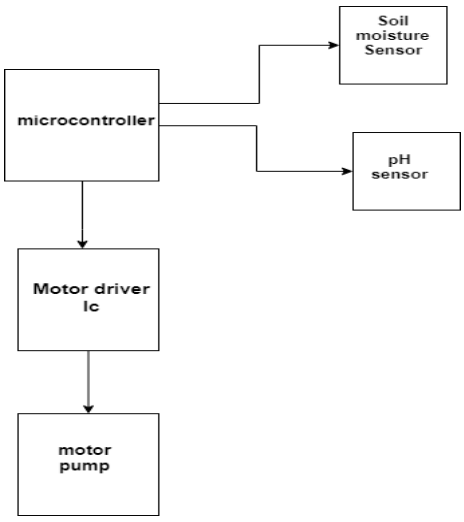


Figure 1. Block Diagram for Proposed System

The development of system can be carried on different level comprising of different modules.

A. Soil Moisture sensing module:

The Soil Moisture Sensor is used to measure the volumetric water content of soil. This makes it ideal for performing experiments in courses such as soil science, agricultural science, environmental science, horticulture, botany, and biology.

The Soil Moisture Sensor uses capacitance to measure the water content of soil (by measuring the dielectric permittivity of the soil, which is a function of the water content). Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is reported in percent.

B. PH and Salinity Detecting Module:

Test the pH level of soil by using the pH detector.
When you think of pH, you probably think of liquid acids and bases. But soil can be acidic or basic, too. Soils with pH above 7 are basic or sweet. Soils with pH below 7 are acidic or sour.

The pH of soil is an important factor in determining which plants will grow because it controls which nutrients are available for the plants to use. Three primary plant nutrients—nitrogen, phosphorus, and potassium—are required for healthy plant growth. They are the main ingredients of most fertilizers that farmers and gardeners add to their soil. Other nutrients, such as iron and manganese, are also needed by plants, but only in very small amounts.

To Test the Salinity of soil by using salinity detector.
Salinity is the measurement of presence of the concentration of dissolved salts in water. Salinity is measured by testing the electrical conductivity (EC) of the water. Saltwater conducts more electricity than water with no salt. Fresh water has less amount of dissolved salt, whereas ocean water has a salinity in the range of around 34 to 36 parts per thousand (ppt). Brackish water is a mixture of fresh and

saltwater. By using salinity sensor we detect the presence of salt in water, if salt is present in the water then the farmer need to take the precaution. Because the presence of salt in water damages the crop growth. The value of the salinity is high then this water cannot used for the crops.

C. Integration of all Module:

To Test the moisture level of soil and on the level of moisture present in the soil micro-controller generate an alert.

Presence of moisture in the soil is beneficial for crops if the moisture level of soil is get decreased then crops get harmed.

If the moisture level of soil is minimum then the sensor send an alert to the micro-controller and based on that alert the micro-controller switch on the motor (Flow of water), and the soil satisfied the condition of moisture level then the sensor generates an alert to micro-controller to switch off the pump/motor.

IV. CONCLUSIONS

By using Internet of Things, majority of Farmers were aware about the monitoring and warning detection method in agriculture. This will facilitate the e-agriculture to assessing the performance of the farmers doing independently. It enables to provide the alert messages and statistical survey report to the farmers by irrespective of location. This study is to provide great potential for improving decision making in agriculture. From this report it extend the agriculture organization's ability to meet the needs of its farmers

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QoS Based Discovery and Service Provider System

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ABSTRACT

We propose a two-step, context-based semantic approach to the problem of matching and ranking Web services for possible service composition. Semantic understanding of Web services may provide added value by identifying new possibilities for compositions of services and context-based semantic. The semantic matching ranking approach is unique since it provides the Web service designer with an explicit numeric estimation of the extent to which a possible composition. This process consists of multiple services that can be executed in sequence or in a parallel process. Given a service request, a set of candidates (available services and service patterns) is dynamically generated layer by layer from inputs to outputs of this request. For each layer, the algorithm traverses a priori search space which is a set of service patterns from historical solutions, then it searches available services from the repositories. That means each layer contains all services and service patterns that can be executed with a set of outputs provided by previous layers. The search process terminates until all the outputs of a request are obtained.

Keywords : QoS Based Discovery, Web service, Service Oriented Architecture, Internet of Things, CDMA, EPC, Bootstrapping Ontologies, CTM, Frequent Subgraph Mining, WSDL, FCA, CBR

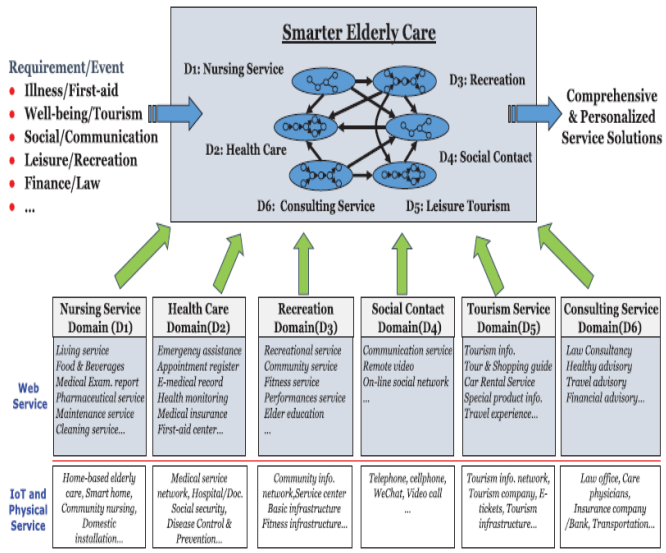
I. INTRODUCTION

In Service Oriented Architecture (SOA), Web service as a method of communication between two applications over the Internet has grown up to be an important part of software development. Web services are software components designed to assist interoperable machine-to-machine interactions without considering the development platform or operating environment. Subsequently, semantic Web service approaches give us the ability to describe the capabilities of services in a formal and machine-process able manner and the semantic relationships among services, which are stimulating automatic service discovery and composition.

Over the past decade, the success of Semantic Web turns out to depend on the use of ontology as a means of communication and information sharing.

Ontology is a paramount technology of the Semantic Web, which provides a formal and explicit speciation of knowledge representation, with the advantage that they are reusable and shareable. However, as Web services go through different stages of development, the existing Web services on the Internet utilize various description languages. Not all service providers adopt semantic technology to Web services. Meanwhile, with the development and popularization of intelligent hardware, the booming of Internet of Things (IoT) represents

the next most exciting technological revolution. The IoT connects billions of things that include sensors, actuators, services, and other Internet-connected objects which sets up the environment where things can automatically communicate with computers. The implementation of the IoT system will seamlessly integrate the cyber world with our physical world, and computers will be able to learn and gain information and knowledge to solve real-world problems. In order to tackle the previous problems, we propose a Priori Knowledge Based Service Composition (PKBSC) algorithm. For RQ1, we utilize an interoperable approach including an ontology construction method for services without semantic technology and a merging method for multiple ontologies. We also provide a method to calculate the similarity of semantic concepts in a merged ontology for RQ2, we adopt *service pattern* to describe priori knowledge from massive historical solutions, which is a recurrent valuable fragment (or a coarse-grained component) composed of services frequently invoked together in service solutions.



II. LITERATURE REVIEW

2.1 Web service composition

Service composition is a complex task that has inspired a variety of automation techniques trying to overcome some of the complexity.We identified three automation techniques of major importance: synthesis, planning, and model-driven development. Clearly, previous efforts by research and practitioner ´communities have produced promising results that are certainly useful. A commonly overlooked limitation of current systems is that they do not make composition languages accessible to end users (also called knowledge workers).

2.2 A Survey on Issues and Enabling Technologies

We believe emerging techniques such as privacy by design, differential privacy, and light weight public key cryptography will form the building blocks for security in IoT middleware. The results from these systems are still experimental and preliminary. In [46], Ostermaier et al. reported a system, named Dyser, for real-time discovery of things on the Web. limitations of CPU and memory put severe restrictions on the utility of the resource-demanding public-key cryptography as used in the Internet security.

2.3 A survey on enabling technologies, protocols and Applications.

We also reviewed the role of cloud and fog computing in the IoT ecosystem. At the cloud level, we need platforms to support IoT big data, IoT analytics and availability.

Their results show that the expected number of queries for tag identification using the CDMA technique is lower than the EPC Gen-2 protocol. the limitation of the cloud which offers just a specific application protocol is a barrier to its expansion.

2.4 A survey on data-centric Internet of Things

Traffic engineering techniques for managing VNFs in a SDN-based network include for example steering network traffic through an existing sequence of VNFs by using middleboxes that modify packet headers and alter traffic signatures. In conclusion, the lack of a standard definition of a smart city eventually results in various shortcomings in many facets of a smart city. We highlight the achievements in realizing various aspects of smart cities, present the lessons learnt and identify limitations and research challenges.

2.5 Distributed QoS Evaluation for Real-World Web Services

Web services have been emerging in recent years and are by now one of the most popular techniques for building versatile distributed systems. Comprehensive experimental results are presented and reusable datasets are released. The fact that different users will observe quite different QoS of the same Web service limits the applicability of this dataset.

2.6 Automatic Target-driven Ontology Merging

The idea is that these relationships produce different edges in the integrated concept graph and consequently different concepts and relationships in the merged taxonomy. More recent work on schema integration builds on the research results on semiautomatic schema matching and separate matching from merging. Hence, several algorithms have been proposed to merge schemas based on a pre-determined match mapping. It implements a new approach for taxonomy merging which generates a default solution in a fully automatic way that may interactively be adapted by users if needed.

2.7 Bootstrapping Ontologies for Web Services

Our model analyzes the concept results and concept relations and performs stemming on the results. It should be noted that other techniques of clustering could be used to limit the ontology expansion. clusters the results according to textual descriptors, and classifies which set of descriptors identifies the context of the web service. This limitation could be overcome by either recalculating the TF and IDF after each new web service or alternatively collecting an additional set of services and reevaluating the IDF values.

2.8 Leveraging formal concept analysis with topic correlation for service clustering and discovery.

Topic proportions exhibit correlation via the logistic normal distribution. In this paper, we utilized CTM to extract latent factors and the correlation between these topics to propose an efficient Web Service. The results show that the hierarchical clustering method based on CTM performs better than HAC. We also evaluated our service discovery approach by calculating the P recision@n and NDCGn. In our approach, we use the Formal Concept Analysis (FCA) [3] formalism to organize the constructed hierarchical clusters into concept lattices according to their topics. Thus, service discovery may be achieved more easily using the concept lattice.

2.9 Web service interface decomposition using formal concept analysis

A conceptual clustering technique as it also provides intensional descriptions for the abstract concepts or data units it produces. Central to FCA is the notion of a formal context. This practice results in a "hodge-podge" of unrelated operations in a single Web Service interface. Indeed, recent studies found that developers seem to take little care of the structure of their WSDL documents. Limitations of both approaches could be related to the coupling between interfaces which is not considered. Our approach attempts to explicitly address these two drawbacks to improve the interface design quality, taking the advantages of FCA.

2.10 Structural and Role-Oriented Web Service Discovery with Taxonomies in OWL-S

We combine object-based structural matching techniques that are used in the domain of Structural Case-based Reasoning (SCBR) [6], with Description Logic (DL) reasoning [7] over Profile instances, enhancing the discovery with services that cannot be retrieved using only logic-based reasoning. In order to overcome this limitation of the SP paradigm, we enhance our framework with the ability of a role-based Web service functional annotation based on the open-world assumption and the classification capabilities of the DL reasoning paradigm.

III. EXISTING SYSTEM

To promote the efficiency and accuracy of constructing a new service solution, considering the historical solutions could be a promising approach, which contains a set of already developed service solutions to satisfy customer's request. Often, there are lots of valuable sub processes frequently appeared in service solutions. Such a large number of sub processes could serve as a knowledge base for providing the guidance for solution construction effort. Therefore, the discovery and presentation of these valuable sub processes (a.k.a. service patterns) have become of great importance. A service solution could be abstracted to a Directed Acyclic Graph (DAG), the valuable sub processes mining can be considered as Frequent Subgraph Mining (FSM).

3.1 DISADVANTAGES OF EXISTING SYSTEM

They just create clients for giving false information. Executed in sequence or in a parallel process. Only contain one service .Domain is created for only particular service.

IV. PROPOSED SYSTEM

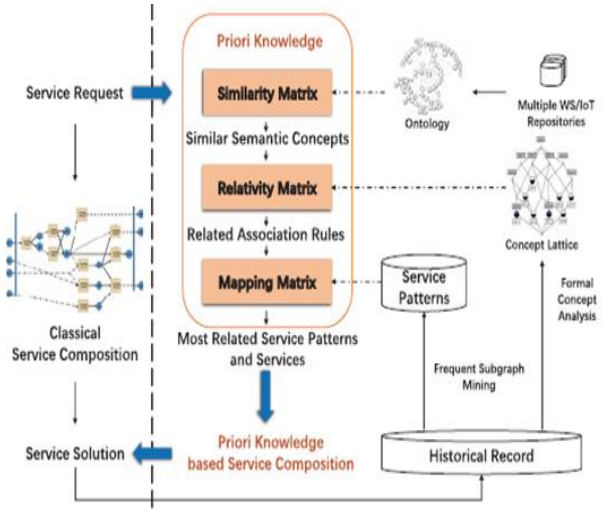
The Service Management System is a new self-contained software product which will be produced by the project team in order to overcome the problems that have occurred due to the current manual system. The newly introduced system will provide an easy access to the system and it will contain user friendly functions with attractive interfaces. The system will give better options for the problem of handling large scale of physical file system, for the errors occurring in calculations and all the other required tasks that has been specified by the client. The final outcome of this project will increase the efficiency of almost all the tasks done at the Hotel in a much convenient manner. We conduct two experiments to verify the effectiveness of our proposed approach. First, we compare the performance of Priori Knowledge Based Service Composition algorithm (PKBSC) with the A* based traditional.Graph searching service composition algorithm

4.1ADVANTAGES OF PROPOSED SYSTEM

Work will focus on how to integrate QoS into service patterns. The System is design and developed in such

way that it tries to overcome all the prescribe problem. The system being an online system will give accurate information regarding the property which helps to view all the stuff information directly from anywhere. The voting system will also be included in this system.

4.2 SYSTEM ARCHITECTURE



V. ALGORITHM

Algorithm 5.1 Apriori-Based Service Pattern Mining Algorithm

Input: Historical service solutions *G*, minimum support

Output: *F*1; *F*2; _ _ _ ; *Fk* a set of frequent patterns of cardinality 1 to *k*

1 begin

2 *F*1 Identify all frequent k=1 pattern in G

3 *k* 2

4 while *Fk*□1 6D ; **do**

5 *Fk* ;

6 *Ck candidate generation*(*Fk*□1) /*Candidate generation by a self-join of (*Fk*□1)*/

7 foreach *candidate c* 2 *Ck* **do**

8 *c*:*count* 0

9 foreach *g* 2 *G* **do**

10 if subgraph-ismorphism(*g*; *c*) **then**

11 *c*:*count* *c*:*count* C 1 /*Counting candidates*/

12 end

13 end

14 if *c*:*count* _ 'j*G*j ^ *c* =2 *Fk* **then**

15 *Fk* *Fk* [*c* /*Pruning based on support*/

16 end

17 end

18 *k* *k* C 1

19 end

20 end

Algorithm 5.2 Priori Knowledge Based Forward Search Algorithm

Input: Service request *r* D (*Inr* ; *Outr*), all services *S*, all service patterns *SP*, similarity matrix *SimM*, relativity matrix *RelM*, mapping matrix *MapM*

Output: Layered candidates *LCS* D f*L*1; *L*2; _ _ _ g

1 begin

2 Calculate related services *S*0 and service patterns *SP*0 by *SimM*; *RelM* and *MapM*

3 C ;; *i* 0; *Li* ;; *Outi* ; /**i* indicates current layer */

4 Create a dummy service *SIn* D (;; *Inr*)

5 *Li* *Li* [*SIn* /**Li* indicates candidate set in layer *i**/

6 *Outi* *Outi* [*Inr* /**Outi* indicates obtained semantic concepts by layer *i**/

7 C C [*Outi* /*C indicates obtained semantic concepts so far*/

8 while C _ *Outr* 6D *Outr* ^ *Li* 6D ; **do**

9 *i* *i* C 1

10 *Li* ;; *Outi* ;

11 foreach *spj* 2 *SP*0 */*Search for available service patterns*/* **do**

12 if C _ *Inspj* D *Inspj* **then**

13 *Li* *Li* [*spj*

14 *Outi* *Outi* [*Outspj*
15 *SP*0 *SP*0 n *spj*
16 end
17 end
18 foreach *sk* 2 *S*0 */*Search for available services*/* **do**
19 if C _ *Insk* D *Insk* **then**
20 *Li* *Li* [*sk*
21 *Outi* *Outi* [*Outsk*
22 *S*0 *S*0 n *sk*
23 end
24 end
25 C C [*Outi*
26 end
27 if C _ *Outr* D *Outr* **then**
28 Create a dummy service *SOut* D (*Outr* ; ;)
29 *i* *i* C 1
30 *Li* ;
31 *Li* *Li* [*SOut*
32 else
33 Execute A*-TSC algorithm
34 end
35 end

VI. SERVICES

1) Login/Registration Module
2) Service Analysis
    a. Tourism Service Domain
    b. Home Tuitions
    c. Recreation Domain
    d. Consulting Domain
    e. Nursing Domain
    f. Furnishing Service
3) Physical Service
4) Quality of Service

VII. SERVICE ANALYSIS

1. Tourism Service Domain
    a. Tourism Information
    b. Guide Information
    c. Car Rental Service
2. Home Tuitions
    a. Tuition Information
    b. Criteria
    c. Fees Description
    d. Experience
3. Recreation Domain
    a. Fitness Service
    b. Beauty Parlour Service
    c. Performance Service
4. Consulting Domain
    a. Law Consulting
    b. Health advisory
    c. Financial Advisory
5. Nursing Domain
    a. First aid service
    b. Maintenance Service
    c. Elder service
    d. Pharmaceutical Service
6. Furnishing Service
    a. Painting Service
    b. False Ceiling
    c. Carpenting
    d. Plumbing

VIII. PHYSICAL SERVICE

In this module, physical service can act as a home based service. User can directly get above mentioned services at home.

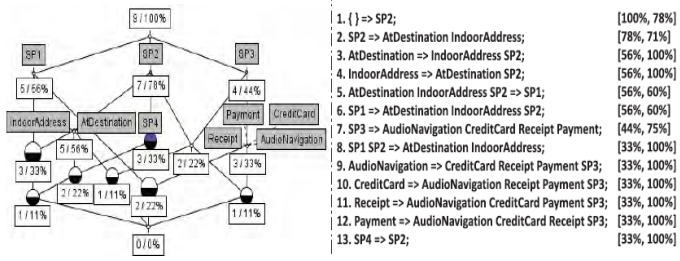
IX. QUALITY OF SERVICE

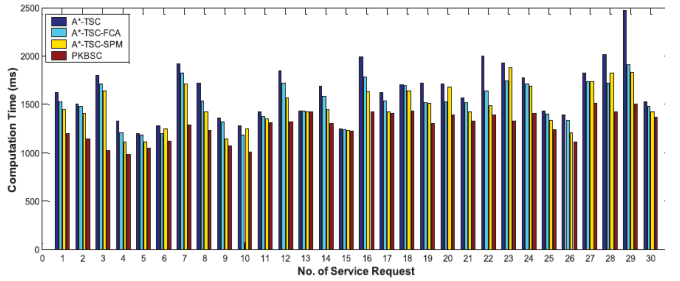
In this module, Web provided services based on quality. In this system, quality means user reviews and ratings.

	Service Solution		Semantic Concept / Service Pattern									
	Original Solution	Annotated with Service Pattern	SP1	At Destination	Indoor Address	SP2	Audio Navigation	Credit Card	Receipt	Payment	SP3	SP4
Sol 1	W1-W2-W3-W5-W6	SP1-W3-SP2	X	X	X	X						
Sol 2	W1-W2-W4-W5-W6	SP1-W4-SP2	X	X	X	X						
Sol 3	W1-W2-W7-W8-W10	SP1-W7-W8-SP3	X				X	X	X	X	X	
Sol 4	W1-W2-W7-W9-W10	SP1-W7-W9-SP3	X				X	X	X	X	X	
Sol 5	W1-W2-W4-W5-W6-W11-W12	SP1-W4-SP2-SP4	X	X	X	X						X
Sol 6	W5-W6-W7-W8-W10	SP2-W7-W8-SP3				X	X	X	X	X	X	
Sol 7	W3-W5-W6-W7-W9-W10	W3-SP1-W7-W9-SP3		X	X	X					X	
Sol 8	W5-W6-W11-W12	SP2-SP4				X						X
Sol 9	W4-W5-W6-W11-W12	W4- SP2- SP4		X	X	X						X

SP1: W1-W2 **SP2:** W5-W6 **SP3:** W10 **SP4:** W11-W12

(a)





IGURE 7. Performance with different approaches (color for better reading result).

LE 1. Results of performance.

	Avg. computation time (ms)	Avg. number of layer	Avg. size of solution	Improvement
A*-TSC	1644.2	8.04	**8.96**	-
A*-TSC-FCA	1526.167	8.03	**8.96**	7.18%
A*-TSC-SPM	1475.367	**4.57**	**8.96**	10.27%

X. CONCLUSION AND FUTURE WORK

In this paper, we present priori knowledge based service composition (PKBSC) that assists the discovering and composition of services which best match user needs. We solve the heterogeneous service interoperability caused by different service repositories. We obtain prior knowledge by mining service patterns from historical records and quickly retrieve prior knowledge by establishing the relationship between requests and service patterns. We conduct a series of experiments using both real and synthetic data to evaluate the efficiency and effectiveness of our approach. We improve the efficiency of A* based traditional service composition algorithm (A*-TSC) by 22.44%. We conduct a series of experiments analyzing system performance in terms of thetime-aware frequency of service patterns. Our future work will focus on how to integrate QoS into service patterns and build service solutions through functional and non-functional requests.

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A Detailed Bromination Study of 7-Hydroxy-4-Methyl Benzopyran-2-One Under Classical Method and Microwave Irradiation

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ABSTRACT

7-Hydroxy-4-methyl benzopyran-2-one, Benzopyran a class of coumarin derivative, has been subjected for bromination under classical method, microwave irradiation and solvent-free protocol for allylic and vinylic bromination using liquid Br_2, organic bromides, NBS, HBr-H_2O_2 and DDH as brominating agent under different protic and aprotic solvents. The efficacy of the bromination of benzopyran under classical method and microwave irradiation has been established. The effects of the bromination and location of the substituents on the outcome of the reaction have been rationalized by using ^{1}H NMR and IR spectrum. Few of them showing promising antibacterial activity.

Keywords : Substituted Benzopyran, Classical Method, Microwave Irradiation, Protic and Aprotic Solvents, Allylic and Vinylic Bromination, ^{1}H NMR, TOF MS ES and Elemental Analysis.

I. INTRODUCTION

Benzopyran (coumarin) derivatives continue to be investigated over the years due to their importance to organic and medicinal chemists because of their huge biological activities[1] (Kumar *et. al.*, 2007). Benzopyran and its derivatives are associated with various functions *viz.* anti-inflammatory[2] (Lin *et. al.*, 2006), anti-convulsant[3] (Bhat *et. al.*, 2006), anti-viral[4] (Massimo *et. al.*, 2003), anticoagulant[5] (Ruszat *et. al.*, 2007), antioxidant[6] (Tyagi *et. al.*, 2003), antibacterial[7] (Modranka *et. al.*, 2006), antifungal[8] (Sardari *et. al.*, 1999), anti-HIV[9a,b] (Huang *et. al.*, 2005), anti-carcinogenic material and antihistamine activity[10] (Elinos-Baez *et. al.*, 2005). Apart from this, they are attracting considerable attention of chemists as a large number of natural products contain this heterocyclic nucleus and are widely used as additives[11] (Mohanty *et. al.*, 1967) in food, perfumes, cosmetics, pharmaceutical[12] (Kennedy *et. al.*, 1997), optical brighterners (Zahradnik, 1990) in dispersed fluorescent and laser dyes[13] (Murray *et. al.*, 1982 and Bodenbender, 1912).

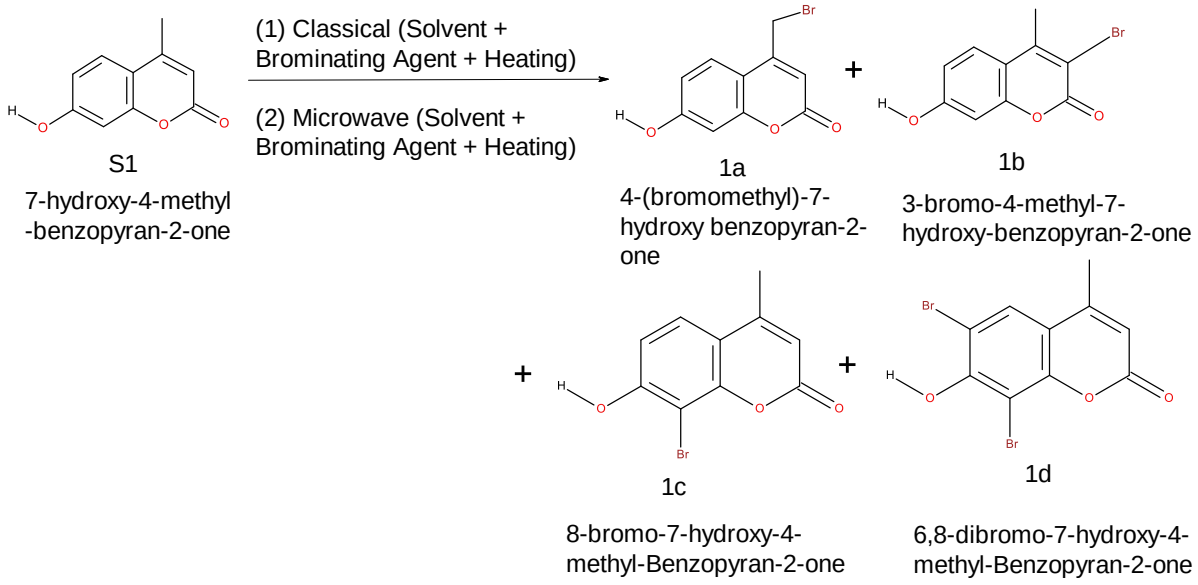
Bromination of organic (Natural) compounds continues to receive attention by research workers all over the world. The Bromination of carbonyl compounds is an important transformation in synthetic organic chemistry, bromination of side chain of aromatic ketones has attracted attention

because the resulting bromo ketones are intermediates for the synthesis of variety of biologically active compounds. Bromination at 1- 8 is the first step of introducing a heteroatom so as to provide additional conjugation to the carbonyl group.

The research involves detailed study of bromination of certain benzopyrones. The various products formed have been analyzed and pathways of their formation are described. Bromo derivatives have wide utility both as products and intermediates. Bromination is one of the most important reaction process used for preparation of lead molecules for drugs and several of the pharmaceuticals. Thus by carrying out bromination studies we propose to enhance the synthetic utility of them.

In continuation to our earlier work[14] (Gangan *et. al.*, 2017) we have systematically studied the effect of various brominating agents under various protic and aprotic solvents. The efficacy of the bromination of benzopyran under classical method and microwave irradiation has been established.

Reaction Scheme :



II. RESULTS AND DISCUSSION

General Procedure for Classical bromination of substituted Coumarin (Method A).

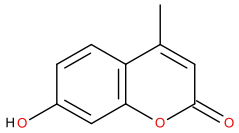
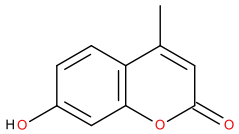
When Br_2, NBS, DDH, H_2O_2-HBr, TBATB, benzyl peroxide and AIBN (radical initiator) was thoroughly mixed stoicheometrically with the substrate in the presence of solvent and elevated temperature for the stipulated time and triturated with crushed ice, then depending on the stoichiometric proportion of brominating agent, the respective product was obtained as a filterable solid under suction and recrystallized from glacial acetic acid. The detailed results are summarized in Table 1.

General Procedure for Microwave Irradiation bromination of substituted Coumarin (Method B).

When brominating agent thoroughly mixed stoicheometrically with the substrate in the

presence of solvent and elevated temperature under Microwave oven and heated at 620W for the appropriate time (monitored by TLC). After completion, the reaction mixture was cooled to room temperature, poured into crushed ice, then depending on the stoichiometric proportion of brominating agent, the respective product was obtained as a filterable solid under suction and the detailed results are summarized in Table 1.

Table 1

Entry	**Substrate**	**Solvents**	**Reaction condition**	**Method A (Classical) Time Yields (in Min.) (in%)**		**M.P. (^{0}C)**
1	 7-hydroxy-4-methyl-benzopyron-2-one	CH_3COOH	1 Eqv. Br_2	45	43	246
		CH_2Cl_2/CH_3COOH	1Eqv. HBr-H_2O_2	45	62	246
		THF / Ethyl acetate/Acetonitrile	1 Eqv. TBATB	90	49	272
		Ethyl acetate/ Ethanol/ CH_3COOH/ CH_2Cl_2	1 Eqv. NBS	60	63	272
		CH_3COOH/ CH_2Cl_2/ Ethyl acetate	0.5 Eqv. DDH-AIBN	55	52	272
		CH_3COOH	1 Eqv. PBPB	60	57	246
Entry	**Substrate**	**Solvents**	**Reaction condition**	**Method B (Microwave) Time Yield (in Min) (in%)**		**M.P. (^{0}C)**
2	 7-hydroxy-4-methyl-benzopyron-2-one	CH_3COOH	1 Eqv. Br_2	2	52	246
		CH_2Cl_2/CH_3COOH	1Eqv. HBr-H_2O_2	3	67	246
		THF / Ethyl acetate/Acetonitrile	1 Eqv. TBATB	3	63	272
		Ethyl acetate/ Ethanol/ CH_3COOH/ CH_2Cl_2	1 Eqv. NBS	2	67	272
		CH_3COOH/ CH_2Cl_2/ Ethyl acetate	0.5 Eqv. DDH-AIBN	2	61	272
		CH_3COOH	1 Eqv. PBPB	3	52	246

^{1}H NMR Analysis of S1:- In ^{1}H NMR spectrum of S1, the signal around δ 2.23 was assigned to C-4 methyl group which is at vinylic position (direct attachment to double bond). The signal at δ 5.90 was assigned to C – 3 olefinic proton. The signal at δ 6.87 appeared as doublet integrating for one proton with coupling constant J = 8.4 Hz (ortho coupling) was assigned to C – 5 aromatic proton. The signal resonating at δ 7.5 appeared as doublet with J = 2.0 Hz (meta coupling) was assigned to C – 8 aromatic proton. The signal at δ 7.65 appeared as double doublet with J = 8.4 Hz and 2.0 Hz integrating for one proton for ortho and meta coupling respectively. The broad singlet appeared as a hump at δ 9.8 was assigned labile – OH group was further confirmed by D_2O exchange technique.

^{1}H NMR Analysis of 1a :- In ^{1}H NMR spectrum of 1a, the signal at δ 3.22 was assigned $–CH_2Br$ group. This is due to bromination of $–CH_3$ to $–CH_2Br$ group by brominating agent. This is due to introduction of electronegative group results in deshielding of methyl protons as well as its direct attachment to double bond. The signal at δ 6.04 was assigned to C – 3 olefinic proton. The signal at δ 6.88 appeared as doublet integrating for one proton with coupling constant J = 8.6 Hz (ortho coupling) was assigned to C – 5 aromatic proton. The signal resonating at δ 7.54 appeared as doublet with J = 2.0 Hz (meta coupling) was assigned to C – 8 aromatic proton. The signal at δ 7.7 appeared as double doublet with J = 8.3 Hz and 2.0 Hz integrating for one proton for ortho and meta coupling respectively. The broad singlet appeared as a hump at δ 10.11 was assigned labile – OH group was further confirmed by D_2O exchange technique.

^{1}H NMR Analysis of 1b :- In ^{1}H NMR spectrum of 1b, the signal at δ 2.44 was assigned to C - 4 methyl group attached to olefinic bond. The absence of signal at δ 5.9 - 6.04 rules out the possibility of any olefinic proton and enhances the possibility of bromination at C – 3 position. The signal at δ 6.87 appeared as doublet integrating for one proton with coupling constant J = 8.6 Hz (ortho coupling) was assigned to C – 5 aromatic proton. The signal resonating at δ 7.5 appeared as doublet with J = 2.0 Hz (meta coupling) was assigned to C – 8 aromatic proton. The signal at δ 7.7 appeared as double doublet with J = 8.4 Hz and 2.0 Hz integrating for one proton for ortho and meta coupling respectively. The broad singlet appeared as a hump at δ 10.11 was assigned labile – OH group was further confirmed by D_2O exchange technique.

^{1}H NMR Analysis of 1c :- In ^{1}H NMR spectrum of 1c, the signal at δ 2.34 was assigned C – 4 methyl group which is attached to olefinic bond. The signal at δ 6.10 was assigned to C – 3 olefinic proton. The signal at δ 6.87 appeared as doublet integrating for one proton with coupling constant J = 8.6 Hz (ortho coupling) was assigned to C – 5 aromatic proton. The absence of signal δ 7.5 with no meta coupling indicating the absence of aromatic proton and hence presence of bromine atom at C – 8 position. The signal at δ 7.7 appeared as doublet with J = 8.4 Hz integrating for one proton for ortho coupling. The broad singlet appeared as a hump at δ 10.11 was assigned labile – OH group was further confirmed by D_2O exchange technique.

^{1}H NMR Analysis of 1d :- In ^{1}H NMR spectrum of 1d, the signal at δ 2.29 was assigned C – 4 methyl group which is attached to olefinic bond. The signal at δ 6.10 was assigned to C – 3 olefinic proton. The signal at δ 7.4 appeared as a singlet integrating for one proton was assigned to C – 5 aromatic proton. The absence of signal δ 7.5 with no meta coupling indicating the absence of aromatic proton and hence presence of bromine atom at C – 8 position. The absence of signal at δ 7.7 with no ortho and meta coupling indicating the absence of aromatic proton and hence presence of bromine atom at C – 6 position.

The broad singlet appeared as a hump at δ 11.2 was assigned labile – OH group was further confirmed by D_2O exchange technique. However, the introduction of bromine atom (bromination study) in a resultant molecule is well confirmed by mass spectrum analysis.

From the aforesaid study, it is clear that the outcome of the mediated solvent-free bromination reaction depends critically on the electronic nature and location of the substituents. This was further corroborated from the fact that coumarins bearing electron-withdrawing substituents remained unaffected under the applied reaction conditions.

The bromination of titled compound was reported by (Rehman *et. al.*, 2015) using liquid bromine and NBS with limited scope. In this paper herein we report detailed bromination study using liquid Br_2, organic bromides, NBS, HBr-H_2O_2 and DDH as brominating agent under different protic and aprotic solvents. The efficacy of the bromination of benzopyran under classical method and microwave irradiation has been established.

Study of Solvent

The effect of the solvent was studied and it was found that the more polar solvents enhance the reactivity of brominating agent to favour side chain bromination. Ethyl acetate found to be a good solvent for regioselective bromination of coumarin with NBS, DDH and TBATB. Benzopyran and its derivatives was brominated under microwave irradiation gave regioselective brominated compound at conjugate double bond at C_3-H and ring bromination. Polar protic solvents increases yields with good selectivity.

From the aforesaid study it is clear that differentially substituted coumarins undergo transformations involving vinylic bromination and/or ring bromination, which are critically dictated by the electronic nature and location of the substituents. A plausible mechanism has been proposed to rationalize the electronic and positional effects of the substituents on the course of the reaction. The ability of the substituents to stabilize the electron-deficient centers seems to play the most crucial role in determining the reactivity and orientation of the said reaction.

Biological Activity

Antibacterial Activity using ditch plate method[15a,b] (Mwambete and Al lafi *et. al.*) :- The synthesized molecules were screened for their antibacterial activity at 100 µg/ml concentration using ditch plate method against Gram positive (*Staphylococcus aureus*) and Gram negative (*Escherichia coli*) bacterial species qualitatively. The results of the antibacterial activities are summarized in **Table 2.**

Theory : Ditch plate method is the method of chosen to test the anti-bacterial activity of compounds. It is a preliminary method to screen the anti-microbial potential of compounds / drugs, which are insoluble or partially soluble in aqueous phase. In this method, the test compound is seeded in an agar plate and the test organisms are streaked across to test the inhibition of the growth as a marker of anti-microbial activity.

PROCEDURE : A ditch (10 mm x 70 mm) is cut into sterile MH agar plate. The test drug / compound is added to 5 ml molten MH agar butt at 40^0C and this mixture is poured into the ditch and allowed to solidify. The ditch should be made in level with the rest of the agar by pouring the mixture. The different bacterial cultures are streaked perpendicular to the ditch using nichrome wire loop. The plate is then incubated at 37^0 C for 24 hours. The results are observed as inhibition of bacterial growth on the ditch as well as adjacent to the ditch.

Table 2 : Antibacterial Activity Results

Sr. No	Compound No.	Antibacterial Activity	
		Against Gram - ve bacteria species (Escherichia coli)	Against Gram +ve bacterial species (Staphylococcus aureus)
1	S1 (Substrate)	+	+
2	1 a	+	+
3	1b	-	-
4	1c	-	-
5	1d	-	-

The above results shows that the starting material (S1) and side chain brominated molecule (1a) have antibacterial activity against both the bacterial cultures. Thus, monobromo derivative (Benzylic bromination, Compound 1a) was potential antibacterial candidate unlike ring brominated compounds 1b, 1c and 1d. In depth analysis of these compounds (S1 & 1a) through structure activity relationship studies would provide further insight and can be an interesting topic of future studies.

III.CONCLUSION

The above-mentioned protocol avoids the use of molecular bromine, in halogenated or other toxic organic solvents and any kind of toxic catalyst. In this protocol, excess use of toxic bromine can be avoided by using the requisite amount of solid brominating agent through accurate weighing. A stoichiometric amount of HBr is liberated, but this is less toxic than Br_2 vapours. Thus, synthetically important bromocoumarin and its derivatives used as intermediate for the many synthesis of with remarkable antituberculotic activity or other biologically important molecules can be accessed easily by this simple protocol. Therefore, the aforesaid protocol for the bromination of coumarins helps to minimize the involvement and dispersal of harmful chemicals in the environment. Moreover, NBS DDH and TBATB under solvent-free conditions is a superior reagent for the bromination of coumarins in comparison to bromine in an organic solvent, as shown in table.

NBS reacts with coumarins faster and more efficiently in the absence of solvent and gives monobromo product. Considerable amounts of unidentified byproducts were produced when TBATB and DDH-AIBN were used in organic solvents. Therefore, the yield and purity of the product were depleted and purity of the products as well as the ease of accessibility of the reagent along with procedural simplicity.

The present NBS, DDH-AIBN and TBATB mediated solvent-free and Microwave irradiation reaction provides a very simple, versatile and efficient regioselective bromination of differentially substituted coumarins at allylic position. Whereas the Br_2, $HBr-H_2O_2$ and PBPB at vinylic position. The most significant features of this methodology are (a) good accessibility of the reagent and its stability (b) a stoichiometric amount of reagent can be used by direct weighing, avoiding excess (c) no evolution of hazardous bromine vapor during the reaction (d) the total elimination of the use of toxic organic solvents (e) a simple experimental procedure (g) good control over the outcome of the reaction by varying the amount of reagent. The aforesaid protocol thus provides an improved procedure for the synthesis of useful bromocoumarins having important pharmaceutical, agricultural and other physicochemical properties.

Supporting Information

All products were characterized by comparison of their ^{1}H NMR, IR, TOF MS ES and elemental analysis. The spectral data of representative compounds are given below.

Supporting Information

All products were unambiguously characterized by ^{1}H NMR, TOF MS ES, IR and elemental analysis. The spectral data for some selected representative compounds are given below:

Compound S1. ($CDCl_3$ + DMSO-d_6, 400MHz) δ_{ppm} :- 2.23 (s, 3H, -CH_3), 5.90 (S,1H, olefinic proton), 6.87 (d, J = 8.6 Hz, 1H, ArH, ortho coupling), 7.5 (d, J = 2.0 Hz, 1H, ArH, meta coupling), 7.65 (dd, J = 8.4 Hz, 2.0 Hz, 1H, ArH, ortho and meta coupling), 9.8 (1H, -OH, D_2O exchangeable); Formula Weight : 176; Molecular formula : $C_{10}H_8O_3$; Pure white shining needle shaped solid; Elemental analysis calcd. C 68.18 % H 4.58 % O 27.25 % found C 68.22 % H 4.54 % O 27.27 %; IR (KBr) cm^{-1} :- 3442(-OH), 3000 – 2800 (methyl, methylene and methine), 1670 (>C=O carbonyl group), 1542 (tri-substituted olefinic bond).

Compound 1a. ($CDCl_3$ + DMSO-d_6, 400MHz) δ_{ppm} :- 3.77 (s, 2H, -CH_2 Br), 6.04 (S,1H, olefinic proton), 6.88 (d, J = 8.6 Hz, 1H, ArH, ortho coupling), 7.54 (d, J = 2.0 Hz, 1H, ArH, meta coupling), 7.7 (d, J = 8.3 Hz,2.0 Hz, 1H, ArH, ortho and meta coupling), 10.11 (brs, 1H, -OH, D_2O exchangeable); Formula Weight : 255; Molecular Formula : $C_{10}H_7BrO_3$; Pure white shining needle shaped solid. Elemental analysis, calcd. C 47.09 % H 2.77 % O 18.82 % Br 31.33 % found C 47.05 % H 2.74 % O 18.85 % ; IR (KBr) cm^{-1} :- 3502(-OH), 3147(–CH_3), 1694 (>C=O, carbonyl group), 1533 (tri-substituted olefinic bond), 606 (-Br).

Compound 1b. ($CDCl_3$ + DMSO-d_6, 400MHz) δ_{ppm} :- 2.44 (s,3H, -CH_3), 6.87 (d, J = 8.6 Hz, 1H, ArH, ortho coupling), 7.5 (d, J = 2.0 Hz, 1H, ArH, meta coupling), 7.7 (dd, J = 8.4 Hz, 2.0 Hz, 1H, ArH, ortho and meta coupling), 10.11 (brs 1H, -OH, D_2O exchangeable); Formula Weight : 255. Mol. Formula : $C_{10}H_7BrO_3$; Pure white shining needle shaped solid. Elemental analysis, calcd. C 47.09 % H 2.77 % O 18.82 % Br 31.33 % found C 47.06 % H 2.76 % O 18.85 % ; IR (KBr) cm^{-1} :- 3449 (-OH), 3162 (–CH_3), 1701 (>C=O, carbonyl group), 1605 (tetra-substituted olefinic bond), 611(-Br).

Compound 1c. ($CDCl_3$ + DMSO-d_6, 400MHz) δ_{ppm} :- 2.34 (S, 3H, -CH_3), 6.10 (s, 1H, olefinic proton), 6.87 (d, J = 8.6 Hz, 1H, ArH, ortho coupling), 7.7 (d, J = 8.4 Hz, 1H, ArH, ortho coupling), 10.11 (brs, 1H, -OH, D_2O exchangeable); Formula Weight : 255. Molecular Formula : $C_{10}H_7BrO_3$; Pure white shining needle shaped solid. Elemental analysis, calcd. C 47.09 % H 2.77% O 18.82 % Br 31.33% found C 47.06 % H 2.76 % O 18.85 %; IR (KBr) cm^{-1} :- 3475 (-OH), 3147(–CH_3), 1693 (>C=O, carbonyl group), 1554 (tri-substituted olefinic bond), 605(-Br).

Compound 1d. ($CDCl_3$ + DMSO-d_6, 400MHz) δ_{ppm} :- 2.29 (s, 3H, -CH_3), 6.10 (s, 1H, olefinic proton), 7.4 (s, 1H, ArH); Formula Weight : 412. Molecular Formula : $C_{10}H_5Br_3O_3$; Pure yellow flakes. Elemental analysis, calcd. C 29.09 % H 1.22 % O 11.63 % Br 58.06 % found C 29.10 % H 1.25 % O 11.66 %; IR (KBr) cm^{-1} :- 3502 (-OH), 3198 (–CH_3, -CH), 1703 (>C=O, carbonyl group), 1601(olefinic group), 709(-Br).

Experimental : Melting points were determined on a Thomas Hoover capillary melting point apparatus using digital thermometer. IR spectra were recorded on a Shimadzu FTIR Prestige model as KBr pellet. ^{1}H NMR spectra were recorded on a Varian 400 MHz spectrometer in $CDCl_3$. Chemical shifts were recorded in parts per million down field from tetramethyl silane. Mass spectra were recorded on a

TOF MS ES mass spectrometer. Elemental analysis were carried out as a percentage on a Thermo finnigan, Flash EA 1112 series, Italy.

IV. CHROMATOGRAPHIC SYSTEM

Column chromatography : For column chromatography 100 – 200 mesh Acme grade silica gel is used. The crude reaction mixture is concentrated under reduced pressure to yield crude mass which is preadsorbed on silica gel and purified by column chromatography with increase in concentration of Ethyl acetate in Petroleum ether. The fractions having similar 'rf" values were pooled together, concentrated and subjected for characterization using various spectroscopic techniques.

Thin layer chromatography : TLC plates were prepared using silica gel G (ACME, BOMBAY). Pet. ether: EtOAc (85 : 15) was used as the solvent system. Radial chromatography : The circular glass plates of thickness 1 mm, were prepared by using silica gel (PF254, E. MERCK, 50 g) in cold distilled water (105 ml). For elution, gradually increasing concentrations of EtOAc in pet ether were employed.

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A Novel IoT Based Approach for Fire Warning System

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ABSTRACT

The IoT Based Fire Warning System utilizing Arduino Uno R3, which is temperate and reasonable by all. This framework recognizes fire amid the presence of smoke or fire at a specific level and alerts the owner of the property effectively and rapidly by utilizing Wi-Fi Module. AT Mega micro controller of Arduino controls every one of these exercises like flame sensor, smoke sensor and Wi-Fi module. This framework would help everyone and it is affordable by all to have one at their home and it likewise alert from the human misfortune and harm, which may occur because of fire.

Keywords: A Novel IOT Based Approach for Fire Warning System, Fire Detection, AT Mega, Arduino

I. INTRODUCTION

Fire risks can be exceptionally hazardous and cause human misfortune. The main answer for moderate these misfortunes is reacting to such a crisis circumstance rapidly. In developed nations like USA, Singapore and so on, it is government guideline to introduce a fire caution in all homes towards alarming property holder and Fire administration workforce in time for activity. Such sort of Fire Alarm framework doesn't exist in creating nations like India which result in a parcel of misfortunes and harm.

In such circumstances, distinguishing the fire well ahead of time and cautioning would diminish misfortunes of property and life. A fire or smoke alert framework can be observed locally or remotely as suitable. Remote caution framework gives the advantage of observing the reason from a far off area and making quick move dependent on message got dissimilar to manual framework. These Remote checking frameworks can be created in different ways utilizing advances like remote sensor systems, Ethernet, picture handling and other computerized correspondence innovations. Fact that these frameworks are dependable and have the parcel of focal points, there are still bunches of concern being perplexing, in the compact, non-independent, costly and having excess appurtenances. So there is necessity for building up a framework that is dependable and responsive just as basic, effectively implementable and financially savvy from the point of view of the family unit in creating nations.

Fire risks cause miserable occurrences throughout the world, particularly in creating nations where the fire-wellbeing measures are unstable and regularly lacking.

Fact that various propelled frameworks are utilized in commonsense situations, a dependable, simple

implementable and cost-effective robotized fire-caution framework isn't accessible. The current fire alert framework in the market these days is excessively mind-boggling in term of its plan and structure. Since the framework is excessively perplexing, it needs customary preventive support to be completed to guarantee that the framework works well. Then, when the support is being done to the current framework, it could raise the expense of utilizing the framework. Accordingly, the created FAS are planned with a minimal effort micro-controller and every single dimension client can have one for a well-being reason. So there comes the requirement for an independent and self-sufficient fire recognition framework which could rapidly recognize the fire, raise an alert and furthermore now and again start fire smothering as well.

The frameworks outfitted with LM393 Flame sensor that can recognize horrible inadvertent circumstances, as it occurs, and with the assistance of a preparing unit can alarm in a few second by means of WiFi and signal for undertaking careful measures at the premises.

II. LITERATURE REVIEW

In this segment, survey on fire discovery advancements and counteractive action framework been examined. The vast majority of the fire discovery advances are arranged into two gatherings, which are Vision based, and Sensor based. These are altogether talked about in detail in this segment

A. IoT Based Smart Fire Emergency Response System (2018)

The Flame Sensor detect the fire and it activate the GPS which find the current location of the fire accident area. The location is stored in the cloud and activating message is send to the GSM module.

B. An IoT Based Fire Alarm and Monitoring System (Sep-2017)

In that the Galileo board unit responds to the instruction sent by the sensors. The objective of the application to manage the hardware devices remotely was also achieved. The successful in developing a programmable Galileo board-based system with smart sensor and working actuator.

C. An IoT Based Fire Alarm and Authentication System for Workhouse using Rasberry Pi3 (Feb-2017)

In that Author tried to improve the problem of fire detection by using camera and image processing instead the sensors. Study presents the prototype system and implemented it after suggesting some type of fire detection algorithm.

D. Decision and Development of Automatic Fire Detection using SMS and Voice alert System (May-2016)

It give the alert the distant property owner efficiently and quickly by sending SMS via GSM network and voice alerting system. This system guides the usage of fire Extinguisher During the fire accident.

E. Development of Fire Alarm System Using Raspberry pi and Arduino Uno (2003)

Author tried to improve the problems of fire detection by using camera and image processing instead of sensors. Study presents the prototype system and implemented it after suggesting some type of fire detection algorithm.

III. SYSTEM IMPLEMENTATION

Processing Unit

Lolin new Node Mcu V3 is a microcontroller board providing a platform for controlling the signal/input from various sensors and other modules. It provides an open source platform independent IDE that allows the programmer to process the electronic signals from attached components and control them. One of the most popular Arduino is Arduino Uno which is an 8 bit Atmel AVR Microcontroller with a clock speed of 16 MHz. Last but not the least, these boards are not expensive and have a very active developer's community. These are shown in Figure 3.1

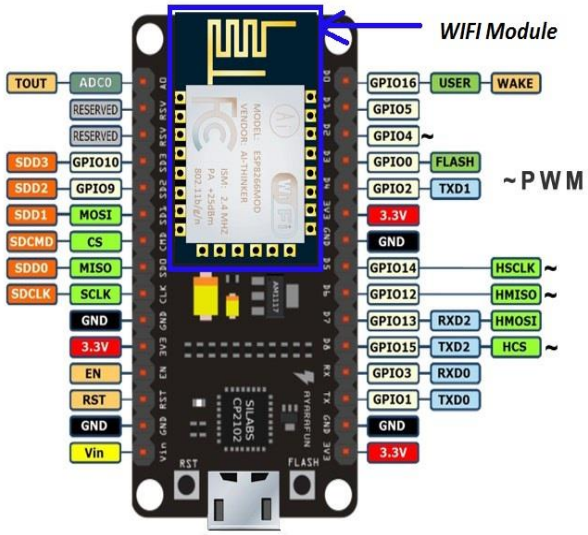


Figure 3.1 Physical outlook of Lolin new NodeMCU V3

Wifi Module

Lolin new NodeMCU V3 contain WiFi Module And Arduino Kit. It contains both feature in single device. From which WiFi Module is used to connect with the server It provide notification to the owner and fire department.

Flame Sensor

In this sensor, the output voltage is linearly proportional to temperature measured in centigrade. The output of LM393 sensor produces an analog voltage as shown in Figure 3.3. LM393 sensor module increases the output by 10 mV/°C. So once the temperature goes beyond the pre-set temperature (50°C), the module will produce a high output. Now towards detecting fire, flame sensor module been used which is highly sensitive to fire and flame spectrum. The module here detects the light wavelength between 760-1100 nm which is range of IR light. However the detection range is normally 3 feet and detection angle is 60 which are not that large to monitor a single room.

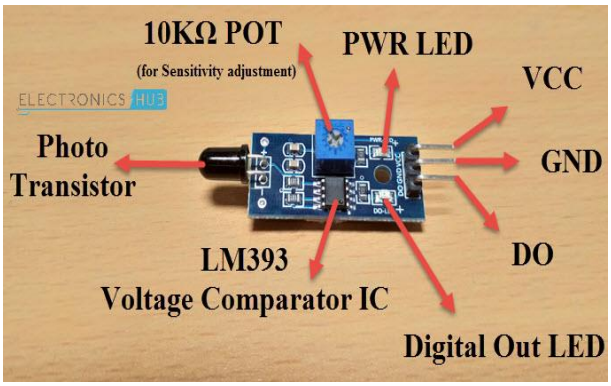


Figure 3.2 Structure of LM393 Flame Sensor

LM393 is an electrical sensor which is used to measure temperature of its surrounding. It's output is generated in the form of Electrical signal and this electrical signal is proportional to the input temperature, which it detects. LM393 is much more sensitive than other temp measuring devices (not accurate) and that's why it is most widely used temp detection device now-a-days. The internal circuitry of this IC is sealed and the external conditions will have no effect on the operation of LM393 and also its output is not affected under any conditions. LM393 is a 3 pin IC and it is used for temperature detection. The physical appearance of LM393 is shown in the image shown above in Figure 3.2

IV. CONCLUSION

The built up the fire alert framework is straightforward however it truly offers an immense division of App in habitation and furthermore producing fundamental well-being, explicitly in

making countries around the globe. Utilizing this strategy, quick and furthermore legitimate admonitions can be performed for us to trigger protection strategies to keep away from the hazard related with fire threats and furthermore diminish misfortunes related with life and furthermore property. This is the ready system more affordable fires that perform constantly to ensure fire prosperity way and can be presented in homes, organizations, practices, home articles, etc successfully. Gigantic business or perhaps non-business district can be regulated all through the prescribed framework introducing a few modules, every one of them for one story or possibly for the unit. At long last, the target of the venture was effectively accomplished with the correct and wanted outcomes. Thus this framework gives a superior and solid method for checking, controlling, finding and detailing of a spot enduring an on slough breakout.

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Library Management System Based on Face Recognition Technique

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ABSTRACT

Biometrics is a term used to characterize a person's DNA, hand geometry, face, and so on or behavioral qualities, for example, hand signature, voice tone, keystrokes et cetera. Consequently, these natural attributes are novel for each person. As a rule, face recognition related advancements are ending up more prominent among biometric-based innovations that measure a person's common information. Hereditary biometrics has for the most part used to verify and recognize people by examining their physical attributes, for example, unique finger impression, eye iris, vein and so forth. The reason for this work is to show a Windows based continuous application framework utilizing face recognition calculations for performing Library Transaction. Rather than utilizing a Library card, a camera would catch pictures of faces of understudy, playing out the library transaction and contrast them and the photographs of the understudy in the database of Library to confirm the understudy's personality. Nearby Binary Patterns, face calculations will used to lessen the effect of light presentation that will influence the exactness of the framework.

Keywords: Biometrics, Library Transaction, Library Card, Face Recognition

I. INTRODUCTION

Face recognition called biometric frameworks that consequently distinguishes or checks a man's character utilizing his/her facial highlights and looks. It is broadly used to distinguish travel papers and driver's licenses conveying people regardless of whether they don't know that a face recognition framework is independently checking their character [1, 2]. Face recognition programming has numerous application in the cutting edge world, for example, signing in on to a PC utilizing facial confirmation as a secret key, gaming, individuals labeling, security et cetera [3] . The present Face Recognition Systems and applications in the market have insufficiencies that range from dependability issues, lessened recognition correctnesses in certain condition, muddled element extraction, high setup expenses and execution issues. Be that as it may, the interest for a hearty Face Recognition System (FRS) pertinent crosswise over different mechanical uses, associations and the general population is expanding significantly.

There are numerous past takes a shot at Face Recognition Security Systems however a strong arrangement that will address the inadequacies of the present FRS stays subtle. In this examination, Eigen Faces and LBP face recognition calculations were

utilized to create and execute a Window based application that is fit for taking care of these difficulties and issues. Independently, LBP calculation has given attractive outcomes. In any case, LBP calculation indicates more noteworthy guarantee and execution better under various lighting conditions that influence the recognition procedure [4]. Thus, it is just sound to utilize LBP calculation to give prevalent outcomes.

Preparing of Library information is an undertaking which alludes to library frameworks which are for the most part little or medium in estimate. It is utilized to deal with the library utilizing a modernized framework where he/she can record different transactions like issue of books, return of books, expansion of new books, and expansion of new understudies and so on. The ID Cards chiefly do the approvals for client issuing the books comprising of Barcodes. Being the Physical Token it has the likelihood of being lost or abused. We Propose the Integration of Face Recognition system for the Validation of the client playing out the transaction. Figure 1 demonstrates the design for Recognition of facial pictures.

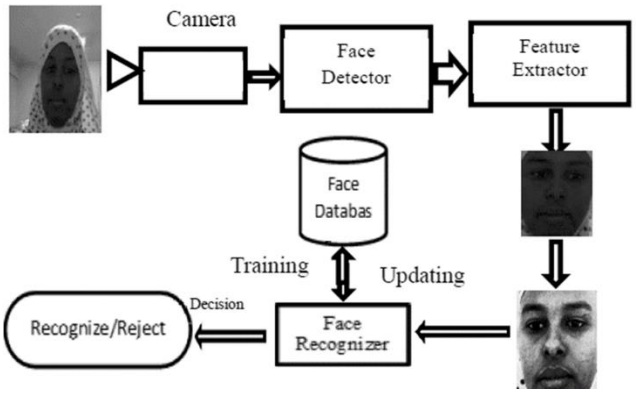


Figure 1 System Overview

Normally ID-cards comprising of Barcodes are utilized to approve the validness of the client/understudy performing transaction from the library. Because of some reason, the ID-Card harmed or it can be lost and even it can be abused. To make it more dependable and effective we propose to actualize the face Recognition technique for approval of the client. Natural qualities are one of a kind for each person. Much of the time, face recognition related advancements are ending up more prevalent among biometric-based advances that measure a person's regular information. The motivation behind this work is to show a Windows based ongoing application framework utilizing face recognition calculations for performing Library Transaction.

The application exhibited in this investigation catches pictures of individuals' faces utilizing cameras and recoveries the pictures as preparing set into a database. At that point, it utilizes the spared pictures as the preparation set to prepare the framework to perceive a specific individual progressively at whatever point he/she comes before the camera. This new framework has extra focal points that incorporates, simple to setup and introduce high transportability and low start-up costs.

II. REVIEW OF LITERATURE

There is a quick progression in the zone of recognition and biometric security frameworks throughout the years and the examination improvement development isn't backing off by any stretch of the imagination. In 1964-1965, Bledsoe, alongside Helen Chan and Charles Bisson, influenced a noteworthy achievement when they to utilize PCs to perceive human faces [5]. Presently, there are a few works and undertakings in the field of manmade brainpower or biometrics specifically, for example, the face recognition security framework utilized by the German Federal Police Department in Frankfurt Rhein-Main global airplane terminal [6]. In any case, yet numerous waiting issues should be settled.

In the Face Recognition (FR) space, different distinctive strategies were exhibited and connected. Vital Component Analysis (PCA), is one of the main effective and most grounded approaches in the FR space [7]. This technique takes an entire picture as a vector and utilizations it to create measurable data. It consolidates all picture vectors and shapes a picture grid and after that Eigen vectors of this network will be ascertained. The face pictures would then be able to be communicated as a direct arrangement. Another effective approach [4] is Local Binary Patterns (LBP) for facial component extraction. The LBP administrator consolidates a locale in the picture and doles out an incentive as a focal pixel. These focal pixels are marked either 0 or 1. On the off chance that the esteem is lower or higher than the esteem doled out to the focal pixel, a histogram of the marks is registered and utilized as a descriptor. The LBP descriptor will be built and gathered in each area and the outcomes are consolidated to make one vector speaking to the whole face picture. For each given pixel, a paired number is gotten by blending all these parallel esteems in a clockwise way, beginning from the upper left Neighbor pixel.

In spite of the way that as of now effectively several of business face recognition frameworks are being used, along these lines of distinguishing proof keeps on being a fascinating point for specialists. This is because of the way that the present frameworks perform well under moderately straightforward and controlled conditions, however perform much more awful when varieties in various variables are available, for example, posture, perspective, outward appearances, time (when the photos are made) and enlightenment (helping changes)[8]. The objective in this exploration region is to limit the impact of these elements and make hearty face recognition framework. A model for face recognition is appeared in Figure 2.

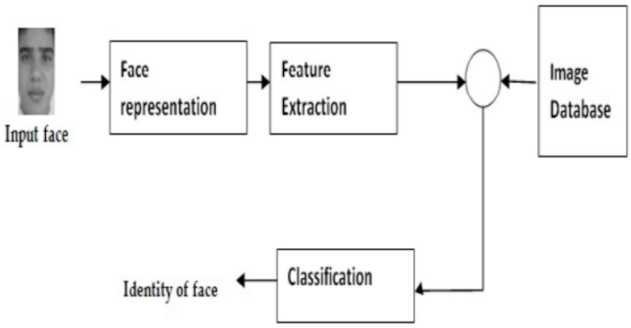


Figure 2: Model of Face Recognition

The procedure of individual ID by utilizing face recognition can be part into three fundamental stages (Figure 2). These are face portrayal, highlight extraction and arrangement [6]. Face portrayal is the main assignment, that is, the means by which to demonstrate a face. The best approach to speak to a face decides the progressive calculations of recognition and recognizable proof. For the passage level recognition (that is, to decide if the given picture speaks to a face), the picture is changed (scaled and pivoted) till it has the same 'position' as the pictures from the database. In the component extraction stage, the most valuable and exceptional highlights (properties) of the face picture are extricated.

With these acquired highlights, the face picture is contrasted and the pictures from the database. This is done in the characterization stage [7, 9]. The yield of the grouping part is the personality of a face picture from the database with the most elevated coordinating score, along these lines with the littlest contrasts contrasted with the information face picture. Likewise, an edge esteem can be utilized to decide whether the distinctions are sufficiently little. Overall, it may be the case that a specific face is not in the database by any stretch of the imagination.

III. IMPLEMENTATION

Face Recognition as it is regularly alluded to as, investigations attributes of a man's face picture contribution through a camera. Facial recognition or face recognition as it is regularly alluded to as; examinations qualities of a man's face picture contribution through a camera.

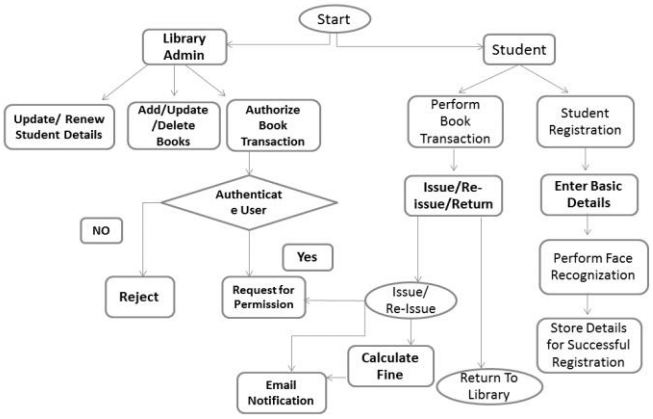


Figure 3: System Flow

The proposed framework is an independent application that uses a brought together database to perceive human faces. In this application, human faces will be caught by the webcam or camera and the distinguished face is put away into the database. The proposed framework has been set up with the assistance of three fundamental advances:

- Recognize and concentrate facial pictures and spares the facial data into database for future references.
- Prepare and figuring Eigen Value and Eigen Vector
- Perceive and match face pictures with existing put away face picture database.

Customarily Library frameworks utilizes understudy's ID card for issuing books. The Current strategies are repetitive and tedious. The proposed framework comprises of a Face Recognition utilizing Local Binary Pattern Algorithm. The detail stream of the framework is shown in figure 3.

IV. LOCAL BINARY PATTERN

There exist a few techniques for separating the most helpful highlights from (preprocessed) confront pictures to perform confront acknowledgment. One of these element extraction techniques is the Local Binary Pattern (LBP) strategy. Ojala et al. [5] presented this relative new approach in 1996. With LBP, it is conceivable to depict the surface and state of a computerized picture. This is finished by separating a picture into a few little areas from which the highlights are removed (figure 4).



Figure 4: A preprocessed picture separated into 64 areas

These highlights comprise of double examples that depict the surroundings of pixels in the districts. The got highlights from the locales are linked into a solitary component histogram, which shapes a portrayal of the picture. Pictures would then be able to be looked at by estimating the likeness (separate) between their histograms. As indicated by a few investigations [2, 3, and 4] confront acknowledgment utilizing the LBP strategy gives great outcomes, both as far as speed and segregation execution. Because of the way the surface and state of pictures is depicted, the technique is by all accounts very strong against confront pictures with various outward appearances, changed helping conditions, picture pivot and maturing of people.

The Algorithm of the proposed implementation is as follows:

Input: Training Image set.

Output: Feature extracted from face image and compared with centre pixel and recognition with unknown face image.

1. Initialize temp = 0
2. FOR each image I in the training image set
3. Initialize the pattern histogram, H = 0
4. FOR each center pixel tc belongs to I
5. Compute the pattern label of tc, LBP (1)
6. Increase the corresponding bin by 1.
7. END FOR
8. Find the highest LBP feature for each face image and combined into single vector.
9. Compare with test face image.

V. CONCLUSION

Our principle center all through this work is to first distinguish the understudy/client by means of face id i.e. we can remember it first and later on going towards the library part taking care of the library transaction, for example, restore the specific book and additionally issue the distinctive book. Our principle point is to maintain a strategic distance from the repetitive human (curator) push to deal with the library work. The all in all achievement is a push to see how face Recognition is utilized as a type of biometric to perceive characters of people. It incorporates every one of the phases from particulars extraction from face to details coordinating which produces a match pick up. Different standard strategies are utilized as a part of the moderate phases of preparing. The unwavering quality of any consistent Face Recognition framework emphatically depends on the accuracy got in the minutia extraction process. Various elements are adverse to the right area of minutia. Among them, poor picture quality is the most genuine one. In Future we can ad lib the calculation for numerous face coordinating all the while. Besides the framework can be enhanced and actualized as an android application for making it less demanding to get to.

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DOI :https://doi.org/10.32628/IJSRST196242

Phobias and Gender- A Case Study on Engineering Students

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ABSTRACT

Fears and phobias are common in the student community. The present study was observed some of the specific phobias- Exam phobia, Acrophobia, Hemophobia, Achluophobia, Hodophobia, Zoophobia and Oneirophobia in engineering students with reference to gender. A total of 460 students studying in four Engineering colleges, located in Guntur and Prakasam districts was selected, out of which 294 are male and 166 are female. The study found that all the examined phobias were high in female students, particularly, Exam (50.60%) and Zoophobia (39.16%) are very high in female and compared to male (42.52% and 13.27%).

Keywords: Specific Phobias, Therapies, Engineering Students, Gender

I. INTRODUCTION

A phobia is a type of anxiety disorder, defined by a persistent and excessive fear of an object or situation. Typically results in a rapid onset of fear and are present for more than six months (American Psychiatric Association, 2013). Different specific phobias, namely Exam phobia, Acrophobia, Hemophobia, Achluophobia, Hodophobia, Zoophobia and Oneirophobia are present in students. Fears and phobias are common in students. They have a serious impact on student academic achievement and well being. Phobias are irrational, that leads to avoidance of the phobia situation or object which in turn increases the severity of the phobia. Sufiana and Farhat (2015) found that the phobia of examination affects the academic performance of the students in the examination and they could not perform according to their knowledge due to a phobia of examination. Acrophobia is an irrational fear of heights. Acrophobic behavior typically involves the avoidance of a variety of situations, including stairs, terraces, apartments and offices located in high buildings, bridges, elevators and plane trips (Menzies, 1997). Hemophobia is an abnormal and persistent fear of blood, also called a blood injury phobia. Sufferers of this very common phobia dread the sight of their own blood, the sight of the blood of another person or an animal (https://www.medicinenet.com). Achluophobia is the scientific term for fear of the dark (https://www.allhealthsite.com).

Hodophobia is an irrational fear, or phobia, of travel (Ronald, 2010). Some people are afraid only of specific methods of transportation, such as planes or trains, while others fear all types of trips (https://www.verywellmind.com). Zoophobia or animal phobia is a class of specific phobias of a particular animal (Fodor and Gaynor, 2004) or an irrational fear or even simply dislike of any non-human animals. Oneirophobia is the fear of nightmares.

Various studies were carried out on specific phobias (Ollendick et al., 2010; https://www.verywellmind.com/; Curtis et al., 1998; de Oliveira-Souza 2018; Naveed et al., 2015; Carleton 2016; Garcia 2017 Pull 2008 and Singh and Singh 2016).

II. METHODOLOGY

A total of 460 students studying in four Engineering colleges, located in Guntur and Prakasam districts was selected, out of which 294 are male and 166 are female. Students were assembled in a classroom of the respective institutions and asked them to give their response to a question-"Do you have any specific fear/phobia?" The purpose of the study and the details regarding the phobia were explained in their mother tongue. The response was analyzed using statistical analysis. Percent variation and correlation studies are presented under results and discussion between the male and female students.

III. RESULTS AND DISCUSSION

Various phobias were studied with reference to gender and the results are incorporated in this section. Number of students with specific phobias was shown in table 1 and the percentages were given in table 2.

TABLE 1
STUDENT'S WITH SPECIFIC PHOBIAS

Phobias	Male	Female	Total
Exam phobia	125	84	209
Acrophobia	44	28	72
Hemophobia	24	25	49
Achluophobia	25	26	51
Hodophobia	11	12	23
Zoophobia	39	65	104
Oneirophobia	41	28	69
Total	**309**	**268**	**577**

TABLE 2
GENDER WISE PHOBIAS (%)

Phobias	Male	Female
Exam phobia	42.52	50.60
Acrophobia	14.97	16.87
Hemophobia	8.16	15.06
Achluophobia	8.50	15.66
Hodophobia	3.74	7.23
Zoophobia	13.27	39.16
Oneirophobia	13.95	16.87

Specific Phobias

Male Students

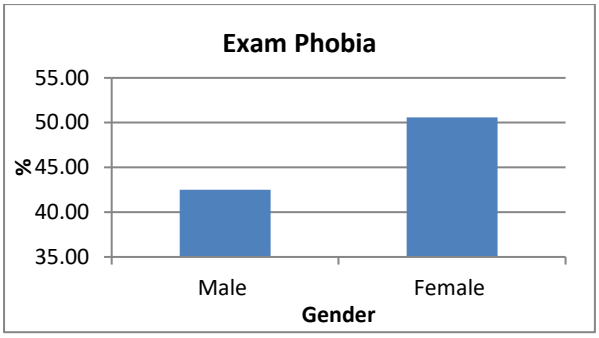
The highest percent of male students expressed exam phobia (42.52) (Table 2). It is followed by Acrophobia (14.97%), Oneirophobia (13.95) and Zoophobia (13.27). Comparatively, lower percentage was recorded with Achluophobia (8.50), followed by Hemophobia (8.16) and Hodophobia (3.74). These variations are depicted in figures 1a to 1g.

Female Students

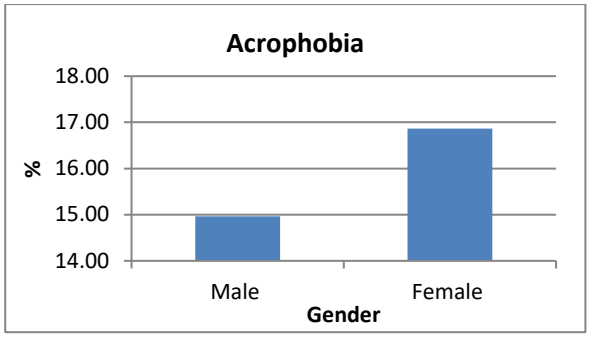
50.60% of female students marked that they have exam phobia, followed by 39.16% marked Zoophobia (Table 2). The lowest percent was recorded with Hodophobia (7.23). The percentages are more or less similar for Acrophobia, Hemophobia, Achluophobia and Oneirophobia. These variations are shown in figures 1a to 1g.

Comparative Study

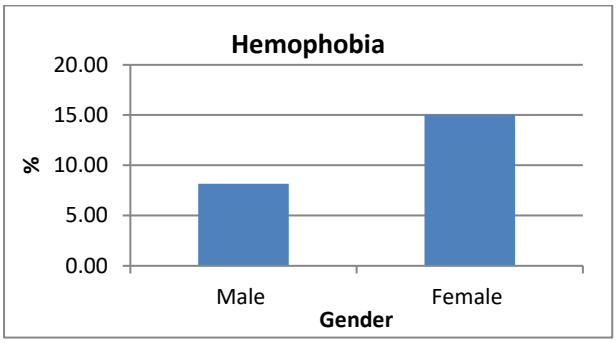
Compared to the males (42.52%), high percent of female students (50.60%) expressed exam phobia. Similarly, Zoophobia is high in female (39.16%) than male (13.27%). Though the difference is percentage is less compared to exam and zoophobia all other examined phobias are high female students (Figure 2).



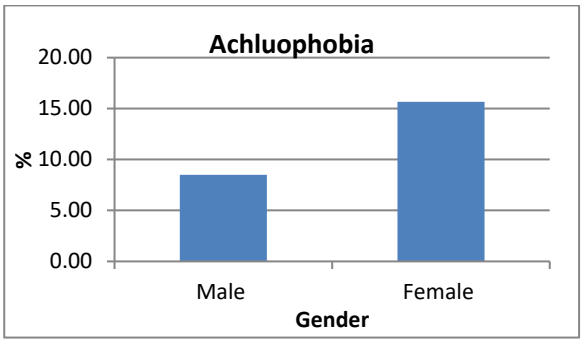
(a)



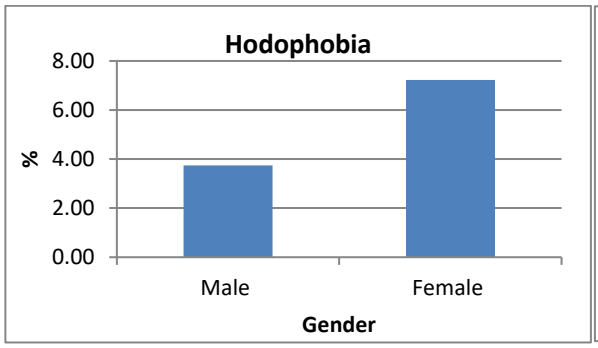
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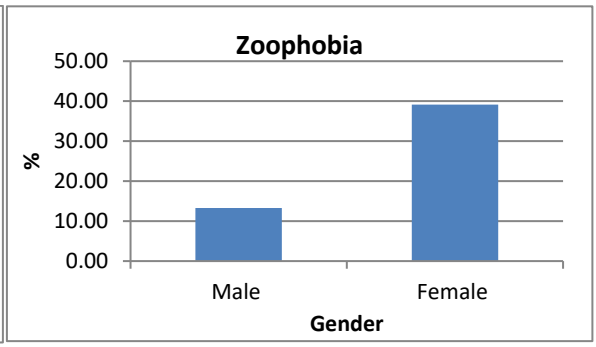
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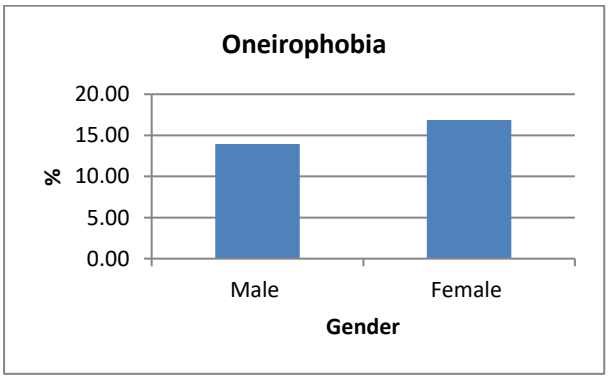
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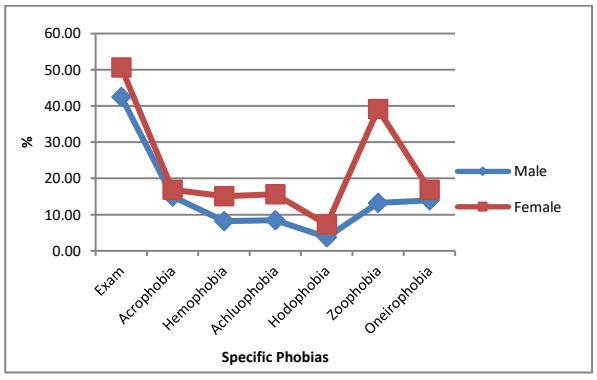
(e)



(f)



(g)



(h)

Figure 1 Phobias and Gender

Figure 2. Comparison of Phobias and Gender

Treatment

It is important to remember that the Phobias are common and you are not alone. At the neurobiological level, significant advances have been made in identifying fear circuits and mechanisms; dysfunctions in these

circuits/mechanisms can lead to chronic psychiatric disorders, Indeed, available treatments that aim to reduce pathological fear are associated with decreased symptom severity, but up to 40% of patients show only partial long-term benefit, while most of them fail to achieve complete remission (Singewald et al. 2015). It appears that the amygdala is central to two phenomena that may support pathological innate fear: fear sensitization (Garcia, 2017).

The treatments vary with the type of phobia. For example Exam phobia is better prevented than treated. A systematic, persistent, organized, planned and regular effort from the beginning of the academic session is the best method for any adolescent to prevent anxiety related to the examination. Students may be given frequent tests and a healthy competitive environment among their students within the class may be promoted. In case of Achluophobia and Zoophobia treatment exposures, reduce the fear.

According to Hanies et al., (2007), Cognitive Behavioral Therapy (CBT) has been found to significantly decrease phobic symptoms by helping the phobia sufferer change his or her way of thinking. A variety of treatment options are available, including Cognitive Behavioral Therapy (CBT), Exposure Therapy, Anxiety Management, Relaxation Techniques, and Medications. Hoffman and Weghorst (1997) stated that one or a combination of these may be recommended according to the situation and intensity. No any single treatment is sufficient. If anyone may be suitable for one person, perhaps it may not be the best choice for someone else.

Some of the useful methods

Exposure-based therapy - (Singh and Singh, 2016) Cognitive therapy (CT)- (Specific phobia. http://www. med.upenn.edu). Progressive desensitization (Specific phobia. http://www. med.upenn.edu). Relaxation- (Specific phobia. http://www. med.upenn.edu). Hypnosis (hypnotherapy)- (Natural treatment for phobia and anxiety. http://www.phobicss- ociety.org) Homeopathy- (http:// www.phobicssociety.org). Herbal remedies- (Natural treatment for phobia and anxiety. http:// www.phobicssociety.org). Pharmacotherapy-(Specific phobia. http:// www. med .upenn.edu).

IV. CONCLUSION

Specific phobias influence health and academic achievement of the students. The study observed that exam phobia is high in both male (42.52%) and female (50.60%) students. It is concluded that the specific phobias are more in female compared to male.

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IoT Based Energy Management for Residential Area

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ABSTRACT

Cities are becoming more and more of a focal point for our economies and societies at large, particularly because of on-going urbanization, and the trend towards increasingly knowledge-intensive economies as well as their growing share of resource consumption and emissions. To meet public policy objectives under these circumstances, cities need to change and develop, but in times of tight budgets this change needs to be achieved in a smart way: our cities need to become smart cities.

Keywords : IoT Based Energy Management, Urbanization, Public Policy, EU Energy, GHG, Smart Buildings

I. INTRODUCTION

In order to follow the policy of the decarbonisation today's energy usage in transport systems and infrastructures have to drastically change. There is a need to shift to sustainable production and use of energy, to sustainable mobility, and sustainable infrastructures and services. Cities and urban communities play a crucial role in this process. Three quarters of our citizens live in urban areas, consuming 70% of the overall energy consumption and emitting roughly the same share of greenhouse gases. Of that, buildings and transport represent the lion's share.

Within the worldwide perspective of energy efficiency, it is important to highlight that buildings are responsible for 40% of total EU energy consumption and generate 36% of GHG [8]. This indicates the need to achieve energy-efficient buildings to reduce their CO2 emissions and their energy consumption. Moreover, the building environment affects the quality of life and work of all citizens. Thus, buildings must be capable of not only providing mechanisms to minimize their energy consumption (even integrating their own energy sources to ensure their energy sustainability), but also of improving occupant experience and productivity.

In this thesis, we analyse the important role that buildings represent in terms of their energy performance at city level and, even, at world level, where they represent an important factor for the energy sustainability of the planet.

Analysis of the energy efficiency of the built environment has received growing attention in the last decade [1], [7], [9]. Various approaches have addressed energy efficiency of buildings using predictive modelling of energy consumption based on usage profiles, climate data and building characteristics.

On the other hand, studies have demonstrated the impact of displaying public information to occupants and its effect in modifying individual behaviour in order to obtain energy savings [2], [4]. Nevertheless, most of the approaches proposed to date only provide partial solutions to the overall problem of energy efficiency in buildings, where different factors are involved in a holistic way, but which, until now, have been addressed separately or even neglected by previous proposals. In other words, a more integral vision is required to provide accurate models of the energy consumed in buildings [10].

In order to obtain an accurate simulation model, a detailed representation of the building structure and its subsystems is required, although it is the integration of all these pieces that requires the most significant effort.

IoT permits the interaction between smart things and the effective integration of real world information and knowledge in the digital world. Smart (mobile) things endowed with sensing and interaction capabilities or identification technologies (such as RFID) provide the means to capture information about the real world in much more detail than ever before.

II. RELATED WORK

A complete review of previous solutions from the literature was carried out during the development period of the present thesis. We tried to find ways that would enable us to propose holistic solutions to building energy management problems, which should address the relevant aspects mentioned previously, i.e. a complete monitoring phase, the efficient management of information, using automation systems and involving occupants during the system operation. Nevertheless, different proposals were found for different goals, but none was integrated all the aspects. This was the first constraint identified among previous solutions.

Consequently, we decided to review the main related work tackling each one of these aspects separately. Proposals such as those given by the manufacturer Johnson Controls3, a company that provides products, services and solutions that help increase energy efficiency and reduce the operation costs of its client's buildings.

Another well-known manufacturer is Siemens4, who offer a technical infrastructure for building automation and energy efficiency in the form of market-specific solutions in buildings and public places. The main differences between these commercial solutions and our proposal for automation and energy efficiency management in smart buildings are those related with the open and transparent character of our proposal, as well as its capability to gather data from a large number of heterogeneous sources.

As regards user involvement in building energy management, there are studios that maintain that energy usage feedback is the most successful approach, whereby users are involved in saving energy in buildings [2] [4]. However, few works have been addressed this aspect. It is important to note that energy usage feedback in building energy management systems needs to be provided to users frequently and over a long time, offering an appliance-specific breakdown, while presented in a clear and appealing way using computerized and interactive tools.

Concerning the fact that users have little awareness of the energy wastage associated with their energy consumption behaviours is due partly to the fact that

most people do not know what the optimum comfort conditions are according to environmental features and their needs.

Smart buildings should prevent users from having to perform routine and tedious tasks to achieve comfort, security, and effective energy management. Sensors and actuators distributed in buildings can make user life more comfortable; for example:

- ✓ room heating can be adapted to user preferences and to the weather;
- ✓ room lighting can change according to the daylight;
- ✓ domestic incidents can be avoided with appropriate monitoring and alarm systems;
- ✓ energy can be saved by automatically switching off electrical equipment when not needed, or regulating their operating power according to user needs, thus avoiding any energy overuse.

III. GENERAL ARCHITECTURE FOR MANAGEMENT SYSTEMS OF SMART BUILDINGS

The general architecture of for smart building is modelled in layers which cover the requirements of different smart environments of cities, such as intelligent transport systems, security, health assistance or, as is the case analysed in this thesis, smart buildings. This architecture promotes high-level interoperability at the communication, information and services layers and has the following layers

1) **Data Collection Layer**
2) Data Processing Layer
3) Services Layer

The general block diagram can be given as below

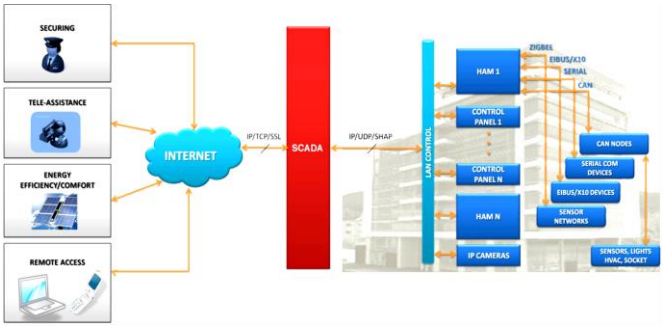


Figure 3.1 General Block Diagram of IoT-based Energy Information Management System for Energy Efficiency in Smart Buildings

IV. PROPOSED SYSTEM

4.1 BLOCK DIAGRAM:

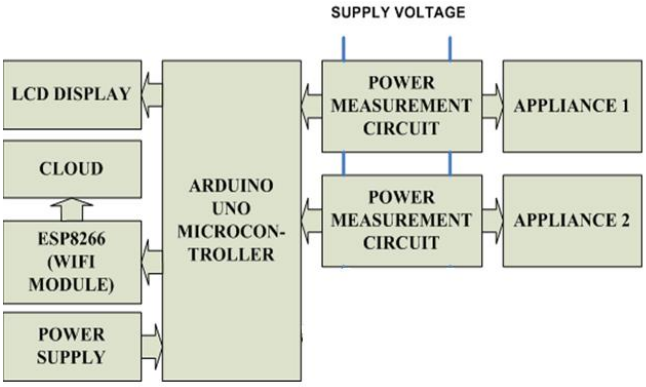


Figure 4.1 Block Diagram of the Proposed System

As seen in the system shown above it consist of the following

1. LCD Display
2. ESP8266 WI FI Module
3. Power Supply
4. Arduino Uno

Appliance are interfaced with power measurement circuts. These power measurements circuits forward the value of power obtained from the appliances to the Microcontroller.

Arduino Uno is used as a microcontroller. The value of power received from the appliances are forwarded by a wifi module onto the cloud . Cloud interface acts as a front end or a dashboard to the user. With the dashboard the user is able to view the power consumed by the particular appliance. Thus the user is bale to monitor the power consumption pattern of the particular appliance and can turn on and off any appliances from any part of the world . Thus by doing so the user is in control of the appliances and thus can play a role of an active user who tries to optimize the energy consumption by minimal wastage of power.

4.1 COMPONENT DESCRIPTION :

The following section gives the details of different components used in the projectof

4.1.1 LCD Display

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

1) The declining prices of LCDs.
2) The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
3) Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.
4) Ease of programming for characters and graphics. These components are “specialized” for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits.



Figure 4.2 LCD Display board

4.4.2. ESP8266 WI FI Module

The ESP8266 is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by manufacturer Espressif Systems in Shanghai, China.

The chip first came to the attention of western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at first there was almost no English-language documentation on the chip and the commands it accepted.

The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing for single-chip devices capable of connecting to Wi-Fi.

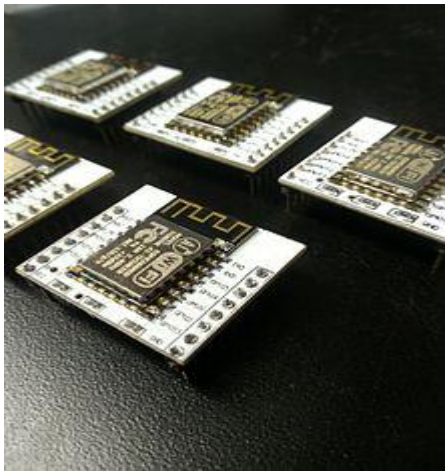


Figure 4.6 Ai-Thinker modules

4.1.3 Power Supply

4.1.3.1 Block Diagram



Figure 4.7. Block diagram (Power supply)

The ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies. This voltage regulation is usually obtained using one of the popular voltage regulator IC units.

4.3.4.1 Arduino UNO R3



This is the **Arduino Uno R3**. In addition to all the features of the previous board, the Uno now uses an ATmega16U2 instead of the 8U2 found on the Uno (or the FTDI found on previous generations). This allows for faster transfer rates and more memory. No drivers needed for Linux or Mac (inf file for Windows is needed and included in the Arduino IDE), and the ability to have the Uno show up as a keyboard, mouse, joystick, etc.

The Uno R3 also adds SDA and SCL pins next to the AREF. In addition, there are two new pins placed near the RESET pin. One is the IOREF that allow the shields to adapt to the voltage provided from the board. The other is a not connected and is reserved for future purposes. The Uno R3 works with all existing shields but can adapt to new shields which use these additional pins.

V. RESULTS AND DISCUSSION

In this work we have been able to develop a system in which appliances are interfaced with power measurement circuts. These power measurements circuits forward the value of power obtained from the appliances to the Microcontroller.

The figures below shows the screen shots of the implemented module along with the screen shots of the cloud interface.

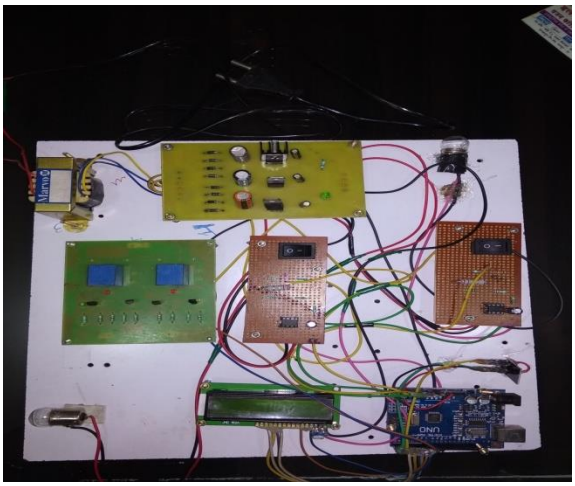


Figure 5.1 The implemented system

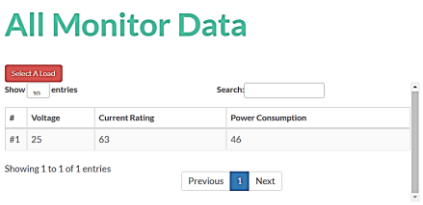


Figure 5.2 Data of Appliance 1

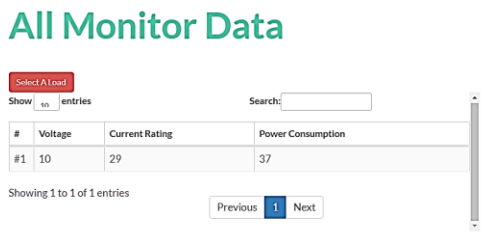


Figure 5.3 Data of Appliance 1

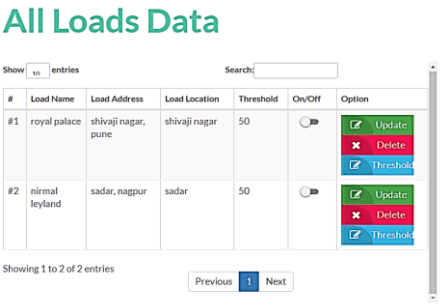


Figure 5.4 Screen shot of Dashboard at cloud to turn load on or off

VI. CONCLUSION

We have been able to design and develop a system which gathers the value of power consumed by appliances in real time on the cloud. A user can get the access to all the appliances which have been integrated with the cloud and can have the idea of the appliances as to whether they are on or off. Through the cloud he can turn the appliance on as well as off.

With the user being able to access the appliances in terms of their power consumption and turning them on or off, it provides the basic platform to carry on with the energy management.

VII. FUTURE WORK

With the profile of appliances being available to the user customized power solutions can be designed and proposed.
The system can be integrated to provide High Comfort level, Air quality control, Automated Heating and Cooling system, Automated lightning system.

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Blind's Mate- A Navigation System for Blind People

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ABSTRACT

Visually challenged people rely on companions around them on daily basis. Basic chores of day to day life pose a challenge for people with impaired vision. Walking on streets while dodging obstacles and navigating through roads to reach desired destination independently is one such challenge. Proposed system 'Blind's Mate' is a combination of software and hardware technology that can be used to improve the walking experience of blind people. Blind's Mate is a combination of smart stick and a mobile app that can alert people of impending obstacles and water pits while providing audio feed to the users about obstacles encountered during walking. This stick is embedded with ultrasonic sensor to detect any obstacles in front of the user. The app gives live feed to the user continuously via earphones. Speech warning messages are activated when any obstacle is detected. The proposed stick is of low cost, has fast response, low power consumption, light weight and an effective means to help blind people finding their way on streets with ease.

Keywords: Smart Stick, Mobile App, Audio Feed, Ultrasonic Sensor, Speech Warning, Low Cost

I. INTRODUCTION

Blind or visually impaired people often find difficulties while walking on the streets. With so many obstacles present around them, being able to walk safely to their desired destination isn't exactly a piece of cake. Often, visually challenged people need to rely on their friends or companions in order to help them reach their destination safely.

But luckily, owing to the advancements in the field of technology, this doesn't pose to be a problem anymore. Keeping the concerns of blind and visually impaired people in mind, we have come up with the idea of a 'smart stick'.

Visually impaired people are the people who can't identify smallest detail with healthy eyes. Those who have the visual acuity of 6/60 or the horizontal extent of the visual field with both eyes open less than or equal to 20 degrees, these people are considered blind[1]. As described in [2] such people are in need of aiding devices for blindness related disabilities.10% of blind have no usable eyesight at all to help them move around independently and safely.

The electronic aiding devices are designed to solve such issue. To record information about the obstacles presence in a road, active or passive sensors can be used. In case of a passive sensor, the sensor just receives a signal. It detects the reflected, emitted or transmitted electro-magnetic radiation provided by natural energy sources. In case of using an active sensor, the sensor emits a signal and receives a distorted version of the reflected signal. It detects reflected responses from objects irradiated with

artificially generated energy sources. These kind of active sensors are capable of sensing and detecting far and near obstacles. In addition, it determines an accurate measurement of the distance between the blind and the obstacle [3].

Overall, in the obstacle detection domain, four different types of active sensors may be used: infrared, laser, ultrasonic, in addition to radar sensors [4].

Table 1.1.General Characteristics of some active sensor

	Laser	Infrared	Radar	Ultrasonic
Principle	Transmission and reception of light waves	Transmission and reception of pulse of IR light	Transmission and reception of pulse of microwave	Transmission and reception of pulse of acoustic wave
Range	SLR: 15cm to 120cm LLR: about 10- 50 m	From 20 cm to 150 cm	About 15-200 m	From 3 cm to 10 m
Beam Width	Narrow	Fairly thin	Depended on size of antenna	Wide
Atmospheric Condition	Affected	Affected	Affected	Not affected
Cost	Very high	Low	High	Low

The proposed system called 'Blind's Mate' consists of a smart stick. This smart stick comes equipped with sensors that would help with obstacle detection and hence, let the blind person know whenever an obstacle arises in his path. To make things even easier, there is an Android app to go along with the stick. Whenever an obstacle is detected, the app would let the blind person know about it via voice instructions. The blind person needs to wear earphones for this purpose.

The main motivation behind this project is to help blind or even visually challenged people to get to their destination safely and with ease. The proposed system is an effective as well as low cost aid for the visually challenged. The sensors are very quick in detecting obstacles and respond immediately.

II. METHODS AND MATERIAL

For setting up the hardware part of our project, we first gathered all the hardware components. To program the hardware components, they are to be attached to the different pins of the Arduino Uno one by one. A hardware component (for example, ultrasonic sensor) is first attached to the Arduino Uno. Then, the Arduino Uno has a USB port to which a USB cable is attached and the whole thing is then attached to a laptop/ PC. After opening Arduino IDE on the laptop/ PC, the following hardware component is programmed. This is how the programming of all hardware parts is done. The language used for programming is C.

After all the components were programmed, we took all the components and attached them to the different pins of Arduino (every hardware component was attached to a particular pin which was the same pin that we used while programming) with the use of jumper cables. All the components were then integrated on the stick.

- The system contains components like Arduino Uno R3 microcontroller, Ultrasonic sensors are object detectors, Wi-Fi module ESP 8266, moisture sensor, buzzer and vibrator motor.
- The whole system is powered by with regulated DC power supply. Either a transistor battery of 9Volts or an adapter of 12Volts, 2Ampere can be used to power the system.
- A micro-controller does all the work of detecting ultrasonic signals and sending back respective messages to the blind person [5].
- An ultrasonic sensor is used to detect the obstacles in front of the blind to alert the user.
- Arduino Uno is a connecting interface used to mount the sensor and output indicators such as buzzer and vibrator.
- The stick apparatus is connected to the mobile application via the Wi-Fi module ESP 8266.
- One pair of moisture sensor probes are used along with calibrator to detect the presence of moisture or water.
- Audio instruction will be given to user via earphones to alert the user about obstacles.

A. System Requirement



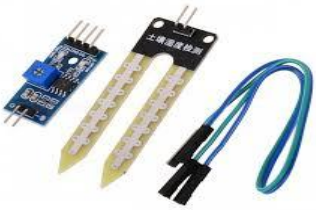
(a) Arduino Uno

Arduino is an open source, computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world [6].



(b) Ultrasonic Sensor

Ultrasonic sensors are devices that utilization electrical– mechanical vitality change, the mechanical vitality being as ultrasonic waves, to gauge separate from the sensor to the objective question. [6]



(c) Moisture Sensor

Soil moisture sensors are used for measuring the water content of soil. Multiple soil moisture sensors are combined to form a soil moisture probe.



(d) Buzzer

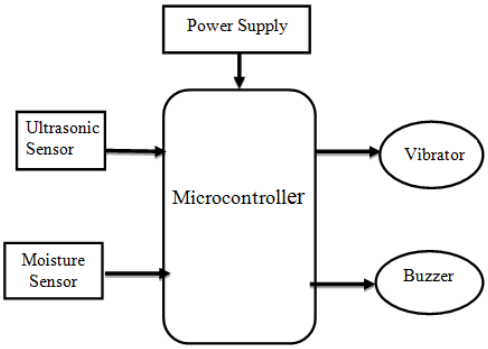
A buzzer or beeper is an audio signalling device, may be mechanical, electro –mechanical. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke [7].



(e) Vibrator Motor

It is the smallest DC vibration motors, perfect for lightweight applications or where space is at a premium. They include miniaturized DC coreless motors with eccentric masses, both in cylindrical and coin form.

B. System Architecture

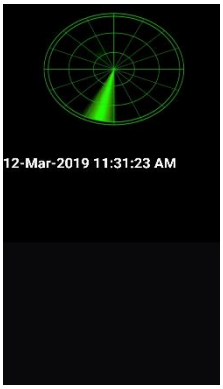


(f) Architecture

III. RESULTS AND DISCUSSION

The proposed stick comes with an android app that reflects the status of the stick by providing timely alerts.

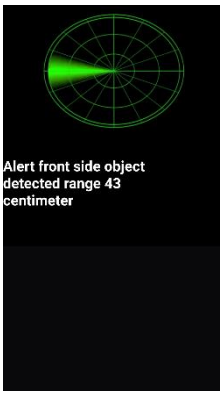
C. App Interface



Module 1:

When you'll open the Blind's Mate app, you'll be greeted by the screen as shown.

This will indicate that the app is connected to the stick through hotspot.

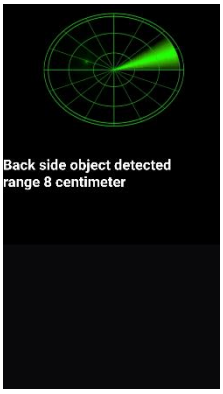


Module 2:

When an obstacle is detected by the front ultrasonic sensor, the stick vibrates.

The software equivalent of this action is as shown at the screen.

The blind person gets an audio feedback "Alert front side object detected" along with distance from the obstacle.

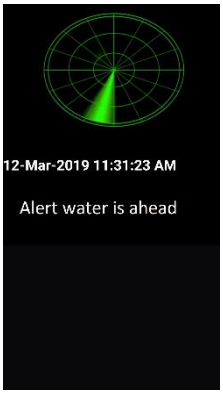


Module 3:

When an obstacle is detected by the back ultrasonic sensor which is for pit holes or ditches, the stick vibrates.

The software equivalent of this action is as shown at the screen.

The blind person gets an audio feedback "Back side object detected" along with distance.



Module 4:

When the probes of the moisture sensor detect presence of water at the bottom end of the stick, the stick sets the buzzer off.

The software equivalent of this action is as shown at the screen.

The blind person gets an audio feedback alert about the presence of water.

IV. CONCLUSION

The designed system is highly efficient along with being user friendly. The system is very easy to use and hence, can easily be used by blind persons without any assistance. With the help of this system, visually challenged people can travel to their desired location without having to worry about getting there safely. The sensors are super quick to detect obstacles and respond too, making the stick highly proficient. The stick is well co-ordinated with the app, making the system work in an extremely efficient manner. This system also promotes independency as the need for another person to constantly accompany them is removed.

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Secure and Dynamic Multi-Keyword Ranked Search Scheme Over Encrypted Cloud Data Using K-Means Clustering

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ABSTRACT

A Secure and Dynamic Multi-keyword graded Search theme over Encrypted Cloud information attributable to the increasing fame of cloud computing, a lot of information homeowners are spurred to source their information to cloud servers for unimaginable accommodation and diminished expense in information management can also perform information dynamic operations on files. On the opposite hand, sensitive information needs to be encrypted before outsourcing for security conditions, that obsoletes information use like keyword-based document retrieval. A protected multi-keyword graded search theme over encrypted cloud information, that all the whereas underpins part update operations like deletion and insertion of documents. Especially, the vector area model and therefore the usually utilised TF_IDF model are consolidated as a neighbourhood of the index development and question generation. A unique tree-based index structure employing a "K-means Clustering" formula to provide practiced multi-keyword graded search. The secure KNN formula is employed to cipher the index and question vectors, so guarantee precise importance score calculation between encrypted index and question vectors. With a selected finish goal to oppose measurable attacks, phantom terms are accessorial to the index vector for glaring search results. Due to the employment of our exceptional tree-based index structure. Keyword: Reduplication, Authorized duplicate check, public auditing, shared data, Cloud computing.

Keywords : K-Means Clustering, KNN, Cloud Computing, Inverse Document Return, EDMRS, Searchable Encryption, Multi-Keyword Ranked Search, Dynamic Update

I. INTRODUCTION

CLOUD computing has been thought-about as another model of enterprise IT infrastructure, which may compose mammoth resource of computing, storage and applications, and empower users to understand pervasive, useful and on demand network access to a mutual pool of configurable computing resources with unbelievable potency and insignificant economic overhead. Force in by these partaking options, each people and enterprises are roused to source their information to the cloud, instead of shopping for software system and hardware to influence the information themselves. In spite of the various points of interest of cloud services, outsourcing delicate info, (for example, e-mail, individual health records, organization account info, government archives, so forth.) to remote servers brings privacy considerations. The cloud service suppliers (CSPs) that keep for users might access users' sensitive information while not authorization.

Inverse document return (IDF)" model are joined within the list development and inquiry era to allow multi keyword positioned ask for. Keeping in mind the tip goal to induce high search Effectiveness, we

have a tendency to develop a tree primarily based list structure victimisation a "K-means Clustering" calculation supported this list tree. Thanks to the uncommon structure of our tree-based list, the search theme will flexibly accomplish sub-straight search time and manage the deletion and insertion of reports. The protected KNN formula is employed to encipher the index and question vectors, and within the interim guarantee connection score calculation between encrypted index and question vectors. To oppose distinctive attacks in several threat models, we have a tendency to build 2 secure search themes: the fundamental dynamic multi-keyword hierarchic search (BDMRS) scheme within the acknowledged cipher text model, and therefore the increased dynamic multi-keyword hierarchic search (EDMRS) theme within the acknowledged background model. Our commitments are condensed as takes after:

1) Style a searchable cryptography theme that underpins each the precise multi-keyword hierarchic search and versatile dynamic operation on document assortment for multiple information owner atmospheres.
2) Because of the uncommon structure of our tree-based index, the search quality is during a general sense unbroken to index. What is additional, much speaking; the theme will accomplish higher search proficiency by capital punishment our "K-means clustering" formula. In addition, parallel search may be flexibly performed to more reduce the time value of inquiry procedure.

II. LITERATURE SURVEY

1] Fuzzy Keyword Search over Encrypted Data in Cloud Computing

Authors: Jaydip Sen

In this paper, for the first time an inclination to formalize and solve the matter of effective fuzzy keyword search over encrypted cloud data whereas maintaining keyword privacy. Fuzzy keyword search greatly enhances system usability by returning the matching files once users' looking inputs specifically match the predefined keywords or the best achievable matching files supported keyword similarity linguistics, once precise match fails. In our answer, we've got an inclination to take advantage of edit distance to quantify keywords similarity and develop an advanced technique on constructing fuzzy keyword sets, that greatly reduces the storage and illustration overheads. Through rigorous security analysis, we've got an inclination to point out that our projected answer is secure and privacy-preserving, whereas properly realizing the goal of fuzzy keyword search easy way to comply with the conference paper formatting requirements is to use this document as a template and simply type your text into it.

2] Practical Techniques for Searches on Encrypted Data

Authors: Seny Kamara

In this paper, an inclination to explain our science schemes for the matter of betting on encrypted data and provide proofs of security for the following crypto systems. Our techniques have form of crucial blessings. they are demonstrably secure: they provide obvious secrecy for cryptography, among the sense that the un trusted server cannot learn one thing relating to the plaintext once only given the cipher text; they provide question isolation for searches, meaning that the un trusted server cannot learn one thing plenty of relating to the plaintext than the search result; they provide controlled trying, that the un trusted server cannot hunt for AN arbitrary word whereas not the user's authorization; they to boot support hidden queries, that the user might raise the un trusted server to travel longing for a secret word whereas not revealing the word to the server.

3] A fully homomorphic encryption scheme

Authors: Reza Carmela, Juan Garay

"In this Paper propose the first fully homomorphic coding theme, taking care of a focal open issue in cryptography. Such a thought permits one to work subjective capacities over encrypted information while not the secret writing key – i.e., given encryptions E (m1),..., E (m t) of M1,...,m t, one will anciently method a smaller cipher text that encrypts f(m1,...,m t) for any efficiently computable capability f. This issue was postured by Rivets et al. in 1978. Fully homomorphism coding has varied applications. as an example, it empowers non-public queries to a hunt engine– the user presents Associate in Nursing encrypted question and therefore the computer programme processes a short-encrypted answer whereas ne'er taking a goose at the question within the clear. It likewise empowers betting on encrypted information – a user stores encrypted field on an overseas file server and may later have the server recover simply files that (when decoded) fulfil a number of Boolean limitations, despite the very fact that the server cannot unscramble the files on their lonesome. All the additional comprehensively, fully homomorphism coding enhances the efficiency of secure multi keyword rank search.

4] Searchable Symmetric Encryption: Improved Definitions and Efficient Constructions

Authors: Dan Bones

In this paper we've an inclination to point out two solutions to south southeast that at a similar time relish the following properties:

1. Every solution are lots of economical than all previous constant round schemes. Specially, the work performed by the server per came back document is constant as hostile linear at intervals the scale of the information.

2. Every solution relish stronger security guarantee than previous constant-round schemes. In fact, we've an inclination for instance delicate but serious problems with previous notions of security for south southeast, and show the thanks to vogue constructions that avoid these pitfalls. Further, our second answer in addition achieves what we've an inclination to call adaptative south southeast security, where queries to the server could also be chosen adaptively (by the adversary) throughout the execution of the search.

III.EXISTING SCHEME

UDMRS Scheme

More formally, an attribute-based cloud data integrity auditing protocol consists of the following six algorithms.

The search process of the UDMRS scheme is a recursive procedure upon the tree, named as “Greedy Depth-first Search” algorithm. We construct a result list denoted as RList, whose element is defined as hRScore; FIDi. Here, the RScore is the relevance score of the document fFID to the query, which is calculated according to Formula (1). The RList stores the k accessed documents with the largest relevance scores to the query. The elements of the list are ranked in descending order according to the RScore, and will be updated timely during the search process. Following are some other notations, and the GDFS algorithm is described in Algorithm 2.

Algorithm 2. GDFS (IndexTreeNode u)

Step 1 : If node a is not a leaf node then

Step 2 : GDFS(lchild);

Step 3 : else

Step 4 : return

Step 5 : end if

Step 6 : else

Step 7 : if Rscore > kth score then

Step 8 : Delete the element with the smallest relevance score from RList;
Step 9 : Insert a new element Rscore and sort all the elements of RList;
Step 10 : return
Step 11: end if

BDMRS Scheme

Based on the UDMRS scheme, we construct the basic dynamic multi-keyword ranked search scheme by using the secure kNN algorithm [8]. The BDMRS scheme is designed to achieve the goal of privacy-preserving in the known ciphertext model, and the four algorithms included are described as follows:
Security analysis. We analyze the BDMRS scheme accord-ing to the three predefined privacy requirements in the design goals:
Index confidentiality and query confidentiality. In the proposed BDMRS scheme, Iu and TD are obfuscated vectors, which means the cloud server cannot infer the original vectors Du and Q without the secret key set SK. The secret keys M1 and M2 are Gaussian random matrices. According to [38], the attacker (cloud server) of COA cannot calculate the matrices merely with cipher text. Thus, the BDMRS scheme is resilient against ciphertext only attack and the index confidentiality and the query confidentiality are well protected.
Query unlink ability. The trapdoor of query vector is generated from a random splitting operation, which means that the same search requests will be trans-formed into different query trapdoors, and thus the query unlinkability is protected. However, the cloud server is able to link the same search requests according to the same visited path and the same relevance scores.

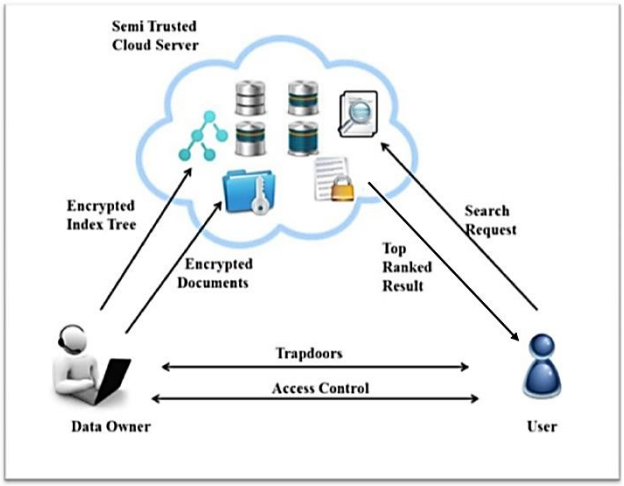
Drawbacks of existing scheme

- This system is more time consuming because of they search one by one node in the index tree.
- Time complexity: not suitable for large data sets.
- There is no guarantee of finding the Target node.

IV. PROPOSED SCHEME

The system model during this paper incorporates 3 clear substances: information homeowners, information user and cloud server, as illustrated in Fig. 1 There square measure multiple information owner in system As information owner incorporates a gathering of records F = That he has to source to the cloud server in encoded structure whereas up 'til currently keeping the power to envision on them for convincing utilization. information owner first manufactures a secure searchable tree index I from archive accumulation F, and a brief time later makes a encrypted document gathering C for F. a quick span later, the information owner outsources the encoded accumulation C and therefore the secure index I to the cloud server, and safely disseminates the key information of trapdoor era and document decoding to the approved information users. To boot, the information owner is aware of his documents hold on within the cloud server. Whereas change, owner creates the upgrade information regionally and sends it to the server can also perform data dynamic operations on files. Data users square measure approved ones to induce to the archives of information owner. With t question keywords, the approved user will produce a trapdoor TD as indicated by search management mechanisms to induce k encrypted documents from cloud server. By then, decipher the documents with the shared secret key. Cloud server stores the encrypted document accumulation C and therefore the encrypted searchable tree index I for information owner.

Within the wake of tolerating the trapdoor TD from the information user, look over the index tree I, lastly provides back the relating gathering of top-k settled encoded reports. Also, within the wake of tolerating the update data from the information owner, the server has to update the index I and document gathering C as per the received data. After insertion or deletion of a record, we have a tendency to need change synchronously the index. Since the index of DMRS theme is planned as a balanced binary tree, the dynamic operation is finished by redesigning hubs within the list tree. The report on record is simply in sight of archive acknowledges, and no entrance to the substance of records is needed.



System architecture

BDMRS Scheme:

In view of the UDMRS scheme, we build the essential element multi-keyword ranked search (BDMRS) scheme by utilizing the secure kNN algorithm. The BDMRS scheme is intended to accomplish the objective of privacy preserving in the known cipher text model. BDMRS scheme can secure the Index Confidentiality and Query Confidentiality in the known cipher text model.

EDMRS Scheme:

Cloud server has the capacity interface the same search requests by following way of visited nodes.The Cloud server recognize a keyword as the standardized TF distribution of the keyword can be precisely acquired from the last computed relevance scores. A heuristic strategy to further enhance the security is to break such correct quality. Hence, we can acquaint some tunable haphazardness with exasperate the significance score estimation. Likewise, to suit diverse users' inclinations for higher exact positioned results or better protected keyword privacy, the arbitrariness are set movable.

Dynamic Update Operation of DMRS:

After insertion or deletion of a record, we require to update synchronously the index. Since the index of DMRS scheme is planned as a balanced binary tree, the dynamic operation is done by redesigning hubs in the list tree. The report on record is just in view of archive recognizes, and no entrance to the substance of records is required.

ALGORITHM FOR SEARCHING:

Step 1 : Clusters the data into k groups where k is predefined.

Step 2 : Select k points at random as cluster canters.

Step 3 : Assign objects to their closest cluster canter according to the Euclidean distance function.

Step 4 : Calculate the centroid or mean of all objects in each cluster.

Step 5 : Repeat steps 2, 3 and 4 until the same points are assigned to each cluster in consecutive rounds.

Advantages of Proposed scheme

- It takes less time for searching process.
- It solves the problem even data set is large.
- It gives accurate searching results.

- It is flexible.

V. RESULTS AND DISCUSSION

We implement the propose scheme using java language in windows7 operation system and test its efficiency on real-world document collection. We compare our scheme with "Greedy Depth First Search" algorithm. Our scheme can also carry out the update operation without storing the index tree on data owner side. The experimental result proved that our scheme will obtain better search efficiency.

Sr. No	Existing scheme	proposed scheme
1	88%	89%
2	94%	92%
3	97%	98.3%
4	100%	95%
5	85%	82%
6	89%	88%
7	89%	86%
8	96%	72.5%
9	96%	86%
10	86.7%	79.7%
11	87.5%	78%
12	100%	92%
13	82%	95.6%
14	100%	100%
15	100%	98%
16	71.1%	93%
Avg. Precision =91%		Avg. Precision =93%

Table Comparison precision values

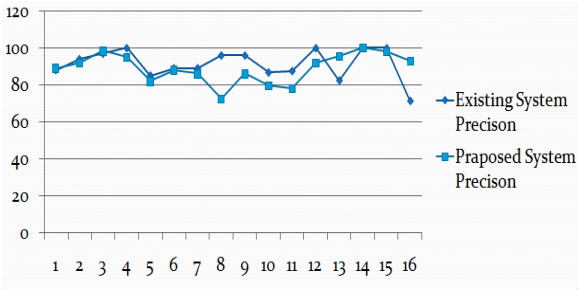


Figure 1. Graph for precision values

Table 1. Performance for searching files

Size/time	Greedy	K Means
10KB	0.9	0.7
20KB	1.6	1.4
40KB	3.2	2.8
80KB	6.2	4.9

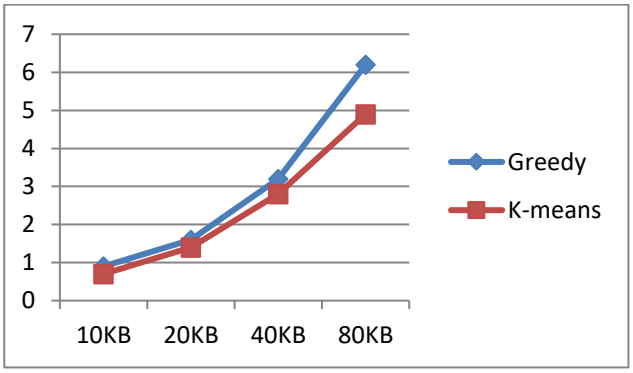


Figure 2. Graph for searching files

VI. CONCLUSION

The Proposed system display's accurate multi keyword ranked search result. Result will be displayed in the ranked format. Useful for perform dynamic operations. Existing system's precision ratio is 91% and proposed system's precision ratio is 93%. Searching time reduced by 3 sec in proposed scheme. For ex. 10kb file taking 0.9 sec in existing scheme where as proposed scheme it takes only 0.6 sec.

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Effectiveness of Audio-Visual Aids with Subsequent Structured Manual Instruction in Anatomy Dissection Hall Teaching

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ABSTRACT

The knowledge of anatomy plays an integral role in the education and practice of health care professionals. Cadaveric dissection is the most reliable method to teach the gross anatomy since centuries. Hands-on-educational experiences on cadavers can also stimulate student interest, increase knowledge retention and enhance development of clinical skills. Common problems faced during anatomy dissection are non-availability of individual instructor for each table, Crowding of students in dissection owing to lack of clear, timely and uniform instructions. Hence, the purpose of our study is to evolve a modality that will increase efficiency of dissection, make it more clinically relevant and make students enthusiastically participate in dissection. This modality will contribute more to overall better understanding of human anatomy within limited time period.

AIM AND OBJECTIVE: To study the effectiveness of audio-visual aids followed by structured manual instruction in dissection hall teaching and to compare the student's learning gain between conventional and modified dissection hall teaching.

OBSERVATIONS AND RESULTS: During the study period two hundred students were present in First MBBS, anatomy department. Out of these all two hundred students fulfilled the inclusion criteria and participated in the study. Mean post test score of study group was2.84±1.46 where as mean pre test score of control Group was3.7±1.8showing significant difference. The post test score of the study group was almost double the post test score of control group. This finding is statistically very significant.

CONCLUSION: Audio-visual aids, structured schedules, and cadaveric dissection were found to be effective in dissection hall teaching in anatomy. It was found to be more effective than conventional method with regard to understanding of the structure, its placement and building of the concepts.

Keywords : Audio-Visual Aid, Dissection Hall Teaching, Modified Dissection Hall Teaching, Cadaveric Dissection, Gross Anatomy Teaching

I. INTRODUCTION

The knowledge of anatomy plays an integral role in the education and practice of health care professionals.[1] The teaching of gross anatomy has for centuries relied on the dissection of human cadavers.[2-5] Most of the clinical skills and procedures require a thorough understanding of the spatial relationship between adjacent structures of the body.[6] Hands-on-educational experiences on cadavers can also stimulate student interest, increase knowledge retention and enhance development of clinical skills.[7-10] Common problems faced during anatomy dissection are non-availability of individual instructor for each tables, Crowding of students in dissection owing to lack of clear, timely and uniform instructions.There is a need to identify a strategy that makes dissection not only interesting but also more purposeful, clinically oriented and contribute more to overall understanding of human anatomy within a limited time period. In certain circumstances, the cadaveric dissection may not be an ideal tool for learning anatomy and can be replaced by or enhanced by tools like videos of cadaveric dissection or animated pictures.[11,12] Viewing the video clips in anatomy among medical students has been reported to improve on comprehension of theoretical knowledge and aid in long term memory retention in them.[13,23]

Hence, the purpose of our study is to evolve a modality that will increase efficiency of dissection, make it more clinically relevant and make students enthusiastically participate in dissection. This modality will contribute more to overall understanding of human anatomy within limited time period. Provision of structured schedules will also bring about objectivity and uniformity in dissection hall teaching. We hope that the modality can foster learning by having its role in affective domain, whereby it will engage learner interest and sustain motivation and ensure learners that there is uniformity in instructions on all dissection tables.

AIM:

To study of the effectiveness of audio-visual aids followed by structured manual instruction in dissection hall teaching.

OBJECTIVES:

1) To sensitize students and faculty about modified dissection hall teaching using audio-visual aids. 2) To assess student's performance or learning gain using conventional dissection hall teaching and modified dissection hall teaching using A-V aids 3) To compare the student's learning gain between conventional and modified dissection hall teaching.

II. METHODS AND MATERIAL

The present prospective study was conducted in Department of Anatomy, Jawaharlal Nehru Medical College, Sawangi, (Meghe), Wardha in collaboration with SHPER current academic year 2015-16.

Type of study: Non-randomized control study

Ethical clearances: Institutional Ethic Committee duly approved the study vide letter no. DMIMS(DU)/IEC/2014-15/968,Dated 15/12/2014

Duration of study: The study duration was one year during the period from 1st January 2015 to 31st December 2015. **Inclusion criteria:** All 200 student of 2015 batch admitted in 1st MBBS

1. The conventional method of dissection hall teaching:

The students are divided into twenty groups with ten students in each table. Two tables are allotted to one teacher. During dissection teacher delivers verbal instructions and then students do dissection by following steps given in Cunningham's manual. In case they find any difficulty, teachers guide them to find that particular structure.

2. The method for modified dissection hall teaching using audio-visual aids:

The study commenced by preparation of structured manual, audio-visual aids/video for dissection hall teaching, pre-test post-test questionnaire and observer's check list.

Methodology:

The faculty and students were sensitized and introduced the concept of modified dissection hall teaching. They were also sensitized regarding use of audio visual aids. All students willingly participated in the study and informed written consent was obtained from all the students from study group. **(Annexure II).**

Didactic lecture on thyroid region was taken for all 1st-MBBS 200 students. After that, validated pre-test of all 200 students was conducted. Then the students were divided into 2- batches of 100 each by convenience sampling into study group and control group. Following this, audio-visual aid of 20 minutes duration was projected in the E-museum to the study group. This was followed by provision of structured dissection manuals to the study group and dissection in a two hours dissection class. Instructions by the table teachers were given as per the dissection steps given in the manual on all the tables of study groups. This maintained uniformity in instructions on all tables. At the end of dissection class, teachers ensured that the students have seen all relevant structures.

This was followed by post test. The conduction of pre test and post test was observation- based. Check list was provided to the faculty during the process and were asked to give marking according to the structures identified.

Dissection class for the control group was conducted by conventional method using Cunningham's manual for dissection. They were also exposed to post-test.

Both control and study groups had equal number of total hours available for dissection and equal time duration for self study, due care was taken in this area. The students of control group were also exposed to new modality and their perceptions were also obtained. There were no dropouts from the study.

Data analysis and statistics:

The study included two hundred students from First MBBS 2015 batch, and it was conducted in department of anatomy.

The study was evaluated by comparing pre and post-test scores of both study group and control group.

Evaluation of the study was according to Kirkpatrik's model. The quantitative data obtained by pre and post-test scores for two groups was compared using unpaired "t" test. Paired t-test was also used for comparing the pre and post-test scores of individual group .For this demo version of software GraphPad InStat was used. [GraphPad Software Inc, San Digeo, USA].

III. RESULTS AND DISCUSSION

OBSERVATIONS & RESULTS:

During the study period two hundred students were present in First MBBS, anatomy department. Out of these all two hundred students fulfilled the inclusion criteria and participated in the study.

PRE TEST AND POST TEST SCORE

	Study group	Control Group
Mean pre test score ± standard deviation	2.84±1.46	2.75±1.2
Mean post test score ± standard deviation	6.58±1.44	3.7±1.8

Table 1. Shows the mean pre and post test scores of study and control Groups

Mean pre test score of study group was2.84±1.46 where as mean pre test score of Control Group was2.75±1.2 showing no significant difference. Mean post test score of study group was2.84±1.46 where as mean pre test score of control Group was3.7±1.8showing significant difference. (Table no. 1) The post test score of the study group was almost double the post test score of control group. This finding is statistically very significant.

ABSOLUTE LEARNING GAIN

It is to know the learning gain of the students in comparison to the maximum score.

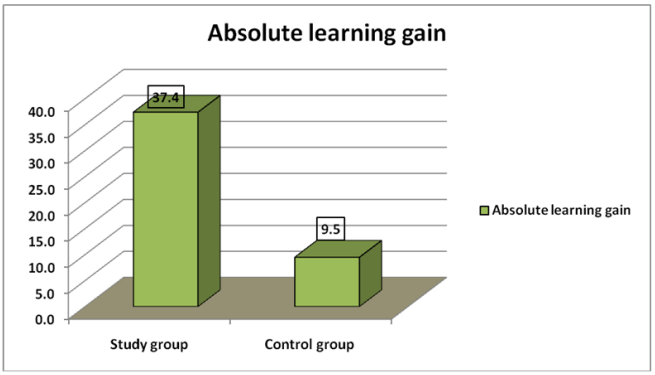
The absolute learning gain was calculated for study and the control group by using the following formula:

Absolute learning gain = {(Post test score – Pre test score)/Maximum score} x 100

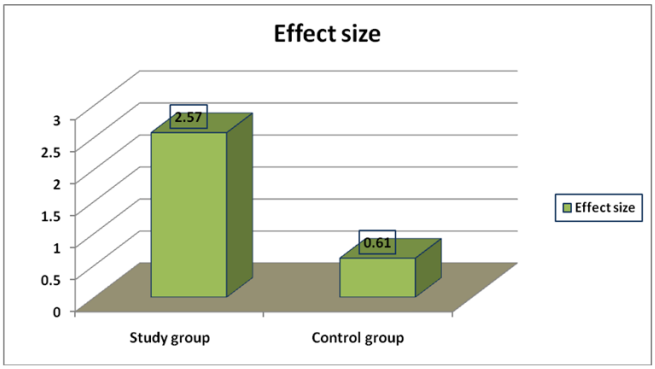
	Study group	Control Group
Absolute learning gain (%)	37.4%	9.5%

Table no. 2 shows the absolute learning gain for the study group was 37.4% whereas the absolute learning gain for control group was 9.5%. This observation is displayed in the form of a bar diagram in Graph no.1.

Interpretation – This test interprets the learning gain of the students in comparison to the maximum score of the test 37.4% and 9.5% for the study and Control group respectively and it is significant.(Table no. 2, Graph no.1)



Graph 1 : Bar diagram showing 'Absolute learning gain' score of Study and Control group.



Graph 2 : Bar diagram showing 'Effect size' of Study and Control group.

RELATIVE LEARNING GAIN

It is to know the learning gain of the students in comparison to the pre test score.
The relative learning gain was calculated for study and the control group by using the following formula:
Relative learning gain = {(Post test score – Pre test score) / Pre test score} x 100

	Study group	Control Group
Relative learning gain (%)	131%	34.5%

Table no. 3 shows the relative learning gain for the study group was 131% whereas the absolute learning gain for control group was 35.5%.

Interpretation - The learning gain of the students in comparison to the pre test score of the test is 131% and 34.5% for the study and Control group respectively and it is very significant.(**Table no. 3)**

EFFECT SIZE

It is the way to measure the effectiveness of a particular intervention

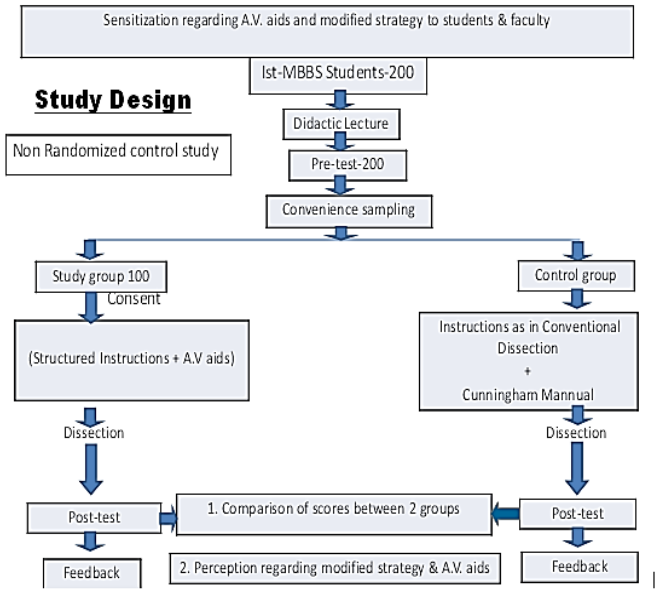
The effect size was calculated by using the following formula: Effect size=Post test score – pre test score/Avg. spread of std. deviation

Effect size	**Study group**	**Control group**
	2.57	0.61

Table no. 4 shows the effect size for the study group and the control group and the values are 2.57 and 0.61 respectively. These observations are displayed in the Graph no.2.

Interpretation: - Effect size is way to measure the effectiveness of a particular intervention. Effect size of the study group is 2.57 i.e. much more than that of the Control group (0.61). Hence, it can be concluded that the intervention is more effective than traditional approach. (**Table no. 4, Graph no.2)**

Plan of Work



DISCUSSION:

The traditional anatomy education based on structural anatomy taught through didactic lectures and complete dissection of the body guided by teacher has been replaced by many new teaching tools. In this era, where methods and time dedicated for teaching human anatomy are changing, it compels

anatomists to add effective teaching modalities for the medical students.

During our teaching experience in medical school for nearly two decades and from informal feedback from students, we have observed that students on different dissection tables are taught by different teachers with disparity in their instructions. To bridge this gap there is a need to design structured schedules and audio visual aids which will bring about objectivity and retain uniformity in dissection hall teaching.

The results of the work by Machado JA (2013) highlighted the value of imaging anatomy in learning human anatomy. Students' comments pointed out a need to focus teaching/learning programs toward a more practical rather than theoretical approach. In order to provide an optimal learning environment to students, it also seemed important to create improved media material as an additional resource tool.[11] In our study group 66% students commented that it will help to perform better in clinical posting period.

In the study by Chapman SJ et al (2013), 170 students (71%) responded to the survey. Overall, dissection was the single highest scored method, followed by prosection. Newer approaches such as models, computer software packages and living & radiological anatomy scored comparatively worse. The most suitable method for achieving individual learning objectives was variable with dissection perceived as most suitable for four out of nine objectives.[12] This is also reflected in our study that audio visual aid and structured schedule in dissection proved to be most suitable modality as perceived by the 86% students of the study group.

The faculty of anatomy at University of north Texas Health sciences centre (UNTHSC) had developed computer based dissection manual to adjust with their curricular changes and their time constraints. Even with strong priority and importance to the computerization of anatomy lab, they gave utmost importance to cadaveric dissection. R Bhatnagar et al (2013) reported that the time constraints had compelled the traditional teacher to only teach anatomy that was going to be clinically relevant to them in their subsequent practices. The dissection room teaching when complimented by structured tests would make the student focused for learning and enthusiastically participate in dissection within the given time frame which reflects from this study that 71% students agreed with the fact.[14]

The current crop of medical students is techno-savvy whose major part of the day is broadly influenced by visual and auditory communication. These undergraduate prefer animations over and above text books and however anathema it may seem to educator, this preference should be respected and incorporated in instructions to get the results.[15]

Rustin E. et al (2004) reported that the computer is a perfect medium for the delivery of complementary educational aids in Anatomy , such as cross sectional Anatomy and digital images of prosected cadaveric structures, as well as a highly efficient means of portraying dissection procedures linked to anatomic images. [16] This is comparable to our study in which 87% of the students agreed that audio visual aids should be there with the traditional teaching for dissection hall teaching.

Satendra Singh et al (2009) from their study on teaching styles and approaches have reported that the students disliked both Transparencies & Power Point slides for the monotony of the classes & lack of interest it generates among both the teacher & the students. Whereas Animation based lecture (ABL) was maximally accepted by students & majority of

students agreed that Animation based lecture (ABL) helped to sustain interest, visualize concepts better, remembering facts, applying knowledge and understanding facts better. [17] Animations base lecture is similar to the Teaching Learning modality used by us. In our study, we have got similar findings in favors of the use of audio visual aids.

Snigdha Mishra et al(2014) in their study in their study titled "Impact of noval method of teaching Anatomy of male perineum on undergraduate medical students," used the video recording of the dissected perineum, 2D images and 3D models to teach anatomy of perineum. They compared the effectiveness of this method with the traditional method of verbal teaching of dissection and found that the digital anatomical teaching tool i.e. video recording of dissection, 2D images and 3D models was very effective and enhances the understanding of the students. [18] In our study, we have got the similar findings. We have used the dissection video recording of thyroid region with commentary prior to the beginning of the dissection class. It was appreciated by 84% of the study group students and reported that the study material and structured schedule were very effective and it was very useful for retention of the topic, to understand the steps, procedure of the dissection and the locations of the structures better.

Sushil kumar and R. K. Zargar (2014) subjected the students for few tests and the tabulated learning objectives for the dissection during week were put up on notice board. It was observed that the students started taking active part in dissection. It gave the students an impetus to do better in the next test. The under achiever started asserting themselves. Outcome of each dissection were neat and better exposed structures. Each dissection was purposeful. The keenness to learn about the clinical aspect was the driving force to enter the dissection hall with enthusiasm and met the learning objectives which are comparable with the importance of structured schedule and learning gain.[19]

According to Lewis T. L. et al (2014) the strength of tablet technology lies in its ability to consolidate and present anatomical information to the user in the most appropriate manner for their learning style. The only question mark remains over the level of detail and accuracy of these applications. Innovative medical educators who embrace tablet technology will find that anatomy applications serve as a useful learning tool when used in conjunction with existing teaching setups,[20] which holds true for the present study also where 86% students agreed with the fact.
Lastly, the lecture effectiveness depends upon the teachers' skill like communicational skills, gesture, voice, handling of the subject and command over the language. Good communication skills are required that facilitate students to communicate effectively with one another.[21] Therefore whatever mode of instruction the teacher is using, his /her own personal abilities of verbal oration and oral teaching play a important role in educating the students and transferring the essence of a topic to them.[22] And if the teachers are not with the good communication skills, one of the way to dispense knowledge to the students in a effective way is audio visual aids and other technologies.

By conduction of the modality framed, we believe that the expected outcome would account for dividing the entire body dissection into the required number of structured schedules. The students remained focused because the schedule has specific learning objectives. The dissection of the part to be dissected was systematically done and the result of dissection was improved. The students started taking genuine interest which started lively academic

dissection in the dissection hall. To the best of our knowledge and literature search, we could not find any one study that combined real cadaveric dissection, audio visual aids and structured schedules, for the better understanding of the orientation of the structure in the body.

SUMMARY:

The amplitude of Teaching /Learning in dissection hall is fairly wide and within the time constraint, the teacher is compelled to be skimpy. The purpose of our study is to evolve a modality that will increase efficiency of the dissection, make it more clinically relevant and make students enthusiastically participate in dissection. This modality will contribute more to overall understanding of human anatomy within limited time period. Provision of structured schedules will also bring about objectivity and uniformity in dissection hall teaching. The improvement in the knowledge, was assessed in both groups study and control group by comparing pre-test and post-test scores. The mean score of study & control group was compared by unpaired't' test & paired't' test.

Overall to conclude, the modality was well accepted by the students. In order to provide optimal learning environment to students it is important to create improved multimedia material as an additional resource to utilizing new modalities in dissection hall teaching. In coming years each university in each discipline would modify, change and evolve a pattern that would bring in uniformity and objectivity in conduction of dissection classes.

IV. CONCLUSION

Audio-visual aids, structured schedules, and cadaveric dissection were found to be effective in dissection hall teaching in anatomy. It was found to be more effective than conventional method with regard to understanding of the structure, its placement and building of the concepts.

V. LIMITATIONS OF THE STUDY

Preparing audio-visual aids may be difficult with regard to time constraint and availability of trained multimedia technocrat.

VI. RECOMMENDATIONS

- Audio-visual aids, structured dissection schedule and cadaveric dissection in combination should be regularly utilised as a teaching learning method in dissection hall teaching for first MBBS students.
- It should be utilised in other disciplines also.
- There should be arrangement of Kiosk for repeated reference on all dissection tables.
- Each university/Institutions should modify, change and evolve a modality that would bring uniformity and objectivity in conduction of dissection classes.

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Modified SVPWM Algorithm for Three Level VSI With Synchronized and Symmetrical Waveforms

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ABSTRACT

To generate the required reference vector than triangle comparison based PWM techniques for three-level inverters the space vector based PWM (SVPWM) strategies contain broader choice of switching sequences. This space vector based PWM technique involves in various steps. These steps are computationally exhaustive. The SVPWM has been used in three phase inverter control system. The center-aligned PWM is the most effective way for the Microprocessor Control Unit implementation of the SVPWM, because it can easily generate the center aligned PWM of the multilevel inverters for generation of the signal of space vector pulse width modulation (SVPWM), this concept brings out the method. The inverter leg switching times are generated by this algorithm and middle vector switching times are centered in a sampled interval. The proposed algorithm does not require any sector identification. And it reduces the computational time as a result. The adjacent voltage space vectors are forming the small triangles it is called sectors. Multilevel converters can meet the increasing demand of power ratings and power quality associated with reduced harmonic distortion and lower electromagnetic interference. Furthermore to optimize switching waveforms, space vector pulse-width modulation algorithms offer great flexibility among them. Finally the results are verified through MATLAB/SIMULINK

Keywords : SVPWM Algorithm, VSI, Symmetrical Waveforms, PWM, SVM, FFT, MCU, EMC, ACIM

I. INTRODUCTION

Design the control system for three phase induction motor with help of modified Space vector modulation technique. It helps to reduce the harmonic in inverter design. The modified SVM technique is harmonic analysis is done by using the FFT based harmonic analysis. To generate the required reference vector than triangle comparison based PWM techniques for three-level inverters the Space vector based PWM strategies contain broader choice of switching sequences. This Space Vector based PWM technique involves in various steps. These steps are computationally exhaustive. (SVPWM) has been used in three phase inverter control system. The center-aligned PWM is the most effective way for the MCU implementation of the SVPWM, because it can easily generate the center aligned PWM. For the multilevel inverters for generation of the signal of space vector pulse width modulation (SVPWM), this concept brings out the method. The inverter leg switching times are generated by this algorithm and the middle vector switching times are centered, in a sampled interval. The proposed algorithm does not require any sector identification. And it reduces the computational time as a result. The adjacent voltage

space vectors are forming the small triangles. It is called sectors. Multilevel converters can meet the increasing demand of power ratings and power quality associated with reduced harmonic distortion and lower electromagnetic interference. To optimize switching waveforms, space vector pulse-width modulation algorithms offer great flexibility among them. And they are well suited for digital implementation.

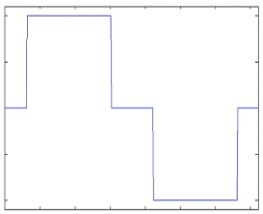
The concept of the PWM algorithms which is presented is extended for multilevel inverters. This paper presents a simple generalized scalar PWM algorithm for 2, 3 and 5-level inverters. By using the concept of imaginary switching times the proposed algorithm has been developed, which are proportional to the instantaneous sampled phase voltages only. Moreover, this proposed algorithm does not require the calculation of angle and sector information and hence reduces the complexity involved in the PWM algorithm.

Inverter

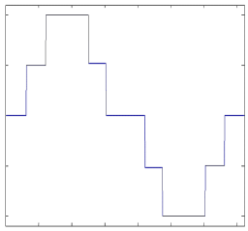
A power inverter, or inverter, is an electronic device or circuitry that changes direct current (DC) to alternating current (AC). The input voltage, output voltage and frequency, and overall power handling depend on the design of the specific device or circuitry. The inverter does not produce any power; the power is provided by the DC source. A power inverter can be entirely electronic or may be a combination of mechanical effects (such as a rotary apparatus) and electronic circuitry. Static inverters do not use moving parts in the conversion process.

Multilevel Inverter

Multilevel inverters provide another approach to harmonic cancellation. Multilevel inverters provide an output waveform that exhibits multiple steps at several voltage levels. For example, it is possible to produce a more sinusoidal wave by having split-rail direct current inputs at two voltages, or positive and negative inputs with a central ground. By connecting the inverter output terminals in sequence between the positive rail and ground, the positive rail and the negative rail, the ground rail and the negative rail, then both to the ground rail, a stepped waveform is generated at the inverter output waveform as shown in Figure.



3-level inverter



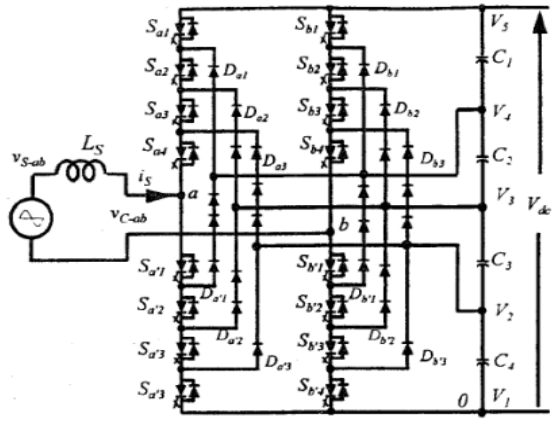
5-level inverter

The concept of utilizing multiple small voltage levels to perform power conversion was patented by an MIT researcher over twenty years ago. Advantages of this multilevel approach include good power quality, good electromagnetic compatibility (EMC), low switching losses, and high voltage capability. The main disadvantages of this technique are that a larger number of switching semiconductors are required for lower-voltage systems and the small voltage steps must be supplied on the dc side either by a capacitor bank or isolated voltage sources. The first topology introduced was the series H-bridge design. This was followed by the diode clamped converter which utilized a bank of series capacitors. A later invention detailed the flying capacitor design in which the capacitors were floating rather than series-connected. Another multilevel design involves parallel connection of inverter phases through inter-phase reactors. In this design, the semiconductors block the entire dc voltage, but share the load current. Several combinational designs have also emerged some involving cascading the fundamental topologies. These designs can create higher power quality for a given number of semiconductor devices than the

fundamental topologies alone due to a multiplying effect of the number of levels.

Diode clamped multilevel inverter

An m-level diode-clamp converter typically consists of (m – 1) capacitor on the dc bus produces m levels of the phase voltage. The above figure shows a single-phase full bridge five level diode-clamp converter in which the dc bus consists of four capacitors C_1, C_2, C_3, C_4. For a dc bus voltage Vdc the voltage across each capacitor is Vdc / 4, and each device voltage stress will be limited to one capacitor voltage level, Vdc / 4, through clamping diodes. If the inverter runs under pulse width modulation (PWM), the diode reverse recovery of these clamping diodes becomes the major design challenge.



Basic diode clamp inverter

Principle of operation

The new diode clamping inverter is shown in Fig. 2. For the five-level case, a total of eight switches and twelve diodes of equal voltage rating are used, which are the same with the conventional diode clamping inverter with diodes in series. This pyramid architecture is extensible to any level unless otherwise practically limited. A M-level inverter leg requires (M-1) storage capacitors, 2(M-1) switches and (M- 1) clamping diodes

Advantages

- High efficiency for the fundamental switching frequency.
- The capacitors can be pre-charged together at the desired voltage level.
- The capacitance requirement of the inverter is minimized due to all phases sharing a common DC link. Disadvantages:
- Packaging for inverters with a high number of levels could be a problem due to the quadrate

Some of the applications using Multilevel Diode Clamped converters are:

- An interface between High voltage DC transmission line and AC transmission line.
- High power medium voltage variable speed drives.
- Static VAR compensation

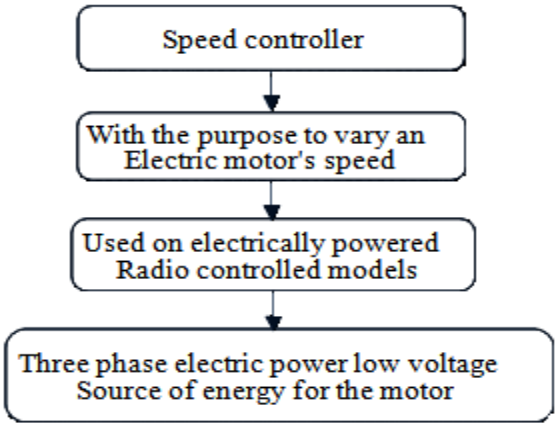
Induction motor control

The AC induction motor (ACIM) is the most popular motor used in consumer and industrial applications, and represented the "muscle" behind the industrial revolution. The concept of this "sparkles" motor was first conceived by Nicola Tesla in the late nineteenth century as a polyphone structure consisting of two stator phases in an orthogonal relationship. It has since been modified to the more common three phase structure, which results in balanced operation of the motor voltages and currents.

Speed controller

An electronic speed control or ESC is an electronic circuit with the purpose to vary an electric motor's speed, its direction and possibly also to act as a dynamic brake.

ESCs are often used on electrically powered radio controlled models, with the variety most often used for brushless motors essentially providing an electronically-generated three phase electric power low voltage source of energy for the motor. It has been represented in Figure.



Speed controller

Scalar control

Scalar control as the name indicates, is due to magnitude variation of the control variables only and disregards the coupling effects in the machine. For example, voltage of a machine can be controlled to control the flux, and the frequency or the slip can be controlled to control the torque. However, flux and torque are also functions of frequency and voltage respectively. In scalar control both the magnitude and phase alignment of vector variables are controlled. Scalar controlled drives give somewhat inferior performance, but they are easy to implement.

The motor control industry is a strong, aggressive sector. To remain competitive, new products must address several design constraints including cost reduction, power consumption reduction, power factor correction, and reduced EMI radiation. In order to meet these challenges, advanced control algorithms are necessary. Embedded control technology allows both a high level of performance and system cost reduction to be achieved. According to market analysis, the majority of industrial motor applications use AC induction motors. The reasons for this are higher robustness, higher reliability, lower prices and higher efficiency (up to 80%) on comparison with other motor types. However, the use of induction motors is challenging because of its complex mathematical model, its non linear behavior during saturation and the electrical parameter oscillation that depends on the physical influence of the temperature. These factors make the control of induction motor complex and call for use of a high performance control algorithms such as "vector control" and a powerful microcontroller to execute this algorithm. Scalar control is the term used to describe a simpler form of motor control, using non-vector controlled drive schemes.

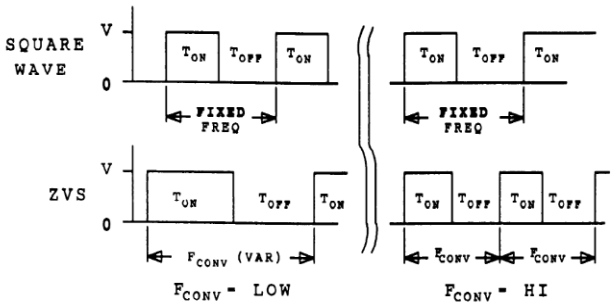
II. PULSE WIDTH MODULATION TECHNIQUES

PWM TECHNIQUES

Pulse-width modulation (PWM), or pulse-duration modulation (PDM), is a modulation technique used to encode a message into a pulsing signal. Although this modulation technique can be used to encode information for transmission, its main use is to allow the control of the power supplied to electrical devices, especially to inertial loads such as motors.

Pulse-width modulation (PWM), or pulse-duration modulation (PDM), is a modulation technique that conforms the width of the pulse, formally the pulse duration, based on modulator signal information. Although this modulation technique can be used to encode information for transmission, its main use is to allow the control of the power supplied to electrical devices, especially to inertial loads such as motors. The main advantage of PWM is that power loss in the switching devices is very low. When a switch is off there is practically no current, and when

it is on, there is almost no voltage drop across the switch.



Zero Voltage Switching Vs. Conventional SVPWM

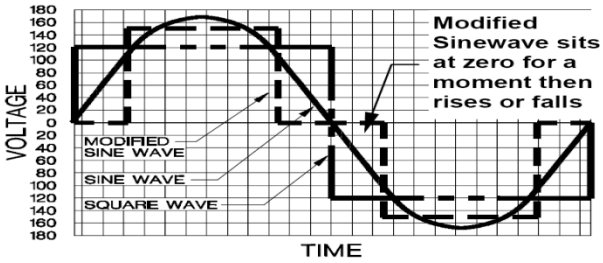
Multilevel pulse width modulation (PWM) inverters have been developed to overcome shortcomings in solid-state switching device ratings, so that large motors can be controlled by high-power adjustable-frequency drives. The most popular structure proposed as a transformer less voltage source inverter is the diode-clamped converter based on the neutral-point converter proposed. The two multilevel PWM methods most discussed in the literature are multilevel carrier-based PWM and multilevel space-vector PWM; both are extensions of traditional two level PWM strategies to several levels. Investigators have proposed carrier-based multilevel sine-triangle PWM schemes for control of a multilevel diode-clamped inverter used as a motor drive or static variable compensator. Others have generalized space-vector PWM theory for use with multilevel inverters. A third PWM method used to control a multilevel diode-clamped converter is with selective harmonic elimination. Medium/large motor drives, uninterruptible power supply (UPS) systems, and high-power inverters in flexible alternate current transmission systems (FACTS) need switching elements which can bear high voltages and currents.

Various PWM approach

To overcome the limitations of semiconductor switches, several new techniques and topologies have been developed, such as multiple switching elements in one leg of an inverter, series-connected inverters, parallel-connected inverters, multilevel reactive power compensators, multiple rectifiers for unity power factor correction, optimization of motor performance indexes (such as harmonic current, torque ripple, common mode voltage, and bearing currents), and neutral-point-clamped (NPC) inverters. This paper focuses on series-connected voltage-source PWM inverters. In this area, present control techniques are based on the following methods:

- Sinusoidal PWM (SPWM),
- Space-vector PWM (SVPWM)

The term multilevel starts with the three-level inverter introduced by Novae. Nowadays, multilevel converters are becoming increasingly popular in power applications, owing to their ability to meet the increasing demand of power ratings and power quality associated with reduced harmonic distortion and lower electromagnetic interference. Multilevel topologies have been used as rectifiers for the connection of renewable energy sources to the utility grid in and as a power-conditioning system of variable speed wind turbines. The combination of a large number of semiconductors to achieve high power ratings is well established. Choosing an arrangement where all devices are individually controlled, rather than switched together in series, provides more control opportunities. Voltage-source multilevel-inverter topologies, synthesize a voltage waveform from several voltage levels typically obtained from several capacitors or dc sources. The commutation of the power switches permits the addition of the voltages of these sources, which reach high voltage at the output, whereas the power semiconductors must withstand only reduced voltages.



Sinusoidal SVPWM

Carrier based PWM approach

Carrier based PWM methods employ the \per carrier cycle volt-second balance" principle to program a desirable inverter output voltage waveform. According to this principle, a sequence of inverter states is generated over a carrier cycle in a manner that for each phase the average value of the rectangular pulse output voltage approaches its reference voltage value. This principle has been utilized in DC/DC converters for a long time and is commonly termed as duty cycle control, or PWM control. However, its application to three phase VSI's is not as intuitive as the DC/DC converters. PWM-VSI modulator design and implementation is also substantially more complex than the DC/DC converter duty cycle controllers. This is so, because in a three phase PWM-VSI, the duty cycle of each switch is time variant both under steady state and dynamic operating conditions. In addition, the inverter output line-to-line voltages cannot be independently controlled by any switch, i.e. the VSI is a coupled system. Therefore, a detailed modulator study requires a knowledge of both microscopic (per carrier cycle) and macroscopic (over a fundamental cycle) behavior. Following the description of two carrier based PWM implementation techniques, the microscopic and macroscopic views will be provided.

Sine-triangle PWM technique

Two main carrier based PWM implementation techniques exist: the triangle intersection technique and the direct digital technique. In the triangle intersection technique, for example in the Sinusoidal PWM (SPWM) method. The reference modulation wave is compared with a triangular carrier wave and the intersections de ne the switching instants. Within every carrier cycle, the average value of the output voltage becomes equal to the reference value. In particular, in the digital implementation which employs the regular sampling technique, this result becomes obvious as the reference volt seconds precisely equals the output volt-seconds. This principle is illustrated. In the regular sampling technique, the modulation signals are sampled/output at the positive (and/or negative) peak of the triangular carrier cycle and held constant for the remainder of the carrier cycle. Although the early triangle intersection implementations mostly involved analog hardware circuits, the advent of low cost digital electronics rendered the analog solutions obsolete. Most present triangle intersection implementations involve high resolution digital PWM counters and comparators. Therefore, in this work the term triangle intersection is generally not associated with the analog implementations, and typically digital implementation is implied.

Space vector based PWM approach

The direct digital implementation involves the space vector theory. The space vector theory employs the following complex number transformation which transforms the three phase time domain variables X_a, X_b, X_c, to a time parametric complex number variable, i.e. a space vector X.

$$X = \frac{2}{3}(x_a + ax_b + a^2 x_c) \qquad (2.1)$$

In the transformation equation “a" represents the conventional 120 rotation operator, $e^{j\frac{2\pi}{3}}$, and “j” represents the imaginary axis unit. Applying this transformation to the seven discrete inverter states, the inverter voltage vectors , and the hexagon which the tip points of these vectors form are obtained. The inverter voltage vectors and the hexagon are illustrated details. This diagram is commonly termed as the space vector diagram. Applying the transformation to the three phase voltage references

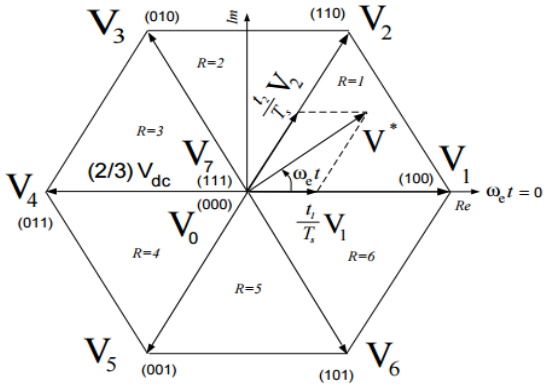
generated by the controller of a PWM-VSI drive, a reference voltage vector is also obtained. In the direct digital approach, the time integral of the reference voltage vector and the time integral of a selected sequence of inverter voltage vectors over a carrier cycle are equated. Of the available inverter voltage vectors, the two zero states and the two vectors adjacent to the reference voltage vector are selected to match the reference volt-seconds. The volt-second balance calculation gives the total time length of each adjacent inverter state and the total zero state time length. Once the inverter state time lengths are determined, the number and sequence of commutations are selected by the user.

Finally, the switch duty cycles are calculated from the data and loaded to the digital PWM counters to generate the selected output voltages. Since the approach does not involve a modulation signal, it is often termed as the direct digital approach, and this term will be adopted in the remainder of this thesis. Note in this method the duty cycles are recalculated for each carrier cycle, and therefore the regular sampling technique is implied. In both direct digital and triangle intersection methods, with the volt-second balance principle being quite simple, a variety of PWM methods have appeared in the technical literature; each method results from a unique placement of the voltage pulses in isolated neutral type loads. Following a modulation index definition, which will be immediately utilized, the freedom in placing voltage pulses in isolated neutral type loads will be discussed in detail.

Since the performance characteristics of a modulator are primarily dependent on the voltage utilization level, i.e. modulation index, it is helpful to de ne a modulation index term at this stage. For a given DC link voltage V_{dc} , the ratio of the fundamental component magnitude of the line to neutral inverter output voltage, V_{1m}, to the fundamental component magnitude of the six-step mode voltage, $V_{1m6\text{step}}$, is termed the modulation index M_i

$$M_i = \frac{V_{1m}}{V_{1m6step}} \qquad (2.2)$$

$$V_{1m6step} = \frac{2V_{dc}}{\pi} \qquad (2.3)$$



Space vector based PWM approach

Summary

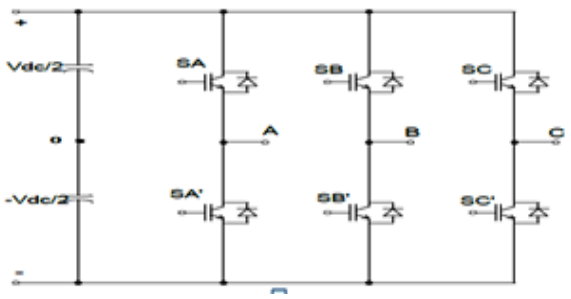
In this chapter has been discussed, the various pulse width modulation techniques and design of space vector modulation technique for multilevel inverter.

III. CONVENTIONAL SPACE VECTOR PULSE - WIDTH MODULATION

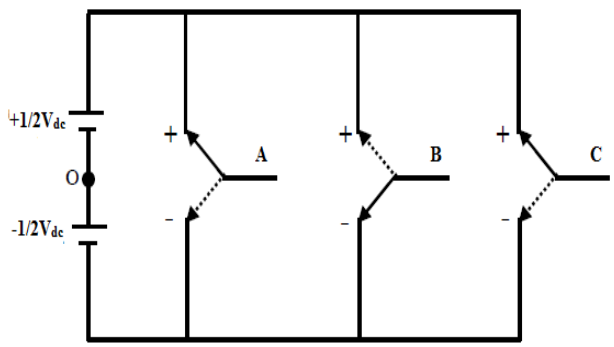
Space-vector modulation (SVM) is a well-suited technique to be applied to multilevel converters and is an important research focus in the last 25 years. Recently, a single-phase multilevel modulator has been introduced, showing its conceptual simplicity and its very low computational cost. In this work, some of the most conventional multilevel SVPWM techniques have been chosen to compare their results with those obtained with single-phase multilevel modulators. The obtained results demonstrate that the single-phase multilevel modulators applied to each phase are equivalent with the chosen well-known multilevel SVPWM techniques. In this way, single-phase multilevel modulators can be applied to a converter with any number of levels and phases,

avoiding the use of conceptually and mathematically complex SVPWM strategies.

Voltage source inverters (VSI) are used to generate three phase variable voltage and variable frequency of AC supply. In many applications AC three phase variable supply is required. Generally AC voltage is defined by amplitude and frequency. This algorithm essentially controls these two quantities. SVPWM controls average output voltage in a sampling period by producing switching pulses of variable duty cycles. The two-level VSI is shown in Figure. Two-level inverter consists of six power semiconductor devices. Every leg of inverter consists of two switches, but for understanding purpose every leg is represented by a single-pole double-through (SPDT) switch. Generally three phase load terminals are connected to any one of the pole of inverter legs, either to the positive dc side or negative side. VSI represents with SPDTs is shown in Fig.3.2, the pole voltages of inverter (V_{ao},V_{bo} and V_{co}) are measured with respect to the centre of the DC bus(O), ether the pole voltages either +1/2 V_{dc} or -1/2 V_{dc} at every instant. The position of leg is considered based on the pole voltage or the load terminal is connected to the positive side or negative side of DC bus. As in the Fig.3.3, A phase and C phase are connected to the positive DC bus and B phase is connected to the negative DC bus. This inverter state is represented as 101 or +-+. Every phase is connected to either positive or negative side of DC bus ant any instant of operation.

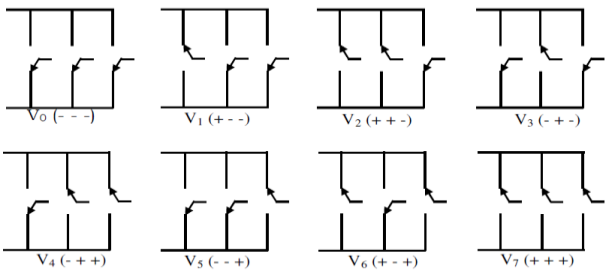


Three Phase Voltage Source Inverter



Three Phase VSI with SPDT Representation

The two-level VSI having the possible switching combinations are 2^3=8. These eight switching combinations are coded with 0 to 7, these eight switching states V_0(- - -), V_1(+ - -), V_2(+ + -), V_3(- + -), V_4(- + +), V_5(- - +), V_6(+ - +) and V_7(+ + +). The switching states V_0 and V_7, in this state the three phases of load is connected to the same dc voltage, effectively shorting the load hence no power is transferred to the load so these states are called as 'zero states' or 'null states'. At the remaining six switching states V_1 to V_6power is transferred between Dc source and load so it is called as 'active states' or 'active voltage states'. The eight possible switching combinations of inverter is shown in Figure.



Possible Switching States of Three-Phase VSI

Conventional SVPWM

The objective of the SVPWM method is to approximate the motor voltage vector by suitable combination of switching states corresponding to the basic space vectors. This requires that, for any small time period (normally the sampling period set by the program), the average inverter output voltage must be equal to the average reference voltageU_{out}. The

basic Space Vector orientations are shown in Figure 2. In this diagram, the reference voltage U_{out} is in sector 1 between U_0 and U_{60}. The required switching durations T1 and T2 corresponding to U_0 and $U_{60}$are given below.

$$\frac{T_1}{2} = \frac{m^* \cos(\alpha+30)}{(2^* f_{pwm})} \quad (3.1)$$

$$\frac{T_2}{2} = \frac{m^* \sin(\alpha)}{(2^* f_{pwm})} \quad (3.2)$$

Where,

U_0,U_{60},····· U_{300} = Basic space Voltage Vectors

$\propto$= Phase ange of output Vector(deg)

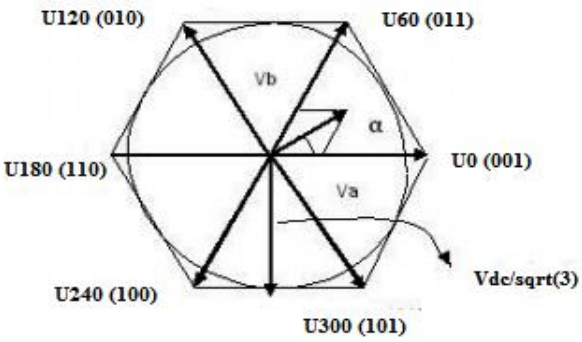
Modulation index is given by

$$m = \frac{U_{out}}{\left(\frac{V_{dc}}{sqrt(3)}\right)} \quad (3.3)$$

T1, T2 = Switching durations for U_0 and U_{60} vectors

Switching frequency is given by

$$f_{pwm} = \frac{1}{T_{pwm}} \quad (3.4)$$



The basic Space Vector orientations

For one sampling period

$$T_{pwm} * U_{out} = T_1.U_x + T_2.U_{x+\cdots 60} + T_0 \quad (3.5)$$

$$T_1 + T_2 + T_3 = T_{pwm} \quad (3.6)$$

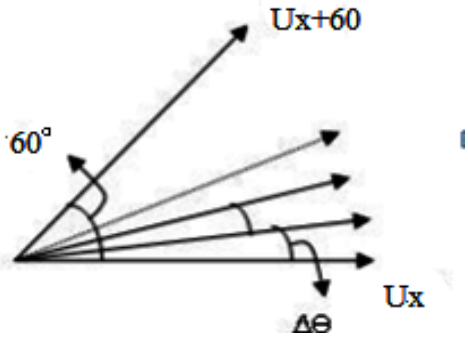
Where,

T_0 = Zero vector

U_{out} = Output reference voltage vector

V_{dc} = DC Link voltage

The step angle increment of the voltage vector in one sampling period (Figure 3) is considered as Δθ. Hence, the number of intermediate positions of the rotating Space Vector will be (60°/Δθ – 1). The compare register values T1, T2 for each angular position, can be easily calculated from equations before program execution and then obtained via a look-up table during execution. Only register values for one sector is required to be calculated, as the other sectors are treated exactly in the same way. The order of execution of the different sectors, however, depends on the direction of rotation of the motor and is accordingly set by the program. One complete cycle time of the AC output thus generated, is therefore (360°/ Δθ)* T_{pwm}.



The Step angle increment of the voltage vector in one sampling period

For a specified set of pole voltages of inverter (Vao, V_{bo}, V_{co}), the voltage vector Components of stationary reference frame (V_d, V_q) are found by the forward Clarke transform as

$$\overline{v_{ref}} = \frac{2}{3}\left(V_{ao} + V_{bo}e^{j\frac{2\pi}{3}} + V_{co}e^{j\frac{4\pi}{3}}\right) \quad (3.7)$$

The phase voltages are V_{an}, V_{bn} and V_{cn}. The relation between pole and phase voltages is given by

$$V_{an}=V_{ao}-V_{no};\quad V_{bn}=V_{bo}-V_{no};\quad V_{cn}=V_{co}-V_{no} \quad (3.8)$$

since, $V_{an}+V_{bn}+V_{cn}=0$

$$V_{no} = \frac{V_{ao}+V_{bo}+V_{co}}{3} \quad (3.9)$$

From (3.1) and (3.2) it is clear that the phase voltages V_{an},V_{bn}, V_{cn} also result in the same space vector $\overline{V_{ref}}$. The space vector $\overline{V_{ref}}$ can also be determined into two stationary frame namely $V_d$and V_q. The relationship between the instantaneous phase voltages V_{an},V_{bn}, V_{cn} and stationary components V_d, V_q can be given by the conventional three-phase to two-phase transformation as follows:

$$\begin{bmatrix} V_q \\ V_d \end{bmatrix} = \frac{2}{3}\begin{bmatrix} 1 & -\frac{1}{2} & -\frac{1}{2} \\ 0 & \frac{\sqrt{3}}{2} & -\frac{\sqrt{3}}{2} \end{bmatrix}\begin{bmatrix} V_{an} \\ V_{bn} \\ V_{cn} \end{bmatrix} \quad (3.10)$$

The instantaneous three phase voltages can be represented by a space vector in stationary reference frame. The vector having constant magnitude it is equal to the amplitude of voltages. The vector is revolving with angular speed $\omega=2\pi f$. The eight possible switching states of VSI are indicated as voltage space vectors in a two-level space plane as shown in Fig.

The active states can be represented by space vectors each of magnitude V_{dc} and divides the space vector plane into six equal sectors as shown in Fig.2.1. It can be shown that all the six active states can be represented by space vectors given by (3.5) forming a regular hexagon and dividing the space plane into six sectors each of 60^0, denoted as 1,2,…,6 as shown in Fig.

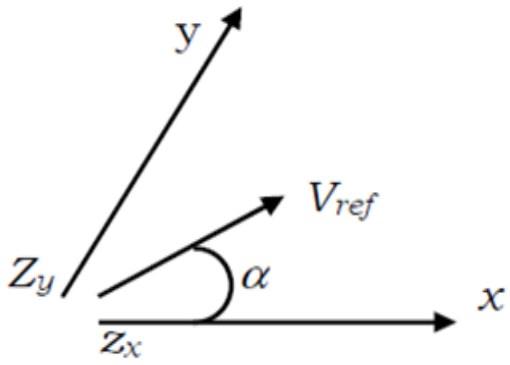
$$V_S = V_{dc} * e^{j(S-1)\Pi/3}, S = 1,2,..,6. \quad (3.11)$$

A group of switching states can be used, for maintaining the volt-second balance to generate during a sub cycle. This grouping of switching states, which generate a sample, is called as a 'switching sequence'. There are certain limitations, which must be imposed so as to produce a PWM waveform, which results in minimum ripple. Group of switching states are operating in a sample of time means to achieve desired value of output voltage. But it required some information regarding vector, where the tip of reference vector is located (number of sector), which are the nearer active and null states to operate a group.

The location of vector is identified based on the angle of reference vector 'α'. Angle of reference vector is finding by using (3.6).

$$\alpha = \tan^{-1}\frac{V_q}{V_d} \quad (3.12)$$

Hence, when the reference voltage vector is in a given sector, the active voltage state that can be applied are only those two, namely x and y, which vectors form the boundaries of that sector as shown in Fig.3.4. The zero state or null state, which is very close to x or just one switch away, can be referred to as Zx. The other zero state, which is closer to y, can be referred to as Zy. The active and zero states that can be applied for each sector are given in Table.



Active and Null States in a Sector

The reference vector collects the sample at equal intervals of time, *Ts* referred to as sampling time period or sub cycle. All the vectors in a group is not equally sampled in a all sub cycles of time period. Varies voltage vectors that can be produced by the inverter are applied over different times within a sample period such that the average vector produced over the sample period is equal to the sampled value

of the reference vector, in terms of angle (frequency) and magnitude.

Table : Active and Null States for Each Sector

Angle 'α'	Sector	Z_x	X	Y	Z_y
0-60	1	0	1	2	7
60-120	2	7	2	3	0
120-180	3	0	3	4	7
180-240	4	7	4	5	0
240-300	5	0	5	6	7
300-360	6	7	6	1	0

As all the six sectors are equal, here the discussion is restricted to sector-I only. Let T1, T2 and T_z be the duration for which the active states 1, active states 2 and zero state are to be applied respectively in a given sampling time period From the principle of volt-sec balance T_1, $T_2$and T_z can be calculate

$$V_{ref}\angle\alpha^\circ = \frac{2}{3}V_{dc}\angle 0^\circ * T_1 + \frac{2}{3}V_{dc}\angle 60^\circ * T_2 + 0 * T_z \quad (3.13)$$

$$V_{ref}(\cos\alpha + j\sin\alpha) * T_s = \frac{2}{3}V_{dc} * T_1 + \frac{2}{3}V_{dc}(\cos 60^\circ + j\sin 60^\circ) * T_2 \quad (3.14)$$

By equating imaginary and real terms

$$V_{ref}\cos\alpha * T_s = \frac{2}{3}V_{dc} * T_1 + \frac{2}{3}V_{dc}\cos 60^\circ * T_2 \quad (3.15)$$

$$V_{ref}\sin\alpha * T_s = \frac{2}{3}V_{dc}\sin 60^\circ * T_2 \quad (3.16)$$

From (3.9) and (3.10)

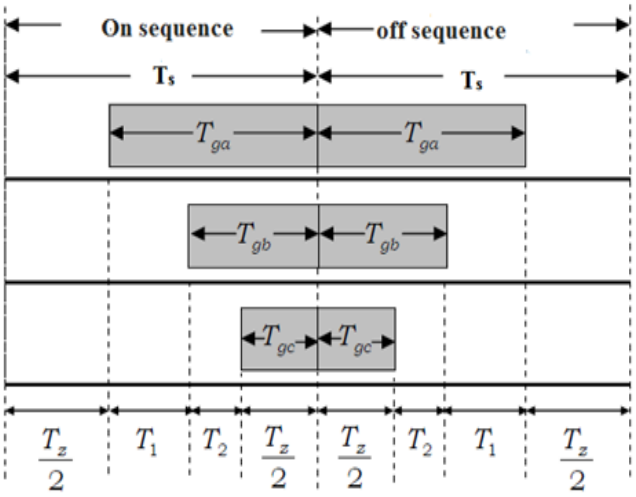
$$T_1 = \frac{Mi * T_s * \sin(60^\circ - \alpha)}{\sin 60^\circ} \quad (3.17)$$

$$T_2 = \frac{Mi * T_s * \sin\alpha}{\sin 60^\circ} \quad (3.18)$$

Here Mi is modulation index $Mi = \frac{3}{2}\frac{V_{ref}}{V_{dc}}$

$T_z = T_s - T_1 - T_2$ (3.19)

In SVPWM strategy T_z time duration equally divided forV_0 and V_7. In SVPWM strategy odd sectors and even sectors on sequence operate anti-clock-wise and clock-wise respectively. For sector-1 on-off sequence is 0127-7210, for sector-2 0327-7230. Generated gating pulse by using SVPWM algorithm in sector-1. In Fig.3.5.T_{ga},T_{gb} and T_{gc} denoted the on-time duration for upper switches of VSI, SA, SB and SC respectively. ON and OFF sequences for all sectors is tabulated in Table.



Generated Gating Pulses using SVPWM Algorithm

Table: ON and OFF Switching Sequences of each Sector for SVPWM

Sector Number	ON-Sequence	OFF-Sequence
1	0→1→2→7	7→2→1→0
2	0→3→2→7	7→2→3→0
3	0→3→4→7	7→4→3→0
4	0→5→4→7	7→4→5→0
5	0→5→6→7	7→6→5→0
6	0→1→6→7	7→6→1→0

Summary

Study about the Pulse with modulation technique for multilevel inverter, and also know about take the well know knowledge about the conventional modulation technique. The modulation technique is used inverter for maintain the harmonic level in the output voltage and current. That space vector level is increase the output comes well and low THD value.

IV. PROPOSED ALGORITHM FOR SVPWM

The Proposed space vector pulse width modulation (SVPWM) scheme is to reduce THD. In comparison with the traditional modulation scheme, under the Proposed strategy, the changing of switch states cause only one single phase voltage change at a time. Thus, the switching loss can be reduced. Using this novel modulation strategy, the changing of switch states cause only one single phase voltage change every time. The simulation study of space vector modulation technique of two levels Inverter reveals that space vector modulation technique utilizes DC bus voltage more efficiently and generates less harmonic distortion. All these methods aim at generating a sinusoidal inverter output voltage without lower-order harmonics. This is possible if the sampling frequency is high compared to the fundamental output frequency of the inverter. The performance of each of these control methods is usually judged based on the Total Harmonic Distortion (THD) of the voltage at the output of the inverter. The objective of this section is to propose and recommend modified SVPWM schemes that are best suitable for specific applications. Applications can be distinguished mainly based on their power level and hence the switching frequency or by the type of load. The choice of modification in SVPWM scheme was governed mainly by the performance criteria, namely THD. Analysis was first performed for each of these schemes to develop expressions for each scheme. Then the scheme was simulated in MATLAB/SIMULINK to verify the expressions developed.

In the first part of this chapter, the efficiency of SVPWM is matched and compared with that of SPWM. Based on the comparison made on the factors like THD, RMS AC voltage and harmonics spectrum, it is inferred that SVPWM technique has low distortion, higher RMS voltage, superior performance characteristics and extended output capabilities compared to SPWM technique at near-rated speed. Hence SVPWM technique is recommended for near-rated speed operation. Conversely, at low speed, the harmonic distortion is less in SPWM technique. Hence SPWM is suggested for low speed operation. Also it can be proposed that a hybrid approach of SPWM for lower speed operations with SVPWM for near-rated speed operation could yield the best usage of these two techniques.

Conditions for synchronization, TPS, HWS and QWS in terms of pole voltages

The processing of synchronization of the clock signal frequency with triangular carrier frequency is explained.

Synchronization

The synchronization is process to operate the inverter output voltage work same with respect to fundamental voltage. This process done by the PWM with satisfies the following condition

$$V_{RO}(2\pi \pm \theta) = V_{RO}(\theta)$$

$$V_{YO}(2\pi \pm \theta) = V_{YO}(\theta) \quad (4.1)$$

$$V_{BO}(2\pi \pm \theta) = V_{BO}(\theta)$$

The synchronization process must need to low switching frequency.

TPS (Three phase symmetry)

The three phase symmetry is necessary at low switching frequency for eliminate the low order harmonics. In these eliminate process the PWM is must satisfy the following condition.

$$V_{RO}(\theta) = V_{YO}(\theta + (2\pi/3)) = V_{BO}(\theta - (2\pi/3)) \quad (4.2)$$

or

$V_{RO}(\theta+(2\pi/3)) = V_{BO}(\theta)$

$V_{YO}(\theta+(2\pi/3))=V_{RO}(\theta)$ (4.3)

$V_{BO}(\theta+(2\pi/3)) = V_{YO}(\theta)$

HWS (Half wave symmetry)

The half wave symmetry eliminates the harmonics in the output voltage. That process is achieved by the pole voltage with opposite condition of it is angel and it is angel with 90° phase angle.

$V_{RO}(\pi \pm \theta) = -V_{RO}(\theta)$

$V_{YO}(\pi \pm \theta) = - V_{YO}(\theta)$ (4.4)

$V_{BO}(\pi \pm \theta) = - V_{BO}(\theta)$

Table: Conditions for Synchronization, TPS, HWS

	Synchronization	HWS	TPS	TPS
Pole voltage at θ	Pole voltage at θ ± 2π	Pole voltage at θ ± π	Pole voltage at θ+(2π/3)	Pole voltage at θ-(2π/3)
V_{RO}	V_{RO}	$-V_{RO}$	V_{BO}	V_{YO}
V_{YO}	V_{YO}	$-V_{YO}$	V_{RO}	V_{BO}
V_{BO}	V_{BO}	$-V_{BO}$	V_{YO}	V_{RO}

QWS (Quarter wave symmetry)

A combination of half-wave symmetry with either even or odd symmetry results in a wave with quarter-wave symmetry. For example, it Posses half-wave symmetry as well as odd symmetry. The wave shown in Fig. possesses both half-wave symmetry and even symmetry. The analytical test of quarter-wave symmetry is as follows: Odd quarter-wave.

The conditions for quarter-wave symmetry are as follows

For even quarter-wave:

$f(t)=-f(t+\frac{T}{2})$ and $f(t)=f(-t)$ (4.5)

For odd quarter-wave

$f(t)=-f(t+\frac{T}{2})$ and $f(t)=f(-t)$ (4.6)

Here, θ_{PR}, θ_{PY} and θ_{PB} are the instants at which the R-phase, Y-phase and B-phase fundamental waveforms have their positive or negative peaks respectively.

Table: Conditions for QWS

Pole voltage at $\theta_{PR}+\theta$	Pole voltage at $\theta_{PR}-\theta$
V_{RO}	V_{RO}
V_{YO}	V_{YO}
V_{BO}	V_{BO}

The conditions for synchronization and TPS, HWS and QWS are summarized in Tables

Conditions for synchronization, TPS, HWS and QWS in terms of inverter states

Synchronization:

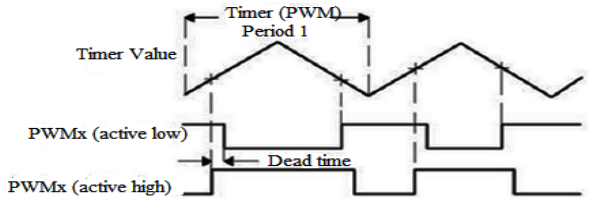
The word synchronization is coincide the time or rate between two signals. The fundamental voltage and out voltage is synchronization with time rate. That is achieving by the pulse width modulation by using the conditions.

Three phase symmetry

A centered or symmetric PWM signal is characterized by modulated pulses which are centered with respect to each PWM period. The advantage of a symmetric PWM signal over an asymmetric PWM signal is that it has two inactive zones of the same duration: at the beginning and at the end of each PWM period. This symmetry has been shown to cause less harmonics than an asymmetric PWM signal in the phase currents of an ac motor, such as induction and dc brushless motors, when sinusoidal modulation is used. Figure shows two examples of symmetric PWM waveforms.

The generation of a symmetric PWM waveform with a compare unit is similar to the generation of an asymmetric PWM waveform. The only exception is that GP timer 1 (or GP timer 3) now needs to be put

in continuous up-/down-counting mode. There are usually two compare matches in a PWM period in symmetric PWM waveform generation, one during the upward counting before period match, and another during downward counting after period match. A new compare value becomes effective after the period match (reload on period) because it makes it possible to advance or delay the second edge of a PWM pulse. An application of this feature is when a PWM waveform modification compensates for current errors caused by the dead-band in ac motor control. Because the compare registers are shadowed, a new value can be written to them at any time during a period. For the same reason, new values can be written to the action and period registers at any time during a period to change the PWM period or to force changes in the PWM output definition.



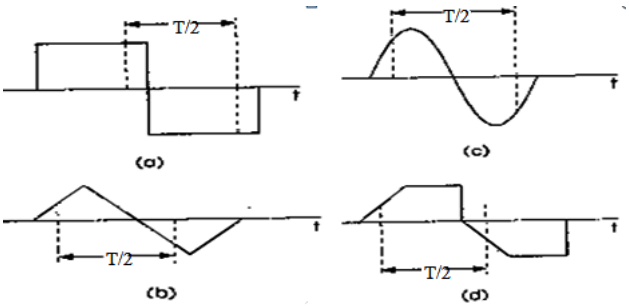
Symmetric PWM waveforms

Half-wave symmetry

A function f (t) is said to possess half-wave symmetry when

$$f(t)=-f(t)+(T/2) \qquad (4.7)$$

This means that for every positive value of f (t) in a period, there is a corresponding negative value of f (t), of the same magnitude at a distance of T/2. A wave possesses half-wave symmetry when the negative portion of the wave is the mirror image of the positive portion of the wave, displaced horizontally at distance T/2. Some of the waveforms possessing half-wave symmetry are shown in Fig. Half-wave symmetry, unlike even and odd symmetries, is hot a function of the choice of the point t = 0.



Half-wave symmetry waveforms

Proposed algorithm for SVPWM

This paper presents a novel space vector pulse width modulation (SVPWM) scheme to reduce switching loss. In comparison with the traditional modulation scheme, under the novel strategy, the changing of switch states cause only one single phase voltage change at a time. Thus, the switching loss can be reduced. Using this novel

Modulation strategy, the changing of switch states cause only one single phase voltage change every time. The simulation study of space vector modulation technique of two levels Inverter reveals that space vector modulation technique utilizes DC bus voltage more efficiently and generates less harmonic distortion. All these methods aim at generating a sinusoidal inverter output voltage without lower-order harmonics. This is possible if the sampling frequency is high compared to the fundamental output frequency of the inverter. The performance of each of these control methods is usually judged based on the Total Harmonic Distortion (THD) of the voltage at the output of the inverter. The objective of this section is to propose and recommend modified SVPWM schemes that are best suitable for specific applications.

Applications can be distinguished mainly based on their power level and hence the switching frequency or by the type of load. The choice of modification in SVPWM scheme was governed mainly by the performance criteria, namely THD. Analysis was first performed for each of these schemes to develop expressions for each scheme.

Then the scheme was simulated in MATLAB/Simulink to verify the expressions developed.

The steps involved in a simplified algorithm

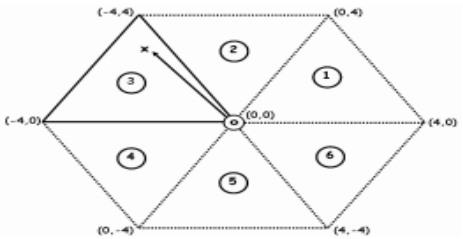
Sector identification

The sector identification can be done by using coordinate transformation of the reference vector into a two dimensional coordinate system. The sector can also be determined by resolving the reference phase vector along a, b and c axis and by repeated comparison with discrete phase voltages. After identifying the sector, the voltage vectors at the vertices of the sector are to be determined. Once the switching voltage space vectors are determined the switching sequences can be identified. The calculations of the duration of the voltage vectors can be simplified by mapping the identified sector correspond to a sector of two-level inverter. To obtain optimum switching, the voltage vectors are to be switched for their respective durations, in a sequence such that only one switching occurs as the inverter moves from one switching state to another.

But as the level of the inverter increases, the sector identification, switching vector determination and dwelling time calculation becomes more complex. The computational complexity and execution time increases. The duty cycles of reference voltage vector will be m1, m2 and 1 – (m1 + m2). The values of m1 and m2 are useful in identifying the region where reference vector is located, which is the major problem in case of multi-level inverters. In this paper, a correction to the duty cycles of reference vector is applied to easily identify the location of reference vector in each region of multi-level inverter. Then the appropriate switching sequence of the identified region and calculation of switching times for each state with the obtained duty cycles are estimated. This new SVPWM algorithm can be extended to higher level inverters also.

In the proposed work an approach based on fractals is used to find the sector which encloses the tip of the reference vector. Since the space vector representation of multilevel inverters has an inherent fractal structure, the sectors of higher level inverter can be generated by a technique called triangularization. The space vector representation of a 5-level inverter (only the vectors in the periphery are shown) and a reference space vector OX situated in basic sector 3. Here the term basic sector is used to represent the sector which is equivalent to the sector of a conventional 2-level inverter. The 60° coordinates corresponding to basic sector 3 are (0, 0), (-4, 4) and (-4, 0). In triangularization, each basic sector is divided into similar small triangular regions. This is achieved by finding the midpoints of the lines joining the vertices of the basic sector. Applying triangularization to basic sector 3 generates four similar sectors as shown in Fig.

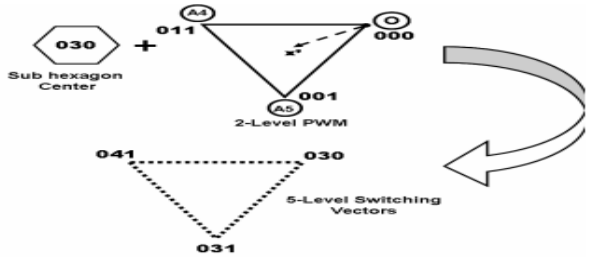
The new switching vectors formed by the process of triangularization are (-2, 2), (-2, 0) and (-4,2).the space vector representation of a 5-level inverter (only the vectors in the periphery are shown) and a reference space vector OX situated in basic sector 3. Here the term basic sector is used to represent the sector which is equivalent to the sector of a conventional 2-level inverter. The 60° coordinates corresponding to basic sector 3 are (0,0), (-4,4) and (-4,0). In triangularization, each basic sector is divided into similar small triangular regions. This is achieved by finding the midpoints of the lines joining the vertices of the basic sector.



Sector identification

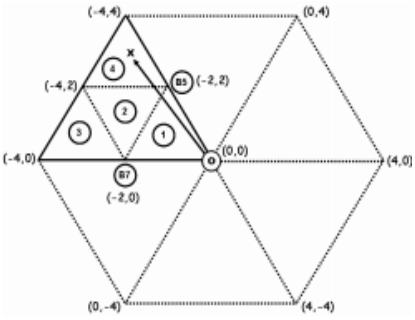
Shifting the modulating waves to the first sector

The proposed scheme also works in over modulation region. If the tip of the reference space vector OX lies outside the hexagon, it will be considered as over modulation region of operation. During over modulation, the vector representing sub hexagon center is not switched. The two other active vectors will switch for the entire
Sample period.



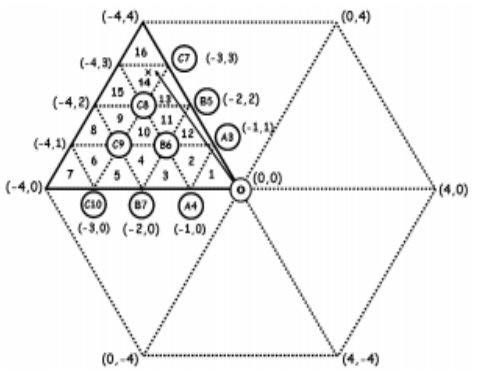
Shifting the modulating waves to the first sector

Subsector identification



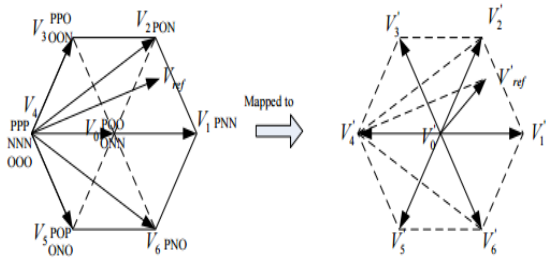
(a) Subsector identification

Applying triangularization to basic sector 3 generates four similar sectors .The new switching vectors formed by the process of triangularization are (-2,2), (-2,0) and (-4,2). Further triangularization will generate sixteen small sectors. The centric of each sector is also calculated as the average value of the vertices enclosing the sector. The sector with its centric closest to the tip of the reference space vector is taken as the sector of operation. The sector of operation identified for reference space vector OX is sector with number 14



b). Subsector identification

Computation of dwell times



Computation of dwell times

We can easily determine the dwell vector is ' V1 and ' V2 . The ' V0 can be taken as the zero vector in the 2-level SVPWM. So, we can get the following function:

$$V_1^{'}T_X + V_2^{'}T_Y + V_0^{'}T_Z = V_{ref}^{'}T_S \quad (4.8)$$

$$T_X + T_Y + T_Z = T_S \quad (4.9)$$

Combine the equation

$$(V_1 - V_{map1})T_X + (V_2 - V_{map1})T_Y + (V_0 - V_{map1})T_Z = (V_{ref} - V_{map1})T_S \quad (4.10)$$

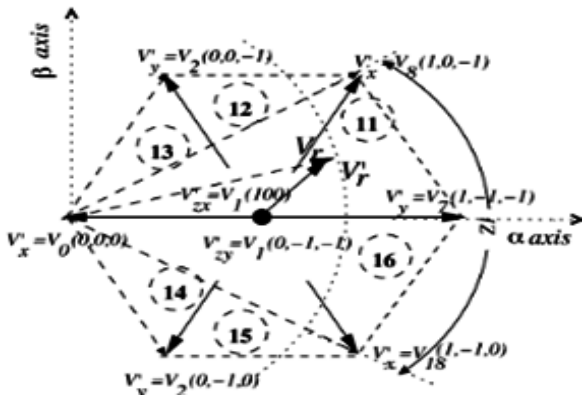
So,

$$T_X + V_2T_Y + V_0T_Z = V_{ref}T_S \quad (4.11)$$

The dwell time of ' V1 , ' V2 , and ' V0 can be calculated, the original vector dwell time can be determined. From the mapping in Figure 5, the vector selection and the dwell time calculation of the 3-level SVPWM are converted to 2-level SVPWM totally.

Selection of suitable switching sequences and states

Consider the above things we can easily identify suitable switching sequences of out process.



Mapping of vectors of sector 1 to fictitious vectors

Summary

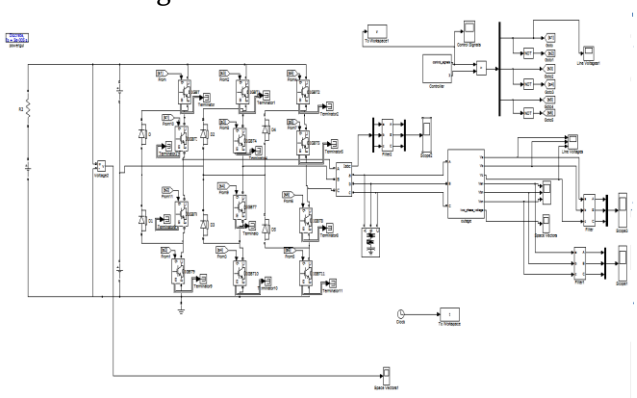
In this chapter has been discussed in details of proposed SVPWM Technique with various state and sectors. Based on this approach the THD is further reduce up to Significant range.

V. RESULT-ANALYSIS

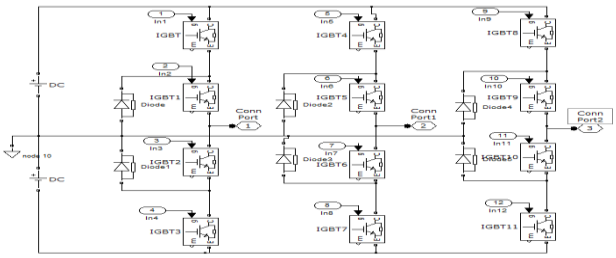
A modified algorithm for SVPWM is explained in the previous chapter. This algorithm applied to the IGBT based three-level Diode Clamped inverter and dc bus voltage maintained at 600V. To simulate the CSVPWM and MSVPWM using proposed algorithm, the motor is operated as a constant v/f control drive and the reference voltage is 0.866V_{dc} at 50Hz. The maximum switching frequency is 1.6 KHz.

Simulation results for CSVPWM and MSVPWM

The simulation circuit of the proposed work is shown in Fig5.1, and the three-level Diode Clamped inverter is shown in Fig.

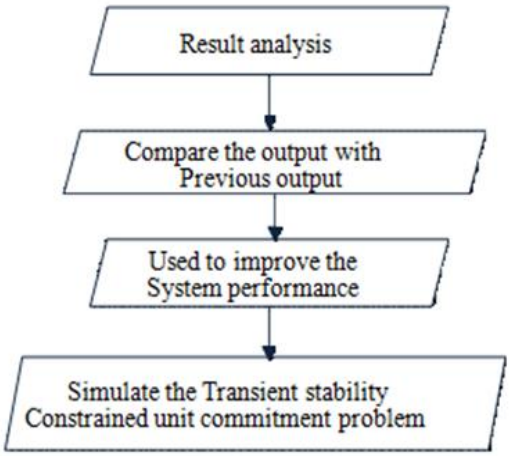


Simulation Model of the Proposed Work



Simulation Model of the Three-Level Diode Clamped Inverter

- In this module, we compare the output with previous output. It is very Helpful for identify the better result than existing methods.
- In this step used to improve the system performance.
- We simulate the Transient stability constrained unit commitment problem.
- The FFT based harmonic distortion is used to analysis the result for our proposed work



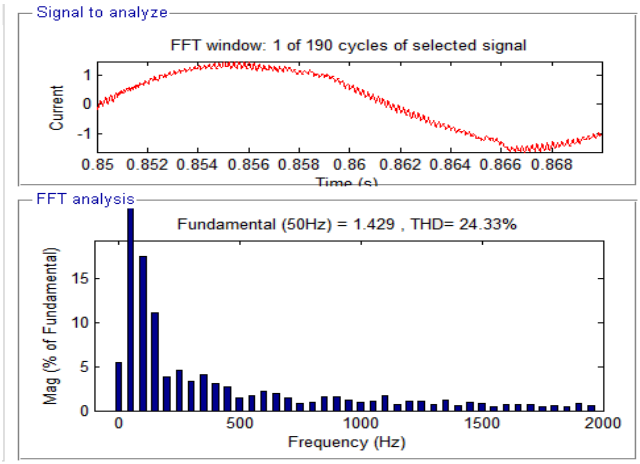
Result analysis of CSVPWM and MSVPWM

Simulation results of CSVPWM

The Simulation results of Conventional Space Vector Pulse Width Modulations are as follows.

Simulation results of the Harmonic Spectrum of stator Current for Conventional SVPWM

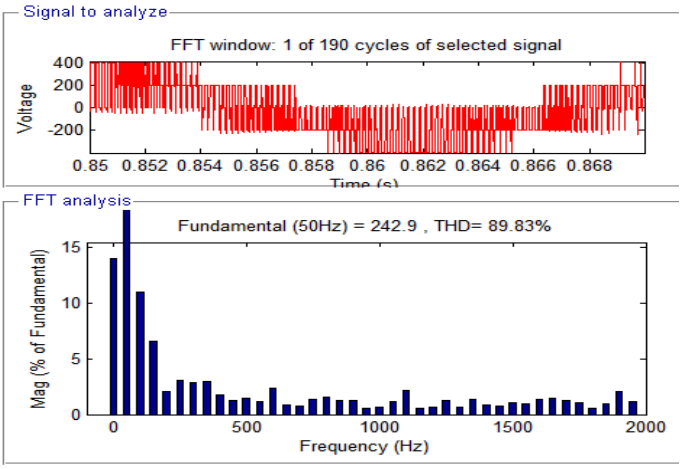
By using Simulink diagram we are observing the simulation results of the Harmonic Spectrum of stator Current for Conventional SVPWM as shown in figure.



Harmonic Spectrum of Stator Current Waveforms

Simulation results of the Harmonic Spectrum of Neutral Voltage for Conventional SVPWM

By using Simulink diagram we are observing the simulation results of the Harmonic Spectrum of for Neutral Voltage Conventional SVPWM as shown in Fig.



Harmonic Spectrum of Neutral Voltage Waveforms

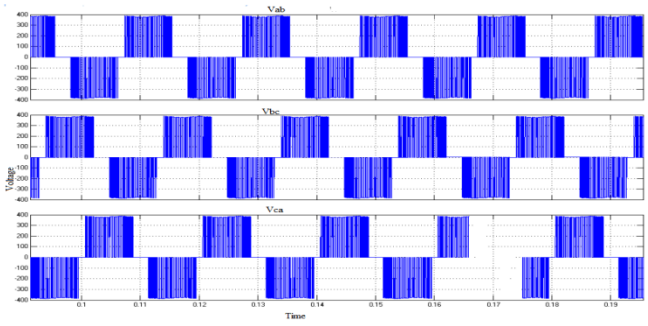
Simulation results of MSVPWM

The Simulation results of Modified Space Vector Pulse Width Modulations are as follows.

Simulation results for Modified Space Vector Pulse Width Modulation

Three-phase Three-level Line Voltages

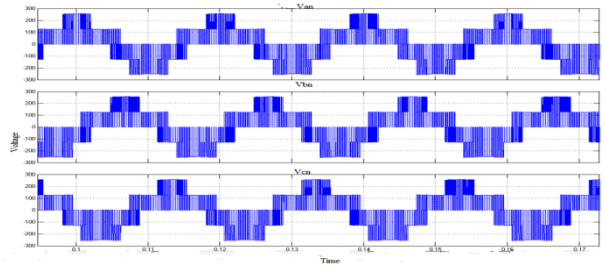
By using Simulink diagram we are observing the simulation results of the three-phase three-level Line Voltages for the Modified Space Vector Pulse Width Modulation as shown in Fig 5.6.



Three phase Three-Level Line Voltages

Simulation results for Modified Space Vector Pulse Width Modulation three-phase three-level Neutral Voltages

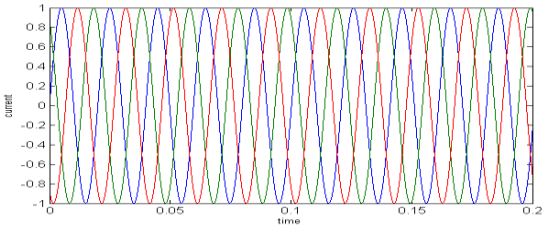
By using Simulink diagram we are observing the simulation results of the three-phase three-level Neutral Voltages for the Modified Space Vector Pulse Width Modulation as shown in Fig. 5.7.



Three phase Three-Level Phase Voltages

Simulation results for three-phase three-level output Currents

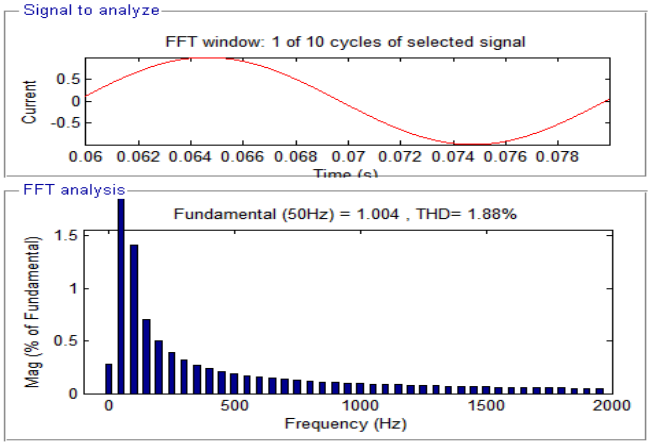
By using Simulink diagram we are observing the simulation results of the three-phase three-level output Currents of the Modified Space Vector Pulse Width Modulation as shown in figure 5.8.



Three phase Three-Level Output Currents

Simulation results of the Harmonic Spectrum of stator Current for Modified Space Vector Pulse Width Modulation

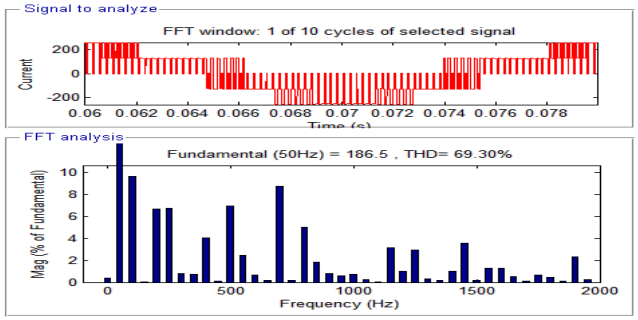
By using Simulink diagram we are observing the simulation results of the Harmonic Spectrum of stator Current for Modified SVPWM as shown in Fig.



Harmonic Spectrum of Stator Current Waveforms

Simulation results of the Harmonic Spectrum of Neutral Voltage for Modified Space Vector Pulse Width Modulation

By using Simulink diagram we are observing the simulation results of the Harmonic Spectrum of for Neutral Voltage for Modified SVPWM as shown in Fig. 5.10.



Harmonic Spectrum of Neutral Voltage Waveforms

Simulation results of Comparison Table of CSVPWM and MSVPWM

Table

	PHASE VOLTAGE THD (%) [M=0.86]	LINE CURRENT THD (%) [M=0.86]
Three phase three level for Conventional SVPWM	89.83	24.33
Three phase three level for Modified SVPWM	69.30	1.88

Regarding the table it is clearly explaining that for three phase three level Modified SVPWM has a phase voltage 69.30% of THD that have been improved by 20.53% of THD when compare with Conventional SVPWM has a phase voltage of 89.83%.

Similarly, comparing for both line current for conventional SVPWM is 24.33% of THD and Modified SVPWM is 1.88% of THD i.e, improved line current is 22.45% of THD.

VI. CONCLUSION & FUTURE SCOPE

Conclusion

It was shown that sinusoidal modulation generated in a space vector representation has the advantages of lower current harmonics and a possible higher modulation index compared with the three-phase sinusoidal modulation method. This reduces software complexity, decreases computation time, and increases the accuracy of the positioning of the switching instants. In this work, a modified SVPWM algorithm is presented for three-level diode clamped inverter. The proposed algorithm generates the switching pulses similar to a two-level inverter based SVPWM algorithm. Thus, the proposed algorithm

reduces the complexity involved in the existing PWM algorithms. To validate the proposed PWM algorithm, numerical simulation studies have been carried out and results are presented. From the simulation results, it can be concluded that the three-level inverter gives educed steady state ripples and harmonic distortion.

Future scope

The further extension of the proposed work as follows

- The proposed work can be implemented through digital controller like Dspace and FPGA.
- That PWM is controlled by the controllers like PI, Fuzzy, and PID etc. That controllers change the PWM based on the voltage. It will controlled by the frequency, amplitude of the output current and voltage. It is will reduce the voltage and harmonic with desired level.

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Tensile Bond Strength of Soft Liner to denture Base Resin Processed by two Commonly used Processing Techniques

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ABSTRACT

This study evaluated the effect of two commonly used methods of processing permanent soft liner on tensile bond strength between denture base and soft liner. Silicone based soft liner was used in this study. Ten heat cure dumbbell shaped specimens along with soft liner were processed together. Another ten heat cure dumbbell shaped specimens were fabricated and later relined with soft liner. All the specimens were subjected to tensile bond strength test. Specimens relined directly with soft liner at the time of processing the denture base resin showed significantly higher bond strength.

Keywords : Soft Liner, Heat Cure Denture Base Resin, Tensile Bond Strength

I. INTRODUCTION

Over the past century, poly methyl methacrylate denture base resin has been the material of choice for complete denture fabrication due to its low cost, adequate aesthetic properties and ease of manipulation. Patient using complete denture may experience discomfort due to thin and non-resilient oral mucosa and severe alveolar resorption. To alleviate these problems, resilient soft liners are used. Permanent soft liners are used to aid in distribution of functional loads to the denture bearing area, to avoid localized stress concentration, and to improve retention by engaging undercuts. Resilient liners are classified based on setting reaction as a chair side relining material and long term reliners. Long term reliners are mostly heat cured materials. Soft liners can be added to a new denture at the time of packing denture base resin. It can also be added to a already fabricated denture. There is not much research on the bond strength between soft liner and denture base resin processed by these two methods of relining the denture base resin. This study was done to determine the bond strength between denture base resin and soft liner processed by two common processing methods.

II. METHODS AND MATERIAL

Dumbbell shaped heat cure denture base resin specimens were fabricated to evaluate the bond strength. A standardized dumbbell shaped stainless steel die which is 5mmin diameter at the thinnest section and 20mm in diameter at the thickest section and 22mm in length was used to fabricate specimens. The metal die was duplicated in polyvinyl siloxane. Wax was melted and and poured into putty index and allowed to cool at room temperature. Fourty wax specimens were fabricated and divided into two groups.

Group 1: Specimens which were relined at the time of processing denture base resin

Group 2: Specimens relined after the denture base resin specimens were fabricated

Conventional compression mould technique was used to process all specimens in the study.

Group 1: Specimens which were relined at the time of processing denture base resin.

The base of the flask was filled with dental plaster and two dumbbell shaped wax specimens with metal spacer (Fig.1) in between was placed into first pour with only half of the specimen inside the plaster. Once the first pour was set, separating medium was applied and second pour of plaster was filled and flask was closed tightly using clamp. Dewaxing was done to remove wax. Separating medium was applied to the mould space prior to packing of acrylic resin. Heat cure denture base resin(DPI heat cure resin; Bombay ;India) was mixed according to the manufacturer instructions and packed into the mould with the 3mm metal spacer in the middle. Trail closure was done, excess resin and spacer were removed. Soft resilient liner (Molloplast B;Detax :Germany) was mixed and packed into the space created by the spacer. The flask was closed and processed in acryliser at 75 ^{0}c for one and half hours followed by 100 ^{0}c for 1 hour. Similar procedure was followed to obtain ten specimens of this group (Fig.2). The specimens were finished and stored in the distilled water until bond strength testing.



Figure 1: Dumbell shaped wax pattern

Group 2: Specimens relined after the denture base resin specimens were fabricated.

All the wax specimens were flasked by conventional method. Dewaxing was done. Heat cure denture base resin was mixed accordingly to manufacturer instructions and packed into mould space with metal spacer in the middle. The flask was closed under clamps and processed in acryliser at 75^{0}c for one and half hour followed by 100 ^{0}c for 1 hour. The obtain heat cured specimen was retrieved and finished and placed back into the mould. The metal spacer was removed. The soft liner was mixed according to the manufacturer recommendations and packed into the mould space obtained after removal of the spacer. The flask was closed and curing was done for 45 min at 100 ^{0}c. The specimens were retrieved and stored in distilled water at 37^{0}c.

Bond strength:

All the specimens were tested by universal testing machine (Minitech;Dax system Inc: India) for tensile bond strength. Each specimen was held in the universal testing machine and specimen was pulled apart at cross head speed of 5mm per minute(Fig.3). The load at which the specimen debonded was recorded. Tensile bond strength values obtained were tabled and statistically analysed.



Figure 2: Dumbell shaped heat cure acrylic resin specimens with soft liner



Figure 3: Testing of the specimens for tensile bond strength

III. RESULTS AND DISCUSSION

Results:

Table 1 : Comparison of tensile bond strength between two methods of soft liner processing. (Unpaired t test)

SNo	Group 1	Group 2
1	1.9721	0.3122
2	2.3128	0.2916
3	1.7821	0.2516
4	1.7585	0.2678
5	2.0937	0.3215
6	2.5121	0.2218
7	1.6821	0.2419
8	1.7218	0.2818
9	1.8016	0.2318
10	2.1226	0.2718
Mean	1.9730	0.2670
Standard deviation	0.2797	0.0333

The tensile bond strength values were subjected to unpaired t test. The mean tensile bond strength of specimens relined directly at the time of denture base resin was 1.97 MPa and mean tensile bond of specimens relined to already fabricated denture base specimens was 0.267 MPa (Table 1). Tensile bond strength of group 1 specimens was a significantly higher than the group 2 specimens.

Discussion:

Residual ridge resorption is a continuous process which is multifactorial but inevitable resulting in compromised retention of the prosthesis and trauma to underlying soft tissues. Application of resilient liner in the intaglio surface of the denture results in more even distribution of occlusal load and increases comfort to the patient. Soft liners reduce the traumatic effect that a denture may have on patients with atropic mucosa.

Resilient lining materials must have good adhesion to the acrylic resin denture base. Poor adhesion between the two materials can lead to functional and hygienic problems if they separate from each other during use.

Resilient soft liner can be applied directly to a new denture or a old denture can be relined with permanent soft liner. This present study evaluated the difference in bond strength between these two techniques. There is a significantly higher bond strength for soft liner applied directly to denture base material than the soft liner applied to already fabricated denture base resin.

The increase in bond strength between denture base and soft liner when applied directly at the time of processing of denture base could be due to better

control in resilient liner thickness and intimate adaptation between the denture base and soft liner.

IV. CONCLUSION

Within the limitations of the present study , the following conclusions are drawn. The mean tensile bond strength of soft liner relined directly to denture base resin during processing was 1.98 MPa. The mean tensile bond strength of soft liner relined to already processed denture base resin was 0.267 MPa. Bond strength of soft liner relined directly to the denture base resin during processing was significantly higher than the bond strength of the soft liner applied to already processed denture base resin.

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Modernization : "Modernization Among College Students"

Vasant Javiya
Shree V. N. Patel Kalyan Vidhyalaya, Babra, Amreli, Gujarat, India

ABSTRACT

The main purpose at present study was to find out mean difference certain personal modernization in college students the data sample consisted of 200 students among which 100 of girls and 100 boys selected from different area of rural and urban of Amreli city the research tool used for modernization by Ahaluvaliya (Hardhr) and Dr. Ashok kaliya (Rohak) and translate in to gujarati by Babubhai gaha It c consists of 45 items to check in 't' test and correlation of college students methods was used in modernization in gender and areas variables were showed not significant difference at 0.05 levels and correlation analysis showed that is positive in modernization of gender and areas result.

Keywords : Modernization, Hypothesis, Correlation

I. INTRODUCTION

Modernization theory both attempted to identify the social progress and development of societies and seeks to explain the process of social evolution modernization theory is subject to critical origination among socialist and free-market ideologies world systems theorists globalization theorists and dependency theorists among other. Modernization theory stresses not only the process of change but also the responses to that change it also looks at internal dynamics while referring to social and cultural structures and the adaptation of meal technologies modernization theory maintains that traditional societies will develop as they adopt more modern practices proponents of modernization theory claim that modern states are wealthier and more powerful and that their citizens are freer to enjoy a higher standard of living developments such as new data technology and the need to update traditional communication and production it is argued make modernization necessary or at least preferable to the status quo-plat view makes critique of modernization difficult since it implies that such developments control the limits of human interaction not vice versa. It also implies that human agency controls the speed and severity of modernization supposedly instead of being dominated by tradition societies undergoing the process of modernization typically arrive at farms of governance dictated by abstract principles. Traditional religious beliefs and cultural traits, according to the theory usually become less important as modernization takes hold.

Definitions:-

1) Modernization:-

As a process of social and cultural change modernization is triggered by industrialization and followed by increased social satisfaction and labor division even in absence of industrialization societies can experience social change. However modernization is a specific kind of social change which is the result of industrialization. The shift to an industrialization society can bring about both positive and negative out comes.

2) Culture :-

Culture refers to the behavior beliefs and all other products of a specific group people that are passed on from one generation of another in other words culture is some ideas and values that are established by the previous generation however, they are subject to change.

3) Technology:-

By technology it is meant the cultural information concerning how to make use of the material resources of the environment in order to remove human needs and desire technological products such as planes automobiles television the atom bump and more recently the computer digital media and the mobile phone have given rise to remarkable changes to our patterns of socialization social institution culture and daily social interactions.

4) Mass Media:-

The term mass media refers to a section of the media which is specially designed to reach Avery large number of people such as the population of a country this term was coined in the 1920s when the nationwide radio networks, magazines and mass circulation newspapers emerged.

Objectives :-

The main objectives at study were as under.

1) To menswear the modernization among rural and urban college students.
2) To menswear the modernization among girls and boys college students.
3) To menswear the correlation between gender and areas modernization among college students.

Hypothesis :-

To related objectives of this study null hypothesis were as under.

1) There will be no significant mean difference of modernization among rural and urban college students.
2) There will be no significant mean difference of modernization among girls and boys college students.
3) There will be no significant correlation between self-control of gender and areas of college students.

II. METHODS AND MATERIAL

Sample :-

In this Investigation total 200 subject were randomly selected 100 girls and boys college student there was ranging rural and urban college students.

Research tools :-

This purpose the following test tools were countered with their reliability, validity and objectivity mentioned in their respecter manuals. In present study one questionnaires used in this research.

Modernization :-

The questionnaires was developed by Dr. Ahaluvaliya (Harthar) and Dr. Ashok kaliya (Rohatak) and translated in to Gujarati by Babubhai gaha (2009) It consists of 45 items and five point. This inventory has test reliability. coefficient and validity at study.

Procedure of Data collection :-

According to purport at present study in vestigial explained the purpose at the study at the subject the whole procedure at filing the inventory was explained to them fully and elderly the instructions giver on the questions were explained to them it was also made dear to them that scares would be keep secret it was left any questions unans weral out that no subject encircled Bothe the and were given against question.

III. RESULT AND DISCUSSION

The main objective of present study was to study at self-control among college students four this prepare 't' test and correlation were used here result discussion of self-control and is as girls and boys and rural and urban as under.

Table 1. Showing the mean SD and 't' value at modernization in college student and girls and boys.

Variables	N	Mean	SD	t	Sing
Girls	100	174.13	61.72	1.40	N.S.
boys	100	165.32	12.08		

P < 0.05, P L < 0.01, N.S. = Not significant

The result obtained on the basic area at modernization reveals not significant in girls and boys college students.

We have seen table 't' calculation for modernization between girls and boys that 't' value was 1.40 which was on significance of 0.05 levels. Hence the hypothesis was accepted and it could be said there was no significant mean difference between girls and boys variable their modernization score.

Table 2. Showing the mean SD and 't' value at rural and urban college students.

Variables	N	Mean	SD	t	Sing
rural	100	167.12	13.13	0.83	N.S.
urban	100	172.33	61.71		

P < 0.05, P L < 0.01, N.S. = Not significant

The result obtained on the basic area at modernization reveals not significant in result and urban college students.

We have seen table-2 't' calculation for self-control between rural and urban that 't' value was 0.83 which was on significant at 0.05 levels. Hence the hypothesis was accepted and it could be said there was not significant mean difference between rural and urban college students.

Table 3. Showing the correlation between modernization of girls and boys and rural and urban college students.

Variable	N	R
Gender	200	
Area	200	0.41

IV. RESULTS AND DISCUSSION

Result at correlation analysis revealed that there is a positive correlation between modernization signification 0.41 we on say that correlation is positive correlation in gender and areas.

Discussion :

The following discussion has been on the basis of the finding of this student. There was no significant difference at college students is 't' value and correlation They was positive corrections between gender and areas.

V. CONCLUSION

The conceded for this study that modernization is in gender and area replanted with modernization to college students more than self control whereas girls, boys, rural and urban replanted more than self-control this students result reason of over load college students so we can see. These studies not affected different at other studies.

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Fuel Allocation and Lockout System

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ABSTRACT

In transport and Logistics business with the fierce competition, avoiding fuel theft through monitoring and management is a major concern throughout the world. In this paper the development of a secure fuel dispensing system with a digital fuelling record book is presented for the use of fleet based companies. The vehicle identification is done by the use of Wi-Fi. A fuel lockout system is implemented to shut down the fuel pump. The system uploads the fuel data to a server in custom hourly intervals chosen by the user.

Keywords: Arduino, Flow sensor, Keypad, Solenoid valve, Wi-Fi module, LCD, Relay.

I. INTRODUCTION

Fuel theft is a major problem for companies that use fleet vehicles since a lot of people see diesel as a form of currency. These vehicles run on company fuel and the fuel is bought in bulk and kept in tanks on site. With the hike in fuel prices, fuel theft has been on the rise. Since it is so easy to steal fuel from the tanks or vehicles for personal use, an efficient fuel tracking and allocation system is needed. A common practice of fuel theft is where drivers fill up a vehicle and then the fuel pump attendant giving false slips and getting cash in return.

The fuel-dispensing system must be able to distinguish vehicles owned by the company, dispense a certain amount of fuel into the vehicle and record the event on a server with details such as the vehicle that was fuelled and the amount of fuel dispensed into the vehicle. This information must be sent to the user or owner's mobile phone the minute that the vehicle was refuelled.

BLOCK DIAGRAM

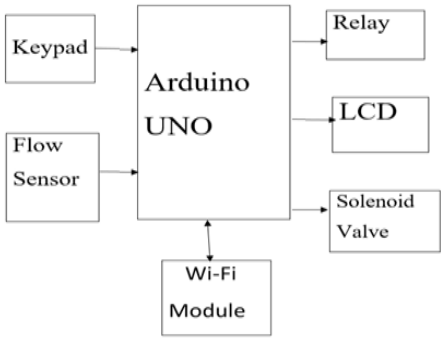


Figure 1 : A basic block diagram of fuel allocation and lockout system

II. OPERATION

- Program dump into the Arduino by using embedded C through the cable.
- With the help of keypad we can enter the data to fill the fuel tank which can show on LCD.
- Later the data sends to the owner of the vehicle and relay will be on.
- Flow sensor allows the fuel to fill the tank upto the data entered by the user & automatically locks the system and relay will be off if extra fuel consumes

III. PROPOSED METHOD

Further options such as GSM,GPS tracking, fuel consumption calculations, odometer readings and fuel tank capacity could be considered to dramatically decrease fuel theft.

These added functionalities can ensure that a vehicle cannot be refuelled with more than its capacity compared with the vehicles fuel consumption as well as the distance the vehicle travelled, thus the system will be able to calculate whether fuel was stolen directly from the vehicles fuel tank All paragraphs must be indented. All paragraphs must be justified, i.e. both left-justified and right-justified.

IV. RESULT

Owner of the vehicle gets the information in the form of either normal message or twitter message which shows below figures

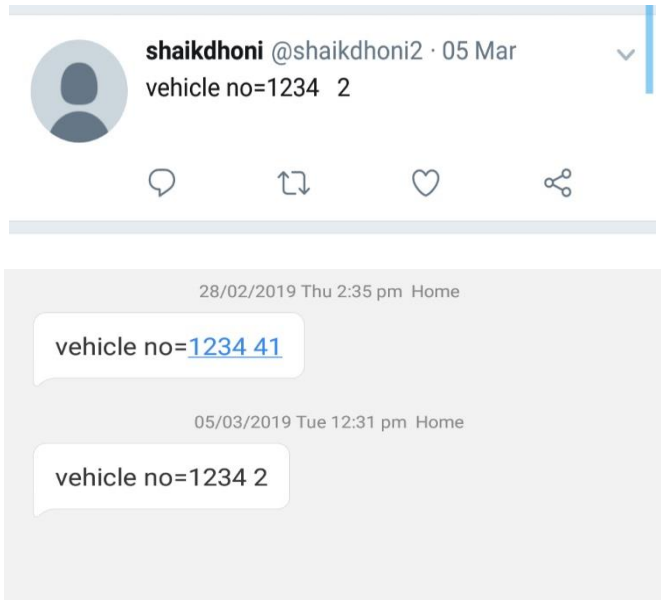


Figure 2 : A sample message information

ADVANTAGES

- Able to record fuel data correctly.
- It is easy to identify the vehicles.
- Applies the lockout method.
- Notify the user through SMS.
- Fuel theft is not possible.

V. CONCLUSION

The system designed is to be used as a secure fuel dispenser as well as a log book generator for fleet based companies. It was successfully demonstrated that by the use of the selected technologies a tamper proof system can be established where fuel theft is impractical. The system in its current state is able to log fuel data correctly, identify vehicles, apply the lockout method, notify the user via SMS and upload data to the server.

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Phishing Detection Using Visual Cryptography

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ABSTRACT

Phishing is an attempt by an individual or a group to thieve personal confidential information such as passwords, credit card information etc from unsuspecting sufferer for burglary, financial gain and other criminal activities. The first defense should be strengthening the authentication mechanism in a web application. A simple username and password based authentication is not sufficient for web sites providing critical financial transactions. Here we have advised a new way for phishing websites classification to solve the problem of phishing. Phishing websites involves a collection of key within its content-parts as well as the browser-based security indicators provided along with the website. The use of images is try to keep the privacy of image captcha by dissolve the original image captcha into two shares that are stored in separate database servers such that the original image captcha can be acknowledged only when both are available together the individual sheet images do not confess the status of the original image captcha. Once the original image captcha is announced to the user it can be used as the password. Several solutions have been suggested to handle phishing.

Keywords : Phishing Websites, Visual Cryptography, Image Processing, Antiphishing.

I. INTRODUCTION

Online transactions are nowadays become very common and there are various attacks present behind this. In these types of various attacks, phishing is determined as a major security threat and new inventive ideas are rising with this in each second so defending mechanism should also be so powerful. Thus the security in these cases be very high and should not be easily tractable with implementation easiness. Today, most applications are only as secure as their basic system. Since the design and technology of middleware has improved regularly, their detection is a difficult problem. As a result, it is nearly impossible to be sure whether a computer that is connected to the internet can be considered believable and secure or not. Phishing blackmail are also becoming a problem for online banking and e-commerce users. The query is how to handle applications that needs a high level of surveillance. Phishing is a form of online identity theft that plans to take responsive information such as online banking passwords and credit card information from users. Phishing scams have been receiving huge press coverage because such attacks have been expanded in number and elegance. one definition of phishing is given as “it is a criminal activity using social engineering techniques. Phishers attempt to dishonestly acquire precise information, such as passwords and credit card details, by pretend as a trustworthy person or business in an electronic communication”. The conduct of identity theft with this acquired sensitive information has also become easier with the use of technology and identity theft

can be described as “a crime in which the impostor obtains key pieces of information such as Social Security and driver's license numbers and uses them for his or her own gain”. Phishing attacks built upon a mix of technical duplicity and social engineering practices. In the majority of cases the phisher must get the person to willingly perform a series of actions that will provide access to secret information. Communication channels such as email, WebPages, IRC and instant messaging services are popular. In all cases the phisher must act like a trusted source for the user to believe. To date, the most successful phishing attacks have been initiated by email – where the phisher impersonates the sending authority So here introduces a new method which can be used as a safe way against phishing which is named as "A novel approach against Anti-phishing using visual cryptography". As the name suggests ,here the website cross checks its own identity and confirms that it is a trusted website (to use bank transaction, E-commerce and online booking system etc.) before the end users and make the both the sides of the system secure as well as an authenticated one. The approach of image processing and an improved visual cryptography is used. Image processing is a method of converting an input image and to get the output as either enhanced form of the same image and/or quality of the input image. Visual Cryptography (VC) is a approach of encrypting a secret image to shares, such that assembling a acceptable number of shares that confess the secret image.

II. LITERATURE SURVEY

THE FOG COMPUTING PARADIGM: SCENARIOS AND SECURITY ISSUES

AUTHORS: I. Stojmenovic and S. Wen

YEAR: 2014

DESCRIPTION

Fog Computing is a paradigm that extends Cloud computing and services to the edge of the network. Identical to Cloud, Fog provides data, compute, storage, and application services to end-users. Elaborate the motivation and advantages of Fog computing, and analyze its applications in a series of real scenarios, such as Smart Grid, smart traffic lights in vehicular networks and software defined networks. Security and privacy issues are further admit according to current Fog computing standard. As an example, study a typical attack, man-in-the-middle attack, for the discussion of security in Fog computing. Consider the private features of this attack by reviewing its CPU and memory utilization on Fog device.

MERITS

Fog computing advantages for services in several domains, and provide the analysis of the state-of-the art and security issues in current paradigm

DEMERITS

Portability between Fog nodes, and between Fog and Cloud, can be checked.

ANTIPHISHING THROUGH PHISHING TARGET DISCOVERY

AUTHORS: L. Wenyin, G. Liu, B. Qiu, and X. Quan

YEAR: 2012

DESCRIPTION

Phishing attacks are growing in both volume and sophistication. The ant phishing method described here collects WebPages with either a direct or indirect association with a given suspicious webpage. This enables the discovery of a webpage’s so-called “parasitic” community and then ultimately its phishing target that is, the page with the strongest parasitic relationship to the suspicious webpage. Discovering this goal lets users conclude whether the given webpage is a phishing page.

MERITS

If the advertising link is detected as phishing, and its target is found, the target owner can be notified and take necessary action.

DEMERITS

When the attack begins, the time these solutions require to verify the attack demonstrates that they don't effectively protect users.

A PAGERANK BASED DETECTION TECHNIQUE FOR PHISHING WEB SITES

AUTHORS: A. N. V. Sunil and A. Sardana

YEAR: 2012

DESCRIPTION

Phishing is an attempt to acquire one's information without user's knowledge by tricking him by making similar kind of website or sending emails to user which looks like legitimate site or email. Phishing is a cyber attack, which is causing severe loss of savings to the user, due to phishing attacks online transaction users are rejecting. To design and implement a new technique to detect phishing web sites using Google's Pagerank. Google provides a Pagerank value to every website in the web. The Pagerank value and other features are used here to segregate phishing sites from normal sites. The collected a dataset of 100 phishing sites and 100 legitimate sites for our use. By using Google Pagerank technique 98% of the sites are positively detected , showing only 0.02 false positive rate and 0.02 false negative rate.

MERITS

This technique will easily classify the phished URL"s. Phishing sites will have very less GTR value so they can be easily identified as phished sites by using the values of this heuristic and other five heuristics.

DEMERITS

The system can be implemented by adding more heuristics to the technique proposed to attain high accuracy rate to classify the phishing sites from the legitimate sites.

SOFTWARE-DEFINED NETWORK FUNCTION VIRTUALIZATION: A SURVEY

AUTHOR: Y. Li and M. Chen

YEAR: 2015

DESCRIPTION

Diverse proprietary network appliances increase both the capital and operational expense of service providers, meanwhile causing problems of network ossification. Network function virtualization (NFV) is recommended to address these issues by carrying out network functions as pure software on commodity and general hardware. NFV allows adjustable facilities, arrangement, and centralized management of virtual network functions. Along with SDN, the software-defined NFV architecture further offers lively traffic steering and joint increase of network functions and resources. This architecture gains a wide range of applications (e.g., service chaining) and is becoming the superior form of NFV. In this survey, a thorough investigation of the development of NFV under the software-defined NFV architecture, with an emphasis on service chaining as its application. First recommend the software-defined NFV architecture as the condition of the art of NFV and present connection between NFV and SDN. Then, provide a historic view of the involvement from middle box to NFV. Finally, Introduce significant challenges and relevant solutions of NFV, and discuss its future research directions by different application domains.

MERITS

Introduce NFV its relationship with SDN. Also look at the history of NFV, presenting how middle boxes evolve to virtual network functions.

DEMERITS:

The obtained higher resource utilization will introduce less investigation on the hardware equipments.

PHISHING WEB PAGE DETECTION

AUTHOR: L. Wenyin, G. Huang, L. Xiaoyue, X. Deng, and Z. Min

YEAR: 2005

DESCRIPTION

An approach to detection of phishing WebPages based on visual similarity is proposed, which can be utilized as a part of an enterprise solution to anti-phishing. A legitimate webpage owner can use this approach to search the Web for suspicious WebPages which are visually similar to the true webpage. The approach first decomposes the WebPages into salient (visually distinguishable) block regions. The visual similarity between two WebPages is then evaluated in three metrics: block level similarity, layout similarity, and overall style similarity. A webpage is stated as a phishing suspected if any of them (with regards to the true one) is above than its comparable preset opening. Preliminary experiments show that the approach can successfully detect those phishing WebPages with few false alarms at a speed adequate for online application.

MERITS

A true webpage owner can use this approach to detect phishing WebPages.

DEMERITS

This approach is limited to detection of this kind of phishing attacks.

ANFIS : ADAPTIVE-NETWORK-BASED FUZZY INFERENCE SYSTEM

AUTHOR: J.-S. R. Jang

YEAR: 1993

DESCRIPTION

The architecture and learning procedure underlying ANF'IS (adaptive-network based fuzzy inference system) is presented, which is a fuzzy inference system implemented in the framework of adaptive networks. By using a hybrid learning procedure, the proposed ANFIS can construct an input-output mapping based on both human knowledge (in the form of fuzzy if-then rules) and stipulated input-output data pairs. In the imitation, the ANFIS architecture is engaged to model nonlinear functions, recognize nonlinear components on-linely in a control system, and conclude a confused time series, all yielding remarkable results. Comparisons with artificial neural networks and earlier work on fuzzy modelling are listed and discussed. Other development of the suggested ANFIS and assuring applications to automatic control and signal processing are also recommended.

MERITS:

By employing a hybrid learning procedure, the proposed architecture can refine fuzzy if-then rules obtained from human experts to describe the input-output behavior of a complex system.

DEMERITS:

Important issue in the training of ANFIS is how to preserve the human-plausible features such as bell-shaped membership functions

TEXTUAL AND VISUAL CONTENT-BASED ANTI-PHISHING: A BAYESIAN APPROACH

AUTHOR: H. Zhang, G. Liu, T. W. Chow, and W. Liu

YEAR: 2011

DESCRIPTION

A novel framework using a Bayesian approach for content-based phishing web page detection is presented. Our model takes into report of textual and visual contents to analyse the likeliness between the secured web page and malicious web pages. A text classifier, an image classifier, and an algorithm merging the results from classifiers are brought in . An outstanding feature of this exploration of a Bayesian model to estimate the matching threshold. This is required in the classifier for deciding the class of the web page and determining whether the web page is phishing or not. In the text classifier, the naive Bayes rule is used to find out the probability

that a web page is phishing. In the image classifier, the earth mover's distance is employed to measure the visual similarity, and our Bayesian model is designed to determine the threshold. In the data fusion algorithm, the Bayes theory is used to synthesize the classification results from textual and visual content. The influence of our suggested method was analysed in a large-scale dataset gathered from real phishing cases. Experimental results demonstrated that the text classifier and the image classifier the designed deliver promising results, the fusion algorithm outperforms either of the individual classifiers, and our model can be adapted to different phishing cases.

MERITS

The new features of this framework can be represented by a text classifier, an image classifier, and a fusion algorithm.

Based on the textual content, the text classifier is able to classify a given web page into corresponding categories as phishing or normal.

DEMERITS

It is not worth for content-based model can be easily embedded into current industrial anti-phishing systems.

NEURO-FUZZY MODELING AND CONTROL

AUTHOR: J.-S. Jang and C.-T. Sun

YEAR: 1995

DESCRIPTION

Fundamental and advanced developments in neuro-fuzzy synergisms for modelling and control are reviewed. The important part of neuro-fuzzy synergisms is derived from a framework called adaptive networks, which consolidates both neural networks and fuzzy models. The fuzzy models that comes under the framework of adaptive networks are called Adaptive-Network-based Fuzzy Inference System (ANFIS), which contains some merits over neural networks. The design methods for ANFIS in both modelling and control applications. Current issues and future enhancements for neuro-fuzzy approaches are also given.

MERITS

Rich literature of optimization, which offers many better gradient-based optimization routines, such as quadratic programming and conjugate gradient descent.

DEMERITS

Need to search for better learning algorithms hold equally true for both neural networks and fuzzy models.

AN EMPIRICAL ANALYSIS OF PHISHING BLACKLISTS

AUTHOR: S. Sheng, B. Wardman, G. Warner, L. F. Cranor, J. Hong, and C. Zhang

YEAR: 2009

DESCRIPTION

The effectiveness of phishing black lists. Used 191 fresh phish that were less than 30 minutes old to conduct two tests on eight anti-phishing toolbars. Found that 63% of the phishing attacks in our dataset existed less than two hours. Blacklists were useless when defending users at first, as most of them caught less than 20% of phish at hour zero. Also found that blacklists were renewed at varied speeds, and in varied coverage, as 47% - 83% of phish were appeared on blacklists 12 hours from the initial test. Found that two tools using heuristics to complement blacklists caught significantly more phish initially than those using only blacklists. Still, it took a long time for phish identified by examiners to appear on blacklists. Finally, tested the toolbars on a set of 13,458 legitimate URLs for false positives, and did not find any instance of mislabelling for either blacklists or heuristics. These verdict and conferring ways anti-phishing tools can be enhanced.

MERITS

The window of opportunity for defenders can be defined as the length of the phishing campaign plus the time lapse between the time a user receives a phishing email and the time the user opens the email.

DEMERITS

URLs came from a single anti-spam vendor; therefore the URLs received may not be representative of all phish.

FIGHTING AGAINST PHISHING ATTACKS: STATE OF THE ART AND FUTURE CHALLENGES

AUTHOR: B. B. Gupta, A. Tewari, A. K. Jain, and D. P. Agrawal

YEAR: 2016

DESCRIPTION

In the last few years, phishing scams have rapidly grown posing huge threat to global Internet security. Today, phishing attack is one of the most common and serious threats over Internet where cyber attackers try to steal user's personal or financial credentials by using either malwares or social engineering. Identification of phishing attacks with high efficiency has always been an issue of great interest .Latest improvements in phishing detection techniques have led to various new techniques, mainly planned for phishing detection where certainty is extremely important. Phishing problem is broadly prevailing as there are many ways to carry out such an attack, which indicate that one solution is not sufficient to explain it. Two main issues are addressed. First, discuss in detail phishing attacks, history of phishing attacks and motivation of attacker behind performing this attack. In addition, also provide taxonomy of various types of phishing attacks. Second, provide taxonomy of various solutions proposed in the literature to detect and defend from phishing attacks. In addition, also discuss various issues and challenges faced in dealing with phishing attacks and spear phishing and how phishing is now targeting the emerging domain of IoT. Consider variety of tools and datasets that are used by the scholars for the assessment of their approaches. This gives us better understanding of the problem, the present outcome space and future research scope to skilfully deal with such attacks.

MERITS

The machine learning techniques give the best results as compared to other techniques as they are able to mitigate zero-hour phishing attacks better than the other.

DEMERITS

Both sender and receiver must use the same technique. Cannot be secured from MITM attacks High FP(False positive) rates and bandwidth requirements.

III. SYSTEM ANALYSIS

EXISTING SYSTEM

Phishing web pages are fake web pages that are created by venomous people to imitates Web pages of real web sites. Most of these kinds of web pages have high visual likeliness to fraud their victims.

Some of these kinds of web pages look accurately like the real ones. Users of phishing web pages may reveal their bank account, password, credit card number, or other important information to the phishing web page owners. It involve techniques such as cheat customers through email and spam messages, man in the middle attacks, installation of key loggers and screen captures.

DISADVANTAGES

These popular technologies have several drawbacks:

Blacklist-based technique with low false alarm probability, but it cannot detect the websites that are not in the blacklist database. Because the life cycle of phishing websites is short and the creation of blacklist has a more lag time, the precision of blacklist is not too high.

Heuristic-based anti-phishing method, with a increased probability of false alarm, and it is easy for the phisher to use technical means to avoid the heuristic characteristics detection.

Similarity assessment based technique is time-consuming. It takes too long to analyze a pair of pages, so using the method to identify phishing websites on the client side is not applicable. And there is low precision rate for this technique that depends on many factors, such as the text, images, and similarity measurement.

PROPOSED SYSTEM

The technique of image processing and an improved visual cryptography is used. Image processing is a method of dealing with an input image and to get the output as either enhanced form of the same image and/or tendency of the input image. In Visual Cryptography (VC) an image is divided into shares and in order to disclose the original image correct number of shares should be connected.

VCS is a cryptographic approach that permits the encryption of visual information such that decryption can be achieved using the human visual system. We can attain this by one of the following access schemes

(2, 2)- Threshold VCS scheme- This is a easiest threshold action that takes a secret key message and encrypts it in two different parts that shows the secret image when they are combined.

(n, n) -Threshold VCS scheme-This approach encrypts the secret image to n shares such that when all n of the shares are overlaid will the secret image be shown.

(k, n) Threshold VCS scheme- This scheme encrypts the secret image to n shares such that when any group of at least k shares are combined the secret image will be revealed.

In the case of (2, 2) VCS, each pixel P in the actual image is encrypted into two sub pixels called shares. They are shares of a white pixel and a black pixel. Note that the number of shares for a white and black pixel is randomly determined (there are two choices available for each pixel). Neither share gives any clue about the original pixel since different pixels in the secret image will be encrypted using random ways. When the two shares are combined, the value of the original pixel P can be revealed. If P is a black pixel, we get two black sub pixels; if it is a white pixel, we get one black sub pixel and one white sub pixel.

ADVANTAGES

For phishing detection and prevention, we are suggesting a new method to identify the phishing website. Our technique is based on the Anti-Phishing Image Captcha validation scheme using visual cryptography.

It safeguards password and other confidential information from the phishing websites.

URL on the address bar of your webpage begins with "https"; the alphabet at the end of "https" which means 'secured'.

Look for the padlock symbol in the address bar or the status bar (mostly in the address bar) but not inside the web page display area. Check the authentication by selecting the padlock.

IV. RESULTS AND DISCUSSION

4.1 REQUIREMENTS SPECIFICATION

4.1.1 SOFTWARE REQUIREMENTS

Operating System : Windows XP or Higher
Languages used : Java (JSP, Servlet), HTML
Tools : JDK 1.7, Net Beans 7.0.1, SQLyog
Backend : My SQL

4.1.2 HARDWARE REQUIREMENTS

Processor : Pentium Dual Core 2.3 GHz
Hard Disk : 250 GB or Higher
Ram : 1 GB (Min)

ALGORITHM:

RANDOM NUMBER:

Java builds a number of functions that you can use in your programs. However, Java runs with a less amount of methods already available. This helps with running time and reduces extra lines of code. When you want to use a certain feature, such as getting input from the user or creating a random number, you need to import that preprocessor into your code. We use the statement to do this. The tool we'll be using is the Random class, which is part of Java's utility (util) library.

We can create random number using rand object. We should provide some information to rand object so that the number generated varies. If we does not provide the information then the compiler always generates the same output.

Import java.util.Random;

We will need to set our constraints; in this case we need a number between 1 and 100. Create two integer variables for this , like this:

Int max=100;

Int min=0;

Next we can create the random number generator. Random is a class in Java, with its own functions. We can create an instance of this class and use all of these features. In order to create a new instance of Random, this code is used

At last, we can create our random number. The Random class shows a method called nextInt(int n), which creates a random number between 0 and the number specified (n). We need only numbers between 1 and 100. It may look a little puzzling, but we'll go through it. This code is to create a random number between 1 and 100 and save it to a new integer, showMe:

```
int showMe = min + randomNum.nextInt(max);
```

Every time we run the program a different number is displayed between 1 and 100. Here is the final, complete code:

```
public static void main(String[] args) {

 //what is our range?
 int max = 100;
 int min = 1;

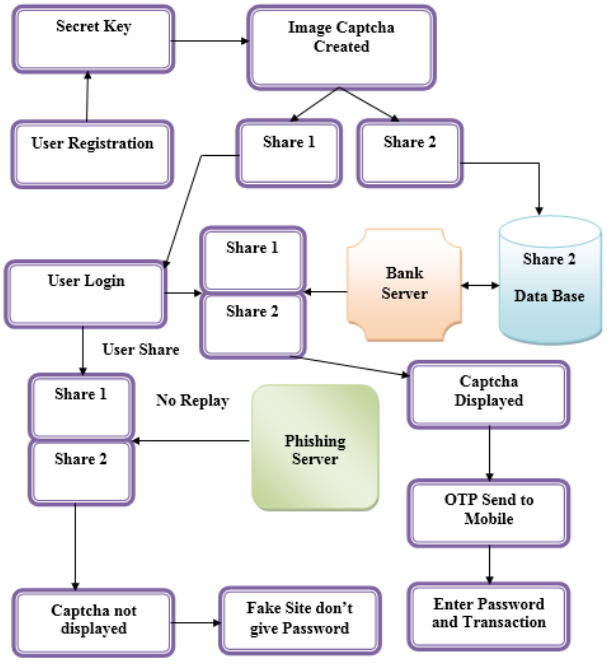
 //create instance of Random class
 Random randomNum = new Random();

 int showMe = min + randomNum.nextInt(max);
 System.out.println(showMe);

}
```

V. SYSTEM DESIGN

5.1 SYSTEM ARCHITECTURE



SYSTEM IMPLEMENTATION

MODULES

Registration With Secrete Code

Image captcha Generation

Shares Creation(VCS)

Login Phase

Module Description

Registration With Secrete Code:

In this registration phase, the user details username, password, email-id, address, and a key string(password) is attained from the user at the time of registration for the protected website. The key string can be a mixture of alphabets and numbers to provide more protected environment. This string is merged with randomly created string in the server.

Image captcha Generation:

A key string is changed into image using java classes Buffered Image and Graphics2D. The image dimension is 260 multiple of 60.Textcolor is red and the background color is white. Text font is about by Font category in java. After image creation it will be written into the user key folder in the server by using ImageIO class.

Shares Creation(VCS):

The image captcha is divided into two shares that one of the share is given to the user and the other share is kept in the server. The user's share and the original image captcha sent to the user for further authentication during login phase. The image captcha is also kept in the actual database of any authenticated website as secured data

Login Phase:

When the user logs in by entering his private information for using his account, then first the user is asked to give his username (user id).Then the user is requested to enter his share that is unbroken with him. This share is shipped to the server wherever the user's share and share that is keep within the info of the web site for every user, is stacked together to produce the image captcha. The image captcha is displayed to the user. Here the top user will check whether or not the displayed image captcha matches with the captcha created at the time of registration. The end user is needed to enter the text displayed within the image captcha and this may serve the aim of arc a num and victimization this, the user can log in into the website. Using the username and image captcha generated by stacking 2 shares one will verify whether or not web site the web site is genuine/secure web site or a phishing website.

Product Perspective

This product is combination of our main components, namely Image processing and visual cryptography, the web portal, web services and the JEE application. The main objective is predicting the phishing sites supported visual cryptography.

VI. CONCLUSION

Currently phishing attacks square measure thus common as a result of it will attack globally and capture and store the users' steer. This information is used by the attackers which are indirectly involved in the phishing process. Phishing websites similarly as human users may be simply known mistreatment our planned "Anti-phishing framework supported Visual Cryptography". The proposed methodology preserves confidential information of users. Verifies whether or not web site the web site could be a genuine/secure web site or a phishing website. If web site the web site could be a phishing web site (website that's a pretend one simply the same as secure website however not the secure website), then therein scenario, the phishing website can't display the image captcha for that specific user (who wants to log in into the website) due to the fact that the image captcha is generated by the stacking of 2 shares, one with the user and the other with the

actual database of the website. The planned methodology is additionally helpful to stop the attacks of phishing internet sites on money web portal, banking portal, on-line looking market.

VII. FUTURE ENHANCEMENT

In future we are able to increase the safety by adding several algorithms to encode the image. Encryption Phase contains many algorithms like Blowfish, Splitting and Rotating algorithm and (2,2) Visual Cryptography Scheme.First the "Blowfish Algorithm" is applied to the initial image captcha then the image captcha is split into several blocks and rearranged. After the image captcha blocks are rearranged, the "Splitting and Rotating Algorithm" is applied to the image captcha, and then the rearranged blocks are rotated.Then the rearranged and rotated blocks are combined. Then (2, 2) VCS theme is applied to the combined blocks.This theme is employed to divide the encrypted image captcha into 2 shares supported white and black pixels. When the 2 sub components are identical blocks it considers as a white pixel. Likewise once the 2 sub components are completely different the initial component is taken into account as black pixel. This VCS theme adds a lot of complication to the image captcha.

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Proficient Justification of Data Accuracy for Cloud Storage Using Dual Protection

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ABSTRACT

The cloud security is one of the essential roles in cloud, here we can preserve our data into cloud storage. More and more clients would like to keep their data to PCS (public cloud servers) along with the rapid development of cloud computing. Cloud storage services allow users to outsource their data to cloud servers to save local data storage costs. Multiple verification tasks from different users can be performed efficiently by the auditor and the cloud-stored data can be updated dynamically. It makes the clients check whether their outsourced data is kept intact without downloading the whole data. In our system we are using the own auditing based on the token generation. Using this key generation technique compare the key values from original keys we can find out the changes about the file. A novel public verification scheme for cloud storage using in distinguishability obfuscation, which requires a lightweight computation on the auditor and delegate most computation to the cloud. Not only stored also the content will be encrypted in the cloud server. If anyone try to hack at the cloud end is not possible to break the two different blocks. The security of our scheme under the strongest security model. They need first decrypt the files and also combine the splitted files from three different locations. This is not possible by anyone. Anyone can download the files from the server with file holder permission. At the time of download key generated (code based key generation) and it will send to the file owner. We can download the file need to use the key for authentication and some other users want to download file owner permission is necessary.

Keywords : Key Generation Technique, File Auditing, Token Generation, Public Verification Key.

I. INTRODUCTION

Distributed computing has been envisioned as the accompanying creation information development (IT) plan for endeavors, due to its broad summary of unparalleled inclinations in the IT history: on-ask for self-advantage, inescapable framework get to, zone self-choosing resource pooling, quick resource adaptability, use based assessing and transference of peril. As an aggravating development with huge consequences, distributed computing is changing the specific method for how associations use information advancement. One fundamental piece of this standpoint changing is that data are being united or outsourced to the. From customers' view, including together individuals and IT tries, securing data remotely to the in a versatile on-ask for strategy bring engaging focal points: landing of the weight for storage space organization, vast data access with put self-sufficiency, and avoidance of advantages costs on hardware, programming, and staff frameworks of help, etcetera. While distributed computing make these compensation more captivating than some other time in ongoing memory, it also passes on new and testing security risks to customers' outsourced data. As organization providers (CSP) are part

administrative components, data outsourcing is truly surrendering customer's last control more than the fate of their data.

As an issue of first significance, in spite of the way that the structures underneath the are altogether more powerful and trustworthy than individual enlisting devices, they are still before the broad assortment of both inside and outside risks for data respectability.

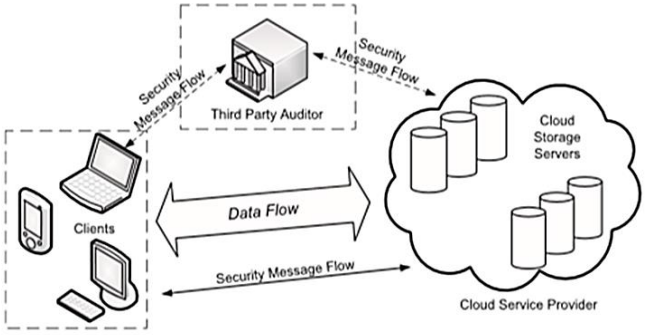


Fig. 1. Cloud data storage architecture.

1.1 SCOPE OF THE PROJECT

As rapid systems and omnipresent Internet get to wind up accessible as of late, numerous administrations are given on the Internet to such an extent that clients can utilize them from anyplace whenever. Information vigor is a noteworthy prerequisite for capacity frameworks. There have been numerous proposition of putting away information over.

1.2 NEED FOR THE PROJECT

As a problematic innovation with significant ramifications, processing is changing the plain idea of how organizations utilize data innovation. One essential part of this outlook changing is that information.

Are being brought together or outsourced to the . From clients' point of view, including the two people and IT ventures, putting away information remotely to the in an adaptable on-request way brings engaging advantages: alleviation of the weight for capacity administration, general information access with area freedom, and evasion of capital consumption on equipment, programming, and work force systems for upkeeps, and so on.

1.3 OBJECTIVE OF THE PROJECT

Specialist organizations (CSP) are separate authoritative elements, information outsourcing is really giving up client's definitive control over the destiny of their information. Thus, the rightness of the information in the is being put in danger because of the accompanying reasons.

Above all else, despite the fact that the foundations under the are substantially more ground-breaking and solid than individualized computing gadgets, they are as yet confronting the wide scope of both inward and outside dangers for information respectability.

Design Goals -- To correctly verify the integrity of shared data with efficient user revocation, our public auditing mechanism should achieve the following properties: (1) Correctness: The TPA is able to correctly check the integrity of shared data. (2) Efficient and Secure User Revocation: On one hand, once a user is revoked from the group, the blocks signed by the revoked user can be efficiently re-signed. On the other hand, only existing users in the group can generate valid signatures on shared data, and the revoked user can no longer compute valid signatures on shared data. (3) Public Auditing: The TPA can audit the integrity of shared data without retrieving the entire data from the cloud, even if some blocks in shared data have been re-signed by the cloud.

II. LITERATURE SURVEY

ENABLING CLOUDSTORAGE AUDITING WITH KEY-EXPOSURE RESISTANCE

AUTHOR: Jia Yu, KuiRen, Cong Wang, Vijay Varadharajan (2015)

Cloud storage auditing is viewed as an important service to verify the integrity of the data in public cloud. Current auditing protocols are all based on the assumption that the client's secret key for auditing is absolutely secure. However, such assumption may not always be held, due to the possibly weak sense of security and/or low security settings at the client. If such a secret key for auditing is exposed, most of the current auditing protocols would inevitably become unable to work. In this paper, a new paradigm called auditing protocol with key-exposure resilience is proposed. In such a protocol, the integrity of the data previously stored in cloud can still be verified even if the client's current secret key for cloud storage auditing is exposed. We formalize the definition and the security model of auditing protocol with key-exposure resilience, and then propose the first practical solution. The security proof and the asymptotic performance evaluation show that the proposed protocol is secure and efficient.

Advantages -- The integrity of the data previously stored in cloud can still be verified even if the client's current secret key for cloud storage auditing is exposed. The security proof and the performance analysis show that our proposed protocol is secure and efficient.

Disadvantages -- The verification algorithm does not need a secret key from the auditor in an auditing protocol with public verifiability. Therefore, any third party can play the role of the auditor in this kind of auditing protocols.

ENABLING PUBLIC AUDITABILITY AND DATA DYNAMICS FOR STORAGE SECURITY IN CLOUD COMPUTING

AUTHOR: Qian Wang, Cong Wang, KuiRen, Wenjing Lou and Jin Li (2011)

Cloud Computing has been envisioned as the next-generation architecture of IT Enterprise. It moves the application software and databases to the centralized large data centers, where the management of the data and services may not be fully trustworthy. This unique paradigm brings about many new security challenges, which have not been well understood. This work studies the problem of ensuring the integrity of data storage in Cloud Computing. In particular, we consider the task of allowing a third party auditor (TPA), on behalf of the cloud client, to verify the integrity of the dynamic data stored in the cloud. The introduction of TPA eliminates the involvement of the client through the auditing of whether his data stored in the cloud are indeed intact, which can be important in achieving economies of scale for Cloud Computing. Although envisioned as a promising service platform for the Internet, this new data storage paradigm in "Cloud" brings about many challenging design issues which have profound influence on the security and performance of the overall system. One of the biggest concerns with cloud data storage is that of data integrity verification at untrusted servers. Although schemes with private auditability can achieve higher scheme efficiency, public auditability allows anyone, not just the client (data owner), to challenge the cloud server for correctness of data storage while keeping no private information. Then, clients are able to delegate the evaluation of the service performance to an independent third party auditor (TPA), without devotion of their computation resources. In the cloud, the clients themselves are unreliable or may not be able to afford the overhead of performing frequent integrity checks.

Advantages -- Private auditability can achieve higher scheme efficiency, public auditability allows anyone, not just the client (data owner), to challenge the

cloud server for correctness of data storage while keeping no private information.

Disadvantages -- It moves the application software and databases to the centralized large data centres, where the management of the data and services may not be fully trustworthy. This unique paradigm brings about many new security challenges, which have not been well understood.

PRIVACY-PRESERVING PUBLIC AUDITING FOR DATA STORAGE SECURITY IN CLOUD COMPUTING

AUTHOR: Cong Wang, Qian Wang, KuiRen and Wenjing Lou (2010)

In this paper, we utilize and uniquely combine the public key based homomorphic authenticator with random masking to achieve the privacy-preserving public cloud data auditing system, which meets all above requirements. To support efficient handling of multiple auditing tasks, we further explore the technique of bilinear aggregate signature to extend our main result into a multi-user setting, where TPA can perform multiple auditing tasks simultaneously. Extensive security and performance analysis shows the proposed schemes are provably secure and highly efficient. In this paper, we propose a privacy-preserving public auditing system for data storage security in Cloud Computing. We utilize the homomorphism authenticator and random masking to guarantee that TPA would not learn any knowledge about the data content stored on the cloud server during the efficient auditing process, which not only eliminates the burden of cloud user from the tedious and possibly expensive auditing task, but also alleviates the users' fear of their outsourced data leakage. Considering TPA may concurrently handle multiple audit sessions from different users for their outsourced data files, we further extend our privacy-preserving public auditing protocol into a multi-user setting, where TPA can perform the multiple auditing tasks in a batch manner.

Advantages -- Extensive security and performance analysis shows the proposed schemes are provably secure and highly efficient. To support efficient handling of multiple auditing tasks

Disadvantages -- Which not only eliminates the burden of cloud user from the tedious and possibly expensive auditing task, but also alleviates the users' fear of their outsourced data leakage.

ORUTA: PRIVACY-PRESERVING PUBLIC AUDITING FOR SHARED DATA IN THE CLOUD

AUTHOR :Boyang Wang, Baochun Li and Hui Li (2014)

With cloud data services, it is commonplace for data to be not only stored in the cloud, but also shared across multiple users. Several mechanisms have been designed to allow both data owners and public verifiers to efficiently audit cloud data integrity without retrieving the entire data from the cloud server. However, public auditing on the integrity of shared data with these existing mechanisms will inevitably reveal confidential information—identity privacy—to public verifiers. In this paper, a novel privacy-preserving mechanism that supports public auditing on shared data stored in the cloud is proposed. In particular, we exploit ring signatures to compute verification metadata needed to audit the correctness of shared data. With our mechanism, the identity of the signer on each block in shared data is kept private from public verifiers, who are able to efficiently verify shared data integrity without retrieving the entire file. In addition, our mechanism is able to perform multiple auditing tasks simultaneously instead of verifying them one by one. This results demonstrate the effectiveness and efficiency of our mechanism when auditing shared data integrity.

Advantages -- The efficiency of verifying multiple auditing tasks is improved by extending mechanism to support batch auditing.

Disadvantages -- Since Oruta is based on ring signatures, where the identity of the signer is unconditionally protected, the current design of ours does not support traceability. The data freshness is not proved, while preserving identity privacy.

PUBLIC AUDITING FOR SHARED DATA WITH EFFICIENT USER REVOCATION IN THE CLOUD

AUTHOR: BoyangWang ,Baochun Li and Hui Li (2013)

With data services in the cloud, users can easily modify and share data as a group. To ensure data integrity can be audited publicly, users need to compute signatures on all the blocks in shared data. The straightforward method, which allows an existing user to download the corresponding part of shared data and re-sign it during user revocation, is inefficient due to the large size of shared data in the cloud. In this paper, we propose a novel public auditing mechanism for the integrity of shared data with efficient user revocation in mind. By utilizing proxy re-signatures, we allow the cloud to re-sign blocks on behalf of existing users during user revocation, so that existing users do not need to download and re-sign blocks by themselves. When a user in the group is revoked, we allow the cloud to re-sign blocks that were signed by the revoked user with proxy re-signatures.

Advantages -- The efficiency of user revocation is improved and existing users in the group can save a significant amount of computation and communication resources during user revocation.

Disadvantages -- The auditing mechanism is designed to preserve identity privacy for a large number of users. However, it fails to support public auditing.

PANDA: PUBLIC AUDITING FOR SHARED DATA WITH EFFICIENT USER REVOCATION IN THE CLOUD

AUTHOR: Boyang Wang, Baochun Li and Hui Li (2015)

With data services in the cloud, users can easily modify and share data as a group. To ensure data integrity can be audited publicly, users need to compute signatures on all the blocks in shared data. The straightforward method, which allows an existing user to download the corresponding part of shared data and re-sign it during user revocation, is inefficient due to the large size of shared data in the cloud. In this paper, we propose a novel public auditing mechanism for the integrity of shared data with efficient user revocation in mind. By utilizing proxy re-signatures, we allow the cloud to re-sign blocks on behalf of existing users during user revocation, so that existing users do not need to download and re-sign blocks by themselves. A public verifier is always able to audit the integrity of shared data without retrieving the entire data from the cloud, even if some part of shared data has been re-signed by the cloud.

Advantages -- When a user in the group is revoked, the semi-trusted cloud to re-sign blocks that were signed by the revoked user with proxy re-signatures is allowed. The efficiency of user revocation is improved, and existing users in the group can save a significant amount of computation and communication resources during user revocation.

Disadvantages -- Proofs of Retrievability (POR) and its subsequent work do not support public verification, which fails to satisfy the design objectives.

ON THE KNOWLEDGE SOUNDNESS OF A COOPERATIVE PROVABLE DATA POSSESSION SCHEME IN MULTICLOUD STORAGE

AUTHOR :Huaqun Wang and Yuqing Zhang (2014)

Provable data possession (PDP) is a probabilistic proof technique for cloud service providers (CSPs) to prove the clients' data integrity without downloading the whole data. The existence of multiple CSPs to cooperatively store and to maintain the clients' data is studied. Then, based on homomorphic verifiable

response and hash index hierarchy, a cooperative PDP (CPDP) scheme from the bilinear pairings is presented. This scheme satisfied the security property of knowledge soundness. It shows that any malicious CSP or the malicious organizer (O) can generate the valid response which can pass the verification even if they have deleted all the stored data, i.e., Then, we discuss the origin and severity of the security flaws. It implies that the attacker can get the pay without storing the clients' data. It is important to clarify the scientific fact to design more secure and practical CPDP scheme in Zhu et al.'s system architecture and security model CPDP scheme cannot satisfy the property of knowledge soundness. Then, the origin and severity of the security flaws is discussed. It implies that the attacker can get the pay without storing the clients' data. It is important to clarify the scientific fact to design more secure and practical CPDP scheme in Zhu et al.'s system architecture and security model.

Advantages -- The malicious CSPs can deceive the clients by getting their payments without storing their data. Thus, the clients will be confronted with huge losses when they want to retrieve their data since they do not store the data locally.

Disadvantages -- CPDP scheme does not satisfy the knowledge soundness. It is still an open problem to design secure and efficient CPDP scheme for integrity verification in multi-cloud storage.

IDENTITY-BASED DISTRIBUTED PROVABLE DATA POSSESSION IN MULTICLOUD STORAGE

AUTHOR: Huaqun Wang (2015)

Remote data integrity checking is of crucial importance in cloud storage. It can make the clients verify whether their outsourced data is kept intact without downloading the whole data. In some application scenarios, the clients have to store their data on multi-cloud servers. At the same time, the integrity checking protocol must be efficient in order to save the verifier's cost. From the two points, we propose a novel remote data integrity checking model: ID-DPDP (identity-based distributed provable data possession) in multi-cloud storage. Based on the bilinear pairings, a concrete ID-DPDP protocol is designed. The proposed ID-DPDP protocol is provably secure under the hardness assumption of the standard CDH (computational Diffie- Hellman) problem. Besides of the elimination of certificate management, our ID-DPDP protocol has also flexibility and high efficiency. Based on the client's authorization, the proposed ID-DPDP protocol can realize private verification, delegated verification and public verification.

Advantages -- The proposed ID-DPDP protocol can realize private verification, delegated verification and public verification based on the client's authorization. It has also flexibility, high efficiency and secure.

Disadvantages -- The complicated certificate management is eliminated.

PUBLIC INTEGRITY AUDITING FOR SHARED DYNAMIC CLOUD DATA WITH GROUP USER REVOCATION

AUTHOR**:** Tao Jiang, Xiaofeng Chen, and Jianfeng Ma (2015)

The advent of the cloud computing makes storage outsourcing become a rising trend, which promotes the secure remote data auditing a hot topic that appeared in the research literature. Recently some research consider the problem of secure and efficient public data integrity auditing for shared dynamic data. However, these schemes are still not secure against the collusion of cloud storage server and revoked group users during user revocation in practical cloud storage system. This paper, provide an efficient public integrity auditing scheme with secure group user revocation based on vector commitment and verifier-local revocation group signature and figure out the collusion attack in the exiting scheme. Beside the public data auditing, the combining of the three primitive enable our scheme to outsource cipher text

database to remote cloud and support secure group users revocation to shared dynamic data. We provide security analysis of our scheme, and it shows that our scheme provide data confidentiality for group users, and it is also secure against the collusion attack from the cloud storage server and revoked group users.

Advantages -- It supports the public checking and efficient user revocation and also some nice properties, such as confidently, efficiency, count ability and traceability of secure group user revocation.

Disadvantages -- The unrevoked members still do not need to update their keys at each revocation.

AN EFFICIENT AND SECURE DYNAMIC AUDITING PROTOCOL FOR DATA STORAGE IN CLOUD COMPUTING

AUTHOR: Kan Yang and XiaohuaJia (2013)

In cloud computing, data owners host their data on cloud servers and users (data consumers) can access the data from cloud servers. Due to the data outsourcing, however, this new paradigm of data hosting service also introduces new security challenges, which requires an independent auditing service to check the data integrity in the cloud. Some existing remote integrity checking methods can only serve for static archive data and thus cannot be applied to the auditing service since the data in the cloud can be dynamically updated. In this paper, an auditing framework for cloud storage systems is designed and an efficient and privacy-preserving auditing protocol is proposed. Then, it is extended protocol to support the data dynamic operations, which is efficient and provably secure in the random oracle model. The multi-cloud batch auditing protocol does not require any additional organizer. The batch auditing protocol can also support the batch auditing for multiple owners.

Advantages -- It incurs less communication cost and less computation cost of the auditor by moving the computing loads of auditing from the auditor to the server, which greatly improves the auditing performance and can be applied to large scale cloud storage systems.

Disadvantages -- It is not supported for batch auditing both multiple owners and multiple clouds, without using any trusted organizer.

III. SYSTEM ANALYIS

EXISTING SYSTEM In public cloud environment, most clients upload their data to PCS and check their remote data's integrity by Internet. When the client is an individual manager, some practical problems will happen. The computation overhead of verification by the auditor linearly increases with the size of the verified data set. Here third party public auditing theme for the regenerating-code-based cloud storage.

To solve the regeneration downside of failing authenticators within the absence of knowledge house owners, if these information can't be processed simply in time, the manager will face the loss of economic interest. In order to forestall the case happening, the manager has to delegate the proxy to process its data. In PKI (public key infrastructure), remote data integrity checking protocol will perform the certificate management. When the manager delegates some entities to perform the remote information integrity checking, Can it will incur respectable overheads since the voucher will check the certificate once it checks the Remote data integrity.

DISADVANTAGE OF EXISTING SYSTEM -- In open condition, most customers transfer their information to PCS and check their remote information's trustworthiness by Internet.

At the point when the customer is an individual supervisor, some useful issues will happen. The calculation overhead of check by the reviewer straightly increments with the span of the confirmed

informational collection. Here outsider open reviewing plan for the recovering code-based capacity.

To take care of the recovery issue of fizzled authenticators without information proprietors, if these information can't be prepared in the nick of time, the supervisor will confront the loss of monetary intrigue. In request to keep the case happening, the supervisor needs to appoint the intermediary to process its information. In PKI (open key framework), remote information uprightness checking convention will play out the declaration administration.

When the chief delegates a few substances to play out the remote information honesty checking, it will acquire extensive overheads since the verifier will check the authentication when it checks the remote information uprightness.

PROPOSED SYSTEM -- An efficient distributed scheme with data in the cloud is been made. Here we have a tendency to area unit mistreatment the erasure code technique for distribute the info to cloud locations and access the info from cloud. User can register and login into their account. Provided Associate in nursing choice to store, share and access the data from cloud storage. Here we have a tendency to area unit mistreatment the double ensured theme for storing knowledge into the cloud. First is your data or file splited into multiple parts and it will store into different cloud server locations. Each and each file generates the key-code for auditing. Then second is each and every splited file will encrypt before store into different locations. The shared users will edit the go into the cloud with file owner's permission. That file eligible of own public auditing. Search and transfer the files, at the time of download user should use the security key. As an authentication success it will be decrypt and combine to get the original data from cloud. Moreover, we have a tendency to style a completely unique public verifiable appraiser, which is generated by a couple of keys and can be regenerated using partial keys. Thus, our theme will utterly unleash knowledge house owners from on-line burden. In addition, we have a tendency to randomize the code coefficients with a pseudorandom operate to preserve knowledge privacy. Extensive security analysis shows that our scheme is provable secure under random oracle model and experimental evaluation indicates that our scheme is highly efficient and can be feasibly integrated into the regenerating code- based cloud storage.

ADVANTAGES OF PROPOSED SYSTEM -- Compared to a lot of its predecessors, which only provide binary results about the storage state across the cloud servers, the challenge-response protocol in our work more provides the localization of data error. Unlike most previous works used for guaranteeing remote information integrity, the new theme supports secure and economical dynamic operations on information blocks, including: update, delete and append. Extensive protection and act analysis demonstrate that the projected theme is very economical and resilient beside Byzantine failure, malicious information modification attack, and even server colluding attacks.

III. SYSTEMREQUIREMENTS

4.1.1 SOFTWARE REQUIREMENTS

1) Operating System: Windows XP or Higher
2) Languages used: Java (JSP, Servlet), HTML
3) Tools:JDK 1.7, Net Beans 7.0.1, SQLyog
4) Backend :My SQL

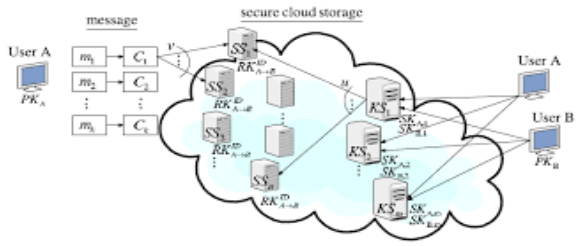
4.2.2 HARDWARE REQUIREMENTS

1) Processor:Pentium Dual Core 2.3GHz
2) Hard Disk: 250 GB or Higher

3) Ram: 1 GB (Min)

ALGORITHM USED

Cloud Secure Erasure -- A cloud storage system, consisting of a collection of storage servers, provides long-term storage services over the Internet. Storing data in a third party's cloud system causes serious concern over data confidentiality. General encryption schemes protect data confidentiality, but also limit the functionality of the storage system because a few operations are supported over encrypted data. Constructing a secure storage system that supports multiple functions is challenging when the storage system is distributed and has no central authority.



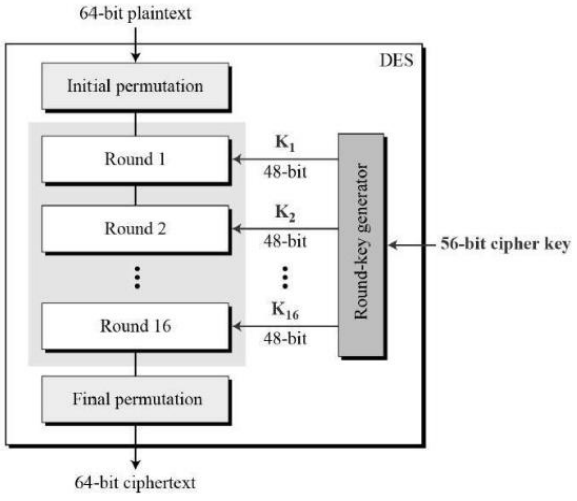
MD5 – The **MD5 message-digest algorithm** is a widely used hash function producing a 128-bit hash value. Although MD5 was initially designed to be used as a cryptographic hash function, it has been found to suffer from extensive vulnerabilities. It can still be used as a checksum to verify data integrity, but only against unintentional corruption. It remains suitable for other non-cryptographic purposes, for example for determining the partition for a particular key in a partitioned database.

A way to take a message of an arbitrary length, and create a 128-bit "fingerprint" or "message digest" of the message. MD5 is a way to verify data integrity. On these forums, it comes up fairly often in discussions about storing user passwords and other sensitive data.

```
$secret_password=md5("password");
if (md5($_POST['password']) == $secret_password)
 {
 echo "Correct password";
 }
else
{
 echo "Incorrect password";
}
```

Simple enough. However, the password is being sent clear text in $_POST['password']. Which brings us to another thing to protect against - the clear text transmission. Thankfully, there is an open source (GPL'd) javascript MD5 implementation available online which can be found here.

DES -- The Data Encryption Standard (DES) is a symmetric-key block cipher published by the National Institute of Standards and Technology (NIST). DES is an implementation of a Feistel Cipher. It uses 16 round Feistel structure. The block size is 64-bit. Though, key length is 64-bit, DES has an effective key length of 56 bits, since 8 of the 64 bits of the key are not used by the encryption algorithm (function as check bits only). General Structure of DES is depicted in the following illustration.



AES -- The more popular and widely adopted symmetric encryption algorithm likely to be encountered nowadays is the Advanced Encryption Standard (AES). It is found at least six time faster than triple DES.

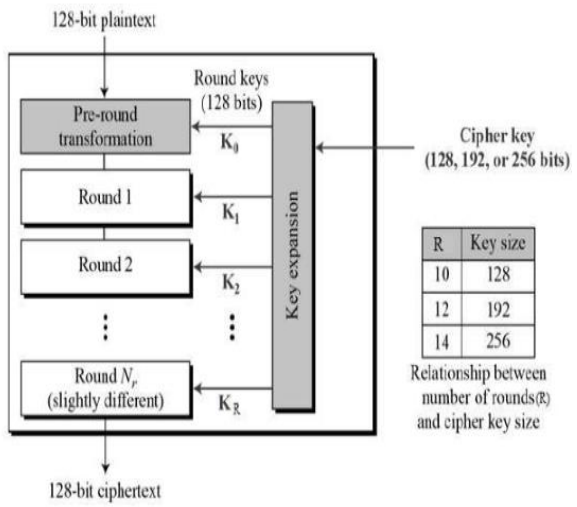
A replacement for DES was needed as its key size was too small. With increasing computing power, it was considered vulnerable against exhaustive key search attack. Triple DES was designed to overcome this drawback but it was found slow.

The features of AES are as follows –

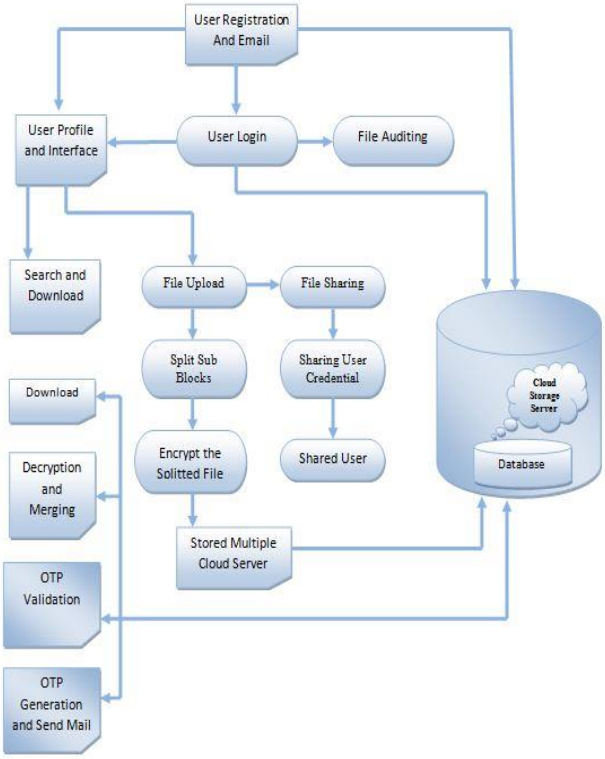
- Symmetric key symmetric block cipher
- 128-bit data, 128/192/256-bit keys
- Stronger and faster than Triple-DES
- Provide full specification and design details
- Software implementable in C and Java

Operation of AES -- AES is an iterative rather than Feistel cipher. It is based on 'substitution–permutation network'. It comprises of a series of linked operations, some of which involve replacing inputs by specific outputs (substitutions) and others involve shuffling bits around (permutations).

Interestingly, AES performs all its computations on bytes rather than bits. Hence, AES treats the 128 bits of a plaintext block as 16 bytes. These 16 bytes are arranged in four columns and four rows for processing as a matrix – Unlike DES, the number of rounds in AES is variable and depends on the length of the key. AES uses 10 rounds for 128-bit keys, 12 rounds for 192-bit keys and 14 rounds for 256-bit keys. Each of these rounds uses a different 128-bit round key, which is calculated from the original AES key.



IV. SYSTEM ARCHITECTURE



V. SYSTEM IMPLEMENTATION

MODULES DESCRIPTION

- User Plug in
- Uploading File
- Secret Key Formation

- File Allocation Process
- File analyzing
- File Loading process
- Alert Mail

User plug in -- In our Secure System we've a user friendly program to move with our System. Every Act dual role as a data owner and data consumer while uploading file they are the owner of that file if they search other's file than they are the consumer. Users can create the account them self for that we have new pages, in that page we will get the details from the user and we generate the account for the user's. We have authentication system; we have a tendency to solely permit licensed users to access our System. In our System we providing the easy file searching user's don't want to keep remember all uploaded file's exact name, for that we have given the keywords while uploading the files it will help to search the file easily.

Uploading File – Storing information over storage servers a method to supply information lustiness is to copy a message specified every storage server stores a message. Another way is to code a message of k symbols into a code word of n symbols by erasure writing. To store a message, every of its code word symbols is hold on in a very completely different storage server. A storage server corresponds to an erasure error of the code word symbol. As long because the variety of servers is underneath the tolerance threshold of the erasure code, the message is recovered from the code word symbols hold on within the offered storage servers by the decoding process.

Secret Key Formation -- Firstly the key are going to be generated because the initial step whereas uploading the file, each that is uploaded, can have distinctive secret key. This key are going to be taken as Associate in Nursing identification of each file. The secret key that we have a tendency to are mistreatment could be a 3 digit range we are going to create it use for each uploading and downloading. If the user want download some file and if he gives the download request the secret key of that file will be sent to the file owner of the file maybe he can share it.

File Allocation Process ---- In our application we can share a file to a registered user by providing basic credentials, with the sharing option it is necessary to provide authority to the shared user whether to view or edit the file. A user can view the shared file within the application without downloading it and the same is possible with the edit option.

File Analyzing -- Auditing is the process of checking the file whether the original contents of the file is changed. This module provides the file owner auditing, this we achieve by generating tokens. The tokens are generated with the ASCII values of the characters in the file and these characters are stored in the DB while uploading the file. If a shared user edit's the file and saves it, again a new token will be generated and stored in the DB. If the initial token and the current token aren't same then a notification will be sent to the file owner.

File Loading Process -- File downloading method is to induce the corresponding secret key to the corresponding file to the user mail id and so rewrite the file knowledge. The file downloading method re-encryption key to storage servers such storage servers perform the re-encryption Operation. The length of forwarded message and therefore the computation of re-encryption is taken care of by storage servers. Proxy re-encryption Schemes considerably scale back the overhead of the info Forwarding operate during a secure storage system.

Alert Mail -- The uploading and downloading method of the user is 1st get the key within the

corresponding user email id and so apply the key to encrypted information to send the server storage and decrypts it by victimization his secret key to transfer the corresponding record within the server storage system's the key conversion victimization the Share Key Gen (SKA, t, m). This formula shares the key SKA of a user to a group of key servers.

VI. CONCLUSION

A protection saving open examining framework for information stockpiling security in processing. We use the homomorphism straight authenticator and arbitrary concealing to ensure that the TPA would not take in any information about the information content put away on the server amid the effective inspecting process, which not just wipes out the weight of client from the dreary and perhaps costly examining assignment, yet in addition reduces the clients' dread of their outsourced information spillage. Considering TPA could at the same time alter varied review sessions from varied shoppers for his or her outsourced data records, we tend to in addition expand our security protective open examining convention into a multiuser setting, where the TPA can play out numerous evaluating undertakings in a bunch way for better effectiveness.

VII. FUTURE ENHANCEMENT

We additionally expand our protection safeguarding open evaluating convention into a multi-client setting, where the TPA can play out different examining errands in a cluster way for better productivity. In imminent we will enhancing the execution.

In this framework we utilized just content records, In future we will incorporate the picture, sound, video documents. In our framework the OTP sent to proprietor mail id, coming up the customer will get the OTP on portable by utilizing the versatile number.

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A Recent Review on Phytochemical Constituents and Medicinal Properties of *Mimosa rubicaulis Lam*

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ABSTRACT

In the developing world the trend has been changed from synthetic to natural medicine. Trees and plants are sources of many medicines. The use of medicinal plants was compiled in Ayurveda which listed more than 8000 herbal remedies. *Mimosa rubicaulis Lam* belonging to the family Fabaceae and subfamily Mimosoideae. It is bipinnately compound, each leaf having 8–12 pairs of pinnae, each with 16–20 pairs of pinnules, unlike this plant is having good potential activity in plant due to it has been attributed to their flavanoid and sterol contents. Several flavanoids isolated from these plants have been discovered to possess significant Various Pharmacological activity. Literature review reports the presence of flavanoids, triterpenoids, phytosterols and alkaloids in *Mimosa rubicaulis Lam.*

Keywords : *Mimosa rubicaulis Lam,* Phytochemical constituents, Medicinal Properties, Gentianaceae

I. INTRODUCTION

Mimosa rubicaulis Lam is Commonly Known as Sankhvel, In Hindi: Kacheyta, kinglu, shiah-kanta InTelugu: Kodimudusu chettu. In Nepal, the Chepang community is using *Mimosa rubicaulis Lam* roots for sprains, abdominal spasms and wounds. Powdered root is given for vomiting and bruised leaves are applied to burn. Smoke arising from burning the gum is disinfectant. It is a large straggling shrub which is very prickly. It sports long clusters of many pink spherical flower-heads which are 1-1.5 cm across. Flowers pink fading to White, tetramerous in globose pedunculate heads 1.25-1.5 cm. diameter peduncles 2.5-5 cm long, pubescent in axillary in the axial of a small, linear spathulate, ciliate bract. The plant *Mimosa rubicaulis Lam* was collected in the month of June 2013 from in and around Tirupathi, Chittor district, Andhra Pradesh, India. *Mimosa rubicaulis* is a large, straggling, very prickly shrub. It flowers from June to September, sporting long clusters of many pink spherical flower heads 1–1.5 cm across. The flowers fade to white, so the clusters sport both pink and white flower-heads most of the time. Leaves are double-compound, 8–15 cm long, with thorny rachis. Leaves have 3–2 pairs of side-stalks, each with 6–15 pairs of tiny oblong leaflets 4–8 mm. Pods are thin, flat, curved, 8–13 cm long, 1 cm wide, breaking into 4–10 rectangular single-seeded units, leaving the remains of the pod attached to the shoot. It is considered useful for hedges. The wood is suitable for tent pegs and for making gun powder charcoal. Roots and leaves are used medicinally. Himalayan Mimosa is found in the Himalayas, from Afghanistan to Bhutan, at altitudes of 300–1900 m. It prefers forest edges and boundaries of fields and gardens.[1,2,3]

Traditionally *Mimosa rubicaulis* Lam. Had higher value in treating of various diseases like laxative, leucoderma, leprosy, chronic diarrhea, Rheumatism, Anti diabetic, Treatment of snake bites, Anti-fungal agent, Used for cuts & wounds (had wound healing property). As we know that generally natural origin compounds had less side effects and less toxic when compared with synthetic compounds. The roots and leaves are widely used in Indian folk medicine for treating piles, bruises, burns diabetics, antiemetic agent [4,5] several phytoconstituents were observed from the plant earlier.

In the early 1800s, an emerging fascination with such molecules give rise to the field of organic chemistry, so named for its emphasis on the chemistry of living things. Later discrete organic compounds were discovered and were known as 'natural products' or 'secondary metabolites'. In particular, higher plants have been the source of medicinal agents since the earliest times and today they continue to play a dominant role in the primary health care of about 80% of the world's population. In spite of overwhelming influence of modern medicine and tremendous advances made in the population of synthetic drugs, traditional medicament referred to now a day as herbal drugs in different places in literature, have retained their place in therapy. Their effectiveness, low cost and comparative freedom from serious toxic effects make these medicaments not only popular but also an accepted mode of treating disease even in developed countries.



Figure 1: Image of *Mimosa rubicaulis Lam.*

Kingdom: Plantae
Division: Angiosperms
Class: Eudicots.
Order: Fabales.
Family: Fabaceae.
Genus:*Mimosa*

Species: *rubicaulis*

PHYTOCHEMICAL CONSTITUENTS

Table 1. Phytochemical constituents of *Mimosa rubicaulis Lam*

Name of Plant Material	Name of Phytochemical constituents
Leaves	flavonoid compounds like quercetin, luteolin, 5,7,4 '-trihydroxy-6,3',5'-trimethoxy-flavone,7-O-alpha-L-arabinopyranosyl(1->6)-O-beta-D-lucopyranoside and tannins, 4-ethylgallic acid,.
Root	Triterpenes, steroids, flavonoids, tannins, carbohydrates and alkaloids B-Sitosterol, 4-Dihydoxy-3-methoxy cinnamic acid, Octadecanoic acid
Stem	Phenol, flavonoids.

MEDICINAL PROPERTIES

Various studies have revealed the different pharmacological potentials of *Mimosa rubicaulis Lam* both in vitro and in vivo test models. *Mimosa rubicaulis Lam* has demonstrated to possess, antibacterial, Anti-inflammatory, Hypoglycemic Activity, Antitumor activity and antioxidant activities. These properties have been described in greater detail in the following subsections.[6]

Antibacterial activity:-

Resistance of many bacteria against antibiotics is alarmingly increasing and the side effects associated with the usage of antibiotics are also a major problem in treatment of infectious diseases. Therefore, search for new substances with antimicrobial activity has become an urgent necessity. Medicinal plants have been used in development of drugs from long time and compounds with antimicrobial activity from plant origin are the possible.

The current study was to investigate the presence of Anti-Bacterial activity on the different root extracts of *Mimosa rubicaulis* Lam. The extracts obtained using continuous hot percolation method and anti-bacterial activity tested by using cup plate method. The present investigation reveals that all the three extracts namely ethyl acetate, methanol and water extracts of concentration 1000 mcg/ml showing anti-bacterial activity against both gram + ve and gram – ve organisms. Among all the three extracts root methanolic extract showing more anti-bacterial activity. The study shown that the all the three root extracts of Mimosa rubicaulis Lam. Possess Anti-Bacterial activity.[7]

Anti-inflammatory activity:-

Among the four extracts of *Mimosa rubicaulis* the ethyl acetate extract showed better activity than other extracts on the superoxide, hydroxyl and DPPH free radicals. The order of activity was in the following manner: Ascorbic acid> ethyl acetate extract >methanol extract >Hydro-alcoholic extract > hexane extract. The anti-inflammatory activity of different extracts of *Mimosa rubicaulis* on carrageenan induced paw oedema in rats. Acute oral toxicity studies reveal that the different extracts up to 2000 mg/kg have not produced any mortality in experimental animals.

The ethyl acetate and methanolic extracts of *Mimosa rubicaulis* roots at the doses of 100, 200 and 400 mg/kg were produced significant ($P<0.001$) reduction when compared to drug vehicle treated control group. The hydroalcoholic and hexane extracts of *Mimosa rubicaulis* tested, at the doses of 100, 200 and 400 mg/kg were exhibited significant ($p<0.05$) activity. The percentage inhibition of the maximal paw oedema during 6 h for the hydroalcoholic extracts of *Mimosa rubicaulis* at 400 mg/kg. The percentage inhibition of the maximal paw oedema during 6 h for the methanolic extracts *Mimosa rubicaulis* at 400 mg/kg. The percentage inhibition of the maximal paw oedema during 6 h for the ethyl acetate extracts of *Mimosa rubicaulis* at 400 mg/kg.

Hypoglycemic Activity:-

The anti-diabetic screening of the hydroalcoholic extract of *M.rubicaulis* leaves was studied on both alloxan induced diabetic rats and normoglycaemic rats [8-9].The acclimatized animals were kept fasting for 24h with water *adlibitum* and injected intraperitoneally a dose of 120 mg/kg of alloxan monohydrate in normal saline. After one hour, the animals were provided feed *ad libitum*. The blood glucose level was checked before alloxanisation and 24 h after alloxanisation by withdrawing blood from the tip of the tail of each rat under mild ether anesthesia. The blood glucose level was measured with haemoglucostrips supplied by M/s Pulsatum Health Care Pvt. Ltd., Bangalore with the help of a Pulsatum blood glucose monitor. Animals were considered diabetic when the blood glucose level was raised beyond twice the value of normal. This condition was observed at the end of 48 h after alloxanisation. The animals were segregated into four groups of six rats in each. Group-I served as control and received vehicle (2 ml/kg) through oral route. Group-II received Glibenclamide (2.5 mg/kg). Group-III and IV received the extract at doses of 200 and 400 mg/kg in a similar manner. Blood samples were collected from each rat by cutting the tip of the tail

under mild ether anesthesia. Blood glucose level was estimated at 0 h, 1 h, 2 h, 4 h and 8 h respectively.[10]

Antitumor activity:-

The World cancer report documents that cancer rates are set to increase at an alarming rate globally. Cancer rates could increase by 50% new cases for the year 2020. The antitumor activity of the methanol stem extract of *Mimosa rubicaulis Lam* (MEMR) was evaluated against Ehrlich Ascites Carcinoma (EAC) tumor model in Swiss albino mice. After 24h of intra-peritoneal inoculation of tumor (EAC) cells in mice, MEMR was administered at the dose of 100, 200 and 400mg per kg body weight orally for 13 consecutive days. After 24 h of the last dose and followed by eighteen hours of fasting, mice were sacrificed and antitumor effect of MEMR extract on EAC bearing mice was assessed by evaluating tumor volume, viable and nonviable tumor cell count, mean survival time, percentage of increase in life span and hematological parameters of EAC bearing host. MEMR showed significant ($p< 0.0001$) decrease in tumor volume, viable cell count, percentage of increase in life span of EAC bearing mice. Haematological profile such as RBC, WBC, Haemoglobin, PCV (packed cell volume) levels restored to more or less normal level in MEMR treated mice as compared to EAC control. Effect of MEMR on viability of cancer cell lines (such as EAC, MCF-7, MDA-MB 435S) was evaluated by XTT assay, MEMR exhibited significant effect on cell viability. Apoptosis in EAC cell line was evaluated by DNA laddering assay, EAC cells treated with MEMR exhibited a characteristic "ladder" pattern after Separation of the fragments by agarose gel electrophoresis and subsequent visualization, by ethidium bromide staining. Therefore, from the results of the present study it can be concluded that MEMR exhibited significant anti-tumor activity against Ehrlich ascites carcinoma (EAC) in Swiss albino mice. The XTT assay and DNA laddering results indicate that MEMR exhibited cytotoxic effect on EAC, MCF-7, MDA-MB 435S cell lines and induced Apoptosis in EAC cell line. [11, 12,)]

Antioxidant activity:-

The antioxidant activities of the prepared plant extract were investigated by using two methods. DPPH radical Scavenging assay and reduction ability ferric to ferrous assay. DPPH Scavenging assay has wide application in determining radical Scavenging activity of antioxidant.[14]Extract of *Mimosa rubicaulis Lam* Showed significant radical Scavenging activity with IC50 Value Close to that of standard , ascorbic acid. The ability of these extract to Scavenge DPPH Free radicals Suggest that they might be electron donors and react with free radical to convert them to more stable products and terminate radical Chain. In this study the hydrogen atom or electron donation ability of each plant extract against DPPH free radical was measured from bleaching of violet colored DPPH solution at 517 nm. DPPH radical Scavenging activity of each sample.[13]

II. DISCUSSION

Medicinal plants have provided leads to combat diseases since the dawn of civilization. From screening the classics of *Brihattrayi* and *Nighantu,* it becomes clear that *Mimosa rubicaulis Lam* has been used to treat a wide range of diseases. Since most of the pharmacological activities of *Mimosa rubicaulis Lam* were limited to animal model, clinical trials of individual as well as compound formulations should be conducted in order to establish their safety and effectiveness. *Mimosa rubicaulis Lam* isused as an antioxidant and antimicrobial. In the earlier studies, it was found that *Mimosa rubicaulis lam* extracts of root and stem showed anti-microbial activity. This preliminary study was carried out to evaluate anti-cancer activity of *Mimosa rubicaulis Lam.* Based on

in vivo results it can be concluded that the life span of EAC tumor bearing mice was increased which is a reliable criteria for judging the value of anti-cancer drug. Based on in-vitro results it can be concluded that MEMR exhibited cytotoxic effect on cancer cells and based DNA laddering assay it can be concluded that MEMR induced apoptosis in EAC cells. Since no negative *Mimosa rubicaulis Lam* drug interaction is reported till date, more studies in this area remain yet to be accomplished. A consorted therapeutic approach by linking *Mimosa rubicaulis Lam* and synthetic drugs will be highly desirable. Though the herb is considered to be safe in the dosage mentioned, potent curative effects of the plant against particular human aliments need to be verified by more controlled and exhaustive clinical trials. To summarise the scattered knowledge in ancient and contemporary literature, it is needed to highlight the entities which are worthy of further investigation leading to the drug developments.

III. CONCLUSION

Mimosa rubicaulis Lam exhibits antioxidant and laxative activities and Anti-Bacterial Investigation on the different Root Extracts of *Mimosa rubicaulis Lam* we can conclude that Root extract of *Mimosa rubicaulis* Lam. has good Anti-Bacterial activity against Gram (+)ve and Gram(-)ve micro- organisms. Ibuprofen and ethyl acetate extract of *Mimosa rubicaulis Lam* significantly inhibited the maximal oedema response by carrageenan-induced rat paw acute inflammation. The present studies revealed that the hydroalcoholic extract of the leaves caused significant reduction in the blood glucose levels in the rats. The extract was found to produce marked reduction in blood glucose concentration. The drug possesses multiple-target actions and several therapeutic claims by virtue of its various active phytomolecules. Contemporary experimental and clinical studies confirm and establish the Ayurvedic therapeutic validation of the herb. Future experiments involving large sample size and in depth cause-effect evaluations would be more confirmatory.

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Analysis of Psychological and Verbal Pattern of Female Protagonists in Anita Desai's Fiction

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ABSTRACT

Anita Desai likes to reach the depth of human psyche. Anita Desai discards the traditional, worn out eternal realism and dives deep into the minds of her protagonists to examine the values and principles that they live by. Even when she probes man's relationship with his socials milieu, her stress falls on her characters' private instincts and intuitions, feelings and emotions. All her characters are shown on one hand struggling with the changed realities of Indian life. In their neurotic condition they fail to adjust themselves to the harsh realities of life and they react aggressively and sometimes they don't react and agree to strike a compromise with their situation after getting no other way. But both situations cause psychological disturbance and this is the case with Anita Desai's protagonists.

Keywords : Psychology, Verbal, Pattern, Instinct, Neurotic, Frustration

Anita Desai is considered the writer who introduced the psychological novel in the tradition of Virginia Woolf to India. She is also a pioneer of writing about feminist issues. Anita Desai is not interested so much in registering surface realities as in the probing of inner truths lying under the surface level. Her pioneering contribution lies in sketching the self-consciousness of her oversensitive characters, who seek fulfillment in the assertion of their self-identity. Thus critics have also tried to highlight her interest in the individual as a significant part of society, the emphasis always being on the individual rather than society. In an interview, Anita Desai admits that her primary interest will always be in the in individual rather than in a mass of people (Sapth 58-63).

Anita Desai discards the traditional, worn out eternal realism and dives deep into the minds of her protagonists to examine the values and principles that they live by. Even when she probes man's relationship with his socials milieu, her stress falls on her characters' private instincts and intuitions, feelings and emotions. The eternal features of personality and the outer lineaments of the visible world interest her only as the starting point of the more important voyage within, so that she can hold the focus on "nine tenth of the ice-berg that is submerged beneath the one-tenth visible portion we call reality" (Dalmia). As rightly noted by Madhusudan Prasad, Anita Desai probes her characters' "emotional ecology, their rumbling, turbulent inner world" (xiii).

As a part of her endeavour to supplement the outer realism with the inner one, Anita Desai likes to reach the depth of human psyche. She remarks in an interview given to Jasbir Jain, "It is depth which is interesting delving deeper and deeper in a character or a scene rather than going around and about it" (61-69). Anita Desai has delineated in her novels problems and plight of alienated and frustrated individuals caught in the crisis of a changing society. She tries to give an explanation of this frustration,

which is possible through psychology. Ramesh Srivastava summaries,

> It is not only the subject matter, characterization and in presenting the atmosphere of mind but also in the use of narrative technique, symbols, images and the disturbed time-scheme that Anita Desai deserves to be called a psychological novelist (xxvi).

All her characters are shown on one hand struggling with the changed realities of Indian life and on the other hand with the psychic conflict of personal origin. Society compels every individual to repress instinctual urges and the desire for the freedom of will in the name of upholding its ideals and expectations which are often anti-human and oppressive. At a certain point of time when these conflicts become too pronounced, their patience gives a way and they try to make effort to seek neurotic solutions to their problems. In their neurotic condition they fail to adjust themselves to the harsh realities of life and they react aggressively and sometimes they don't react and agree to strike a compromise with their situation after getting no other way. But both situations cause psychological disturbance and this is the case with Anita Desai's protagonists. Sigmund Freud also shows the dependence of an individual on the external environment and two important possibilities may be the sequel (i) reduction of tension through gratification of instincts (2) insecurity as a result of frustration. If the individual is confronted with the latter by and by, defence mechanism fails and the individual is about to enter in neurotic stage (106).

Neurosis is possibly seen manifested in the form of alienation and fear. The alienation takes the form of loneliness, withdrawal from active interest in other people absence of relationships and rejection of social customs, institutions, values and norms. Karen Horney attributes alienation to environmental influences (39). The kind of alienation that Anita Desai's protagonists suffer from, they are deeply conscious of their senses of emptiness and meaninglessness and much more than this, their sense of helplessness and not being able to mould the outer reality after their hearts' desire.

Sometimes Anita Desai's characters become schizophrenic. In schizophrenia an individual does not suffer from a conflict between difficult choices, but rather a double vision of life. Due to the conditions that spell the psychological disorder of neurosis and schizophrenia, Anita Desai's characters feel neglected, discarded and disowned, and naturally find their social surroundings unattractive and tedious. The consequence of an advanced state of neurosis is violence–violence inflicted on others or oneself. Anita Desai's protagonists when they find themselves trapped between two alternatives which are both unsatisfying, choose violence as their recourse and even go to the length of killing another individual or themselves. N.R Gopal also remarks in this regard,

> Anita Desai not only explores and portrays the feminine psyche of a common woman but also of the sub-normal bordering of abnormal women. These are women who because of various factors are under so much mental stress that they cannot be called insane but then certainly they are not normal (4).

Verbal pattern used by the Characters unfailingly pushes them to the region of mental torture. Although they argue with each other only for the sake of saying but one is totally unaware of the fact that whether the other person is digesting it or not. But the hypersensitivity of Anita Desai's characters seems to be a hurdle in digesting anything easily. Actually, they are extremists in nature –

hypersensitive or insensitive. Whenever hypersensitivity and insensitivity stand against each other, the result is – failure of understanding. The more sensitive a person is, the more frustrated he will be and the more insensitive a person is, the less frustrated he is. After examining the gallery of Anita Desai's characters, it is observed that their normal discourses always end in abnormal situation and echo of their hot words keep their mental torture afresh. We find this killing art in many characters presented by Anita Desai in her novels. This paper includes Anita Desai's two novels *Where Shall We Go This Summer?* and *Clear Light of Day.*

Anita Desai's *Where Shall We Go This Summer?* describes a disillusioned woman named Sita who rebels against her present state and wishes to cut herself off from the main stream of life and desires to return back to her childhood past, her parental house, Manori. She harbors grudge against her fifth pregnancy. She had enjoyed her earlier pregnancies. Perhaps she wants her dreams to be fulfilled through children. But they not only separate themselves from her but they reject her also. Outwardly, anyone can feel jealous to see her happy world, full of children and a nice husband but for Sita it is a world of sufferings and tortures because she lacks a sense of belongingness. From the early childhood to her married life she does not have a home of her own. This damages her senses of belongingness, "Belongingness…. means a subjective feeling of one's personal involvement to the extent that one feels himself to be an integral part and indispensable part of the system" (*Where Shall We Go This Summer?* 31. Further references to *Where Shall We Go This Summer?* will appear as page numbers preceded by *WSWGTS*). But from her very childhood she is forced to think herself an outsider of the familial system by her own parents. Therefore, her frustration germinates from the very beginning of her life.

Her disillusion with her father also sharpens her sense of frustration. Sita's father is exclusively responsible for ingraining insecurity in her by his negligence. There is always an "impossibility of talk between her and her father" (*WSWGTS* 31-32). During these particular moments, nobody comes near her to puncture her balloon of frustration. She is bound to remain silent. She fails to open up. With this experience she fails to feel personal involvement in life. Erich Fromm feels that by getting attached ourselves to another person, alienation can be cured.

> There is only one possible productive solution for the relationship of individualized man with the world: his active solidarity with all men and his spontaneous activity, love and work, which unite him again with the world not by primary ties but as a free and independent individual (96).

But Sita is getting ahead in isolation. After her father's death Sita gets under way of thinking about her isolation to be relieved through deserting island at any cost and she does it by getting married. But Sita's destiny dupes her again. As her new life begins on the mainland she becomes ecstatic. Sita being a lonely young woman, looks up to her husband Raman as her God. Raman, however, does not get ready to honour her respect. Instead of satisfying her psychologically, he enhances her mental tortures. Raman has his own ideas to deal with her. Normally, he does not react and he also dislikes Sita's lack of control instead of understanding her reaction. As Sita argues, "what do you know about my condition?" She flared, "I've told you–I've tried to tell you but you haven't understood a things…" (*WSWGTS* 79). Raman also accepts himself that "I don't understand much …" (*WSWGTS* 33). Humanity is replaced by hatred in Raman with the passage of time: "He was repelled, he turned away, not being able to see her

any more for hatred to her. He hated her, hated her talk." (*WSWGTS* 33). Sita also begins to realize that life is but "a crust of dull tedium of hopeless disappointment" (*WSWGTS* 33). Her married life is also proved to be an extension to continue her silence. And the only option to revolt against her frustration for her is to go back to the island.

Her wish of not going birth to a child also reflects her desire of violating the marriage deed between her and Raman. She is of the view that if she reaches the island, every problem will be solved. On the island she dives deep inter the memories of the past. But how long can she be in the realm of memories. She cannot run away from her life as a mother and a housewife. But soon she realizes soon that revisiting the past in impossible: "If it had ever existed–black, sparkling and glamorous in her memory– it was now buried beneath the soft gray– green mildew of the mansoon, chilled and chocked by it" (*WSWGTS* 39).

Sita wants her daughter to be a creative artist but Menaka does not accept her mother's eccentric temperament: "She had had enough of her mother's disorder and nonsense–she would escape it wholly" (*WSWGTS* 103). She wants to identify with her father. This very attitude of Menaka shatters all hopes of Sita. Through letter Menaka urges her father to take them back to Bombay without giving any prior information to her mother. Sita miserably says, "Menaka didn't tell me she had written you. I don't know anything about if" (*WSWGTS* 117). But instead of pacifying her Raman aggravates her through his dialogues: "There was nothing you could do for her…" (*WSWGTS* 117). And again he argues unsympathetically, "But you know you must leave you will have to come back"…."you must", he said, she shook her head. It seemed to her that he was always saying to her, "you must" (*WSWGTS* 140). She is full of self-contempt as she fails in playing her role as a mother, a wife, a daughter and a woman. Now she feels strongly against the social values imposed by the society. Her rage externalizes her inner turmoil: "It was as though for seven months she had collected inside her resentments; her fears, her rages and now she flung them outward, flung them for her" (*WSWGTS* 140).

Failure in life makes her vindictive. As a result Sita becomes a rebellious. But in the end of the novel, it is clear that Sita compromises with her situation and gets ready to go back to the world in which she is nothing but a non-entity.

In *Clear Light of Day*, there are four brothers and sisters–Raja, Bim, Tara and Baba. The childhood closeness is shattered gradually as the children grow older. They begin to feel their different dreams and aspirations and the ways to fulfill them.

Among all the children, the most affected personality is Bim. In fact, Raja and Tara imitate unknowingly their parents' unfaithfulness and selfishness in their relationships but a Bim remains attached to all surrounding her. Hence, she feels mental torture when others show their selfishness and unfaithfulness. After the death of their parents, Bim was bound to think about managing both ends meet as Raja was selfishly uplifting himself through the aristocratic Hyder Ali and in the same way Tara was passing her time with Bakul. At this juncture Bim takes up a teaching job after finishing her education and also takes care of Baba, a mentally retarded brother and Aunt Mira, a distant cousin of her mother. R. S. Pathak observes:

> The period of that lies in between–the growing consciousness and search for individuality of adolescence– fails to provide of childhood to the later stage of adulthood, causing deep psychological trauma and stress (224).

Tara and Raja never realize about Bim's agony. Tara is enjoying her married life while Bim has no time for her own love and life due to the responsibilities. The

irony is that in spite of her immolation for the family, no one is here to sacrifice anything for her. This is what alienates her to the world of Baba. Bim sense of separation from her brother and sister heightens in her a sense of frustration and disintegration. Bim's pathetic conversation with Baba discloses the disorganized state of the family that disturbs her most: "So now there are just you and I left Baba,…. Does the house seem empty you? Everyone's gone, except you and I. They won't come back. We'll be along now"[182] (*Clear Light of Day* 27). She feels that all her relations to Tara, Bakul and Raja are means to torment her. Nevertheless, the novel ends with a positive note. Her wounded self moves towards the realization of a new self. At last she makes a positive effort to come out of the trauma in which she was caught. S. Indira rightly considers, "Bim seems to be offering the morning hymn,' to 'Time' as it paves the way for her regeneration so that she becomes a fulfilled individual who experience love and peace" (*Clear Light of Day* 28).

By exploring the mind of her characters especially women, Anita Desai is not just examining them from a psychological point of view, but showing us social reasons why her characters are pushed into the position of helplessness. It is acceptable for an Indian woman to search no other life or occupation outside home after her marriage. When she is ignored emotionally, she withdraws into the world of her own and her insensitivity makes her solitary to the point of being neurotic.

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Controlling Digital Device Using Smart Eye-Tracking System

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ABSTRACT

Smart eye tracking system is designed for controlling any devices which has digital screen, with the eye ball movements and gestures without the help of required hardware. This paper proposes the design and implementation of cursor control system based on the movement of the eye ball. Then the movement of the eye ball is tracked and the cursor movement is regulated accordingly and gestures like blinking enables enter and blinking twice enables right click and left click. These gestures and tracking system enables the users to use the entire device. The image processing module consists of webcam and python customized image processing, the eye movement image is captured and transmitted to Raspberry pi 3 model B version 2 microcontroller for processing with open CV to derive the coordinate of eyeball. The coordinate of eyeball is utilized for cursor control on the Raspberry pi screen to control the system.

Keywords - Eye Tracking ,Control Gestures, Raspberry Pi, Image Processing.

I. INTRODUCTION

The number of paralyzed people keeps increasing year by year perhaps because of two common factors. Some are born this way while others have untoward accidents. According to the statistics from the Department of Social Welfare, the total number of disabled people in India is 504640. Among them, 37,363 are visual, 30,303 hearing, 170 speech, 106,252 physical, 117, 799 learning, 3,130 mental and 11,713 multiple disabled people. The disabled people have a limited ability to control the electrical and electronics devices (On and OFF) at their home because normally the switches are placed at a height of 15m while the comfortable height for a wheelchair user is up to13m only. It is also mentioned that the number of disabled friendly facilities are still minimum in major countries. Therefore, providing a very practical facility that can ease accessing home appliances and other systems is really required which can greatly improve the lives of the disabled.

1.1 Importance of Specially Designed Systems for Disabled

Nowadays personal computers are carrying a huge part in our live as they are used in areas such as work, education, entertainment etc. The common part in all these applications which are computer based are the input methods (keyboard and mouse). While this is not a problem for a lively personal, this may be an unbeatable bound for people with limited freedom of movement of their wing. In these cases it would be preferable to use input methods which are based on more abilities of the region such as eye movements. To empower such replacement input methods a

system was made which follows a low-price path to supervision a mouse cursor on a computer system.

The eye tracker is stationed on images which are documented by a mutated webcam to acquire the eye movements. These eye movements are then epitomized to a computer screen to position a mouse cursor subsequently. The position of the cursor in the screen will regulate according to the spot of the eye ball. Camera is used to grab the image of eye movement.

II. LITERATURE SURVEY

2.1 SMART WHEELCHAIR BASED ON EYE TRACKING

AUTHORS: Aniwat Juhong, Nutthanan Wanluk, Pintavirooj and Sarinporn Visitsattapongse

This project is a smart wheelchair based on eye tracking which is drafted for people with locomotive detriment. The accompaniment controlled module can be used with any electrical wheelchair. The sharp wheel chair consists of four sector including imaging processing module, wheelchair- controlled module, SMS manager module and appliance-controlled module. The image deal with module compose of a webcam installed on the eyeglass and C++ customized image processing software. The captured image which is carried to raspberry Pi microcontroller will be handled using OpenCV to formulate the
2D direction of eye ball. The parallel of eyeball movement is then wirelessly carried to wheelchair-controlled module to control the progress of wheel chair. The wheelchair- controlled module is two dimensional revolve stages that are feed to the joystick of the electrical wheelchair to restore the hand operated control of the wheelchair. The movement of eyeball is also utilised as the cursor control on the raspberry Pi screen to control the operation of some armed appliance and send message to smart phone.

2.2 EYE BALL MOVEMENT TO CONTROL COMPUTER SCREEN

AUTHORS: Arslan Qamar Malik, and Jehanzeb Ahmad

The paper introduces a peculiar idea to control computer mouse cursor movement with human eyes. In this paper, a working of the device has been express as to how it helps the limited people share their knowledge with the world. Number of universal manner such as Head and Eye Movement Tracking Systems etc. Prevail for cursor control by making need of image processing in which light is the primary source. Electro- oculography (EOG) is a recent technology to sense eye signals with which the mouse cursor can be manged. The signals recorded using sensors, are amplified, then noise is detached and then digitized, before being carried to PC for software interfacing.

2.3 CONTROLLING MOUSE CURSOR USING EYE MOVEMENT

AUTHORS: Chhabria, Dharaskar and Shrunkhala Satish Wankhede

In this paper, a lone human computer interface system employing eye motion is imported. Traditionally, human computer interface handles mouse, keyboard as an input device. This paper introduces hands free interface between computer and human. This automation is intended to restore the conventional computer screen pointing devices for the use of handicapped. The paper presents a unique idea to control computer mouse cursor

movement with human eyes. It controls mouse-moving by naturally affecting the position where eyesight targets on, and copies mouse-click by affecting blinking action. However, the planned vision-based virtual interface controls system work on numerous eye movements such as eye blinking.

2.4 CURSOR CONTROL SYSTEM USING FACIAL EXPRESSIONS FOR HUMAN-COMPUTER INTERACTION

AUTHORS: A.Geetha and M.Mangaiyarkarasi

Vision based mostly human–computer interface is bestowed during this paper. The interface detects eye movements and
interprets them as indicator management commands. The used image process ways of embody digital camera for detection the face, and guide matching methodology based mostly eye region detection. The Haar feature technique is employed for eye feature extraction. SVM classification method is used for classifying the eye movements. The classification of eye movements like eye open, eye close, eyeball left, and eyeball right movements are used for cursor top, bottom, left and right movement respectively. The interface is predicated on a notebook equipped with a typical net camera and needs no additional light-weight sources. In Hough transform, circular method is used to control the cursor movements. This methodology is employed for physically challenged persons to work with the computers effectively with their eye movements.

2.5 COMMAND THE COMPUTER WITH YOUR EYE- AN ELECTRO-OCULOGRAPHY BASED APPROACH

AUTHORS:, Kristie Huda, Mohiuddin Ahmad and Shazzad Hossain

In this paper, a user freelance human laptop interface system victimization eye movement and blink feature detection is introduced. A hands free interface between laptop and human will doubtless replace the normal human laptop interface devices like mouse, keyboard etc. This technology is meant to relinquish practicality to peoples with severe motor disabilities to regulate a laptop by simply moving their eyes. This paper describes a technique of dominant mouse pointer on a monitor victimizes the electrical potentials developed by eye movements called Electrooculography (EOG) signals which are employed to detect eye movement and blink features. The EOG signal is recorded from electrodes placed at acceptable positions round the eyes. The captured EOG signal is then analyzed to discover and classify eye movement options of interest. The detected options were then to generate management signals to regulate a mouse pointer. The cursor control application is implemented offline.

III. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

In Existing system they use eye ball rotation for control the wheel chair which is used for disabled person. They use four modules including imaging processing module, wheelchair-controlled module, SMS manager module and appliance-controlled module. The coordinate of eyeball movement is then

wirelessly transmitted to wheel chair-controlled module to control the movement of wheel chair. The drawback the existing system is other electronic device can be controlled by sending SMS alert to the registered smart phone. When the mobile is switched off or not reachable the controlling of device is difficult. And by using this system small electronic device like fan, lights alone be controlled.

3.1.1 Disadvantages

- Difficult to implement
- High cost
- Complex system
- Accuracy depends on camera clarity

3.2 PROPOSED SYSTEM

This particular system will be a mile stone for the development of many systems for the disabled people. There are various deformities on comparing one person to other, the development of these kind of system needs a serious data collection and analysis. The eye ball movement control system consist of two parts namely person detection system and cursor control system. When personal computer is attached with the person detector system, thus when the person approaches the system is automatically switched on. The position the eye is tracked. The movement of the eye is tracked and used as the input. The image of the eye is acquired then it is converted into grey scale and the centroid of the eye is found and it is used as the reference to move the cursor on the screen.

3.2.1 System Architecture

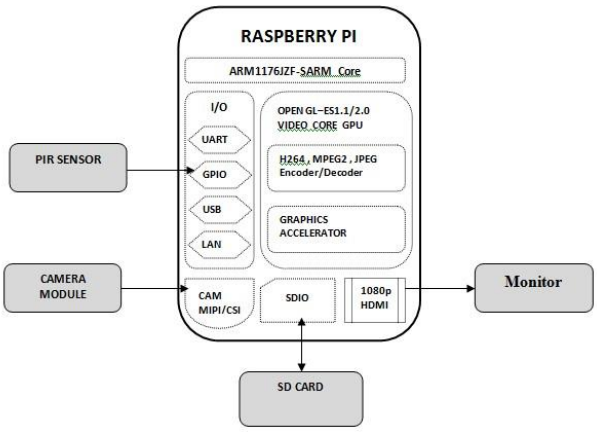


Fig 3.1. System Architecture of the Proposed System

3.2.2 Advantages

- High quality receiving data
- Low power consumption
- High data speed and low cost
- Faster input process
- Easy to implement and use

IV. HARDWARE SPECIFICATION

4.1 INTRODUCTION

The various hardware components involved in the proposed system are raspberry pi 3 model B version 2, webcam, PIR sensor. The webcam and PIR sensor are attached to the raspberry pi 3 model B version 2. Let us discus about all these components in detail.

4.2 RASPBERRY PI MODEL B VERSION

Raspberry pi is AN ARM based mostly mastercard sized SBC(Single Board Computer) created by Raspberry Pi Foundation. Raspberry Pi runs Debian based GNU/Linux operating system Raspbian and ports of many other OS exist for this SBC.It has Broadcom BCM2837 64bit Quad Core Processor powered Single Board Computer running at 1.2GHz with 1GB RAM. It is packed with BCM43143 wireless local area network on board, Bluetooth Low Energy (BLE), 40pin extended GPIO, 4 x USB 2 ports, 4 pole Stereo output and Composite video port. It also has CSI camera port for connecting raspberry pi camera easily. The Raspberry Pi doesn't have a constitutional real clock, and doesn't "know" the time of day. It have many models All models feature a Broadcom system on a chip (SoC), which includes a ARM compatible central processing unit (CPU) and an on chip graphics processingunit (GPU,a Video Core IV).Secure Digital (SD) cards area unit wont to store the software package and program memory in either the SDHC or small SDHC sizes. Most boards have between one and 4 USB slots, HDMI and

composite video output, and a 3.5 metric linear unit jack for audio.

4.2.1 Layout of Raspberry Pi 3

The layout of the raspberry pi 3 model B version 2 is shown in the figure below. The below figure also represents the various parts

4.2.2 Key Features

1. Same full size HDMI port
2. Same 10/100 Ethernet port
3. Same CSI camera port and DSI display ports
4. Same micro USB power supply connection
5. SoC – Broadcom BCM2836 quad core Cortex A7 processor @ 900MHz with VideoCore IV GPU

4.2.3 Pin Configuration

1. BCM - Broadcom pin number, commonly called "GPIO", these are the ones you probably want to use with RPi.
2. GPIO and GPIO ZeroWiringPi - Wiring Pi pin number (shown as a tooltip), for Gordon Henderson's Wiring Pi library
3. Physical - Number corresponding to the pin's physical location on the header
4. Rev 1 Pi - Alternate BCM numbers for the original, 26-pin model "A" and "B" Pi

4.2.4 Raspberry Pi Operating Systems

An operating system makes Raspberry Pi run. Since Raspberry Pi may be a credit sized pc that's supported UNIX operating system, optimum performance of RPI will be achieved if it's operated during this atmosphere. Raspbian provides over a pure OS: it comes with over thirty five packages, pre-compiled code bundled during a nice format for simple installation on RPI. Important to notice is that the Raspberry Pi doesn't operate during a Windows atmosphere. To get access to Pi from windows we tend to need a Putty code. Putty is an SSH and TelNet client.

4.2.5 Advantages

- Low cost
- Low power
- High speed operation
- High reliability

4.3 WEB CAM

A digital camera may be a video camera that feeds or streams its image in real time to or through a raspberry pi. Webcam with mic comes with high speed USB interface. The webcam also offers great camera resolution and is available with AWB (Automatic Whiteness Balance) so that you get clear and natural images. With the CMOS sensing element incorporated during this digital camera, the pictures are rendered with supreme quality.

4.3.1 Steps to Setup Webcam to Raspberry

Pi

- Turn on your Raspberry Pi, open a terminal window
- Connect the webcam into the USB port and enter the following command that will list all the USB devices that are being connected. Command - lsusb
- It will display camera listed as ausb device, for example “Bus 001 Device 006:ID0c45:602c MicrodiaClasOhlson TWC-30XOP Webcam”
- If your Webcam is compatible, you can try to take some pictures to verify its functionality by installing fswebcam software

4.4 PASSIVE INFRA RED SENSOR

A passive infrared sensor (PIR sensor) is associate electronic device that measures infrared (IR) lightweight diverging from objects in its field of read. They are most frequently employed in PIR-based motion detectors.Infrared radiation enters through the front of the device, referred to as the 'sensor face'. At the core of a PIR device may be a solid state device or set of sensors, made up of pyro-electric materials— materials that generate energy once exposed to heat. Typically, the sensors ar just about 1/4 in. sq. (40 mm2), and take the shape of a skinny film.

4.4.1 Working

PIRs are basically made of a pyro-electric sensor (which you can see above as the round metal can with a rectangular crystal in the center), which can detect levels of infrared radiation. Everything emits some low level radiation, and therefore the hotter one thing is, the a lot of radiation is emitted. The detector in an exceedingly motion detector is truly split in 2 halves. The two halves are wired up in order that they cancel one another out. If one sees a lot of or less IR radiation than the opposite, the output can swing high or low.

V. SOFTWARE SPECIFICATION

5.1 PYTHON

The Python programing language really started as a scripting language for UNIX. Python programs are like shell scripts in this the files contain a series of commands that the pc executes from high to bottom. Python may be a terribly helpful and versatile high level programing language, with straightforward to scan syntax that permits programmers to use

5.1.1 Features

- Simple
- Easy to Learn
- Free and Open Source
- High-level Language
- Portable

5.1.3 Advantages

- Presence of Third Party Modules
- Extensive Support Libraries
- Open Source and Community Development

Object Oriented fewer lines of code than would be potential in languages such as assembly, C, or Java. Python programs don’t need to be compiled before running them, as you are doing with C programs. However, you may need to install the Python interpreter on your pc to run them. The interpreter is that the program that reads the Python file and executes the code. There are programs that can package Python code into stand-alone executable programs so you can run Python programs on computers without the Python interpreter installed. Like shell scripts, Python will automatize tasks like batch renaming and moving massive amounts of files. Using IDLE, Python’s REPL (read, eval, print, loop) operate may be used rather like a program line. However, there are additional helpful stuff you will produce with Python. Programmers use Python to create things like:

- Web applications
- Desktop applications and utilities
- Small databases

Python conjointly contains a massive assortment of libraries, that quickens the event method. There are libraries for everything you'll think about – game programming, rendering graphics, GUI interfaces, web frameworks, and scientific computing Python 2

and Python 3 come pre-installed on Raspbian, but to install it on another Linux OS or to update it, simply run sudo apt-get install python3 or sudo apt-get install python. To access Python from the electronic communication, sort “python” or “python3” counting on that version you would like to use. This exposes the Python REPL (read-eval- print-loop), from that you'll enter Python commands rather like you employ the program line. Use Ctrl-D to exit the REPL.

VI. IMPLEMENTATION METHOD

6.1 INTRODUCTION

Various steps involved in tracking and mapping the movement to screen are

- Capturing real time image using Web- Camera focusing pupil of eye.
- Processing the individual image frame.
- Flipping of each image frame.
- Conversion of each frame to a grey scale image.
- Color detection and extraction of the different colors (RGB) from flipped gray scale image.
- Mouse Movement
- Processing the individual image frame.
- Flipping of each image frame

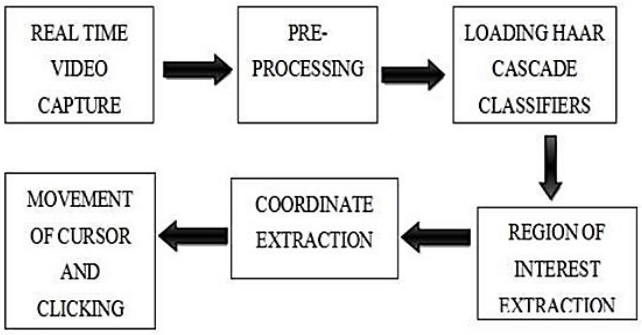


Fig 6.1 Functions Hidden Under Proposed System

6.2 PERSON DETECTION

The person detection is done using the PIR sensor. The PIR device itself has 2 slots in it, every slot is formed of a special material that's sensitive to IR. The lens used is not really doing much and so that the two slots can 'see' out past some distance. When the device is idle, both slots detect the same amount of IR, the ambient amount radiated from the room or walls or outdoors. When a heat body sort of a human or animal passes by, it first intercepts one half of the PIR sensor, which causes a positive differential change between the two halves. When the nice and cozy body leaves the sensing space, the reverse happens, whereby the sensor generates a negative differential change. These change pulses are what is detected.

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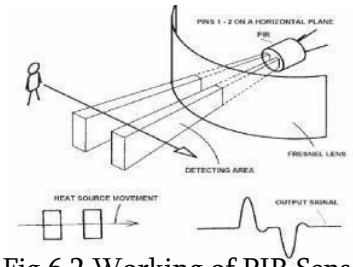


Fig 6.2 Working of PIR Sensor

6.3 CAMERA ACTIVATION

The image of the eye is tracked when the PIR sensor detects a person. The PIR sensor enables the camera.

The camera tracks the image of the eye and stores it in the memory location mentioned in the main program. As a primary section, Acquisition is very important. Obtaining a transparent image of the pupil within the eye is crucial to the eye-tracking method. A changed low price USB digital camera is employed for capturing a close-up image of 1 eye pupil. An integral a part of the planning method, therefore, is to determine the optimum camera settings and light source positions to produce a clear image. Matlab program is employed to decision the digital camera for deed the important time video input file. The tracked image of the eye is converted into grey scale and the centroid of the eye is calculated. Thus when the centroid is calculated the continuous eye ball tracking is done.Thus by this way the image tracking is displayed as the result.

6.4 CURSOR MOVEMENT BASED ON EYE BALL POSITION

The gray region of the image obtained when subtraction must be regenerate to a binary image for locating the region of the detected pupil . A grayscale image consists of a matrix containing the values of every picture element. The picture element values lay between the ranges zero to 255 wherever zero represents pure black and 255 represents pure white color. We use a threshold value to convert the image to a binary image. This means that each one the picture element prices lying below threshold value is regenerate to pure black that's zero and therefore the rest is regenerate to white that's so the resultant image obtained may be a monochromatic image consisting of solely black and white colours. The conversion to binary is required because it is easy to find the properties of a monochromatic image. Final output image: (after boundary detection and centroid): For the user to control the mouse pointer it is necessary to determine a point whose coordinates can be sent to the cursor. With these coordinates, the system will management the pointer movement. An inbuilt function is used to find the centroid of the detected region. The output of function is a matrix consisting of the X (horizontal) and Y (vertical) coordinates of the centroid. These coordinates amendment with time because the pupil moves. Centroid of the image is detected Coordinates area unit placed and hold on in a very variable currently the desired pupil trailing of eye is achieved. The pointer location is set by assignment X and Y position of bounding box. If the X and Y positions of Bounding box varies, accordingly the position of the cursor will also vary. Now the mouse movement in monitor is achieved by mistreatment pupil of eye movement detection that may be an alternate approach for the bit screen. Works may be done to perform the operations mistreatment the inherent.

This image shows the operation of the system when a person is detected. This is done when the PIR sensor triggers the system. The working of the PIR sensor is explained above This image shows the console window of the raspberry pi. This is where the execution status of the code is displayed and the execution is started by using certain commands. After the conversion of the RGB image into grey scale and after the morphological process , centroid calculation is done. The above figure shows the centroid calculation of the eye for tracking.

VII. CONCLUSION

The goal of this study is to propose a system that can help disabled people to operate their personal computer without the help of others. This technique can be implemented in their wheelchairs so that they can operate without an extra person. The developed technology is a base for the various applications which are to be developed for the disabled people.

The implementation of the AI unit can further enhance the sophistication of this system.

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Improving the Life Time of the Wireless Sensor Network Using Fuzzy Logic

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ABSTRACT

In the past few years, intensive research that addresses the potential of collaboration among sensors in data gathering and processing, and coordination and management of the sensing activity was conducted. Thus, innovative techniques to eliminate energy inefficiencies that shorten the lifetime of the Network and efficient use of the limited bandwidth are highly required. LEACH (Low Energy Adaptive Clustering Hierarchy) is the most famous routing protocol which consumes less energy. In LEACH, the Cluster Head is selected based on some random probabilities. These Cluster Heads send the aggregated data to the base station. In the proposed protocol, Cluster Heads are selected in the same procedure followed by the LEACH. But, among the Cluster Heads, we have selected a Super Cluster Head (SCH) based on some fuzzy descriptors such as remaining battery power, centrality of cluster heads and mobility of base station. The Super Cluster Head then sends the data to the base station. The results have been derived from NS-2 simulator and show that the proposed protocol performs better than the LEACH protocol.

Keywords : LEACH, CH, SCH, fuzzy logic, NS- 2 Simulator.

I. INTRODUCTION

Wireless Sensor Network considered as real time embedded system deployed in a particular region to sense various types of environmental parameters such as temperature, pressure, gas, humidity etc. The huge applications of WSN like habitant monitoring, forest fire detection, surveillances, transport monitoring etc. have created a lot of interest among the researcher community in recent past. Typically, WSNs are densely deployed in hazardous places where battery recharge or replacement is nearly impossible and human monitoring scheme is highly risky. Once the network is established, nodes keep on sensing the information and the battery power goes exponentially. Whenever the nodes detect any event, they send the information to the other nodes or to the base station. Sometimes it happens that the same information received by nearby sensor nodes can be received by the base station that makes the network in efficient. Cluster based routing protocol is one of these efficient ideas, where sensor nodes are divided into number of groups and each group is called as a cluster. One group leader is elected in each cluster known as Cluster Head (CH). Data aggregation is obtained at the leader node. The leader node (CH) is only responsible for sending the message to the BS.

II. RELATED WORK

LEACH Protocol:

LEACH stands for Low-Energy Adaptive Clustering Hierarchy. It is TDMA based MAC protocol. In LEACH, the nodes are organize themselves into local clusters, with one node acting as the cluster head. LEACH performs local data aggregation to “compress”

the amount of data being sent from the clusters to the base station .So reducing energy dissipation and enhancing system lifetime. The operation of LEACH is divided into rounds. Each round contains two phases:
Set-up phase

Steady-state phase

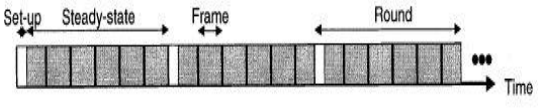


Fig 1: Setup and Steady phases

To minimize overhead, the steady-state phase is long compared to the set-up phase.

- **Setup Phase:**

In this phase select cluster head and form the clusters by choosing the node with maximum energy

Steps:

1. Cluster Head Advertisement
2. Cluster setup
3. Creation of TDMA schedule

- **Steady State Phase**:

1. Cluster nodes send data to CH
2. CH aggregates all the collected data and send to the BS.

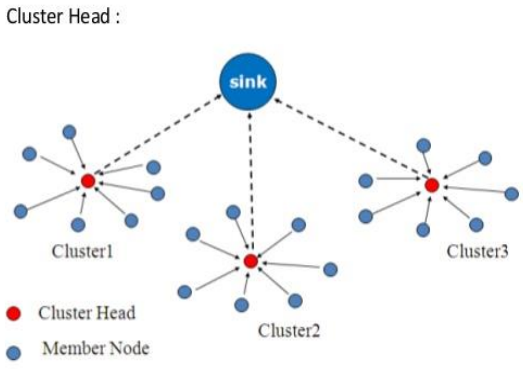


Fig 2 : LEACH Architecture

Cluster Formation:

CH sends join advertisement message to all the non cluster head nodes in the network using MAC protocol. Non CH nodes sends join request message to CH's based on the requirement of communication energy. The cluster head node sets up a TDMA schedule and transmits this schedule to the nodes in the cluster. Due to this the radio components of each non-cluster head node to be turned off at all times except during their transmit time.

Limitations:

- In LEACH each cluster head collects data from nodes and send to base station. So, energy consumption is more.
- If the elected node is located near to the boundary of the network, other nodes could dissipate more energy to transfer the message to CH.

III. PROPOSED SYSTEM

Fuzzy Logic is used to model human experience and human decision making behavior. Further, it can handle uncertainties of real time applications more accurately than the probabilistic model .Applying suitable fuzzy descriptors to improve the performance of LEACH protocol in view of electing an appropriate Super Cluster Head (SCH) among the CHs. Fuzzy Logic is adopted in this technique in order to handle the uncertainties for electing the SCH. Instead of multiple CHs, one SCH can deliver the message to BS that can reduce the energy consumption and enhances energy efficiency. It is assumed that sensor nodes send the data after detecting an interesting event. CH collects these data, aggregates it and send to the base station. To save some energy, we may think of one SCH among the CHs can send the data to BS to utilize the bandwidth efficiently. Instead of multiple CHs, one SCH can deliver the message to BS that can reduce energy consumption and enhances energy efficiency.

Further assumption we have made that Remaining battery power, Mobility, Centrality. The three fuzzy descriptors are suitable to calculate the chance to be SCH that can deliver the message to the BS.

Fuzzy Inference System:

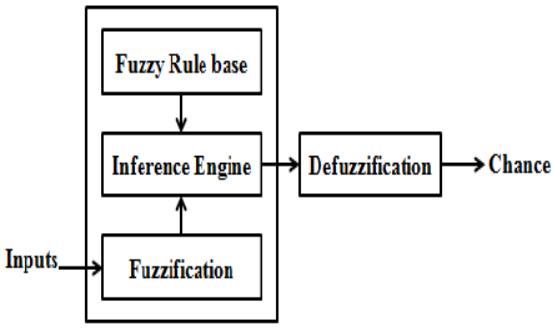


Fig 3: Block diagram of Fuzzy Inference System

1.Fuzzification: In fuzzifier, inputs are given with crisp value and changed into a fuzzy set. This can be achieved by fuzzification.

2. Rule Evaluation: It stores IF-THEN rule.

3. Fuzzy Inference Engine: This engine takes both the input values and IF-THEN rules to simulate the reasoning by which it produces a fuzzy inference.

4. Defuzzification: Defuzzifier transforms the fuzzy set into crisp value.

Input parameters of fuzzy logic controller in the proposed method are:

- **Remaining battery power:** The energy level available in each node.
- **Mobility**: The BS moves in a particular direction, the distance between BS and SCH increases or decreases w.r.t to the speed and direction of moving BS
- **Centrality**: A value which classifies the nodes based on how central the node is to the cluster.

Output parameter:

- **Chance = (Remaining battery power) + mobility+ centrality**

Language variables for each of the inputs and output are:

Table 1: Membership functions for inputs and output parameters

Remaining battery power	Mobility	Centrality	chance
Less(0)	Low(0)	Close(0)	Very Weak(-1)
Medium(1)	Moderate(1)	Adequate(1)	Weak(0)
High(2)	Frequent(2)	Far(2)	Lower Medium(1)
			medium (2)
			Higher Medium(3)
			Strong (4)
			Very strong(5)

Membership Functions:

The membership functions and their corresponding linguistic states:

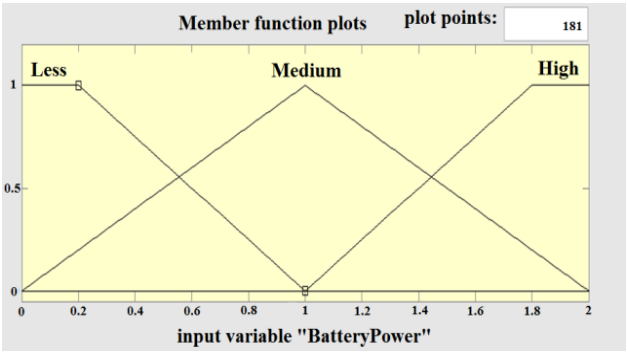


Fig 4 : Battery Power

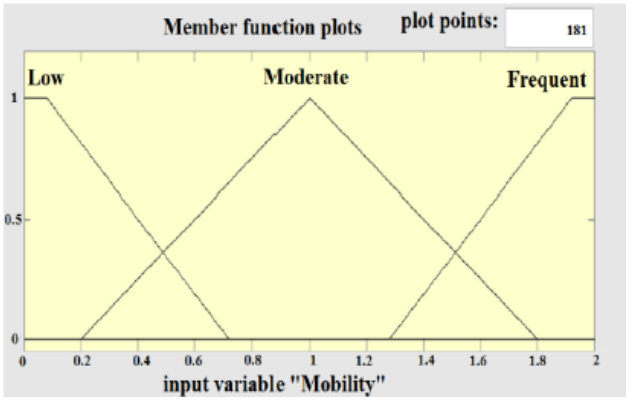


Fig 5: Mobility

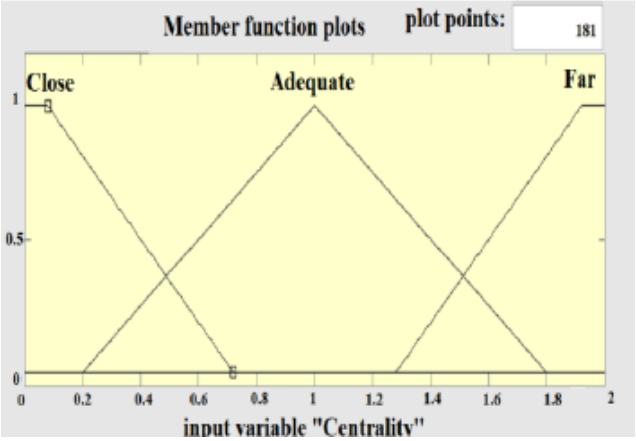


Fig 6: Centrality

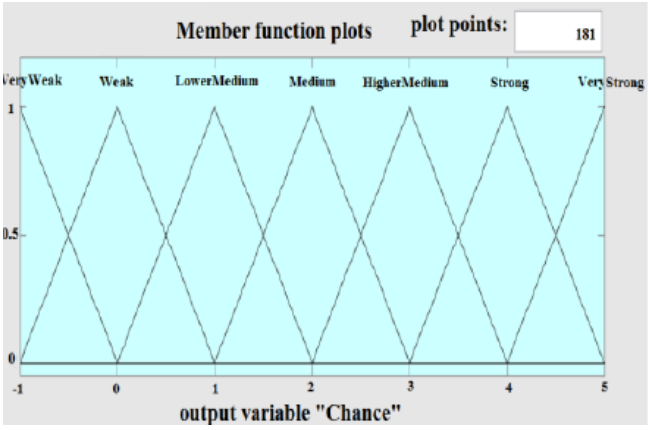


Fig 7: Chance

Fuzzy Rule Base:

The chance value to be the SCH is calculated considering three input parameters such as remaining battery power, mobility and centrality by using Fuzzy rules. In our system, we have used 27 rules in the fuzzy inference.

Table 2 : Fuzzy Rules and Value of Chance

Remaining Battery Power	Mobility	Centrality	Chance
Less (0)	Low (0)	Close (0)	Very Weak (-1)
Less (0)	Low (0)	Adequate (1)	Weak (0)
Less (0)	Low (0)	Far (2)	Lower Medium (1)
Less (0)	Moderate (1)	Close (0)	Weak (0)
Less (0)	Moderate (1)	Adequate (1)	Lower Medium (1)
Less (0)	Moderate (1)	Far (2)	Medium (2)
Less (0)	Frequent (2)	Close (0)	Lower Medium (1)
Less (0)	Frequent (2)	Adequate (1)	Medium (2)
Less (0)	Frequent (2)	Far (2)	Higher Medium (3)
Medium (1)	Low (0)	Close (0)	Weak (0)
Medium (1)	Low (0)	Adequate (1)	Lower Medium (1)
Medium (1)	Low (0)	Far (2)	Medium (2)
Medium (1)	Moderate (1)	Close (0)	Lower Medium (1)
Medium (1)	Moderate (1)	Adequate (1)	Medium (2)
Medium (1)	Moderate (1)	Far (2)	Higher Medium (3)
Medium (1)	Frequent (2)	Close (0)	Medium (2)
Medium (1)	Frequent (2)	Adequate (1)	Higher Medium (3)
Medium (1)	Frequent (2)	Far (2)	Strong (4)
High (2)	Low (0)	Close (0)	Lower Medium (1)
High (2)	Low (0)	Adequate (1)	Medium (2)
High (2)	Low (0)	Far (2)	Higher Medium (3)
High (2)	Moderate (1)	Close (0)	Medium (2)
High (2)	Moderate (1)	Adequate (1)	Higher Medium (3)
High (2)	Moderate (1)	Far (2)	Strong (4)
High (2)	Frequent (2)	Close (0)	Higher medium (3)
High (2)	Frequent (2)	Adequate (1)	Strong (4)
High (2)	Frequent (2)	Far (2)	Very Strong (5)

SIMULATION

To check the validity of the proposed protocol, NS-2 simulator (2.34) tool is used to compare the performance metrics of LEACH protocol which ensures extended lifetime of the WSN for the proposed protocol.

Simulation Parameters:

Table 3 : Simulation Parameters of the Network

Parameter	Value
Network Size	500m x 500m
No. of nodes	50
No. of cluster heads	3
BS location	250m x 250m
Node distribution	Random
BS Mobility	Random Walk
Channel	Wireless
Simulation Time	50sec
Bandwidth	1Mbps
Packet size	512 bytes

IV. RESULTS AND DISCUSSION

In this section, we present the experimental results obtained from the simulations to evaluate the proposed algorithm. In fig : calculate the average throughput of the network w.r.t number of nodes and in fig : the total residual energy of the network w.r.t number of nodes to both LEACH and proposed systems.

NAM: Network Animator Window

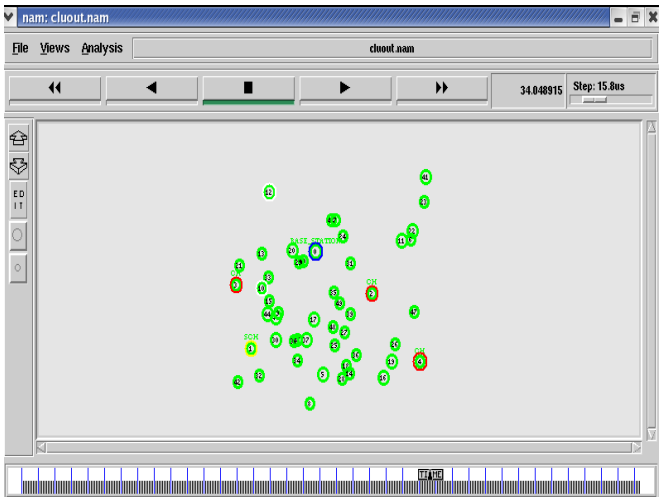


Fig 8: NAM output

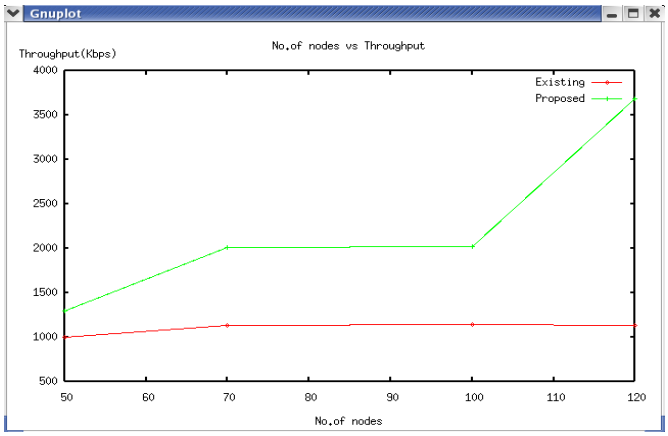


Fig 9: No. of nodes Vs Throughput

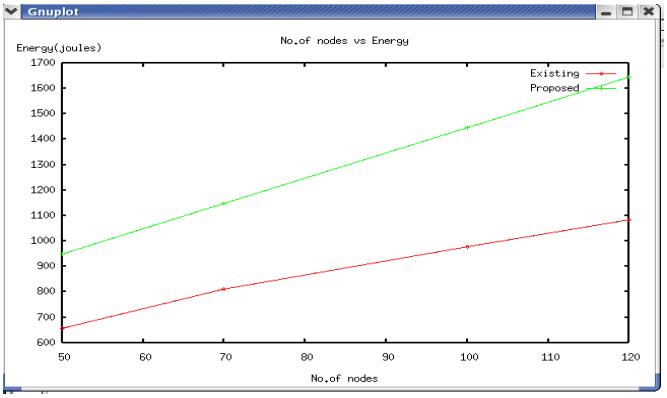


Fig 10: No of nodes Vs Energy of the network

Table 4: Comparison of Average Throughput

Number of nodes	LEACH(kbps)	FUZZY LOGIC(kbps)
50	996.28	1297
70	1125	2013
100	1141.5	2018
120	1127	3686

Table 5: Comparison of Total Residual Energy

Number of nodes	LEACH(joules)	FUZZY LOGIC(joules)
50	656.06	948.32
70	810.47	1146.62
100	978.09	1445.88
120	1083.81	1645.17

V. CONCLUSION

The summary of the system is "Performance comparison of Fuzzy based clustering protocol with LEACH routing protocol for Wireless Sensor Network applications" is that we have considered a novel approach to develop a new clustering protocol which is more efficient than the existing LEACH clustering protocol, In this protocol, we have considered three fuzzy parameters such as mobility, node energy, centrality to select the super cluster head among the cluster heads so that super cluster head can send the

data to the base station with most effective and efficient manner. Further we have considered the performance metrics such as Average throughput and energy of the network of the LEACH and our proposed protocol using NS-2 simulator. From this simulation results, it is concluded that our proposed protocol works better than LEACH. The simulations are done using NS -version (2.34) and the results are analyzed through gnuplot.

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QoS Aware Services Selection for IOT

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ABSTRACT

An important challenge is addressed in this paper for developing efficient services selection algorithm with the optimization of both quality and energy consumption in the context of IOT services composition. In a large scale IOT environment, the composition of thousands of entities becomes a crucial issue. In this paper, an EQSA algorithm is proposed for service composition. The proposed selection approach consists in the quality of the services in view of the satisfaction of the user through the use of a lexicographical optimization technique. In order to increase the energy conservation without decreasing the user's preferences, a most suitable service is selected among the pre candidate service ones are then Selected using the concept of relative dominance of services in the sense of Pareto. The relative dominance concept mainly depends on the energy profile and QoS attributes and users preferences.

Keywords : EQSA algorithm, IOT, QoS

I. INTRODUCTION

The internet of things is an interconnection of various objects with their capabilities like sensing, actuation communication and computation are rapidly developed to collect the data to create the applications the users requirements

In our everyday lives, the vision of iot is extended so number of connected devices and their innovative applications are rapidly increasing in many domains as possible.

The interconnected devices can communicate with each other through the various Communication protocols without human invocation. The IoT can be introduced in the fields of communication, e business applications. For example, a composite service would be a travel planning system that interconnects the multiple component services for flight booking, accommodation booking, car rental and itinerary planning are executed sequentially or concurrently

The composition of IOT services promotes the creation of complex applications. .i.e. composite services. This composite service is formed by aggregating the individual atomic services to provide new functionalities.

In this study, the term candidate service refers the invocable service, where as an abstract service is also called service classes. Each Abstract service, there may exist several concrete services which is having same functionality but different quality value. The composition plan describes how candidate services interact with each other by specifying the order of invocation.

A key issue in a composition process how effectively chooses the most relevant services that can match the user's requirements. interms of QoS, the services selection is still crucial task because dynamic and stochastic nature of IoT. In the energy model, the candidate services selected for a composition process which is hosted in devices are limited budget of energy. During the execution of composition plan, the services may fail due to intensive use of battery leading to unreliable of service. The mobility of devices new services are introduced but energy budget cannot be increased much more, the battery capabilities gradually increase per annum by only 5%. So, finally less energy consumption services may lead to high availability of services. In this paper, an EQSA algorithm proposed for iot services composition. The main aim of this algorithm is to reduce energy consumption by slightly reducing the QoS level without affecting the user's requirements. The services selection approach is carried out by 2 methods.

1) Pre-selection of services 2) Relative dominance method

In the first phase, services selection approach is solved by using the lexicographic optimization method. This method consists of solving the sequence of each QoS attribute (availability, reliability, response time etc). The QoS attributes are ranked in the order of user preferences. For each operation, finding the candidate services providing the best quality with respect to the QoS attribute q. A threshold value of best quality is defined from the best quality value and tolerance factor [0,1] represents the reduction of the quality allowed by the user.

The candidate services which do not satisfy the obtained threshold value are removed from the candidate services set. The first phase allows us reduce the search space along with selection time. The candidate services obtained in the pre selection phase are compared in the 2nd phase .i.e. dominance concept. An utility value which represents the relative dominance of each candidate service are selected for the services composition. The utility value mainly depends on energy profile, QoS attributes, user preferences.

II. METHODS AND MATERIAL

A. Service model description.

1) concrete versus abstract services: A concrete service(CSj) is described by its functional properties in the form of transformation function Action(CSj) that takes an input Input Data(csJ) to produce an Output data(CSj) and non functional attributes like QoS(CSj) and energy profile Eprof(CSj)

$$cs_j = \{InputData(cs_j), OutputData(cs_j), Action(cs_j), QoS(cs_j), EProf(cs_j)\}.$$

An abstract service ASi={CS1,CS2,……..CSn} is a class of 'N' concrete services having the similar functional properties.i.e. atleast the same input data and output data but differ by the non-functional properties.

2)Abstract versus Concrete Composite Service: An abstract composite service is represented by the aggregation of abstract services(services classes) with out representing the concrete services. A concrete composite service is example of an abstract composite service obtained by mapping the each abstract service (e.g., localization of an object) to one of its concrete services (e.g., RFID-based localization, vision-based localization).

B.Energy Profile Model:

The energy profile Eprof(CSj) of a concrete service is descibed by following parameters like Ecost(CSJ) and AutoS(CSj). The Ecost(CSj) represents the overall energy consumption during the execution of the

service. The AutoS(CSj) represents Energy level of the device which hosting the service.

$$AutoS(cs_j) = EnergyDevice(cs_j) - EnergyThreshold(cs_j)$$

Energy device and Energy threshold represented as, the charge level of battery powered device hosting a service and threshold value under which device cannot provide a service anymore.

$$ECost(cs_j) = ConsRate(cs_j) \cdot ExecTime(cs_j)$$

ConsRate represents the consumption rate and Exec Time (CSj) represents the execution time of the service.

Finally, the energy profile of a service is defined as ratio of its energy cost and its autonomy is represented as

$$EProf(cs_j) = \frac{ECost(cs_j)}{AutoS(cs_j)}.$$

1) QoS Level Based Services Pre-selection:

The Qos aware services selection can be done by using the Lexicographic optimization. In this technique, ranking the each QoS attribute in an order based on the user's preferences. Let us consider 5 candidate services C1, C2, C3, C4, and C5.

C1={cost=100, AV=90%, RL=0.95}
C2={cost=90, AV= 85%,RL=0.90}
C3={cost=110,AV=85%,RL=0.85}
C4={cost=120,AV=88%,RL=0.90}
C5={cost=95,AV=86%,RL=0.88}

The user selects cost is his first priority. So, from the above 5 candidate services cost=90 is the best quality of service.

Here, we define a threshold value and tolerance factor which is characterizing the decrease of quality allowed by the user.

$$qos_q^{\text{Threshold}} = \begin{cases} qos_q^* - qos_q^{\text{Decrease}}, & \text{if } q \text{ is positive} \\ qos_q^* + qos_q^{\text{Decrease}} & \text{otherwise} \end{cases}$$

$$\text{with} \quad qos_q^{Decrease} = qos_q^* \cdot \delta_q$$

Where qos*q ,qosdecrease, del q represents best quality value, decrease the quality which allowed by the user, tolerance factor ranging from[0,1].

Algorithm 1 – QoS level-based services preselection

Inputs: Abstract service AS_i with n candidate services.

δ_q : the tolerance factor for each QoS attribute q.

1: Ranking the QoS attributes according to the user's preferences. The rank is $1 \ldots k$. The attribute $q = 1$ has the highest priority.

2: $PCS = AS_i$.

3: **for** $q = 1$ until k **do**

4: Find cs_j^i from PCS such as $qos_q^* = optimal(qos_{q,j}^i)$.

5: Calculate $qos_q^{Decrease}$ using **(13)**.

6: Calculate $qos_q^{Threshold}$ using **(12)**.

7: Update PCS as follows:

8: **if** q is a positive attribute **then**

9: $PCS = \{cs_x^i \in PCS \cap AS_i / qos_{q,x}^i \geq qos_q^{Threshold}\}$

10: **else**

11: $PCS = \{cs_x^i \in PCS \cap AS_i / qos_{q,x}^i \leq qos_q^{Threshold}\}$

12: **end if**

13: **end for**

Outputs: The Preselected Candidates Set (PCS).

2) Relative dominance based services selection:

In this phase, the pre selected candidate services are compared using the value which reflects their relative dominance. The dominance value mainly depends on its energy profile, QoS attributes and

users preferences. Finally, the best services in terms of relative dominance are selected for the composition process.

The candidate services which are selected for PCS (CS) are given below

C1={cost=100, AV=90%, RL=0.95}

C2={cost=90, AV= 85%,RL=0.90}

C3={cost=110,AV=85%,RL=0.85}

C5={cost=95,AV=86%,RL=0.88}

2.1) QoS-BasedParetoDominance:

The paretodominance is defined as follows.

The COST (CS1)> COST(CS3) because cost is a negative attribute. The Av(cs1) greater than equal of Av(CS3). So CS1 strictly dominates the CS3 at least one one attribute (user preferred) strongly. Hence, the candidate service CS3 is removed from the set.

The COST(C2)>COST(CS1) and Av(C1)>Av(C2).in this case, the service C2 doesn't dominates the service C1. The remaining candidate services are does not a dominates each other. These 2 services are called nondominated or Pareto equivalents.

To overcome this difficult to compare the services which can be pareto equivalents in terms of QoS, a relative dominance concept is proposed.

2.2) Relative Dominance:

Let Eprof (cs1)=Ecost(cs1)/AutoS(cs1) and Eprof(cs2)=Ecost(cs2)/AutoS(cs2) be the energy profile of CS1 and CS2.

Definition1:

QoS Attribute based Dominance: It can be represented as how many number of candidate services are dominated with respect to its attributes like 'COST'. From the above candidate services, C2=90 dominates 3 candidate services (C1=100,C3=95,C5=95). But C3 and C5dominates only 1 candidate service C1. Finally, the Candidate service C2 dominates 3 services so it can be noted as Dom (csj,q).

Definition2: In the energy model description, the battery of each device has initial charge value "Cintial" chosen randomly in the interval [0.7Cmax to 1.0Cmax]. Where the Cmax represents the maximum battery charge. When a service is requested, a charge chosen randomly in the interval [100mA.S, 10000mA.s] is subtracted from the actual battery charge of the device hosting the service.

Cmax=1500 mA.h

Cthreshold=30% of Cmax

A device can stop providing a service when the battery level reaches its threshold level and the service considered to be failed in the selection view.

Algorithm 2 – Relative dominance-based services selection

Inputs: The PCS of abstract service AS_i

The set of user's preferences.

1: **for each** $cs_j^i \in PCS$ **do**
2: **for each** QoS attribute q **do**
3: Determine the $Dom(cs_j^i, q)$.
4: **end for**
5: Determine the $EP - Dom(cs_j^i)$.
6: Calculate relative dominance of cs_j^i using **(15)**.
7: **end for**
8: Find the cs_x^i having the maximal relative dominance value.

Outputs: The selected candidate service cs_x^i.

In the proposed selection approach, the added value can be shown by using the 3 algorithms.

1) EQSA: Here both energy profile and quality value can be considered for the services selection

2) EQSA-EP: Here the only the energy profile values can be considered .i.e. lower energy profile services are selected.
3) EQSA-QoS: Here the only quality attributes are considered for selection and composition process.

III. RESULTS AND DISCUSSION

Simulation Results:

- Selection time: it represents the computational time of the Selection algorithm.
- Optimality: it is defined as the ratio of quality value obtained in the case of EQSA to optimal value of composite service in EQSA-QoS algorithm.

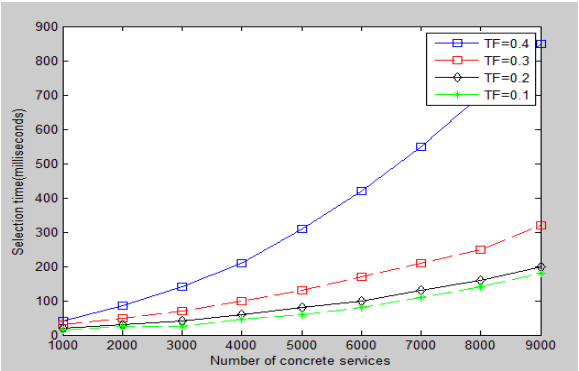
$$Optimality = \frac{\sum_{q=1}^{|QoS|} Optimality(qos_q)}{|QoS|}.$$

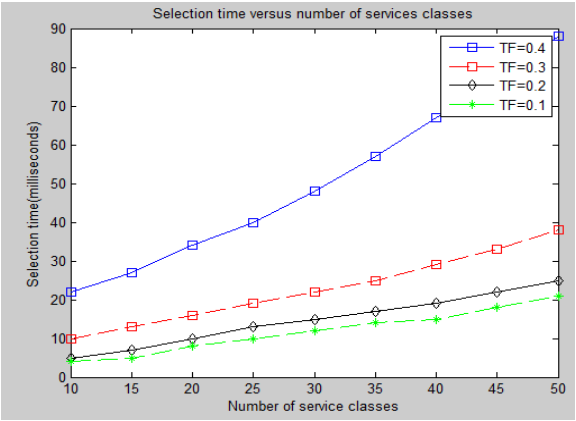
$$Optimality(qos_q) = \begin{cases} \frac{\frac{1}{qos_q(EQSA)}}{\frac{1}{qos_q(EQSA \sim QoS)}}, & \text{if } q \text{ is negative} \\ \frac{qos_q(EQSA)}{qos_q(EQSA \sim QoS)}, & \text{otherwise} \end{cases}$$

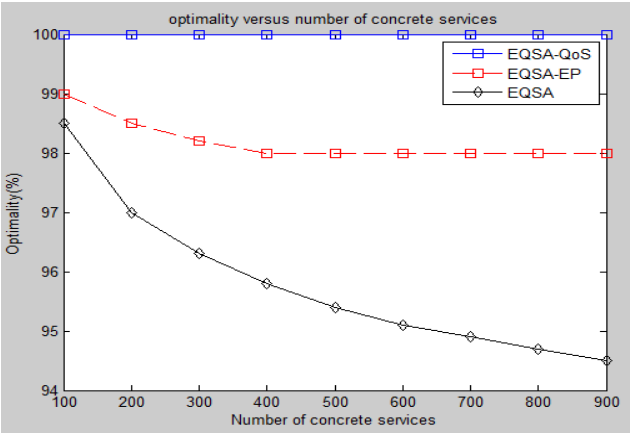
Where qos(q) is the qth QoS attribute and |QoS| is the number of QoS attributes. And qos (q) EQSA and qos(q)-EQSA-QoS are the Values of the qth QoS attribute of the composite service obtained using and algorithms, respectively.

1) Selection Time Versus Number of Services: The first simulation is intended to validate the scalability of the algorithm. The number of services classes is set to 10, which correspond to a typical structure of a composition plan in the ad dressed use-case. The number of candidate services for each class varies from 1000 to 10000. As shown in Fig. 1, the selection time increases with the tolerance factor as the number of candidate services satisfying the QoS threshold values increases. The average selection time taken by the algorithm is compatible with large scale IoT environments since it does not exceed 900 milliseconds for a number of concrete services equal to 10 000.

In the second simulation, the number of services classes varies from 10 to 50 classes whereas the number of concrete services is set to 1000 for each class .The bound of 50 services classes corresponds to an extreme but realistic case of services composition. As observed in Fig. the selection time increases with the number of services classes used in the composition Structure. Similarly to the first simulation, the selection time increases with the tolerance factor. In addition, when this factor becomes larger ( ), the number of preselected candidate services increases significantly as well as the selection time that does not exceed 90 ms for a number of services classes equal to 50.







IV. CONCLUSION AND PERSPECTIVES

In this paper, QOS aware services selection with reduced energy consumption approach for IoT environment is presented. It can be solved as a bi-objective optimization problem includes quality value and minimization of energy consumption which provides the high availability of services along with users satisfaction. A QoS based services selection can be achieved by using the Lexicographic optimization technique. In the next phase, a relative dominance concept is used for those candidate services which are Pareto equivalents. The pre selected candidate services are compared for best service selection and the relative dominance value can be calculated from the energy profile and QoS attributes. The posted simulation results promising performances of the proposed algorithm. The EQSA algorithm can be scalable in large IoT structures and gives the very optimal solution (98%). For the future work, the extension of EQSA algorithm can be handled with re-selection of services by predicting the QoS and Energy values changes.

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IOT based Automatic Farm Monitoring

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ABSTRACT

The aim this project is to monitoring farm by using IOT. Emergence of Controlled Environment Agriculture (CEA) ranging from computer-controlled water irrigation system to lightning and ventilation has changed the conventional scenario of farming. This project proposes and demonstrate an economical and easy to use arduino based controlled irrigation system. The designed system deals with various environmental factors such as moisture, temperature and amount of water required by the crops using sensors like water flow sensor, temperature sensor and soil moisture sensor. Datas are collected and received by arduino which can be linked to an interactive website which show the real time values along with the standard values of different factor required by a crop. This allows user to control irrigation pumps from far distance through a website and to meet the standard values which would help the farmer to yield maximum and quality crops. In India, farming is done by traditional method, farmer's plant crops traditionally without knowing the content of soil and quality of that soil. As a result farmers will not gain sufficient profit from there farming. Due to human intervention there are chances of human errors so farmers may receive incorrect report. So there is need of automated process for soil testing and crop prediction.

Keywords : IOT (Internet of Things), Arduino, Temperature, Sensor, Soil Moisture Sensor.

I. INTRODUCTION

Latest technology using various sensors for precision agriculture has become a popular research. Monitoring parameters of pH and humidity is an important means for obtaining high quality environment. The traditional way of analyze the soil parameters is doing an on-the-spot evaluation, which is always requires additional labor which is very inconvenient method. In order to overcome these problems, we designed a monitoring system which is Arduino based. Irrigation is the process of artificially watering the plants which helps for its growth. Soil pH is the most commonly measured agricultural parameters. Because pH of the soil is related to its fertility and plant growth, hence it is essential and edifying soil parameters. The wireless sensor monitoring system for drought was capable monitoring for extended periods on real–time basis and also capable of identify drought conditions at the earliest as possible and therefore we can take corrective measures accordingly. For every two seconds the data collected from base station are uploaded to the cloud for study purposes. This smart irrigation industry where water waste is minimised and is no longer sustainable socially, economically and conventionally as well. The idea and development of smart irrigation is basically focused onto reduce human efforts as well as reduce resources (water) and power consumption (electricity).

Although smart irrigation has developed but so far no solution is obtained to measure accurate flow of water along with availability of datas over website which could be fetched from anywhere in the world. Further another advantage of the designed irrigation system is that it would keep the farmer up to date and also aware before any adverse situation come in. Thus helping the farmer to have control on the field 24x7 We can check the temperature of the crops because crops are temperature sensitive too and if the smart system awares the farmer before then farmer can use sprinklers in order to cool down temperature of the crops it would save both crop and farmer. Our approach is to make this system accessible from even far distance so that farmer have the information and control on the field 24x7 throughout a year. The whole setup is controlled by an arduino which is a microcontroller and the data is sent and received by a wifi module i. e ESP8266.

II. LITERATURE SURVEY

Primary investigation is carried out under these stages, such as Understanding the requirements, build up an abstract for the system.

In this paper, soil moisture sensor, temperature and humidity sensors placed in root area of plant and transmit data to android mobile. Threshold value of soil moisture sensor that was programmed into a microcontroller to control the water level quantity. Temperature, humidity and soil moisture values are displayed on the android application.

This paper on “A wireless application of drip irrigation automation supported by soil moisture sensors” the farm monitoring is carried out using soil moisture values but extend to this system displays temperature and humidity values. [18]

"Automatic Irrigation System on Sensing Soil Moisture Content". In this paper to create an automatic farm monitoring which turns the pumping motor ON and OFF on detecting the dryness content of the earth. In this paper, only soil moisture vale is considered but in this project temperature and humidity value is considered. [2].

“Irrigation Control System Using Android and GSM for Efficient Use of Water and Power”. In this paper, GSM is used to control the system which may cost more so to overcome that system used arduino board which already consist of in build wifi module[13].

“Remote Monitoring in Agricultural Free house Using Wireless Sensor and Short Message Service (SMS)”. In this paper they are sending data with the help of sms but in this system sends the value to the android mobiles . [5]

BLOCK DIAGRAM:

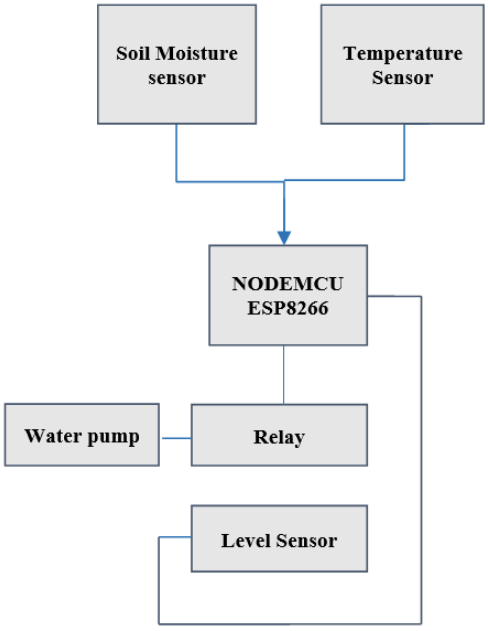


Figure 1

WORKING

The block diagram of farm monitoring system with IoT. Farmers start to utilize various monitoring and controlled system in order to increase the yield qualities with the help of automation of an agricultural parameters like temperature, humidity and soil moisture are monitored and control the system which can help the farmers to improve the yield qualities. This proposed work includes an embedded system for automatic control of farm monitoring. This project has wireless sensor network for real-time sensing of an irrigation system. This system provides required level of water for the agricultural farm and it avoids wastage of water. System automatically switch ON the motor when the moisture level in the soil reaches below threshold value. The motor automatically switch OFF When the water level reaches normal level. The sensed parameters and current status of the motor will be displayed on user's android application.

Arduino Uno and Arduino ide

Arduino Uno is a microcontroller board based on the ATmega328p which is a datasheet. It has 14 digital I/O pins. Out of 14 digital I/O pins , 6 can be used as PWM outputs, another 6 pins used as a analog inputs. Arduino has needed to support the microcontroller . Any one can program then connecting it with the computer by a USB cable. It accepts or supports 9V to 20V DC. It controls the whole System actions.



Figure 2 : ATmega328

Node MCU

NodeMCU is an open source Io Ti. e. Internet of Things platform. It includes firmware which runs on the ESP8266 Wi-Fi Syste-on-Chip (SoC) from Espressif Systems, and hardware which is based on the ESP-12 module. The term "NodeMCU" by default refers to the firmware. It uses many open source projects.



Figure 3 : ESP8266

SOIL MOISTURE SENSOR

The Soil Moisture Sensor uses capacitance to measure dielectric permittivity of the surrounding medium. In soil, dielectric permittivity is a function of the water content. The sensor creates a voltage proportional to the dielectric permittivity, and therefore the water content of the soil. Moisture Sensor measures the soil moisture and sends it to the Arduino in the form of data.

TEMPERATURE/HUMIDITY SENSOR

The DS18B20 Digital Thermometer provides 9 to 12-bit (configurable) temperature readings which indicate the temperature of the device. The DS18B20 communicates over a 1-Wire bus that by definition requires only one data line (and ground) for communication with a central microprocessor. This sensor is waterproof sensor. This sensor connected with the Arduino and it provides the data to the Arduino from the soil.

Power supply range is 3. 0V to 5. 5V

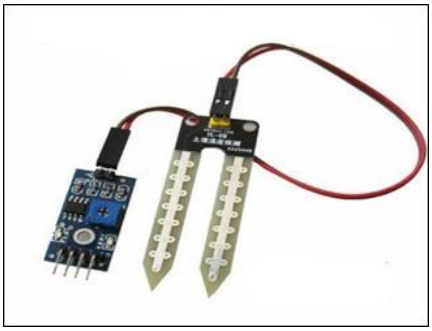


Figure 4. Soil Moisture Sensor

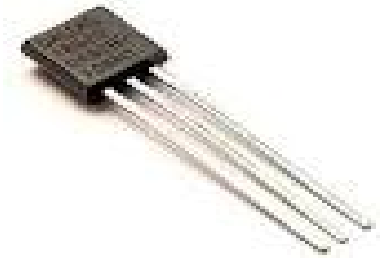


Figure 5 : Temperature/Humidity Sensor

GSM SIM 800L

Mini GSM / GPRS breakout board is based on SIM800L module, supports quad-band GSM/GPRS network, available for GPRS and SMS message data remote transmission. The board features compact size and low current consumption. With power saving technique, the current consumption is as low as 1mA in sleep mode.

Features

Send and receive SMS messages
Send and receive GPRS data
Scan and receive FM radio broadcasts
Connect any global GSM network with any 2G SIM

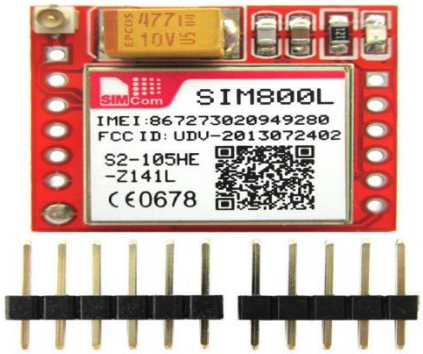


Figure 6 : GSM SIM 800L

RELAY

A relay is an electrically operated switch. Relay is used to run a pumping motor in automatic farm monitoring. Arduino operates at 5V current. It is not able to control higher voltage devices directly. Arduino will be corrupted if higher voltage device is attached with it. Relay has three high voltage terminals. They are: NC, COM, NO. These terminals connect to the device which we want to control. Relay has three low voltage pins. They are: GND, VCC, IN. These pins connect to the Arduino directly.



Figure 7 : 5V Relay

DC MOTOR

Motor is the main part of the automatic farm monitoring. Moisture sensor measures the moisture of the soil . If the moisture value of the soil is low then soil needs water. To give the water we used this DC pumping motor. If the temperature is so high for crops to survive, the temperature sensor sends the data to the Arduino and Arduino turn on the DC motor.

Operating : 3v to 6v DC
Power consumption: 0. 4W to 1. 5W
Rate of flow: 80 - 120L/hr

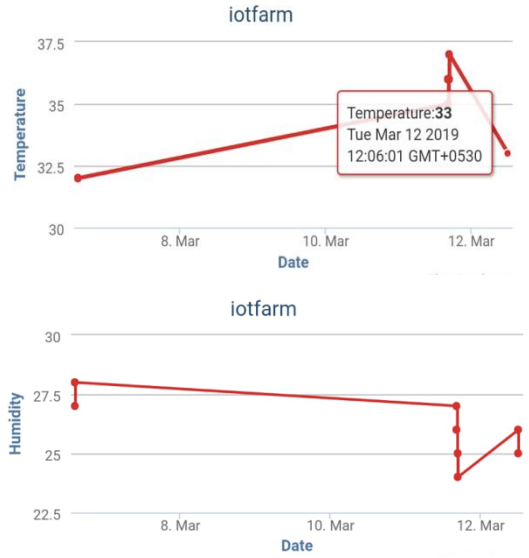


Figure 8 : DC Motor

THINGSPEAK

THINGSPEAK is an open source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates.

RESULTS



These are the results which shown in thingspeak site.

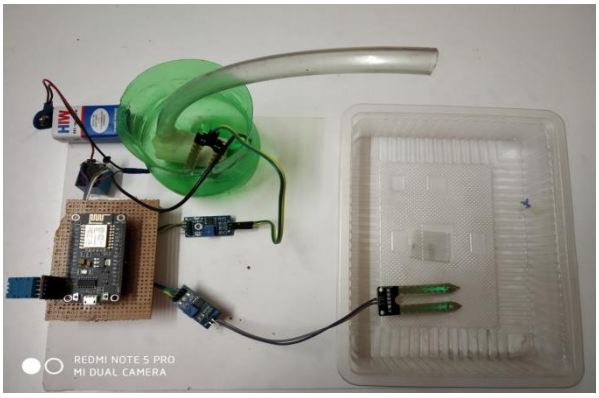
III. CONCLUSION

During the implementation, number of conclusions has been considered based on the practical results Obtained from the model. The system designed cost is very much effective when compared with other approaches to systems. The purpose of designing of Automatic Farm Monitoring System is successfully achieved and fulfills the desired objectives. The hardware and software used performed their function properly to produce desired result which is the required for the farmers in the irrigation field. The system, which is designed, will help the farmers to do the irrigation process in night also. The system designed do not requires the physical presence of the farmers during irrigation in the fields. The system is automatically monitored and controls the pump on and off.

IV. FUTURE SCOPE

- The IOT is related to cloud computing in a way that IOT obtains powerful computing tools through cloud computing and it finds the best practicing channel based on IOT.
- Large amount of data obtained by using radio frequency, identification, wireless, communication, automatic control, information sensing techniques of IOT are handled with agricultural information cloud, truly realizing smart agriculture.

ACTUAL MODEL



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Design and Implementation of a Bionic Arm

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ABSTRACT

Physical weakness can restrain the physical capacity or fine/net engine capacity of appendages of a person. Such an individual at that point can be called as a handicap. In instances of people with loss of appendages and alongside nothing remaining limit, it is extremely troublesome for them to connect with every day exercises just as a business, instruction, autonomous living, and so on. This paper will delineate the data relating the substitution of the upper appendage of an amputee by Bionic Arm. The prosthesis is a piece of Rehabilitation Engineering which implies, the reintegration of a person with weaknesses into society. The main role of an arm prosthesis is to emulate the appearance and supplant the capacity of a missing appendage. It requires powerful utilization of assistive frameworks to reestablish the engine elements of an amputee and furthermore it ought to be cosmetically engaging. These prerequisites and advances in science and innovation have prompted improvement of the remotely controlled prosthesis that interface legitimately with the neuromuscular framework and reproduce a portion of a typical hand's complex proprioceptive control.

Keywords: Rehabilitation, Prosthesis, Bionic ARM

I. INTRODUCTION

The hands are the central instrument for the physical control of things, additionally being the piece of the body with the greater part of the nerve endings on the grounds that the material data they give. The principle utilization of the hands is to take and hold objects, in spite of the fact that exists a ton of inferences because of the flexibility and exactness of developments they have. Being utilized as instruments to eat, compose, convey through gesture-based communication, and so on. As indicated by the American Occupational Safety and Health Administration (OSHA), from the 2 million Americans incapacitated laborers every year, about 400.000 have hand wounds, being the most incessant area fingers (72%). The modern part demonstrates that 60% of removals are on hands, with the laborers who work with metals the most awful removals recorded (6.7%). In our nation there are few examinations on the study of disease transmission of word-related mishaps, among them there is one made in material organizations, which reports that from the complete mishaps in work, 54.8% are at hand and 2.4% of them are horrendous removal. The hand wounds have imperative importance since they are an excellent anatomic area with high esteem, due to be utilized in practically every one of the callings or

occupations. Any dimension of removal prompts a level of inability that may constrain the human to perform fundamental exercises like nourishing and prepping for all time. These days exists a ton of prosthesis pretty much like the genuine hands and which can accomplish practically 50% of the elements of the genuine ones, the most up to date can be moved by mental signs, or by nerve signals. Moreover, the cost of them can't manage the cost of by a large portion of the general population with a fundamental pay. Consequently, this task is tied in with making a model of an orthopedic hand which can be made with a low cost. Utilizing the new innovation of the 3Dprinters and the development will be performed by muscle signs.

The point of this task is to make a model of a hand which can be put on the forearm of the body, this hand would accomplish the fundamental developments of graving an item in two diverse ways:

- Impingement, with the file, center finger and thumb. For littler articles and more accuracy.
- Enclosure, with the entire fingers. For standard articles.

The central matter of the task is the execution of the development, it will be moved by the signs of power read at the biceps with certain cathodes, enhanced by an electronic gadget self-made and translated by Arduino UNO. Arduino will move three precise servos every one dismantling a few strings joined to the hand to make the fingers contract or broaden contingent upon the power you make with the biceps. The structure of the hand will be taken from the Internet, "Inmoov" is an open-source 3D printed life-estimate robot, it has been chosen to take only the correct hand from this task and the forearm will be planned with CREO Parametric so as to set the hand on the human forearm and convey the servos, hardware, and sustenance on it.

II. LITERATURE REVIEW



Figure 1. VASI Hand Family (Technologies, Liberating, 2012)

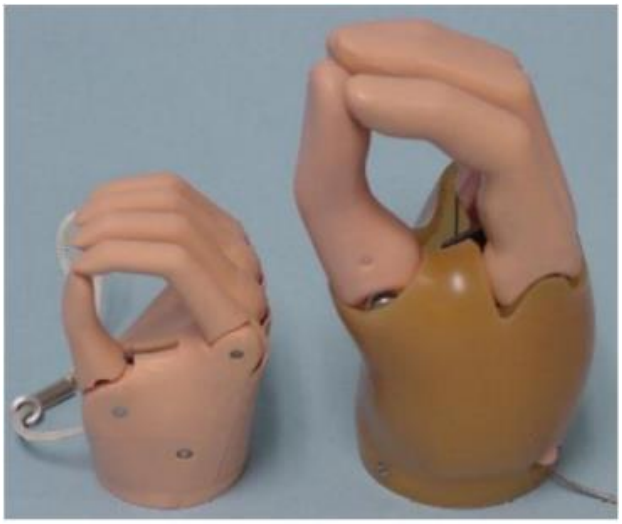


Figure 2. Mech Hands (Technologies, Liberating, 2012)

There are commonly available prosthetic hands which offer very limited and simple functionality. All of these hands offer one action, opening or closing. They generally have a very blocky appearance, and often have 3 fingers instead of 5. The simple hands were easier to design and build, but cannot perform many tasks required of the user.

A. BeBionic and iLimb Hands



Figure 3. BeBionic Hand (Advanced Arm Dynamics, 2012)



Figure 4. iLimb Hand (Arthur Finnieston Prosthetics + Orthotics, 2012)

Several years ago, robotic prosthetic hands with individually articulated fingers were released onto the market. These hands were completely revolutionary in their look and function compared with other prosthetic options that existed.

Touch Bionics was the first company to release one of these hands known as the "iLimb". The iLimb is based around the design of an individual finger, known as "digits" by Touch Bionics. Each finger contains its own motor and gearbox which is very helpful when designing a prosthetic hand which must fit inside human proportions. In fact, amputees who are only missing partial fingers may simply use as many Digits as they need in a custom solution from Touch Bionics. Each finger has a joint at the base and one pivot point at the first knuckle. The fingertip is passively actuated by being pulled on by a cable. One interesting mechanical aspect of the fingers is a spring linkage which allows the fingers to be manually bent inwards to prevent damage if the hand hits into a hard object. Altogether, the iLimb has 5 degrees of freedom. User input is controlled through myoelectric sensors reading the muscle signals remaining on a portion of an amputees arm. The control is designed to be intuitive in this sense that a person should optimally be able to open and close their hand with the same muscle signals they would normally send them to an actual human hand. Touch bionics boasts 14 different grip patterns which are all subtle variations of the most commonly used patterns. (Touch Bionics, 2012) Overall, the iLimb is a fantastic product which has given a tremendous amount of increased functionality to the lives of many amputees. The iLimb however does not have an actively powered positionable thumb. The user must use their other hand to manually rotate the angle of the thumb. For example, if a user is eating a meal and has their hand in a key grip mode for holding onto a spoon or fork, and then decides to drink from a glass or cup, the user would have to manually rotate the thumb down until it is in position for a cylindrical grip. The iLimb does at least contain a sensor to recognize the current position of the thumb to help ensure the hand is not going to damage itself in certain grip modes. There is also no force feedback provided to the user, so it can be difficult to perform precision tasks. As a result of the

lack of force feedback, users may inadvertently drop objects because they are not being gripped firmly enough, but there is no indication before it is too late and the object has fallen.

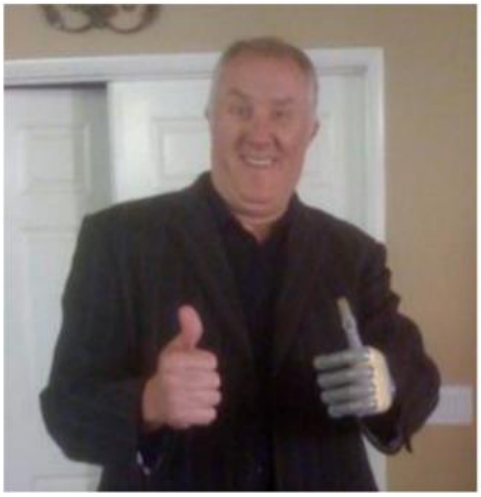


Figure 5. Darin Sargent (Sargent, 2012)

Several people have posted videos on the Internet demonstrating how they use the iLimb to perform daily tasks. Due to the fact that there are such a low number of prosthetic hands available on the market, these videos serve as a great tool for spreading information about options for the prosthetic community. One such man named Darin Sargent created an entire video diary explaining the process of him obtaining the iLimb from initially hearing about it, all the way through months of use. He documented his journey clearly and excitedly including the emotional highs and lows along the way. The most viewed video of his diary is an extremely touching moment which candidly captured his younger daughter reaching for his prosthetic hand to hold onto it, as if it was his real hand. The young girl accepted the prosthetic limb as his actual hand in that moment.

One surprising moment from Sargent's video diary was the explanation of his initial discussions with Hanger Prosthetics. Hanger Prosthetics was a local distributor recommended by Touch Bionics who specializes in custom prosthetic and orthotic devices. Hanger Prosthetics is a large national chain well known in the prosthetic community and industry. The sales specialist described that the full the cost of the prosthetic hand should be covered completely by insurance. They disclosed that the cost of the hand would be a staggering $60,000. Sargent, as well as most people, had a very small budget, so paying for the hand out right was not remotely an option. It was several weeks of back-and-forth phone calls from the insurance company and Hanger prosthetics before it was concluded that the insurance company would be willing to cover most of the cost of the prosthetic hand. This would normally sound like good news, but that they would only be able to cover 75% of the cost, which would leave $15,000 still to be paid for. This was simply too much money for Sargent, but the people at Hanger prosthetics were persistent enough with the insurance company to reduce the cost until only $1000 remained. This side story helps explain just how expensive robotic prosthetic hands actually are.

The BeBionic hand is incredibly similar in construction to the iLimb. The BeBionic hand was produced by RSL Steeper with the intention of offering similar functionality to the iLimb at a slightly reduced cost. Some people speculate that the hand is a direct spinoff based on identical mechanical components. There are little to no functional differences between the two hands, so they are considered the same for the sake of discussion.

B. Michelangelo Hand

The Michelangelo Hand built by Advanced Arm Dynamics is simply the most advanced hand on the market today in prosthetics. It actually has the powered opposable thumb, the first one released as an actual product. Sadly, the arm costs $100,000, so it

is unable to be purchased, and difficult for even insurance companies to pay for. (Pittman, 2012) The hand is incredibly well refined and streamlined in execution.



Figure 6. Michelangelo Hand (Schweitzer, 2011)

C. Interview with Art Shae

I was fortunate enough to find a local Prosthetist named Art Shea who works at New England Orthotics and Prosthetics. They are a local branch right in Worcester, about 1 mile from WPI campus. Art was incredibly nice and honest, willing to answer all of my questions. Our discussion was very helpful in narrowing down the scope of my project early on in the design phase. At the time, I was still considering investigating a complete human arm as opposed to focusing on the hand, but when he described the low level of amputees who are missing a complete arm it lead me towards the hand. Art was very frank in explaining why prosthetic devices can cost so much, they are all custom and most of the cost comes from the frequent visits with the prosthetist as opposed to the actual cost of the device. Each amputee has a unique situation. Not everyone can accept a socket or prosthesis at all because of problems with nerve damage and pain levels, or bone fragmentation. He also offered me several older prosthetic part catalogs which lead to my inspiration of designing a hand that would be able to bolt in directly where a hook used to be. If an amputee has already gone through the time consuming and difficult process of getting a custom socket, then they are more willing to experiment with new and different terminal devices.

III.Design Methodology

The replication of the sensory-motor capabilities of the human hand is still an open challenge for scientists and engineers. The results, in fact, are quite far from the original, either in terms of dimension, sensors and so on.

Two of the most critical aspects in current hand prostheses:

• Poor functionality

• Poor control capabilities

Surveys on using such artificial hands, in fact, reveal that, due to the above limitations, 30 to 50% of the upper extremity amputees users prefer to use simpler cosmetic or kinematic prosthesis instead of the myoelectric ones.

A possible solution to the first problem is the enhancement of the current design of prosthetic hand, for example by the introduction of advanced underactuated mechanism, biologically-inspired sensors, and so on. A possible solution to overcome this limitation is the use of soft-computing techniques for the construction of the classifier. In particular, a novel evolutionary approach for the generation of a compact neural classification scheme directly from EMG data, based on is implemented and tested. This new generation of hands could provide the user with much more functionality and capabilities. As for the poor control interface, instead, among several different possibilities, more or less invasive, the EMG signals recorded using surface electrodes are considered as an interesting source of information to allow human beings to control robotic artifacts. In fact, these signals are very easy to record in a non-invasive way and provide an important access to the neuro-muscular system of the user.

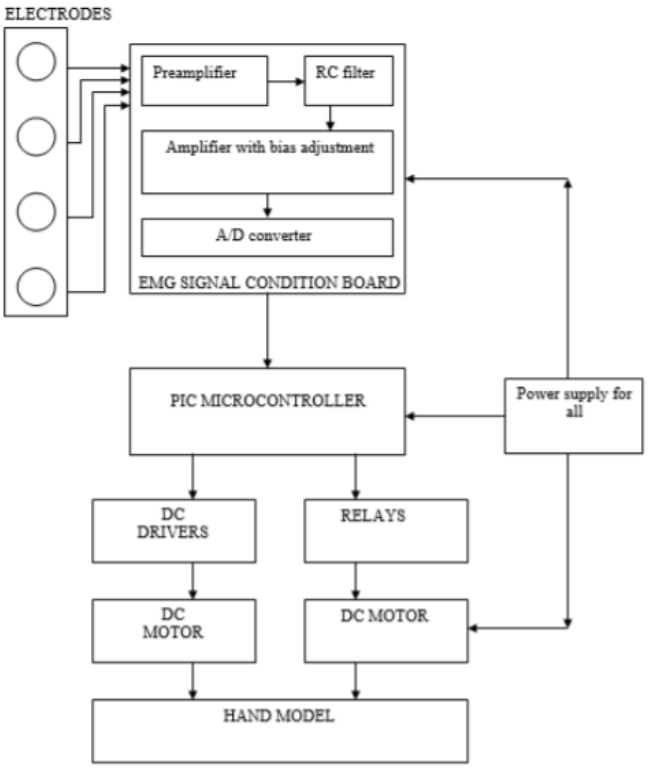


Figure 7. Block Diagram of Bionic Arm

Power Supply

The power supply output is given to microcontroller and another circuit also; the design of the power supply is mainly because of the microcontroller, the microcontroller work in Dc source with a voltage of +5v. As we are getting the line voltage VL has 230v in ac source, so it is not possible. This power supply designs an output of +5v Dc to activate the microcontroller.

Microprocessor

Here we are using an Arduino Uno. We use the analog pins as input since the output of the EMG sensors is analog. We convert them into digital signals using basic A/D converters. This is integrated with an Atmega microcontroller. This to ensure that we can integrate the Arduino board with an LCD display and the motors.

Relay

A relay is an electrical switch that opens and closes under the control of another electrical circuit. In the original form, the switch is operated by an electromagnet to open or close one or many sets of contacts. It was invented by Joseph Henry in 1835. Because a relay is able to control an output circuit of higher power than the input circuit, it can be considered, in a broad sense, to be a form of an electrical amplifier.

DC Motor

In any electric motor, the operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.

EMG Sensors

Electromyography sensors are used to sense the movement in the muscles. The EMG sensors have three electrodes. One for reference, one for noting the change in the muscle and one is the ground. The signals from the sensors are sent to an amplification stage to allow for voltages in the range which can be processed.

Skeletal Arm Structure

The artificial arm structure is made out of aluminum and replicates the movements of a human arm very closely. It is carefully designed and integrated with the DC motor to allow for natural reflexes in real time.

IV. CONCLUSION

With the proposed thought, the simple combination of upper appendage prosthetics can be completed to

the client regardless of age, sex, ailments and so on. The model requires no obtrusive medical procedure and subsequently is anything but difficult to keep up and profoundly tough. When worn by the client, it can begin to identify their muscle developments. At the point when the client needs to close their clench hands and moves the lingering muscle, the EMG sensors recognize this and the handling unit controls the counterfeit arm. At the point when the client loosens up the muscle, the voltage necessities are checked and the arm is opened. Hence a financially savvy, low support, exceedingly touchy ongoing Bionic Arm proposed by the thought had the capacity to do the vital prerequisites to be executed, all things considered, circumstances.

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A Review on the Vertical Axis Wind Turbines

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ABSTRACT

This paper gives an outline of a vertical axis wind turbine. The conduct of the Vertical Axis Wind Turbine (VAWT), present innovative state, new finding through displaying work and future bearing of VAWTs were checked on. It was seen that VAWT assumes an essential job in the present vitality emergency. Ones can anticipate that person abiding in a world with wind turbines and sun oriented boards because of present vitality emergency with the non-sustainable power source. Wind vitality has been recognized as a promising inexhaustible choice Although the full life cycle bookkeeping indicates VAWTs are invaluable on a cost premise or materials premise over horizontal axis wind turbines (HAWTs), Currently the VAWTs don't produce enough electricity because of certain difficulties which talked about in this paper. Drag driven VAWT (Savonius type), lift driven VAWT (Darrieus type) and a crossbreed of both (D+S) turbine efficiencies can be expanded by including the diverter framework that directs the wind towards the turbine sharp edges. A great deal of explores are progressing at present in this dimension. From the huge review of the present innovative conditions of VAWT, it was seen that China is the main analyst in this field for as far back as a couple of years while European nations serve their place in this exploration zone.

Keywords: Vertical Axis, Wind Turbine, Horizontal Axis, Solar Panel

I. INTRODUCTION

Sustainable power source is the most essential subject on the planet at present. It was distinguished that the non-renewable energy source saves on the planet are lessening quickly and no stores were recognized. Notwithstanding that, vitality age from petroleum derivative may cause such a large number of ecological issues like discharge of nursery gasses, an unnatural weather change and corrosive downpours. Sustainable power sources assume a noteworthy job in these kind of circumstance. The sustainable power source is the vitality that extricates from inexhaustible sources, for example, Winds, Sunlight, Rain, Tides, Waves, Geothermal warmth… and so on. Ordinarily, sustainable power source gives vitality to four distinct territories. They are electricity age, air and water warming/cooling, transportation, and provincial (off-lattice) vitality administrations. [1] for instance, Iceland and Norway as of now create their electricity by utilizing sustainable power source. A ton of nations has define

up an objective to achieve 100% sustainable power source later on. For instance, the administration of Denmark has chosen to switch the complete vitality supply (electricity, portability and warming/cooling) to 100% sustainable power source by 2050. [2]

Wind vitality has been distinguished as a promising inexhaustible alternative. Numerous countries on the planet have distinguished and they have figured approaches to guarantee that wind control has a developing job in vitality assets.

1.1. Wind

The Wind is created because of weight contrast of climate. In view of the climatic weight distinction, air particles move high-weight end to bring down weight end. Amid the air streaming, air particles are exposed to Coriolis impact aside from precisely on the equator. The winds are frequently alluded to as per the bearing from which the wind blows and its power. Little blasts of rapid winds are called blasts. Solid winds of the middle of the road span are called squalls. Dependable winds have distinctive names, for example, breeze, hurricane, storm, and hurricane.[3]

1.2. Wind Power

Wind turbines produce electric power by utilizing the intensity of wind to drive an electric generator.[4]The the generator creates electricity and moves from the pinnacle to an accessible transformer and changes from the yield voltage (as a rule around 700 V) to an across the country matrix (33000 V) or individual use (around 240 V).[5]Wind control is an alluring and elective power hotspot for both huge scale and little scale and disseminated control age applications. a standout amongst the most imperative preferences of wind vitality is being measured and adaptable. It is conceivable to frequently discover applications in both extensive winds cultivates and appropriated control age. As a symptom of utilizing wind vitality, the reliance on petroleum derivative likewise is diminished. With to a great extent undiscovered wind vitality assets all through the world and declining wind vitality costs, individuals pushing ahead into the 21st century with a forceful activity to quicken the advancement of wind innovation and further decrease its expenses, to make new occupations, and to improve natural quality. The inland wind is an affordable wellspring of electric power, focused than coal or gas plants. [6][7][8]Offshore wind is more steady and solid than inland, and seaward homesteads have a less visual effect, yet development and support costs are a lot higher than coastal development and upkeep. [9]

1.3. Development of Wind Energy in the World

There is a fast development in wind control improvement all around. This usage of the wind for electricity age is growing rapidly, because of huge mechanical upgrades, industry development and expanding worries with nursery discharges related to petroleum derivative copying. Given the huge wind assets, just a little segment of the usable wind potential is being used by and by. Government and electrical industry guidelines, just as government motivations, have a huge job in how rapidly wind power will be received.

European nations have likewise broadly outfitted this vitality source. Germany, Denmark and Spain are striking clients of wind control. Denmark pushing to produce 40% of its electricity through wind turbines. The UK has the biggest wind vitality asset and it is set for vast development to cut down the cost of wind vitality. The Global Wind Energy Council (GWEC) discharged the worldwide wind report. More than 54 GW of wind control was introduced around the

worldwide market in 2016.GWEC's five-year estimate accommodates around 60 GW of new wind establishments by 2017, achieving a yearly market of around 75 GW by 2021, to build the combined introduced limit of more than 800 GW before the finish of 2021.[10]

Wind turbine innovation, as well as different advances, create step by step. For instance, rambles with turbine sharp edges send to the sky and bridle wind vitality however much as could be expected and send back that vitality through the link. Just as kites use for outfit wind vitality.

1.4. Tackling Wind Energy Potential

As per the National Renewable Energy Laboratory (NREL) wind mapping results, there are numerous zones that concentrated wind vitality. These territories are moved generally in the northwestern waterfront locale of the Kalpitiya Peninsula to Jaffna Peninsula and focal good countries in the inside of the nation and close zones. Different locales with prominent regions of good wind assets incorporate the uncovered territory in the southern piece of the North Central Province and seaside regions in the southeastern piece of the Southern Province. Highquality wind estimation information was accessible to affirm the guide evaluations of wind asset in explicit territories, for example, the Kalpitiya Peninsula, the focal good countries, and the southeast coast. So it would exceptionally accommodate for the future to start numerous endeavors on wind vitality control age which may profit us incomprehensibly with the assets we have in Sri Lanka.[11]

1.5. Wind Turbine

Wind turbine sharp edges remove some dynamic vitality from the wind and that vitality is changed over into mechanical intensity of the wind turbine as underneath.

$$P_{Mechanical} = 1/2 \times \dot{m} \times V_i^2 - 1/2 \times \dot{m} \times V_o^2 \ (Vi > Vo) \ldots\ldots\ldots\ldots\ldots\ldots Eq.01$$

Where ṁ is the mass stream rate (kg/s), Vi is the upstream wind speed (m/s) and Vo is the downstream wind speed (m/s). [12]

There are two kinds of wind turbines. They are the Horizontal Axis Wind Turbine (HAWT) and Vertical Axis Wind Turbine (VAWT). Regularly, Horizontal axis wind turbine (HAWT) gives a high power yield than Vertical axis wind turbine (VAWT). [13]. Be that as it may, HAWT needs rapid of airspeeds (around Rating speeds) to give its most extreme exhibitions. And furthermore, moving wind turbine sharp edge encounters the wind generally. As indicated by the wind speed and the headings, the relative speed edge of the wind additionally changes. Like the sharp edge speed increments to the tip, the relative wind speed turns out to be progressively disposed towards the tip. At that point creates tip vortices which are caused to the high commotion.

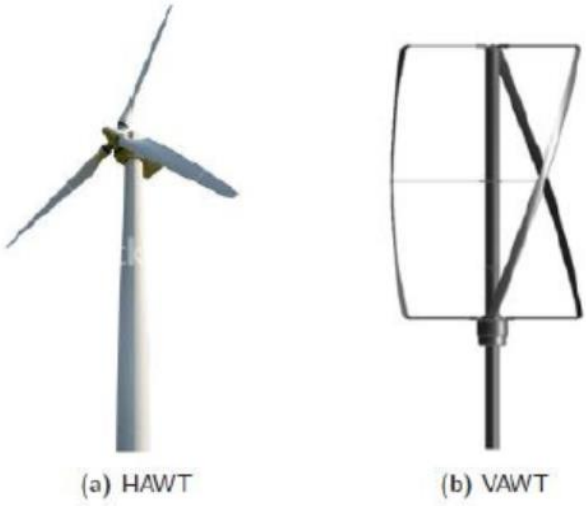


Figure 1. demonstrates the two primary sort of wind turbines.

II. VERTICAL AXIS WIND TURBINE

VAWTs offer a number of advantages over traditional horizontal-axis wind turbines (HAWTs). They can be packed closer together in wind farms, allowing more in a given space. They are quiet, Omni-directional, and they produce lower forces on the support structure. They do not require as much wind to generate power, thus allowing them to be closer to the ground where wind speed is lower. By being closer to the ground they are easily maintained and can be installed on chimneys and similar tall structures. [14]

When the wind passes through the blades of a HAWT, all of them contribute to energy production. When the wind passes through a VAWT, only a fraction of the blades generates torque while the other parts merely 'go along for the ride'. The result is comparably reduced efficiency in power generation. Getting high efficiency from small scale VAWT is somewhat difficult. It is because of the performance of VAWT is very sensitive to the lift/drag ratio of the blade and it is not good in the low Reynolds number condition of small applications.

There are a number of obstacles in scaling VAWTs to commercial size. The first is that they aren't as sturdy by design as a HAWT. This is because of where a HAWT carries most of its stress compared to widely-used VAWT models. VAWTs' advantage is only in niche environments. [15] At present, VAWTs don't generate enough electricity that the full-lifecycle accounting shows them to be advantageous on a cost or materials basis over HAWTs. VAWT designs have the blades much closer to the ground than HAWTs, so they are losing significant amounts of wind. [16]

There are two main types of VAWTs called thedrag driven VAWT (Savonius type) and the lift driven VAWT (Darrieus type). The Savonius type functions similar to a water wheel that uses drag forces. On the other hand, the Darrieus type has blades similar to the HAWTs. [15] Main rotor shaft of the VAWT is arranged vertically.

The generator can be connected by using that axis shaft. The rudder is unnecessary for this type wind turbines because it accepts the wind which comes from any direction. The maximum possible efficiency of lift driven turbines is larger than the drag driven turbines, the main attention today is focused on lift driven turbines. The first turbine of this design was patented in 1931 by G.J.M. Darrieus. [18]

Figure No. 02 shows that main types of vertical axis wind turbines

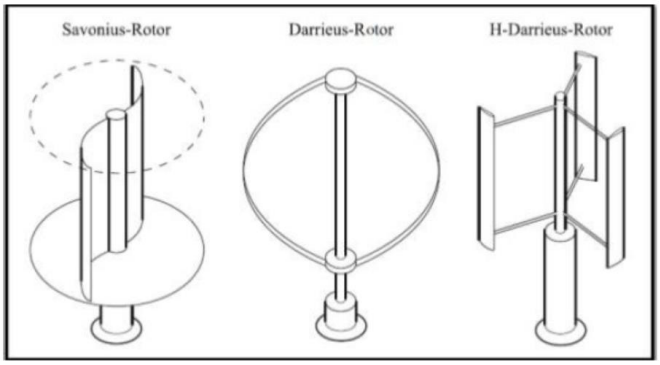


Figure No. 02: Main Types Of Vertical Axis Wind Turbines

III. CONCLUSION

Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions. Authors are strongly encouraged not to call out multiple figures or tables in the conclusion—these should be referenced in the body of the paper.

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Identification of Single Nucleotide Polymorphism and Association Analysis of Alpha 2-Heremans Schmid Glycoprotein (AHSG) Gene Related to Fatty Acid Traits in Sheep

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ABSTRACT

Fatty acid (FA) composition of meat is regulated by many genes. The aim of this study was to identify Single Nucleotide Polymorphism (SNP) of Alpha 2-Heremans Schmid Glycoprotein (AHSG) gene and analyze its association with fatty acid (FA) traits in lambs. The study used a total of 67 rams of 12 months with average body size of 25-30 kg, consisted of 20 heads of Javanese Fat-Tailed (JFT) sheep, 17 heads of Javanese Thin-Tailed (JTT) sheep, 10 heads of Composite Garut (CG) sheep, 10 heads of Compass Agrinak (CA) sheep and 10 heads of Barbados Black Belly Cross (BC) sheep. Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP) were used to identify the single nucleotide polymorphisms (SNP) of AHSG gene. Association of AHSG genotypes with fatty acid traits was performed using General Linear Model by SAS 9.4 program. The SNP of AHSG gene was polymorphic with three genotypes (GG, GA and AA). In combined population, the genotype frequency of GG, GA and AA were 0.25, 0.13 and 0.62, respectively. The Chi-square test revealed that the locus of AHSG (g. 198655287 (G>A) was in Hardy-Weinberg equilibrium, except in Composite Garut (CG), Compass Agrinak (CA) and Barbados Black Belly Cross (BC) sheep breeds. The g.198655287 (G>A) SNP of AHSG gene was significantly associated ($P<0.05$) with saturated fatty acid, including capric acid (C10:0), palmitic acid (C16:0), heptadecanoic acid (17:0), arachidic acid (C20:0), heneicosylic acid (C21:0), behenic acid (C22:0), tricosylic acid (C23:0), lignoceric acid (C24:0); with monounsaturated fatty acids, including palmitoleic acid (C16:1); oleic acid (C18:1n9c); eicosenoic acid (C20:1); nervonic acid (C24:1) and with polyunsaturated fatty acids, including linoleic acid (C18:2n6c); γ-Linolenic acid; α-Linolenic acid; eicosadienoic acid (C20:2); dihomo-gamma-linolenic acid; arachidonic acid; docosadienoic acid(C22:2); eicosapentanoic and docosahexaenoic acid. The SNP g. 198655287 (G>A) of AHSG gene may be a useful marker for selecting and producing sheep meat having desirable fatty acids.

Keywords : AHSG, Fatty Acid, Sheep, SNP

I. INTRODUCTION

Meat has a vital role in human diet as a source of protein, fats, minerals and essential vitamins (Wood et al. 2007; Cabrera and Saadoun 2014; Quiñones et al. 2017). Fatty acids are components of fats and are grouped into saturated fatty acids and unsaturated fatty acids, the latter are classified as monounsaturated fatty acids (MUFA) with one double bond and polyunsaturated fatty acids (PUFA) with the presence of more than one double bond (PUFA) (Hidayati et al. 2015; Gunawan et al. 2018). Fatty acids have many advantages including being source of energy, structure components of cell membranes, signaling molecules in immune system and regulators of gene expression (Kaić and Mioč

2016). Fatty acid composition of meat controls its quality and acceptance level by meat consumers (Sebsibe 2008). However, sheep meat is characterized by high level of saturated fatty acids and cholesterol which have been associated with cardiovascular diseases and cancer (Maharani et al. 2013). This affects sheep meat consumption.

Many researches were carried out to maintain saturated fatty acids at acceptable level and increase high levels of unsaturated fatty acids as higher consumption of unsaturated fatty acids including (PUFA) and (MUFA) has been reported to have a beneficial effects on human healthy (Maharani et al. 2013, Hidayati et al. 2015; Kaić and Mioč 2016). Fatty acid composition of muscle and adipose lipid tissue is under the control of breed, quality and quantity of feed, age/body weight, sex and level of fatness, where fatty acid composition affects the nutritive value and the sensational characteristics of meat (Sebsibe 2008).

To select and produce desirable and healthy meat meeting preferences of sheep meat consumers, direct selection of genes that affect fatty acids and meat quality is applied for breeding purposes. The fatty acid composition of meat is regulated by many genes involved in lipogenesis (Quiñones et al. 2017). AHSG gene was identified to be a potential candidate gene for fatty acid composition by a study of Gunawan et al. (2016) using RNA deep sequencing technology. Alpha2-Heremans-Schmid glycoprotein (AHSG), also known as Fetuin-A is coded by AHSG gene and is synthesized and secreted by the liver (Fisher et al. 2009). AHSG plays a role of a connection between fatty liver and insulin resistance where high AHSG plasma levels are associated with insulin resistance in humans resulting into accumulation of fat in the liver (Stefan et al. 2006). Elevated circulating levels of fetuin-A in blood have been linked to the increased risk of cardiovascular disease (Fisher et al. 2009). A Singlenucleotide polymorphism (SNP), rs4917, in the AHSG gene has been shown to be associated with reduced plasma levels as well as lower body fat in humans (Lavebratt et al. 2005). AHSG gene is mapped on chromosome 1, has 9 exons and 8 introns. There is no previous study conducted to identify and investigate the association of AHSG gene with fatty acid composition in sheep. Therefore, this study aimed to identify Single Nucleotide Polymorphism (SNP) of Alpha 2-Heremans Schmid Glycoprotein (AHSG) gene and analyze its association with fatty acid (FA) traits in sheep.

II. METHODS AND MATERIAL

Animals and samples

The present study was conducted at IPB University, Indonesia. Blood samples for DNA extraction were collected from jugular vein of one hundred and fifty one (151) male rams consisted of Javanese Fat Tailed (JFT) sheep (n=20), Javanese Thin Tailed (JTT) sheep (n=17), Composite Garut (CG) sheep (n=45), Compass Agrinak (CA) sheep (n=35) and Barbados Black Belly Cross (BC) sheep (n=34) while loin samples for fatty acid analysis were collected from sixty seven (67) sheep consisted of JFT sheep (n=20), JTT sheep (n=17), CG sheep (n=10), CA sheep (n=10) and BC (n=10). All sheep had average body weight of 25-30 kg and 12 months old, they were reared in groups of 5 animals in 14 covered pens equipped with troughs for food and water at *ad libitum*, were slaughtered according to the welfare ethics in a commercial abattoir in Indonesia. A total of 100µl of blood samples and 100 mg of loin samples for DNA extraction and fatty acids analysis were used, respectively. All samples were kept at -20° C until further usage.

Analysis of Fatty Acid Composition

Loin samples (100g) were collected and grounded for fatty acid analysis using the protocol of Association of Official Analytical Chemists (AOAC, 2012), the measured traits for fatty acids included total fatty acids, saturated fatty acids, monounsaturated fatty acids and polyunsaturated fatty acids.

DNA Extraction and Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP)

The g.198655287 (G>A) SNP of AHSG gene used in this study was described by a study of Gunawan et al. (2016) using RNA sequencing. DNA extraction was performed using a reference (Sambrook *et al*. 1989). PCR was performed for amplification of polymorphic region of AHSG gene. A pair of primers was designed using the software tool (http://www.ncbi.nlm.nih.gov/tools/primer-blast/) and PCR suitability tests were checked using Primer Stat. These primers (forward and reverse), 5'-GGAGGAATCAGGGCATTTTC-3' and 5'-CCCATATCCTTACGCAATCC-3', respectively were used to amplify a 473base pairs (bp) fragment according to the sheep genomic sequence in the GenBank database (accession number NC_019458.2). The PCR was performed under the following conditions, initial denaturation at 95 °C for 5 minutes and for 1 cycle. The second phase consisted of 35 cycles, each cycle consisting of denaturation process at 95° C for 20 seconds, primer annealing at 58 °C for 30 seconds and DNA extension at 72 °C for 30 seconds. The final phase was the primer elongation or final extension at 72 ° C for 5 minutes. The DNA amplification product of 473 bp was visualized by 1.5% agarose gel electrophoresis.

PCR products from polymorphic region of AHSG gene (473bp) were digested with EagI restriction enzyme which was selected according to the software (http://tools.neb.com/ NEB cutter2 /index. php) of the polymorphic sites. PCR product and EagI restriction enzyme were incubated at 37 °C for 2 hours (Thermo Fisher Scientific, EU, Lithuania). The products of DNA fragments from PCR-RFLP were visualized using agarose gel electrophoresis with a concentration of 2%, 0.6 g agarose powder was added to 30 ml of 0.5 x TBE, the mixture then heated to boiling and added to 1 µL fluoro safe, electrophoresis was run on average voltage of 100 volts for 45 minutes. Gels were visualized under ultra-violet transilluminator (Alpha Imager, Alpha Innotech, Santa Clara, USA).

Statistical Analysis

Gene frequency consists of genotype and allele frequencies were analyzed using genotyping data of four sheep breeds (JFT, JTT, CG, CA and BC). Genotype frequency was calculated using the formula of Nei and Kumar (2000): $x_{ii} = \frac{\sum_{i=1}^{n} n_i}{N}$

Allele frequencies (Nei and Kumar 2000): $x_i = \frac{(2n_{ii} + \sum_{i \neq j} n_{ij})}{2N}$

Where x_i is the i-th allele frequency, x_{ii} is ii-th genotype frequency, i is the frequency of allele i^{th} ; n_{ii} is the total individuals with genotype ii ; n_{ij} is the total individuals with genotype ij and N is the population size.

Hardy-Weinberg equilibrium (H-W) (Hartl and Clark 1997)

$$\chi^2 = \sum_{i=1}^{N} \frac{(O-E)^2}{E}$$

Where χ^2 is Chi Squared ; O is total of observed genotypes and E is total of expected genotypes and i is number of observation.

Association Analysis

Association between the SNP of AHSG gene and fatty acid traits was performed using the GLM procedure (SAS Inst, Inc., Cary, NC). The following model was used with the genotype as fixed effects (Genotype; 3 levels; GG, GA and AA) and breed (CG, CA, BC, JFT and JTT) :

$$Y_{ijk} = \mu + G_i + B_j + e_{ijk}$$

Where Y_{ik} is the observation on sheep meat fatty acid, μ is the populations mean for traits, genotype is the fixed effects, B_j is breed effects and e is random error. A p-value of <0.05 was considered to be statistically significant. In order to test the pair wise differences between the effects of genotype and breed, Duncan Multiple Range Test (DMRT) was performed.

III. RESULTS AND DISCUSSION

Results

AHSG Gene Polymorphism

The AHSG gene single nucleotide polymorphism (G>A) is located at the nucleotide position g.198655287, exon 2 of chromosome 1 with GenBank Accession Number: NC_019458.2. The 473 bp fragment of AHSG (g.198655287 (G>A) gene was successfully amplified as shown in (Figure 1). Figure 1. Amplification result of PCR for AHSG gene was performed on 1.5% gel agarose.

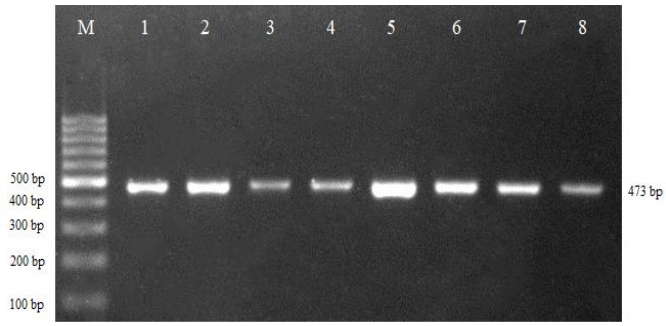


Figure 1. Amplification result of PCR for AHSG gene on 1.5% gel agarose; M=100 bp ladder size standard; Line 1-8=Individual sheep samples.

The 473 base pairs fragment was digested with EagI restriction enzyme and resulted into three genotypes designed as GG (two fragments of 200 and 273bp), GA (three fragments of 200, 273 and 473bp) and AA (a single, uncut fragment of 473bp) (figure 2). PCR-RFLP analysis of 473 bp fragment of AHSG gene by EagI restriction enzyme was performed on 2% agarose gel. Figure 2. PCR-RFLP analysis of 473 bp fragment of AHSG gene by EagI restriction enzyme on 2% agarose gel

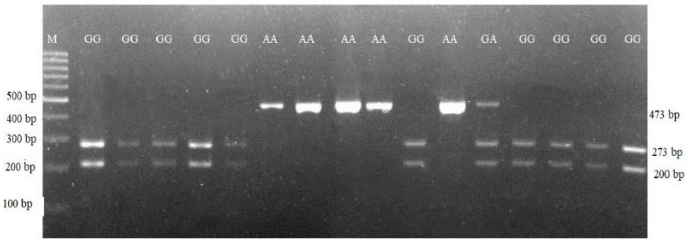


Figure 2. PCR-RFLP analysis of 473 bp fragment of AHSG gene by EagI restriction enzyme on 2% agarose gel. GG: GG genotype; GA: GA genotype; AA: AA genotype; M: DNA marker 100bp

They were two alleles (G and A). The allele G had a higher frequency in CA and BC sheep breeds, and allele A had a higher frequency in CG, JFT and JTT sheep breeds. The distributions of genotype and allele frequencies for AHSG/ EagI in all sheep are presented in Table 1.

Table 1. Genotype and allele frequencies of AHSG gene g. 198655287 (G>A SNP in JFT, JTT, CG, CA and BC sheep breeds.

Sample	N	Genotype frequency			Allele frequency		χ^2
		GG	GA	AA	G	A	
JFT	20	0.00(0)	0.10(2)	0.90(18)	0.05	0.95	0.06^{ns}
JTT	17	0.00(0)	0.12(2)	0.88(15)	0.06	0.94	0.07^{ns}
CG	45	0.13(6)	0.11(5)	0.76(34)	0.19	0.81	18.18^{**}
CA	35	0.51(18)	0.00(0)	0.49(17)	0.51	0.49	35^{**}
BC	34	0.412(14)	0.323(11)	0.265(9)	0.57	0.43	3.88^{**}
Combined	151	0.25(38)	0.13(20)	0.62(93)	0.32	0.68	72.4^{**}

Note: ^{ns}=not significant at P<0.05, **=significant (P<0.01). χ^2: Chi-square: Chi-square from table=3.841(P<0.05), degree of freedom (df) is equal to the number of expected genotypes-1, number of genotypes is 3 and df=1.)

The SNP of AHSG (g.198655287 (G>A) was in Hardy-Weinberg Equilibrium, except in Composite Garut (CG), Compass Agrinak (CA) and BC sheep breeds. To the author's knowledge, no information is available on the SNP of AHSG (G>A) either in humans or animals which made difficult to compare the present results.

Association of AHSG gene polymorphism and fatty acid traits in CG, CA, BC JFT and JTT sheep breeds

Due to the fact that GG and GA genotypes were not segregated in all populations used in this study and due to the low frequency of G allele in JFT, JTT and CG sheep breeds, association analysis conducted between SNP of AHSG (g.198655287 (G>A) gene and fatty acid traits was carried out in combined population (BC, CA, CG, JFT and JTT). The association of SNP of AHSG (g.198655287 (G>A) gene and fatty acid traits in combined population (BC, CA, CG, JFT and JTT) is summarized in Table 2.

Table 2 Phenotype of meat fatty acid traits of JFT, JTT, CG, CA and BC sheep breeds (%).

Variable	BC, CA, CG, JFT, JTT(n=67)	BC(n=10)	CA(n=10)	CG(n=10)	JFT(n=20)	JTT(n=17)
Fat Content of meat	4.23±3.86	$1.68±1.86^{b}$	$0.00±0.00^{b}$	$1.95±0.91^{b}$	$7.08±4.01^{a}$	$6.21±2.65^{a}$
Total Fatty Acid	71.39±8.99	$64.90±15.52^{b}$	$79.78±7.32^{a}$	$69.08±5.93^{b}$	$71.26±6.09^{b}$	$71.79±5.50^{b}$
Saturated Fatty Acid	38.78±8.03	$34.36±10.71^{c}$	$47.84±6.15^{a}$	$41.78±5.53^{b}$	$35.28±6.67^{c}$	$38.42±5.06^{bc}$
Capric acid (C10:0)	0.08±0.05	$0.01±0.01^{d}$	$0.04±0.01^{cd}$	$0.05±0.01^{c}$	$0.10±0.03^{b}$	$0.13±0.05^{a}$
Lauric acid (C12:0)	0.48±0.54	0.47±0.40	0.54±0.20	0.35±0.10	0.68±0.89	0.29±0.19
Tridecylic acid (C13:0)	0.01±0.01	$0.00±0.00^{c}$	$0.01±0.01^{ab}$	$0.01±0.01^{ab}$	$0.01±0.01^{a}$	$0.00±0.01^{cb}$
Myristic acid (C14:0)	3.12±1.93	$1.97±1.28^{b}$	$3.32±1.07^{ab}$	$2.14±0.38^{ab}$	$3.55±2.64^{b}$	$3.74±1.84^{a}$
Pentadecanoic acid (C15:0)	0.48±0.15	$0.38±0.17^{b}$	$0.51±0.09^{ab}$	$0.48±0.10^{ab}$	$0.45±0.17^{ab}$	$0.55±0.13^{a}$
Palmitic acid (C16:0)	17.79±3.92	$13.15±6.06^{c}$	$18.36±3.02^{ab}$	$16.26±2.37^{b}$	$18.73±2.65^{ab}$	$19.99±2.20^{a}$
Heptadecanoic acid (17:0)	0.96±0.36	$0.60±0.19^{b}$	$0.80±0.12^{b}$	$0.80±0.08^{b}$	$1.20±0.47^{a}$	$1.09±0.21^{a}$
Stearic acid (C18:0)	15.52±5.98	16.67±4.30b	$23.86±2.60^{a}$	$21.33±3.14^{a}$	$10.43±2.80^{c}$	$12.52±3.36^{c}$
Arachidic acid (C20:0)	0.11±0.11	$0.33±0.06^{a}$	$0.00±0.01^{d}$	$0.16±0.03^{b}$	$0.06±0.02^{c}$	$0.07±0.03^{c}$
Heneicosylic acid (C21:0)	0.02±0.02	$0.05±0.01^{a}$	$0.03±0.01^{b}$	$0.02±0.01^{b}$	$0.01±0.01^{c}$	$0.00±0.00^{c}$
Behenic acid (C22:0)	0.07±0.10	$0.26±0.09^{a}$	$0.13±0.07^{b}$	$0.06±0.03^{c}$	$0.01±0.01^{d}$	$0.01±0.01^{d}$

Tricosylic acid (C23:0)	0.04±0.06	0.15±0.06^{a}	0.07±0.04^{b}	0.03±0.02^{c}	0.00±0.00^{d}	0.00±0.00^{d}
Lignoceric acid (C24:0)	0.06±0.11	0.28±0.12^{a}	0.11±0.08^{b}	0.03±0.02^{c}	0.00±0.00^{c}	0.00±0.00^{c}
Unsaturated Fatty Acid	32.59±5.03	31.27±8.50	31.63±4.10	27.29±1.88	35.89±2.88	33.18±3.04
MUFA[1)]	28.10±6.01	21.93±7.61^{c}	25.60±4.06^{a}	22.78±2.87^{bc}	32.95±3.17^{a}	30.63±3.00^{a}
Myristoleic acid (C14:1)	0.15±0.11	0.26±0.21^{a}	0.12±0.05^{bc}	0.07±0.02^{c}	0.16±0.08^{b}	0.13±0.05^{bc}
Palmitoleic acid (C16:1)	1.64±1.31	2.03±3.40	1.25±0.28	1.17±0.19	1.90±0.25	1.63±0.30
C17:1[2)]	0.47±0.32	0.52±0.21^{b}	0.39±0.15^{bc}	0.28±0.03^{c}	0.76±0.34^{a}	0.27±0.30^{c}
Elaidic acid(C18:1n9t)	0.10±0.11	0.00±0.00^{d}	0.24±0.05^{a}	0.00±0.00^{d}	0.06±0.08^{c}	0.18±0.08^{b}
Oleic acid (C18:1n9c)	25.77±5.73	18.94±6.97^{c}	23.74±3.88^{b}	21.18±2.70^{bc}	30.11±2.98^{a}	28.57±2.88^{a}
C20:1[3)]	0.03±0.09	0.24±0.11^{a}	0.00±0.00^{b}	0.00±0.00^{b}	0.00±0.00^{b}	0.00±0.00^{b}
Nervonic acid (C24:1)	0.05±0.10	0.23±0.17^{a}	0.08±0.05^{b}	0.02±0.02^{c}	0.00±0.00^{c}	0.00±0.00^{c}
PUFA[4)]	4.49±2.99	9.33±2.34^{a}	6.03±3.40^{b}	4.51±1.43^{b}	2.94±1.32^{c}	2.55±1.04^{c}
Linoleic acid(C18:2n6c)	2.72±1.31	4.50±20.83^{a}	3.22±21.50^{b}	3.05±20.71^{b}	2.26±20.90^{c}	1.72±20.82^{c}
C18:3n6[5)]	0.03±0.06	0.09±0.12^{a}	0.10±0.06^{a}	0.00±0.00^{b}	0.00±0.01^{b}	0.00±0.00^{b}
C18:3n3[6)]	0.21±0.19	0.21±0.14	0.14±0.06	0.13±0.01	0.23±0.12	0.29±0.32
Eicosadienoic acid (C20:2)	0.05±0.06	0.10±0.14^{a}	0.06±0.02^{b}	0.04±0.00^{b}	0.05±0.02^{b}	0.03±0.01^{b}
DGLA[7)] (C20:3n6)	0.08±0.13	0.31±0.20^{a}	0.12±0.09^{b}	0.08±0.04^{bc}	0.02±0.03^{c}	0.01±0.01^{c}
(AA)[8)](C20:4n6)	1.18±1.53	3.49±1.87^{a}	2.18±1.72^{b}	1.07±0.60^{c}	0.32±0.24^{c}	0.31±0.22^{c}
Docosadienoic acid(C22:2)	0.00±0.04	0.00±0.00^{b}	0.06±0.10^{a}	0.00±00^{b}	0.00±00^{b}	0.00±00^{b}
DPA[9)] (C20:5n3)	0.13±0.20	0.47±0.28^{a}	0.15±0.15^{b}	0.07±0.05^{bc}	0.01±0.04^{c}	0.09±0.10^{bc}
DHA[10)](C22:6n3)	0.05±0.08	0.14±0.16^{a}	0.03±0.03^{b}	0.05±0.03^{b}	0.01±0.02^{b}	0.06±0.05^{b}

Note: [a, b,c,d] Mean value with different superscript letters in the same row differ significant at $P<0.05$. Numbers shown in parentheses are the number of individuals with the specified genotype. [1)] MUFA: Monounsaturated fatty acid; [2)] C17:1: Heptadecenoic acid; [3)]C20:1: Gondoic acid (Eicosenoic acid); [4)]PUFA: polyunsaturated fatty acid , [5)] C18:3n6: γ-Linolenic acid; [6)] C18:3n3: α-Linolenic acid; [7)]DGLA: Dihomo-gamma-linolenic acid; [8)] AA: Arachidonic acid; [9)] DPA : DPA docosapentaenoic acid (Eicosapentanoic); [10)]DHA: Docosahexaenoic acid).

The g.198655287 (G>A) SNP of AHSG gene was significant associated with fatty acids traits in combined population as shown in Table 2. There was a significant association with saturated fatty acids including, capric acid (C10:0), tridecylic acid (C13:0), myristic acid (C14:0), pentadecanoic acid (C15:0), palmitic acid (C16:0), palmitic acid (C16:0), heptadecanoic acid (17:0), stearic acid (C18:0), arachidic acid (C20:0), heneicosylic acid (C21:0), behenic acid (C22:0), tricosylic acid (C23:0) and lignoceric acid (C24:0), monounsaturated fatty acids including myristoleic acid (C14:1), heptadecenoic acid, elaidic acid(C18:1n9t, oleic acid (C18:1n9c), oleic acid (C18:1n9c), eicosenoic acid and nervonic acid (C24:1). It was also associated with polyunsaturated fatty acids including linoleic acid (C18:2n6c), γ-Linolenic acid, eicosadienoic acid (C20:2), dihomo-gamma-linolenic acid, docosadienoic acid, eicosapentanoic) and docosahexaenoic acid).

Individuals with homozygous GG genotype were associated with lower palmitic acid (C16:0) and lower unsaturated fatty acids in general but with higher polyunsaturated fatty acids (PUFA) as GA sheep had,

according to The table 3. However, this association should be validated with larger samples.

Table 3. Genotype and association analysis of AHSG gene (%)

	Genotypes		
Variable	GG (n=7)	GA(n=9)	AA(n=51)
Fat Content of meat	1.24±2.53^{b}	2.68±2.29^{ab}	4.91±3.98^{a}
Total Fatty Acid	65.99±14.45	71.69±12.44	72.08±7.24
Saturated Fatty Acid	37.69±12.53	38.40±8.44	39.00±7.39
Capric acid (C10:0)	0.03±0.03^{b}	0.07±0.07^{ab}	0.08 ±0.04^{a}
Lauric acid (C12:0)	0.39±0.29	0.55±0.42	0.48±0.58
Tridecylic acid (C13:0)	0.01±0.01	0.00±0.01	0.01±0.01
Myristic acid (C14:0)	2.19±1.54	3.19±1.95	3.23±1.98
Pentadecanoic acid (C15:0)	0.41±0.13	0.44±0.18	0.49±0.14
Palmitic acid (C16:0)	14.14±5.63^{b}	17.23±6.25^{ab}	18.39±2.82^{a}
Heptadecanoic acid (17:0)	0.69±0.16^{b}	0.80±0.36^{ab}	1.03±0.36^{a}
Stearic acid (C18:0)	19.14±5.45	15.39±4.83	15.05±6.16
Arachidic acid (C20:0)	0.14±0.16^{ab}	0.23±0.15^{a}	0.08±0.07^{b}
Heneicosylic acid (C21:0)	0.04±0.02^{a}	0.03±0.02^{a}	0.01±0.01^{b}
Behenic acid (C22:0)	0.20±0.09^{a}	0.16±0.15^{a}	0.04±0.06^{b}
Tricosylic acid (C23:0)	0.11±0.05^{a}	0.09±0.10^{a}	0.02±0.03^{b}
Lignoceric acid (C24:0)	0.18±0.11^{a}	0.17±0.20^{a}	0.03±0.06^{b}
Unsaturated Fatty Acid	28.09±2.57^{b}	34.16±8.00^{a}	32.93±4.35^{a}
MUFA[1)]	20.40±4.86^{b}	27.13±7.21^{a}	29.33±5.14^{a}
Myristoleic acid (C14:1)	0.13±0.06	0.21±0.13	0.14±0.11
Palmitoleic acid (C16:1)	1.04±0.37^{b}	2.54±3.47^{a}	1.57±0.37^{ab}
C17:1[2)]	0.43±0.13	0.47±0.27	0.48±0.35
Elaidic acid(C18:1n9t)	0.14±0.14	0.04±0.09	0.11±0.11
Oleic acid (C18:1n9c)	18.58±4.76^{b}	23.82±7.31^{a}	27.10±4.73^{a}
C20:1[3)]	0.10±0.12^{a}	0.14±0.17^{a}	0.00±0.04^{b}
Nervonic acid (C24:1)	0.11±0.07^{a}	0.16±0.22^{a}	0.02±0.04^{b}
PUFA[4)]	7.69±3.10^{a}	7.02±4.10^{a}	3.60±2.14^{b}
Linoleic acid(C18:2n6c)	4.01±1.24^{a}	3.51±1.45^{a}	2.40±1.14^{b}
C18:3n6[5)]	0.13±0.10^{a}	0.05±0.10^{b}	0.01±0.03^{b}
C18:3n3[6)]	0.14±0.04^{b}	0.33±0.28^{a}	0.20±0.17^{ab}
Eicosadienoic acid (C20:2)	0.05±0.01^{b}	0.11±0.14^{a}	0.04±0.02^{b}
DGLA[7)] (C20:3n6)	0.18±0.12^{a}	0.24±0.25^{a}	0.04±0.06^{b}
(AA)[8)](C20:4n6)	2.89±1.88^{a}	2.24±2.48^{a}	0.76±0.94^{b}
Docosadienoic acid(C22:2)	0.04±0.07^{a}	0.00±0.00^{b}	0.00±0.04^{b}
DPA[9)] (C20:5n3)	0.22±0.17^{b}	0.37±0.36^{a}	0.07±0.11^{b}
DHA[10)](C22:6n3)	0.05±0.04^{b}	0.14±0.18^{a}	0.03±0.04^{b}

Note: $^{a, b, c,d}$ Mean value with different superscript letters in the same row differ significant at $P<0.05$. Numbers shown in parentheses are the number of individuals with the specified genotype. [1)] MUFA: monounsaturated fatty acid; [2)] C17:1: heptadecenoic acid; [3)]C20:1: gondoic acid (Eicosenoic acid); [4)]PUFA: polyunsaturated fatty acid , [5)] C18:3n6: γ-Linolenic acid; [6)] C18:3n3: α-Linolenic acid; [7)]DGLA: dihomo-gamma-linolenic acid; [8)] AA: arachidonic acid; [9)] DPA : docosapentaenoic acid (eicosapentanoic); [10)]DHA: docosahexaenoic acid).

Discussion

In combined population, the most abundant saturated fatty acid in muscle was palmitic acid (C16:0)

followed by stearic acid (C18:0) and myristic acid (C14:0), respectively, it is in agreement with the previous results Gunawan et al. (2018). Considering breeds, BC, CA and CG had higher levels of stearic acids compared to palmitic acids but JFT and JTT are dominated by palmitic acids (C16:0). The fatty acid composition was also affected by breed where results show that BC and JFT sheep breeds had lower levels of saturated fatty acids compared to CA, CG and JTT according to the Table 2. The current results are in agreement with previous results Harten *et al*. (2014) that reported breed effect on fatty acid composition in Dorper, Damara and Merino sheep breeds. They are also in agreement by Gunawan et al. (2018) that examined breed effects in fatty acids of three sheep breeds including, Javanese Fat-Tailed, Javanese Thin-Tailed and Composite Garuk sheep. Javanese Fat-Tailed (JFT) sheep store fat in their tail and they tend to have lower amounts of carcass and intramuscular fat (IMF) (Yousefi et al. 2012; Gunawan et al. 2018).

The SNP of AHSG gene (g. 198655287 G>A) was found to be in Hardy-Weinberg Equilibrium ($P<0.05$), except in Composite Garut (CG), Compass Agrinak (CA) and Barbados Black Belly Cross (BC) sheep breeds sheep breed. A population of large size is in Hardy-Weinberg equilibrium if genotype and allele frequencies remain constant from generation to generation in the absence of evolution forces including selection, mutation, gene migration, genetic drift (Noor, 2010, Allendorf *et al*. 2013, Gunawan *et al*. 2017). The present study revealed the SNP of AHSG gene (g. 198655287 G>A) was significantly associated with saturated fatty acid, including capric acid (C10:0), palmitic acid (C16:0), heptadecanoic acid (17:0), arachidic acid (C20:0), heneicosylic acid (C21:0), behenic acid (C22:0), tricosylic acid (C23:0), lignoceric acid (C24:0); with monounsaturated fatty acids, including palmitoleic acid (C16:1); oleic acid (C18:1n9c); eicosenoic acid (C20:1); nervonic acid (C24:1) and with polyunsaturated fatty acids, including linoleic acid C18:2n6c; γ-Linolenic acid; α-Linolenic acid; eicosadienoic acid (C20:2); dihomo-gamma-linolenic acid; arachidonic acid; docosadienoic acid(C22:2); eicosapentanoic and docosahexaenoic acid as presented in Table 3.

Analysis of SNP g. 198655287 G>A of Alpha 2-Heremans Schmid Glycoprotein (AHSG) mapped on chromosome 1 of BC, CA, CG, JTT and JFT sheep breeds resulted in a significant association ($P<0.05$) on composition of different sheep meat fatty acids from saturated to unsaturated fatty acids both monounsaturated fatty acids (MUFAs) and polyunsaturated fatty acids (PUFAs). High consumption of polyunsaturated fatty acids (PUFAs) and monounsaturated fatty acids (MUFA) in the human diet is healthy and desirable for meat consumers as they increase activity of hepatic low density lipoprotein (LDL) receptor thus reducing circulating concentration of LDL-cholesterol (Maharani *et al*. 2012) but high intake of saturated fatty acids has been linked to high saturated fatty acids with cardiovascular diseases and cancer (Hidayati *et al*. 2015; Kaić and Mioč 2016).

Consumption of saturated fatty acids is limited to 0-10%, MUF 16%, PUFA 7% and cholesterol is limited to 300 mg per day, excess consumption leads to cardiovascular diseases (Gunawan *et al*. 2018). Long chain n-3 PUFA such as Docosahexaenoic acid (DHA, also known as Cervonic acid) (C22:6n3) and eicosapentaenoic acid (20:5n3) are involved in the growth and development of the nervous and visual systems, actively participating in the processes of neurogenesis (Valenzuela *et al*. (2012; Gunawan *et al*. 2018).

Fetuin-A, also called Alpha 2-Heremans Schmid Glycoprotein (AHSG) is physiological inhibitor of insulin receptor tyrosine kinase and thus associated with insulin resistance, metabolic syndrome (MetS) and an increased risk for type 2 diabetes (Dabrowska *et al.* 2015). AHSG connects fatty liver and insulin resistance by which high AHSG plasma levels are associated with insulin resistance in humans leading to the accumulation of fat in the liver (Stefan *et al.* 2006). Elevated circulating levels of fetuin-A in blood have been linked to the increased risk of cardiovascular disease (Fisher *et al.* 2009).

IV. CONCLUSION

AHSG gene was polymorphic in BC, CG, CA, JFT and JTT sheep breeds with A allele more frequent in combined population. The SNP g.198655287 G>A of AHSG gene was significantly associated with different fatty acids including saturated and unsaturated fatty acids. This study showed that SNP (g.198655287 G>A) of AHSG gene might be a useful marker for selecting and producing sheep meat with desirable and healthy fatty acids.

V. CONFLICTS OF INTERESTS

The authors declare that there is no conflict of interest

VI. ACKNOWLEDGEMENT

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Experimental and Analytical Study on Torsional Behaviour Of RC Flanged Beams Strengthened With Glass FRP

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ABSTRACT

Environmental degradation, increased service loads, reduced capacity due to aging, degradation owing to poor construction materials and workmanships and conditional need for seismic retrofitting have demanded the necessity for repair and rehabilitation of existing structures. Fibre reinforced polymers has been used successfully in many such applications for reasons like low weight, high strength and durability. Many previous research works on torsional strengthening were focused on solid rectangular RC beams with different strip layouts and different types of fibres. Various analytical models were developed to predict torsional behavior of strengthened rectangular beams and successfully used for validation of the experimental works. But literature on torsional strengthening of RC T- beam is limited. In the present work experimental study was conducted in order to have a better understanding the behavior of torsional strengthening of solid RC flanged T-beams. An RC T-beam is analyzed and designed for torsion like an RC rectangular beam; the effect of concrete on flange is neglected by codes. In the present study effect of flange part in resisting torsion is studied by changing flange width of controlled beams_ The other parameters studied are strengthening configurations and fiber orientations. The objective of present study is to evaluate the effectiveness of the use of epoxy-bonded GFRP fabrics as external transverse reinforced to reinforced concrete beams with flanged cross sections (T-beam) subjected to torsion. Torsional results from strengthened beams are compared with the experimental result of the control beams without FRP application. The study shows remarkable improvement in torsional behavior of all the GFRP strengthen beams. The experimentally obtained results are validated with analytical model presented by A.Deifalla and A. Ghobarah and found in good agreement.

Keywords : Durability, FRP, Flanged beam, GFRP, Rehabilitation, Torsion

I. INTRODUCTION

Modern civilization relies upon the continuing performance of its civil engineering infrastructure ranging from industrial buildings to power stations and bridges. For the satisfactory performance of the existing structural system, the need for maintenance and strengthening is inevitable. During its whole life span, nearly all engineering structures ranging from residential buildings, an industrial building to power stations and bridges faces degradation or deteriorations. The main causes for those deteriorations are environmental effects including corrosion of steel, gradual loss of strength with ageing, variation in temperature, freeze-thaw cycles, repeated high intensity loading, contact with

chemicals and saline water and exposure to ultra-violet radiations. Addition to these environmental effects earthquakes is also a major cause of deterioration of any structure. This problem needs development of successful structural retrofit technologies. So it is very important to have a check upon the continuing performance of the civil engineering infrastructures.

The structural retrofit problem has two options, repair/retrofit or demolition/reconstruction. Demolition or reconstruction means complete replacement of an existing structure may not be a cost-effective solution and it is likely to become an increasing financial burden if upgrading is a viable alternative. Therefore, repair and rehabilitation of bridges, buildings, and other civil engineering structures is very often chosen over reconstruction for the damage caused due to degradation, aging, lack of maintenance, and severe earthquakes and changes in the current design requirements. Previously, the retrofitting of reinforced concrete structures, such as columns, beams another structural elements, was done by removing and replacing the low quality or damaged concrete or/and steel reinforcements with new and stronger material.

In addition, FRP manufacturing offers a unique opportunity for the development of shapes and forms that would be difficult or impossible with the conventional steel materials. Although the fibers and resins used in FRP systems are relatively expensive compared with traditional strengthening materials, labour and equipment costs to install FRP systems are often lower. FRP systems can also be used in areas with limited access where traditional techniques would be impractical. Several investigators took up concrete beams and columns retrofitted with carbon fiber reinforced polymer (CFRP) glass fiber reinforced polymer (GFRP) composites in order to study the enhancement of strength and ductility, durability, effect of confinement, preparation of design guidelines and experimental investigations of these members.

II. TORSIONAL STRENGHTENING OF BEAMS

Early efforts for understanding the response of plain concrete subjected to pure torsion revealed that the material fails in tension rather than shear. Structural members curved in plan, members of a space frame, eccentrically loaded beams, curved box girders in bridges, spandrel beams in buildings, and spiral stair-cases are typical examples of the structural elements subjected to torsional moments and torsion cannot be neglected while designing such members. Structural members subjected to torsion are of different shapes such as T-shape, inverted L-shape, double T-shapes and box sections. These different configurations make the understanding of torsion in RC members of complex task. In addition, torsion is usually associated with bending moments and shearing forces, and the interaction among these forces is important.

Spandrel beams, located at the perimeter of buildings, carry loads from slabs, joists, and beams from one side of the member only. This loading mechanism generates torsional forces that are transferred from the spandrel beams to the columns. Reinforced concrete (RC) beams have been found to be deficient in torsional capacity and in need of strengthening. These deficiencies occur for several reasons, such as insufficient stirrups resulting from construction errors or inadequate design, reduction in the effective steel area due to corrosion, or increased demand due to a change in occupancy. Similar to the flexure and shear strengthening, the FRP fabric is bonded to the tension surface of the RC members for torsion strengthening. In the case of torsion, all sides of the member are subjected to diagonal tension and

therefore the FRP sheets should be applied to all the faces of the member cross section. However, it is not always possible to provide external reinforcement for all the surfaces of the member cross section.

III. ADVANTAGES AND DISADVANTAGES OF FRP

3.1. Advantages

There have been several important advances in materials and techniques for structural rehabilitation, including a new class of structural materials such as fiber-reinforced polymers (FRP). One such technique for strengthening involves adding external reinforcement in the form of sheets made of FRP. Advanced materials offer the designer a new combination of properties not available from other materials and effective rehabilitation systems. Strengthening structural elements using FRP enables the designer to selectively increase their ductility, flexure, and shear capacity in response to the increasing seismic and service load demands. For columns, wrapping with FRP can significantly improve the strength and ductility.

A potent advantage of using FRP as an alternate external confinement to steel is the high strength to weight ratio comparisons. In order to achieve an equivalent confinement, FRP plates are up to 20% less dense than steel plates and are at least twice as strong, if not more. Manufacture of modern composites is, then, possible in reduced sections and allows composite plates to be shaped on-site. The lower density allows easier placement of confinement in application. Design of external confinement to a structure should be made with conservative adjustments to the primary structures dead weight load. Changes of the stiffness of members should be considered when redesigning the structure. The improved behaviour of FRP wrapped members reduces the strains of internal steel reinforcement thereby delaying attainment of yielding. Much like internal steel confinement in longitudinal and lateral axes, external confinement exerts a similar pressure on the concrete as well as to the internal steel. Furthermore, FRP have high corrosive resistance equating to material longevity whilst within aggressive environments. Such durability makes for potential savings in long-term maintenance costs.

3.2 Disadvantages

With the above advantages FRP does also have some disadvantages as follows: The main disadvantage of externally strengthening structures with fiber composite materials is the risk of fire, vandalism or accidental damage, unless the strengthening is protected. As FRP materials are lightweight they tend to poses aerodynamic instability. Retrofitting using fiber composites are more costly than traditional techniques. Experience of the long-term durability of fiber composites is not yet available. This may be a disadvantage for structures for which a very long design life is required but can be overcome by appropriate monitoring. This technique need highly trained specialists. More over there is lack of standards and design guides.

3.3 LITERATURE REVIEW ON TORSIONAL STRENGTHENING OF RC BEAM

Most of the research projects investigating the use of FRP focused on enhancing the flexural and shear behaviour, ductility, and confinement of concrete structural members. A limited number of mostly experimental studies were conducted to investigate torsion strengthening of RC members.

Ghobarah et al. (2002) conducted an experimental investigation on the improvement of the torsional

resistance of reinforced concrete beams using fiber-reinforced polymer (FRP) fabric. A total of 11 beams were tested. Three beams were designated as control specimens and eight beams were strengthened by FRP wrapping of different configuration and then tested. Both glass and carbon fibers were used in the torsional resistance upgrade. Different wrapping designs were evaluated. The reinforced concrete beams were subjected to pure torsional moments. The load, twist angle of the beam, and strains were recorded. Improving the torsional resistance of reinforced concrete beams using FRP was demonstrated to be viable. The effectiveness of various wrapping configurations indicated that the fully wrapped beams performed better than using strips. The 45° orientation of the fibers ensures that the material is efficiently utilized.

Panchacharam and Belarbi (2002) experimentally found out that externally bonded GFRP sheets can significantly increase both the cracking and the ultimate torsional capacity. The behaviour and performance of reinforced concrete member strengthened with externally bonded Glass FRP (GFRP) sheets subjected to pure torsion was presented. The variables considered in the experimental study include the fiber orientation, the number of beam faces strengthened (three or four), the effect of number of FRP plies used, and the influence of anchors in U-wrapped test beams. Experimental results reveal that externally bonded GFRP sheets can significantly increase both the cracking and the ultimate torsional capacity. Predicted strengths of the test beams using the proposed theoretical models were found to be in good agreement with the experimental results.

Salom et al. (2004) conducted both experimental and analytical programs focused on the torsional strengthening of reinforced concrete spandrel beams using composite laminates. The variables considered in this study included fiber orientation, composite laminate, and effects of a laminate anchoring system. Current torsional strengthening and repair methods are time and resource intensive, and quite often very intrusive. The proposed method however, uses composite laminates to increase the torsional capacity of concrete beams.

IV. EXPERIMENTAL STUDY

To study the most influential strengthening variables on torsional behavior a total of eleven medium scale reinforced concrete beams of 1900 mm long were constructed for this work. T-shaped beams, which are sorted in three groups (T2, T3 and T4) and were tested under combined bending torsion. Three numbers of beams are without torsional reinforcement were the control specimens and eight specimens were strengthened using epoxy-bonded glass FRP fabrics as external transverse rein-forcemeat.

The cross-section of specimens was One beam were flanged beams with T-shaped with dimensions b_w/D/bf/df = 150/270/250/80 mm (beams of series T2). In the series-B five beam specimens were flanged beams, and the dimensions are bw/D/bf/df=150/270/350/80 (beams of series T3). And also another five beam specimens were T-shaped cross-section and dimensions bw/D/bf/df=150/270/350/80 (beams of series T4). The cross-section of all beams has shown in fig 3.1

Each group comprises one control specimen without transverse reinforcement. Specimens T2C were the control specimen of group-A, it had only longitudinal reinforcement; four deformed bars of diameter 20mm^, and 10mm^, at the corners of the

cross-section, and control specimen of T3C,and T4C of series six longitudinal deformed bars of diameter 20 mm^, 10mm^, and 8mm^, transverse bars of 8mm^ two legged stirrups. The other eight specimens of the experimental program included the same longitudinal reinforcement as the control specimens of their group and transverse reinforcement (steel stirrups).

Test beams were identified based on the following naming system. The first character in the name R (Rectangular), T (T-section) is used to identify the cross/section of beam. Second character is the dimensions of the beam. The third two characters are used to specify the strengthening in web or flange or both (U or UA). Fourth character in the name (90, 45) is used to specify the fiber orientation with respect to the longitudinal axis of the beam.

4.1 CASTING OF SPECIMENS.

For conducting experiment, eleven reinforced concrete beam specimen of size as Shown in the fig (Length of main beam (L) = 1900mm, Breadth of main beam (b_w) = 150mm, Depth of main beam(D) = 270mm, Length of cantilever parts = 400mm, Width of cantilever part= 200mm, Depth of cantilever part= 270mm, Distance of cantilever part from end of the beam= 350mm) and all having the same reinforcement detailing are cast. The mix proportion is 0.5: 1:1.67:3.3 for water, cement, fine aggregate and course aggregate is taken. The mixing is done by using concrete mixture. The beams were cured for 28 days. For each beam three cubes, two cylinders and two prisms were casted to determine the compressive strength of concrete for 28 days.

4.2 Cement

Cement is a material, generally in powered form, which can be made into a paste usually by the addition of water and, when molded or poured, will set into a solid mass. Numerous organic compounds used for an adhering, or fastening materials, are called cements, but these are classified as adhesives, and the term cement alone means a construction material. The most widely used of the construction cements is Portland cement. It is bluish-gray powered obtained by finely grinding the clinker made by strongly heating an intimate mixture of calcareous and argillaceous minerals. Portland Slag Cement (PSC) Konark Brand was used for this investigation. It is having a specific gravity of 2.96.

4.3 Fine Aggregate

Fine aggregate is an accumulation of grains of mineral matter derived from disintegration of rocks. It is distinguished from gravel only by the size of the grains or particles, but is distinct from clays which contain organic material. Sand is used for making mortar and concrete and for polishing and sandblasting. Sands containing a little clay are used for making molds in foundries. Clear sands are employed for filtering water. Here, the fine aggregate/sand is passing through 4.75 mm sieve and having a specific gravity of 2.64. The grading zone of fine aggregate is zone III as per Indian Standard specifications IS: 383-1970.

4.4 Coarse Aggregate

Coarse aggregates are the crushed stone is used for making concrete. The commercial stone is quarried, crushed, and graded. Much of the crushed stone used is granite, limestone, and trap rock. The coarse aggregates of two grades are used one retained on 10 mm size sieve and another grade contained aggregates retained on 20 mm size sieve. The maximum size of coarse aggregate was 20 mm and is having specific gravity of 2.88 grading confirming to IS: 383-1970.

4.5 Water

Water fit for drinking is generally considered good for making the concrete. Water should be free from acids, alkalis, oils, vegetables or other organic impurities. Soft water produces weaker concrete. Water has two functions in a concrete mix. Firstly, it reacts chemically with the cement to form a cement paste in which the inert aggregates are held in suspension until the cement paste has hardened. Secondly, it serves as a vehicle or lubricant in the mixture of fine aggregates and cement. Ordinary clean portable tap water is used for concrete mixing in all the mix.

4.6 Reinforcing Steel

High-Yield Strength Deformed (HYSD) bars confirming to IS 1786:1985. The longitudinal steel reinforcing bars were deformed, high-yield strength, with 2O9 mm 109 mm and 8mm^ diameter. The stirrups were made from deformed steel bars with 8 mm 9 diameter.

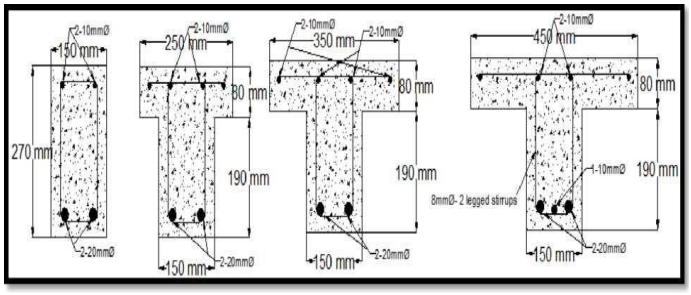


Figure 1 : Detailing of Reinforcement

4.7 Mixing of Concrete

Mixing of concrete is done thoroughly with the help of machine mixer so that a uniform quality of concrete was obtained.

4.8 Compaction

Compaction is done with the help of needle vibrator in all the specimens. And care is taken to avoid displacement of the reinforcement cage inside the form work. Then the surface of the concrete is levelled and smoothened by metal trowel and wooden float

4.9 Curing Of Concrete

Curing is done to prevent the loss of water which is essential for the process of hydration and hence for hardening. It also prevents the exposure of concrete to a hot atmosphere and to drying winds which may lead to quick drying out of moisture in the concrete and there by subject it to contraction stresses at a stage when the concrete would not be strong enough to resists them. Here curing is to be done by spraying water on the jute bags spread over the surface for a period of 7 days.

4.10 Fiber Reinforced Polymer (FRP)

Continuous fiber reinforced materials with polymeric matrix (FRP) can be considered as composite, heterogeneous, and anisotropic materials with a prevalent linear elastic behaviour up to failure. Normally, Glass and Carbon fibers are used as reinforcing material for FRP. Epoxy is used as the binding material between fiber layers. For this study, GFRP sheet was used during the tests i.e., a bidirectional FRP with the fiber oriented in both longitudinal and transverse directions, due to the flexible nature and ease of handling and application, the FRP sheets are used for torsional strengthening. Throughout this study, E-glass was used manufactured by Owens Corning.

V. TEST RESULTS AND DISCUSSIONS

5.1 Experimental Results

This chapter includes experimental results of all beams with different types of configurations and orientation of GFRP. Their behavior throughout the test is described using recorded data on torsional behavior and the ultimate load carrying capacity. The crack patterns and the mode of failure of each

beam are also described in this chapter. All the beams are tested till complete failure. Beams T2C, T3C and T4C are the control beams. It is observed that the control beam had less load carrying capacity and high deflection values compared to that of the FRP strengthened beams. Group A beam T2C has 250 mm wide flange beam is considered as control beam. In group-Band group-C, all beams are strengthened with 100mm wide, four layered strips of GFRP fabrics with an clear spacing of 75 mm. The different patterns of wrapping adopted are 90 degree fully wrapped, 45° fully wrapped, U-wrapped, U-wrap with flange anchored with bolt.

5.2 Failure Modes

Different failure modes have been observed in the experiments. These include torsional shear failure due to GFRP rupture and debonding. Rupture of the FRP strips is assumed to occur if the strain in the FRP reaches its design rupture strain before the concrete reaches its maximum usable strain. GFRP debonding can occur if the force in the FRP cannot be sustained by the substrate. Load was applied on the two moment arm of the beams which is 0.375m away from the main beam. At each increment of the load, deflections at L/3, L/2 and 2L/3 were observed and noted down with the help of six nos. of dial gauges. At each section two dial gauges were fixed to measure the displacement caused by twisting moment. The relative displacements divided by distance between dial gauges gives angle of twist. Section at L/3 was taken as sec-1, section at middle of beam as taken as sec-2, and section at 2L/3 was taken as section 3.The loading arrangement was same for all the beams.

VI. CONCLUSION

The experimental program of this study consists of eleven numbers of reinforced concrete T- beams with different flange widths tested under torsion. The main objective of this study is to investigate the effectiveness of the use of epoxy-bonded FRP fabrics as external transverse reinforcement. Based on presented experimental measurements and analytical predictions, the following conclusions were reached

- ✓ Experimental results shows that the effect of flange width on torsional capacity of GFRP strengthened RC T-beams are significant.
- ✓ Torsional strength increases with increase in flange area irrespective of beam strengthening with GFRP following different configurations schemes.
- ✓ With 250 mm wide flange width increase in strength was 13%, with 350mm wide flange was 29% and for 450mm wide flange was found to be 69%. This is due to increase in area enclosed inside the critical shear path.
- ✓ The cracking and ultimate torque of all strengthen beams were greater than those of the control beams.
- ✓ The cracking and ultimate torque of all strengthen beams were greater than those of the control beams.
- ✓ The increase in magnitude depends on the FRP strengthening configurations.
- ✓ The maximum increase in torque was obtained for 90^0fully wrapped configurations. Increase of 133.33% to 116.67% in first cracking and 155.55% to 107.23% in ultimate torsion were recorded for series B beams and series C beams respectively.

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IOT Based Smart Agriculture System

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ABSTRACT

Technological significance has been an extraordinary help for settling on choices in different fields particularly in agriculture. The improvement of agriculture has been on a work in progress for as far back as couple of years because of absence of Agriculture information and ecological changes. Here, it principally concentrating on the enhancement of rustic and farming improvement through cutting edge data and correspondence forms. It stretch out the agriculture association's capacity to address the issues of its ranchers. By utilizing IoT, it upgrade the simple access monitoring framework to lessen the human worry in agriculture. The monitoring got, through GSM and web can send to the rancher in case of crisis, he can ready to see the factual study report by independent of area and engine has been ON/OFF consequently if the water level is diminished. This examination gives the ideal data at any moment of time from any piece of world and review their concern quickly at any piece of the area.

Keywords : Internet of Things, GSM, Temperature Sensor, Soil Sensor, Water Level Sensor

I. INTRODUCTION

Agriculture has been the most imperative practice from soonest reference purpose of the human advancement. It has seen various cycles of enhancement in advancement with time. A not too bad cultivating practice is so far workmanship. Natural parameters, for instance, soil clamminess, temperature, stickiness, pH, sun put together radiation thus with respect to accept crucial part when all is said in the done enhancement of the plant. Temperature impacts countless activities, for instance, treatment, germination, etc. It is watched that, at the higher temperature, breath rate extends that result in reducing of sugar substance of nourishments developed starting from the earliest stage. At cut down temperatures photosynthesis activity is supported off [1].

Humidity is responsible for moistness incident and temperature organization of the plant. For high damp condition, evaporation will be less and more water will submerged in the leaf an area. This results in expansion and improvement of life form in the porous domain of the leaf. Moistness is essential for seed germination and take-up of enhancements by the plant. Excess water may stop vaporous exchange among soil and the air which diminishes root breath and root improvement. The perfect dimension of clamminess ensures the strong improvement of the root and general progression of the plant [2]. A supportable methodology is required to keep up alter between these parameters and

condition. In this way, there is a need of successful monitoring and control structure. In the present time, the standard systems that are used for irrigation, for instance, overhead sprinkler and flood form, isn't that much benefit. They realize a significant proportion of wastage of water and can similarly propel ailment, for instance, development improvement due to over sogginess in the earth. Automated irrigation structure is crucial for assurance of the water and by suggestion possibility of the farm since it is a basic item. Around 85% of total available water resources over the world are solely used for the irrigation reason [3].

Generally, most of the irrigation structures are physically worked one. These standard techniques are being been displaced with semi-automated and automated strategies proposed an automated thought of irrigation to use the water capable and satisfactorily Automated Drip Irrigation system is executed either in perspective of the earth moisture or in light of the customer contribution through SMS teaching structures. The past methodology is a disengaged irrigation structure where the agriculturist doesn't revive with the irrigation status and later slacks in savvy utilization of water in light of customer arrange without pondering the condition of the soil. From that reliably creating need of the people, present day techniques are familiar with control of the structure.

To give proper thought with respect to the land arranged a long way from the human settlement, supervisory modified control structures like multi-terminal control systems are used since in various strategies, factors like soil, saltiness, irrigation, temperature, light power, etc needs repeated endeavors and need to work in uncommon natural conditions of the earth and to crush the deformities in the present system here we are flooding the land in perspective of the earth dampness and meanwhile the status of the irrigation is revived remotely to Server through sequential

In this framework, we utilize different sensors for estimating the status of the dirt. The Temperature sensor, Water level sensor, and moisture sensor are the sensors which estimate the status of the dirt. The moisture sensor is utilized to quantify the volumetric water content in the dirt with the goal that dirt is Dry or Wet can be distinguished. The temperature sensor estimates the temperature sensor. The water level sensor estimates the water level.

II. LITERATURE REVIEW

We have dissected a few papers beneath.
Intelligent Irrigation System and IOT based Approach, Dr. M. Newlin, RajKumar, S. Abinaya, Dr. V. Venkatesa Kumar.In this paper [4] has genius represented a framework that is extremely essential and doesn't convey anything new to the table. It utilizes a framework that has sensors for moisture, temperature, and humidity, and utilizations Arduino to execute its capacities. It is halfway automated as the client needs to keep a mind the water dimension of the framework. This framework utilizes a GSM module for correspondence.

IOT based Crop- field Monitoring and Irrigation Automation, Raja Lakshmi Mrs. S.Devi Maha Lakshmi.In this paper [5] proposes a strategy that utilizes various sensors i.e Temperature, moisture, humidity and light to make a savvy irrigation framework. The information is sent to a web server for information dissecting and preparing, it is put away in JSON design. The light sensor detects the light, to expand the working of the plant, light is conveyed too. They intend to utilize keen calculations to improve the framework. It publicizes that it has 92% productivity than the rest.

Automated Plant Watering System, Drashti Divani, Pallavi Patil, Prof.Sunil K. PunjabiIn this paper [6] IoT is utilized for irrigation in this task as the moisture sensor identifies the substance of water inside the dirt and in like manner educates the client through the PC it is associated with by means of warnings. The framework contrasts the moisture and the limit esteem and begins the water siphon in agreement and stops the siphon in like manner. The framework has constrained range as it is utilizing a PC to associate with the Arduino board through USB link since it isn't plausible to use for a homestead. The framework makes utilization of an Arduino board, moisture sensors, and a water siphon.

Smart Drip Irrigation System using Raspberry pi and Arduino, Nikhil Agarwal, Smita Singhal. In the framework [7] proposes a technique in which it will utilize an ace and slave design where the raspberry pi will control different Arduino gadgets with Zigbee convention. The raspberry pi will continue searching its email for any directions which will be as "Turn on the siphon for Y minutes." This order will turn on the transfer to the water siphon for the said Y minutes. There is an ultrasonic sensor that continues monitoring the water tank level and it will advise the client with an email as it were.

IOT based Crop- field Monitoring and Irrigation Automation, Raja Lakshmi Mrs. S.Devi Maha Lakshmi.In the framework [5] proposes a strategy to execute a technique for brilliant irrigation with an Arduino and a Raspberry Pi. The framework utilizes Zigbee as a specialized strategy between the two. The framework can be controlled through cherry py with the IP address of the raspberry pi board, i.e it has a short range. In this framework, the raspberry pi does every one of the estimations and guides the aftereffect of it to Arduino's through ZigBee.

III. PROPOSED WORK

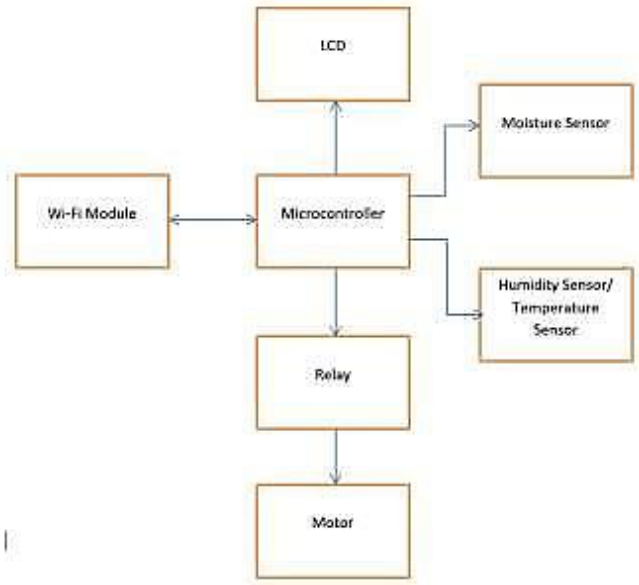


Figure 1. Block Diagram for Proposed System

In this system, various sensors such as soil moisture, DHT11 sensors are connected to the input pins of arduino microcontroller. The sensed values from the sensors are displayed in LCD. If the sensed value goes beyond the threshold values set in the program, the pump will be automatically switched ON/OFF by the relay circuit and it is connected to the driver circuit which helps to switch the voltage. The farmer will be intimated about the current field condition through GSM module and also updated in the web page. By using this system, the farmer can access the details about the condition of the field anywhere at any time.

IV. IMPLEMENTATION And RESULT

In this paper we have two modules:

1. Hardware
2. Software

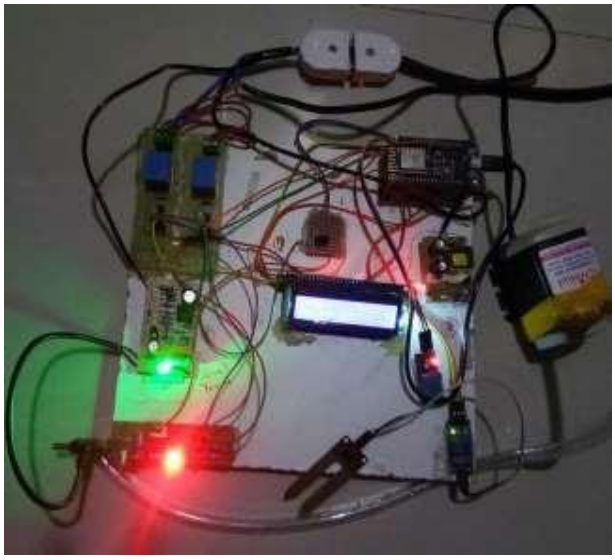


Figure 2. Implemented Circuit

Figure 5 shows the circuit implemented. In this part we have used two types of sensor Soil Moisture sensor, temperature/Humidity sensor Arduino kit with Wi-Fi module, LCD Display, One water Pump (Motor). Using Moisture sensor we check the soil status if the soil get dry then moisture sensor sense and automatically the motor is ON. If the soil is get wet then motor get OFF. It will show in the LCD Display: Temperature/Humidity Sensor can sense the Real-time Temperature and Humidity that is also show in LCD.

The next part based on Android Application.

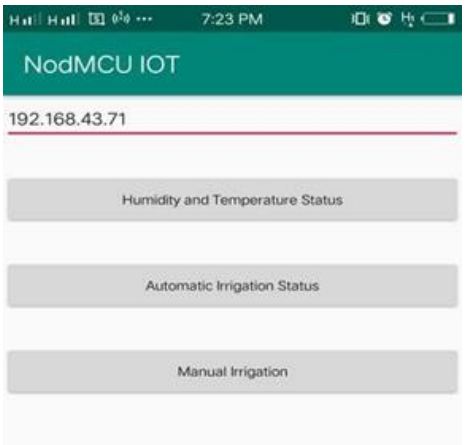


Figure 3. Home Screen

Here in figure 3 we need to enter the IP address of the system. This is important to get connected with the microcontroller.



Figure 4. Monitoring Humidity and Temperature

Figure 4 shows the real time monitoring of the humidity and temperature of the soil.



Figure 5. Automatic Irrigation

Here in figure 5, the automatic irrigation module is implemented. If the moisture level of the soil goes dry, the motor will be activated automatically. Figure 6 shows the status of motor and soil after activation of the motor.



Figure 6. Motor status after automatic irrigation

Additionally we have a feature of manual motor control. We can operate the motor manually at our will. Figure 7 shows the manual irrigation method.



Figure 7. Manual Irrigation

By using Internet of Things, majority of Farmers were aware about the monitoring and warning detection method in agriculture. This will facilitate the e-agriculture to assessing the performance of the farmers doing independently. It enables to provide the alert messages and statistical survey report to the farmers by irrespective of location. This study is to provide great potential for improving decision making in agriculture. From this report it extend the agriculture organization's ability to meet the needs of its farmers.

V. FUTURE SCOPE

- At a time multiple user can connecte throught Application.
- Threshold value is set at different type of soil and different types of crops.

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Design and Implementation of Soldier Health and Position Tracking System

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ABSTRACT

Nowadays all nations keep its security at high priority. Soldiers being the backbone of any armed force usually lose their lives due to lack of medical help when in emergency, also soldiers who are involved in missions or in special operations get straggled on war fields and lose contact with the authorities. To overcome this concerns we had built this project which, using wireless body area sensor network such as temperature sensor, heartbeat sensor etc. will monitor the health status of the soldier whenever required. Also using GPS we can track the soldier's exact location whenever required. Using oxygen level sensor we can also monitor the environmental condition, so authorities can provide essential aids. The communication is established between the soldiers and authorities via GSM. Any abnormalities in the readings of wireless body area sensor network is considered as a trigger for GSM to establish the connection between the soldier and base unit and send current location and health status to the receiver. This system can be used in critical conditions. The most significance in this is implementation of M-Health. By implementing this system we can improve the security of our country this also help to improve the safety of the soldier. This system also helps to provide real time video information. Using this system we can reduce casualties of war.

Keywords : Arduino, Wi-Fi (ESP 8266), Load cell, Database System

I. INTRODUCTION

The nation's security is monitored and kept by army, navy and air-force. The important and vital role is of soldiers who sacrifice their life for their country. There are many concerns regarding the safety of the soldier. Soldiers entering the enemy lines often lose their lives due to lack of connectivity, it is very vital for the army base station to known the location as well as health status of all soldiers. India has already lost so many soldiers in war-fields as there was no proper health backup and connectivity between the soldiers on the war-fields and the officials at the army base stations.

There are many concerns regarding the safety of soldiers. So for their security purpose, many instruments are mounted on them to view their health status as well as ammunitions present with them. Bio-sensor systems comprise various types of small physiological sensors, transmission modules and processing capabilities, and can thus facilitate low-cost wearable unobtrusive solutions for health monitoring. GPS used to log the longitude and latitude so that direction can be known easily. Ranges of physiological sensors monitoring heart rate, core body temperature will improve situational awareness, not only for the host, but also for collocated military

personnel who will exchange information using wireless networks.

II. LITERATURE SURVEY

During, wars and military search operations, soldiers gets injured and sometime becomes losses. To find soldiers and provide health monitoring, army base station and need GPS device for locating soldiers, WBASNs to sense health related parameters of soldiers and a wireless transceiver to transmit the data wirelessly.

In [1] has discussed on recent advantage in growing technology, and on various wearable, portable, light weighted and small sized sensor that have been developed for monitoring of the human physiological parameters .The body sensor network (BSN) consists of many biomedical and physiological sensors such as blood pressure sensors, Electrocardiogram (ECG) sensor, electr dermal activity (EDA) sensor which can be placed on human body for health monitoring in real time.

In [3] author has presented an idea for the safety of soldiers. There are many instruments which can be used to view the health status of soldiers as well as ammunitions on them. The Bio sensor which consist of various types of small physiological sensors, transmission modules have great processing capabilities and can facilitates the low-Cost wearable solutions for health monitoring. Also as stated by Dinesh Kumar Jaiswar, Sanjana S Repal in their survey, P.S.

Kurhe ,S.S Agrawal had introduced a system that gives ability to track the soldiers at any moment additionally ,the soldiers will be able to communicated with control room using GPS coordinate in their distress. The location tracking has great importance since World War II, when military forces realized its usefulness for navigation, positioning, targeting and fleet management. This system is reliable, energy efficient for remote soldier health monitoring and their location tracking. It is able to send the sensed and processed parameters of soldier in real time. It enables to army control room to monitor health parameters of soldiers like heartbeat, body temperature, etc. using body sensor networks. The parameters of soldiers are measured continuously and wirelessly transmitted using GSM.

III. Architecture of AVR

The AVR microcontrollers are based on the advanced RISC architecture and consist of 32 x 8-bit general purpose working registers. Within one single clock cycle, AVR can take inputs from two general purpose registers and put them to ALU for carrying out the requested operation, and transfer back the result to an arbitrary register. The ALU can perform arithmetic as well as logical operations over the inputs from the register or between the register and a constant. Single register operations like taking a complement can also be executed in ALU. We can see that AVR does not have any register like accumulator as in 8051 family of microcontrollers; the operations can be performed between any of the registers and can be stored in either of them.

AVR follows Harvard Architecture format in which the processor is equipped with separate memories and buses for Program and the Data information. Here while an instruction is being executed, the next instruction is pre-fetched from the program memory.

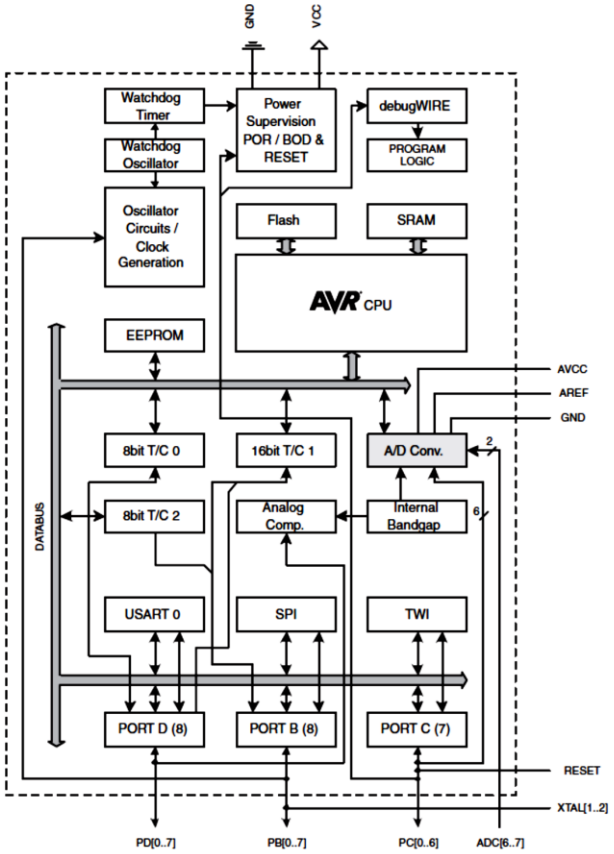


Fig. 1 Architecture of a AVR

IV. COMPONENTS USED IN SOLDIER HEALTH AND POSITION TRACKING SYSTEM

This section presents the design and implementation of various components involved in soldier health and position tracking system.

A. MICROCONTROLLER ATMEGA 328:

The ATmega328 is a single –chip microcontroller created by ATmega in the mega AVR family. The Atmel 8-bit RISC-based microcontroller combines 32kB ISP flash memory with read while-write capabilities, 1KB EEPROM, 2kB SRAM, 23 general purpose I/P lines, 32 general purpose working registers, three flexible timer/counter with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, 6-channel 10-bit A/D converter programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughput approaching 1 MIPS per MHz..

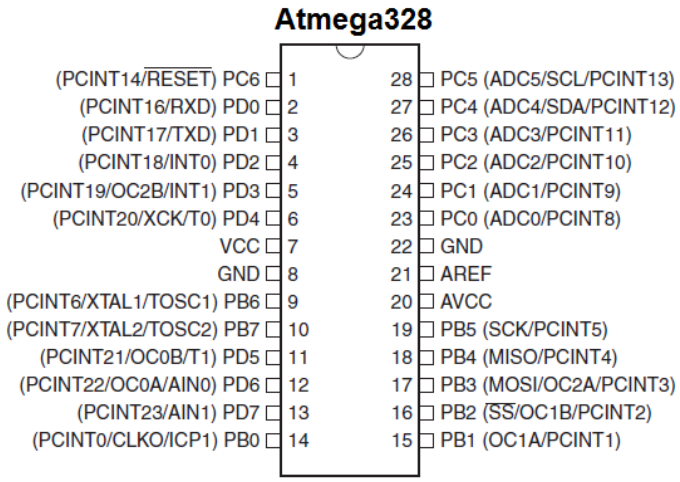


Fig. 2 ATmega 328 controller pinout.

B. GSM MODULE

GSM module is a breakout board and minimum system of SIM900 Quad-band/SIM900A Dual-band GSM/GPRS module. It can communicate with controllers via AT commands (GSM 07.07, 07.05 and SIMCOM enhanced AT Commands). This module supports software power on and reset. It has a quad-band 850/900/1800/1900 MHz and a dual-band 900/1900 MHz. It has control via AT commands, a very low power consume 1.5mA(sleep mode).

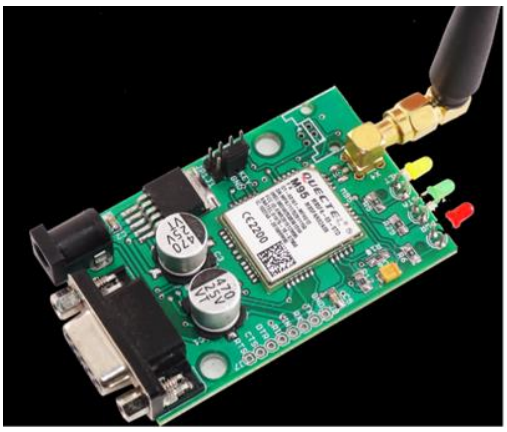


Fig. 3 GSM Module

C. GPS MODULE

Neo 6 M GPS is a USRT 6 M module. It will be used to track the position of the soldier. It gets connected to at-most 32 satellite and will give the exact longitude and latitude readings. In this way it will track the exact position. While originally a military project, GPS is considered a dual-use technology, meaning it has significant military and civilian applications. It operates in the range -40 degree Celsius to 85 degree Celsius and at 2.7V-5V. Also it has a tracking and navigation sensitivity of -161 dBm devices like keyboards, mice, joysticks, etc. Also they are used on DB9 cable assemblies for data connectivity.

D. SIM900

The SIM900 is a complete Quad-band GSM/GPRS solution in a SMT module which can be embedded in the customer applications. Featuring an industry-standard interface, the SIM900 delivers GSM/GPRS 850/900/1800/1900MHz performance for voice, SMS, Data, and Fax in a small form factor and with low power consumption. With a tiny configuration of 24mm x 24mm x 3 mm, SIM900 can fit almost all the space requirements in your M2M application, especially for slim and compact demand of design.

SIM900 is designed with a very powerful single-chip processor integratingAMR926EJ-S core. Quad - band GSM/GPRS module with a size of 24mmx24mmx3mm. SMT type suit for customer application. An embedded Powerful TCP/IP protocol stack.



Fig. 4. SIM900

E. HEART BEAT SENSOR

A Heart Rate Monitor is a personal monitoring device which allows a subject to measure his or her heart rate in real time or record his or her heart rate for later study. The heart's beating rate can be shown in the form of LED Pulses on a LED display or in a number on LCD display. It is largely used by performers of various types of physical exercise. Modern heart rate monitors usually comprise two elements: a chest strap transmitter and a wrist receiver or mobile phone. In early plastic straps water or liquid was required to get good performance. Later units have used conductive smart fabric with built-in microprocessors which analyze the ECG signal to determine heart rate. These again analyze average heart rate over exercise period, time in a specific heart rate zone, calories burned, breathing rate, built-in speed and distance, and detailed logging that can be downloaded to a computer.

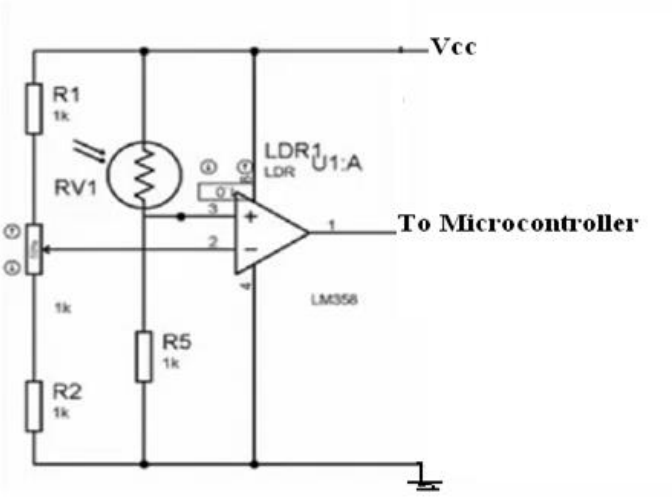


Fig. 5. Heart Beat Sensor Circuit Diagram.

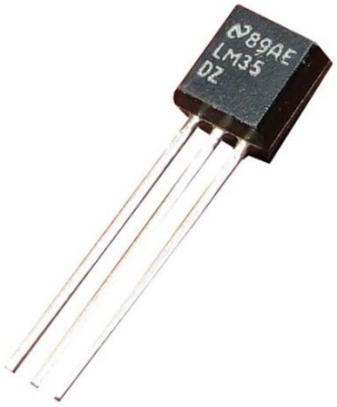
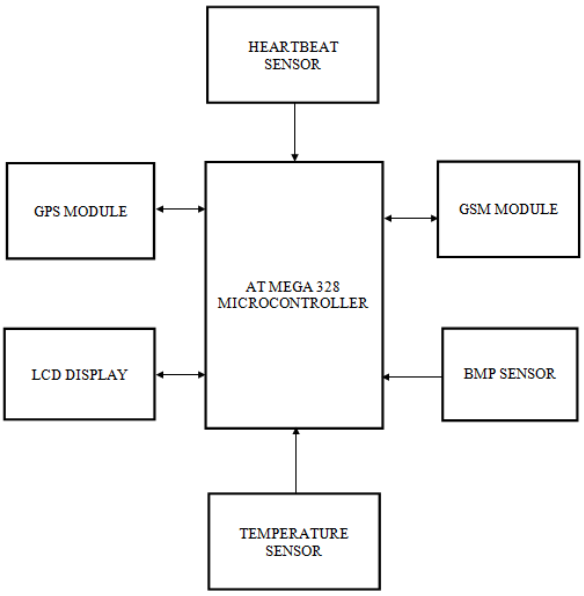


Fig. 6. Temperature sensor LM35

F. TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the centigrade temperature. The LM35 device has an advantage over linear temperature sensor calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient centigrade scaling. To find the health status of soldier base station should know the body temperature and pulse rate of the soldier. So we are using LM35 body biosensor as it is a low cost temperature sensor and it does not require signal conditioning. The LM35 generates a higher output voltage than thermocouples and may not require that the output voltage be amplified. As the temperature increase above the specified value the GSM module will immediately alert the Base station and thus will not wait for heart beats to go out of the normal range.

G. BLOCK DIAGRAM



V. CONCLUSIONS

From the above implementation we have concluded that the communication hurdles between the soldiers and authorities at the base unit is overcome using GSM, the precise location and health parameters are known using GPS and wireless body area sensor network respectively and with the GSM modem all information is send to the base station so that field commander will take necessary action.

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Design and Implementation of Alcohol Sensing and Accident Alert System

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ABSTRACT

These days accidents happen on the street on account of increment in rush hour gridlock and rash or snoozing driving of the drivers. A few accidents happen inferable from the utilization of alcohol. So licker alcoholic driving is the furthermore fundamental purpose behind mishap occurs. The alcohol location in-vehicle framework is assumed for the front of people seating inside the vehicle and in a few things, might want the auto and police expert isn't hip in time. Along these lines reasons for postponing encourage came to the individual endured because of a mishap. Propositions proposed configuration comprise is with respect to alcohol discovery and likewise a coincidental location recognition. When a mishap occurs, in this manner promptly emergency message is sent to closest emergency administration focus with inadvertent location. This proposed plan must be constrained to be fitted with the vehicle. Likewise, additionally, distinguish right safety belt recognition. Right vehicle safety belt is most important to abstain from squandering human life.

Keywords: Car Safety System, Accident Prevention, Alert System, IoT, COST, Microcontroller, Communication Medium

I. INTRODUCTION

Today, the propelled universe of science and advancement, the Transportation system is a basic bit of living. Having this with us gives us the vibe of the for the most part blended creatures on earth. Vehicles accept an essential part in our step by step life yet like each other thing, with a couple of positives there are negatives too. Road incidents are a genuine risk to human lives. Speed is the key factor accountable for a critical number of episodes. PDA based setback ID and cautioning structure will follow the disaster with help of sent impact sensors, will process the data through microcontroller unit and with a Smartphone application GPS, GSM it will send a notice to the nearest emergency benefits and to the loss' family [1].

Speed is a victor among the hugest purposes behind an incident. Nowadays, GPS recipient has transformed into an imperative bit of a vehicle. Other than using as a piece of various purposes, the GPS can in like manner screen the speed and recognize an accident. It can use an incredibly humble and surely

understood GSM modem to send the accident region to the Alert Service Center. It can send the last speed before the incident which will overview the earnestness of the accident and can begin a voice call. Nearby the modified acknowledgment structure, the vehicle occupant will have the ability to physically send the disaster situation by crushing the Manual Detection Switch. Thus, the proposed structure can serve the humankind by an amazing game plan as human life is essential [3].

A GPS vehicle following an organization structure that gives various all-inclusive organizations at whatever point and wherever. The structure empowers people to find their vehicles position, speed, stops, and improvements. The checking procedure fuses setting speed and land limits, getting history reports of the vehicle's improvements or continuous after. It tends to be used to deflect auto theft by uniting the contraption with the auto alert and besides gaining a guide containing the auto territory if the auto is accepted to be stolen. Following vehicles in our structure utilizes a broad assortment of new progressions and correspondence frameworks tallying GPRS, GSM, the Internet, and GPS. For future work, more organizations could be added to the compact application and besides the graphical customer interface could be pushed ahead [6].

II. Literature Review

KiranSawant et al. created an accident alert system using GSM and GPS modem and Raspberry Pi. A piezoelectric sensor first senses the occurrence of an accident and gives its output to the microcontroller. The GPS detects the latitude and longitudinal position of a vehicle. The latitudes and longitude position of the vehicle is sent as message through the GSM. The static IP address of central emergency dispatch server is pre-saved in the EEPROM. Whenever an accident has occurred the position is detected and a message has been sent to the pre-saved static IP address [1].

Mrs. ManasiPatil et al. described a better traffic management system using Raspberry pi and RFID technology. The vehicle has a raspberry pi controller fixed in it which is interfaced with sensors like gas sensor, temperature sensor and shock sensor. These sensors are fixed at a predetermined value before accident. When an accident occurs the value of one of the sensor changes and a message to a predefined number (of the ambulance) is sent through GSM. The GPS module which is also interfaced with the controller also sends the location of the vehicle. When the message is received by the ambulance, a clear route has to be provided to the ambulance. The ambulance has a controller ARM which is interfaced with the RFID tag sends electromagnetic waves. When an ambulance reaches the traffic signal the RFID reader which is placed on the joints detect the electromagnetic waves of the tag. If the traffic signal is red, then the readers goes through the database in fraction of seconds and turn the red light green. And automatically in such condition the RFID on opposite joints turn the opposite signal red. This provides a clear route tothe ambulance. [2].

V.Sagar Reddy et al., developed an accelerometer based System for driver safety. The system has the advantage of tracking or identifying vehicles location just by sending a SMS or email to the authorized person. The system is designed by using Raspberry Pi (ARM11) for fast access to accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. Images captured by the camera on the vehicle are emailed to the concerned person (for

example the owner of the vehicle) along with the type of accident and the time of the accident. [3].

Sri Krishna ChaitanyaVarma et al., proposed an Automatic Vehicle Accident Detection and Messaging System Using GPS and GSM Modems. AT89C52 microcontroller is used in the system. When the system is switched on, LED is ON indicating that power is supplied to the circuit. When the IR sensors that are used sense any obstacle, they send interrupt to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information is sent to a mobile number as a message. This message is received using GSM modem present in the circuit. The message gives the information of longitude and latitude values. Using these values the position of the vehicle can be estimated [4].

Apurva Mane et al., described the methods for vehicle collision detection and remote alarm device using Arduino. Key features of this design include real-time vehicle monitoring by sending its information regarding position (longitude, latitude), time, and angle to the monitoring station and to the user/owners mobile that should help them to get medical help if accident or the theft occurs. Also user/owner has an access to get real- time position of a vehicle in real time. Whenever accident occurs MEMS and vibration sensor detects and sends the signals to microcontroller, by using GPS particular locations where accident has occurred is found, then GSM sends message to authorized members[5].

Prof. Mrs. Bhagya Lakshmi V et al. proposed a FPGA Based Vehicle Tracking and Accident Warning system using GPS. FPGA is mainly used to track position of any vehicle and send automated message to pre-programmed number. The owner of vehicle, police to clear traffic, ambulance to save people can be informed by this device. FPGA controls and co-ordinate all parts used in system. With the help of accelerometer sensor, the exact position of the vehicle can be detected. It can also be predicted whether the vehicle is in normal position or upside down [6].

III. PROBLEM DEFINITION

In this continues world, day by day several cars are invented and being employed by each individual. As a result of an oversized variety of cars, traffic will also increase and rash driving of cars will also increase. In results of that scenario, accidental condition also increases rapidly. By analyzing a number of the accidental reports most of the accidents occur as a result of rash driving of the car by alcoholic drunk driver. In accident detection construct to assume regarding one full proof system that can't be plagued by accident, associate additionally detects accidental condition by analysing car position and use location instrument to provide data regarding the location where an accident has occurred. For sending that data to health aid centre or emergency service supplier, van needed communicating media.

IV. IMPLEMENTATION

The main aim of the project Accident Detection and Messaging System is to inform the Ambulance and Police of the accident site and arrange for necessary steps to control the situation. This system is not only efficient but also worthy to be implemented. . The Accident Detection and Messaging System can be fitted in the vehicle (Ambulance or the Police) and they are informed about any such untoward incident at the go.

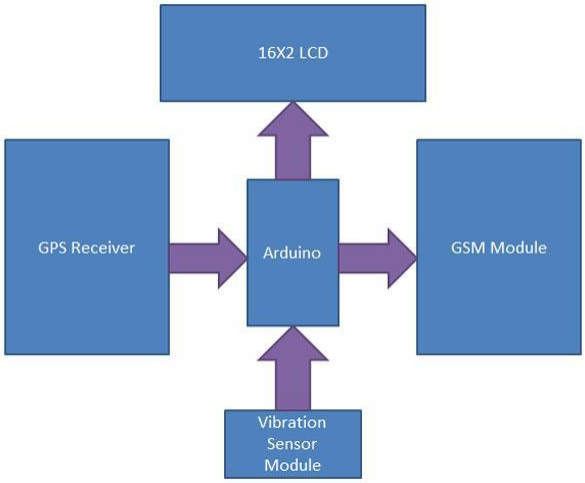


Figure 1. Block Diagram

Accident Detection and Messaging System execution is simple as the system makes use of GSM and GPS technologies. GPS is used for taking the coordinates of the site of the accident while GSM is used for sending the coordinates to cell phones. To make this process all the controls are made using Arduino whereas a LCD is used to display the coordinates.

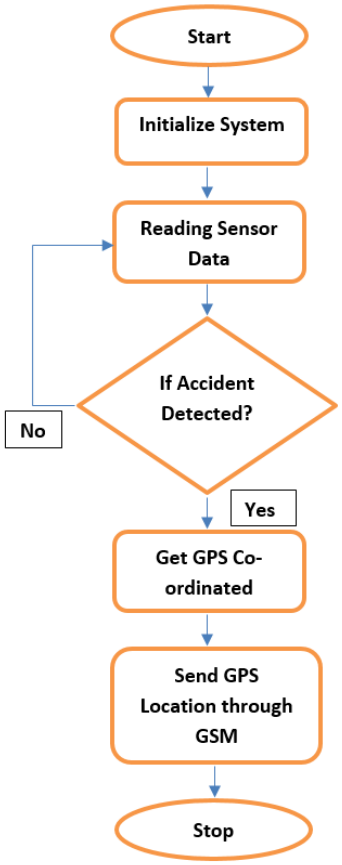


Figure 2. System Flow

Accident Detection and Messaging System is easy and the components used are Vibration Sensor, which detects the accident and in turn sends the signals to Arduino. At this point the Arduino takes control and starts collecting the coordinates received from the GPS which are later sent to the Central Emergency Monitoring Station by using the GSM Module.

V. CONCLUSION

Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions. Authors are strongly encouraged not to call out multiple figures or tables in the conclusion—these should be referenced in the body of the paper.

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Credit Card Fraud Detection Using Machine Learning

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ABSTRACT

Credit card fraud is a serious problem in financial services. Billions of dollars are lost due to credit card fraud every year. There is a lack of research studies on analyzing real-world credit card data owing to confidentiality issues. In this paper, machine learning algorithms are used to detect credit card fraud. Standard models are firstly used. Then, hybrid methods which use AdaBoost and majority voting methods are applied. To evaluate the model efficacy, a publicly available credit card data set is used. Then, a real-world credit card data set from a financial institution is analyzed. In addition, noise is added to the data samples to further assess the robustness of the algorithms. The experimental results positively indicate that the majority voting method achieves good accuracy rates in detecting fraud cases in credit cards.

Keywords : Data Security, Credit card fraud detection, Network Security

I. INTRODUCTION

1.1 Objective

Fraud is a wrongful or criminal deception aimed to bring financial or personal gain. In avoiding loss from fraud, two mechanisms can be used: fraud prevention and fraud detection. Fraud prevention is a proactive method, where it stops fraud from happening in the first place. On the other hand, fraud detection is needed when a fraudulent transaction is attempted by a fraudster.

1.2 Over View

Credit card fraud is concerned with the illegal use of credit card information for purchases. Credit card transactions can be accomplished either physically or digitally. In physical transactions, the credit card is involved during the transactions. In digital transactions, this can happen over the telephone or the internet. Cardholders typically provide the card number, expiry date, and card verification number through telephone or website.

II. RELATED WORKS

2.1 A cost-sensitive decision tree approach for fraud detection

With the developments in the information technology, fraud is spreading all over the world, resulting in huge financial losses. Though fraud prevention mechanisms such as CHIP&PIN are developed for credit card systems, these mechanisms do not prevent the most common fraud types such as

fraudulent credit card usages over virtual POS (Point Of Sale) terminals or mail orders so called online credit card fraud. As a result, fraud detection becomes the essential tool and probably the best way to stop such fraud types. In this study, a new cost-sensitive decision tree approach which minimizes the sum of misclassification costs while selecting the splitting attribute at each non-terminal node is developed and the performance of this approach is compared with the well-known traditional classification models on a real world credit card data set. In this approach, misclassification costs are taken as varying. The results show that this cost-sensitive decision tree algorithm outperforms the existing well-known methods on the given problem set with respect to the well-known performance metrics such as accuracy and true positive rate, but also a newly defined cost-sensitive metric specific to credit card fraud detection domain. Accordingly, financial losses due to fraudulent transactions can be decreased more by the implementation of this approach in fraud detection systems.

2.2 A survey of machine-learning and nature-inspired based credit card fraud detection techniques

Credit card is one of the popular modes of payment for electronic transactions in many developed and developing countries. Invention of credit cards has made online transactions seamless, easier, comfortable and convenient. However, it has also provided new fraud opportunities for criminals, and in turn, increased fraud rate. The global impact of credit card fraud is alarming, millions of US dollars have been lost by many companies and individuals. Furthermore, cybercriminals are innovating sophisticated techniques on a regular basis, hence, there is an urgent task to develop improved and dynamic techniques capable of adapting to rapidly evolving fraudulent patterns. Achieving this task is very challenging, primarily due to the dynamic nature of fraud and also due to lack of dataset for researchers. This paper presents a review of improved credit card fraud detection techniques. Precisely, this paper focused on recent Machine Learning based and Nature Inspired based credit card fraud detection techniques proposed in literature. This paper provides a picture of recent trend in credit card fraud detection. Moreover, this review outlines some limitations and contributions of existing credit card fraud detection techniques, it also provides necessary background information for researchers in this domain. Additionally, this review serves as a guide and stepping stone for financial institutions and individuals seeking for new and effective credit card fraud detection techniques.

2.3 Credit Card Fraud Detection Using Hidden Markov Model

Due to a rapid advancement in the electronic commerce technology, the use of credit cards has dramatically increased. As credit card becomes the most popular mode of payment for both online as well as regular purchase, cases of fraud associated with it are also rising. In this paper, we model the sequence of operations in credit card transaction processing using a hidden Markov model (HMM) and show how it can be used for the detection of frauds. An HMM is initially trained with the normal behavior of a cardholder. If an incoming credit card transaction is not accepted by the trained HMM with sufficiently high probability, it is considered to be fraudulent. At the same time, we try to ensure that genuine transactions are not rejected. We present detailed experimental results to show the effectiveness of our approach and compare it with other techniques available in the literature.

2.4 Real Time Credit Card Fraud Detection using Computational Intelligence

Online banking and e-commerce have been experiencing rapid growth over the past few years and show tremendous promise of growth even in the future. This has made it easier for fraudsters to

indulge in new and abstruse ways of committing credit card fraud over the Internet. This paper focuses on real-time fraud detection and presents a new and innovative approach in understanding spending patterns to decipher potential fraud cases. It makes use of Self Organization Map to decipher, filter and analyze customer behavior for detection of fraud.

2.5 Data mining for credit card fraud: A comparative study

Credit card fraud is a serious and growing problem. While predictive models for credit card fraud detection are in active use in practice, reported studies on the use of data mining approaches for credit card fraud detection are relatively few, possibly due to the lack of available data for research. This paper evaluates two advanced data mining approaches, support vector machines and random forests, together with the well-known logistic regression, as part of an attempt to better detect (and thus control and prosecute) credit card fraud. The study is based on real-life data of transactions from an international credit card operation.

2.6 A novel model for credit card fraud detection using Artificial Immune Systems

The amount of online transactions is growing these days to a large number. A big portion of these transactions contains credit card transactions. The growth of online fraud, on the other hand, is notable, which is generally a result of ease of access to edge technology for everyone. There has been research done on many models and methods for credit card fraud prevention and detection.

Artificial Immune Systems is one of them. However, organizations need accuracy along with speed in the fraud detection systems, which is not completely gained yet. In this paper we address credit card fraud detection using Artificial Immune Systems (AIS), and introduce a new model called AIS-based Fraud Detection Model (AFDM). We will use an immune system inspired algorithm (AIRS) and improve it for fraud detection. We increase the accuracy up to 25%, reduce the cost up to 85%, and decrease system response time up to 40% compared to the base algorithm.

III. EXISTING SYSTEM

With the rise of e-commerce in the past decade, the use of credit cards has increased dramatically. The number of credit card transactions in 2011 in Malaysia were at about 320 million, and increased in 2015 to about 360 million. Along with the rise of credit card usage, the number of fraud cases have been constantly increased. While numerous authorization techniques have been in place, credit card fraud cases have not hindered effectively. Fraudsters favour the internet as their identity and location are hidden. The rise in credit card fraud has a big impact on the financial industry. The global credit card fraud in 2015 reached to a staggering USD $21.84 billion.

IV. PROPOSED SYSTEM

Association rules are utilized for extracting behavior patterns for credit card fraud cases. The data set focused on retail companies in Chile. Data samples were defuzzied and processed using the Fuzzy Query 2+ data mining tool. The resulting output reduced excessive number of rules, which simplified the task of fraud analysts. To improve the detection of credit card fraud cases, a solution was proposed. A data set from a Turkish bank was used. Each transaction was rated as fraudulent or otherwise. The misclassification rates were reduced by using the Genetic Algorithm (GA) and scatter search. The

proposed method doubled the performance, as compared with previous results

V. SYSTEM IMPLEMENTATION

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

5.1 Types of tests

- **Unit testing**

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

- **Integration *testing***

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components

- **Functional test**

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes, and successive processes must be considered for testing. Before functional testing is complete, additional tests are identified and the effective value of current tests is determined.

- **System Test**

System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

- **White Box Testing**

White Box Testing is a testing in which in which the software tester has knowledge of the inner workings, structure and language of the software, or at least its purpose. It is purpose. It is used to test areas that cannot be reached from a black box level.

- **Black Box Testing**

Black Box Testing is testing the software without any knowledge of the inner workings, structure or language of the module being tested. Black box tests, as most other kinds of tests, must be written from a definitive source document, such as specification or

requirements document, such as specification or requirements document. It is a testing in which the software under test is treated, as a black box. You cannot "see" into it. The test provides inputs and responds to outputs without considering how the software works.

VI. ADVANTAGE AND DISADVANTAGE

6.1 Advantage

They are evaluated using both benchmark and real-world credit card data sets. In addition, the AdaBoost and majority voting methods are applied for forming hybrid models. To further evaluate the robustness and reliability of the models, noise is added to the real-world data set. The key contribution of this paper is the evaluation of a variety of machine learning models with a real-world credit card data set for fraud detection. While other researchers have used various methods on publicly available data sets, the data set used in this paper are extracted from actual credit card transaction information over three months.

6.2 Disadvantage

Credit card fraud is concerned with the illegal use of credit card information for purchases. Credit card transactions can be accomplished either physically or digitally. In physical transactions, the credit card is involved during the transactions. In digital transactions, this can happen over the telephone or the internet. Cardholders typically provide the card number, expiry date, and card verification number through telephone or website.

VII. CONCLUSION AND FUTURE SCOPE

Conclusion

A study on credit card fraud detection using machine learning algorithms has been presented in this paper. A number of standard models which include NB, SVM, and DL have been used in the empirical evaluation. A publicly available credit card data set has been used for evaluation using individual (standard) models and hybrid models using AdaBoost and majority voting combination methods. The MCC metric has been adopted as a performance measure, as it takes into account the true and false positive and negative predicted outcomes. The best MCC score is 0.823, achieved using majority voting. A real credit card data set from a financial institution has also been used for evaluation. The same individual and hybrid models have been employed. A perfect MCC score of 1 has been achieved using AdaBoost and majority voting methods. To further evaluate the hybrid models, noise from 10% to 30% has been added into the data samples. The majority voting method has yielded the best MCC score of 0.942 for 30% noise added to the data set. This shows that the majority voting method is stable in performance in the presence of noise.

Future Scope

For future work, the methods studied in this paper will be extended to online learning models. In addition, other online learning models will be investigated. The use of online learning will enable rapid detection of fraud cases, potentially in real-time. This in turn will help detect and prevent fraudulent transactions before they take place, which will reduce the number of losses incurred every day in the financial sector.

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Answer Sheet Evaluation using AI

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ABSTRACT

A lot of software's automating several tasks is coming live each and every day. A variety of improvements have been peeping out in almost every domain that we witness day in and day out. By accentuating the present education system, a lot of technical enhancements have not been brought into action. For instance, consider a typical student's life who gives exams in regular intervals and waits for the results to be out. In spite of a having a hard day by educating so many individuals in class, a teacher has to find time to corrects the answers and submit the report back on time. If the student count is more in a class, the validation process will literally eat up more time which in the end turns out to be a huge complication. Now if a software that could automate the evaluation process comes into play, it brings in two major differences, that is, the student need not wait for the results to be out for a long span and the teacher need not find time to evaluate and validate the answers. Moreover, the bias of being partial will also be broken and the student will be awarded with the marks for what he/she has written. This project aims at creating a digitalized platform to evaluate answer sheets and allocate marks to the answers, leading to the end of paper pen culture for correction. By doing so, a lot of time spent on evaluation and marks allocation can be cut down which in the end saves an ample amount of time.

Keywords - Optical Character Recognition, Answer sheets, Keyword selection, Evaluation, Artificial Intelligence, Keywords matching.

I. INTRODUCTION

Answer Sheet Evaluation is a digital platform that would enable us to evaluate answer sheet, validate the answers, which again is carried out as an online process saving a lot of time. OCR (Optical Character Recognition) is a machine's ability of detecting and extracting handwritten text from notes, letters, essays, whiteboards, forms, and other sources. Reduce paper, pen culture and be more productive by taking photos of handwritten answers instead of transcribing them, and make the digital notes easy to find by implementing search. Handwritten OCR works with different surfaces and backgrounds, such as white paper, yellow sticky notes, and whiteboards. The staff uploads the image of an answer sheet. Once the image is uploaded, the staff panel is checked and the image uploaded is verified.

Our main aim is to provide a system for grading of handwritten answers sheets as a digital platform based on content and style of writing by focusing on the usage of keywords.

II. LITERATURE SURVEY

"Automatic Answer Sheet Checker", an automating the task of scoring subjective answer is considered. The goal is to assign score, which are comparable to those of human score by coupling AI technologies. In

this process involves many image level operation i.e. removal of pre-printed matter, extraction and segmentation of words. Scoring is based on machine learning of parameter and natural language processing. System checks answer and score as good as human being.

"*Question Paper Generator and Answer Verifier",* **e**xams are being digitized all over the world. Meaning that the certain computer is replacing the traditional paper based tests based tests, which have proven to be both more consistent in allocating marks and faster than teacher correcting papers is. The traditional exams usually consisted of subjective answers, which were not the best way of grading the student's perception of the subject. Hence, we are developing a computer-based system that will generate objective based question that will be better suited to grade students academically. The system will generate a question paper and it will grade the student after he/she has solved the question paper. This system will save time as well as the efforts put in by the teachers, which they can spend on activities that are more productive.

"Data Extraction from Exam Answer Sheets using OCR with Adaptive Calibration of Environmental Threshold Parameters", manual Data Collection from a student's exam sheets is always a tedious job which exacts ample amount of time and effort. This paper has suggested a novel approach for developing an automatic, adaptive, fast and reliable system capable of recognizing enrolment number and corresponding marks of student from answer sheet and storing it in the host computer. This system consists a hardware which picks out sheets one by one from a bundle and captures image of the front page of each answer script. This image is processed by proposed robust extraction and noise removal algorithm adaptive to environmental conditions. It is then passed through Optical Character Recognition (OCR) system, which extracts characters using correlation. Accuracy of system depends on the sample space size of OCR system. In our experiment, we have archived average 81 % accuracy in various light and paper (Exam-Sheet) condition. We had trained the OCR with 50 samples of numerals set (0-9). In this way developed system will not only replace the traditional tiring way of manual writing of marks in database but in addition can calculate average marks of all students, ranges of marks for assigning different grade and provide grade for each student automatically.

III. PROPOSED SYSTEM

The project aims at creating a digitalized platform to evaluate answer sheets leading to the end to the paper pen culture. Smart evaluation system is a digital platform that would enable us to evaluate answer sheet, validate the answers which again is carried out as an online process saving a lot of time.

OCR Detect and extract handwritten text from notes, letters, essays, whiteboards, forms, and other sources. Reduce paper clutter and be more productive by taking photos of handwritten notes instead of transcribing them, and make the digital notes easy to find by implementing search. Handwritten OCR works with different surfaces and backgrounds, such as white paper, yellow sticky notes, and whiteboards. In the initial phase, the staffs upload the image of an answer sheet. Once the image is uploaded, the staff panel is checked and the image uploaded is verified. Now we perform optical character recognition to extract the text from the uploaded text. OCR performs removal of Adverbs, supporting verbs, etc., Making Unique keywords from each answer. Intersecting of two sets of keyword.

A. SCORE CALCULATION

(count (Intersecting of staff keywords and student keywords))
/
(unique_keywords_count (student answer))
*
100
=
(P1 || P2 || P3)

B. STEPS

1. Scan the Answer Sheet of the Student.
2. In Staff Panel, Enter the students Register Number and Upload the scanned image then, click submit.
3. In Admin Panel, Click Process OCR to recognize the keywords from the answer sheet.
4. View the Students marks by Clicking Validate.

C. SYSTEM MODULES

- **STAFF PANEL:** The Student answer sheet is scanned and uploaded in the staff panel. On staff view button the evaluated mark for the students will be displayed. The evaluation procedure is based on the keywords. Multiple answer sheets can be validated in a single click by using Process OCR.
- **ADMIN PANEL:** The Process OCR recognize the keywords from the uploaded image and this will evaluate the answer submitted by student with key answer given by subject handling staff. The keywords in the answer sheets are compared with the keywords of three different phrases. The admin panel performs,
  - ✓ Removal of Adverbs, Supporting verbs, etc.,
  - ✓ Making unique keywords from each answer.
  - ✓ Intersecting of two sets of keyword.

D. SYSTEM IMPLEMENTATION

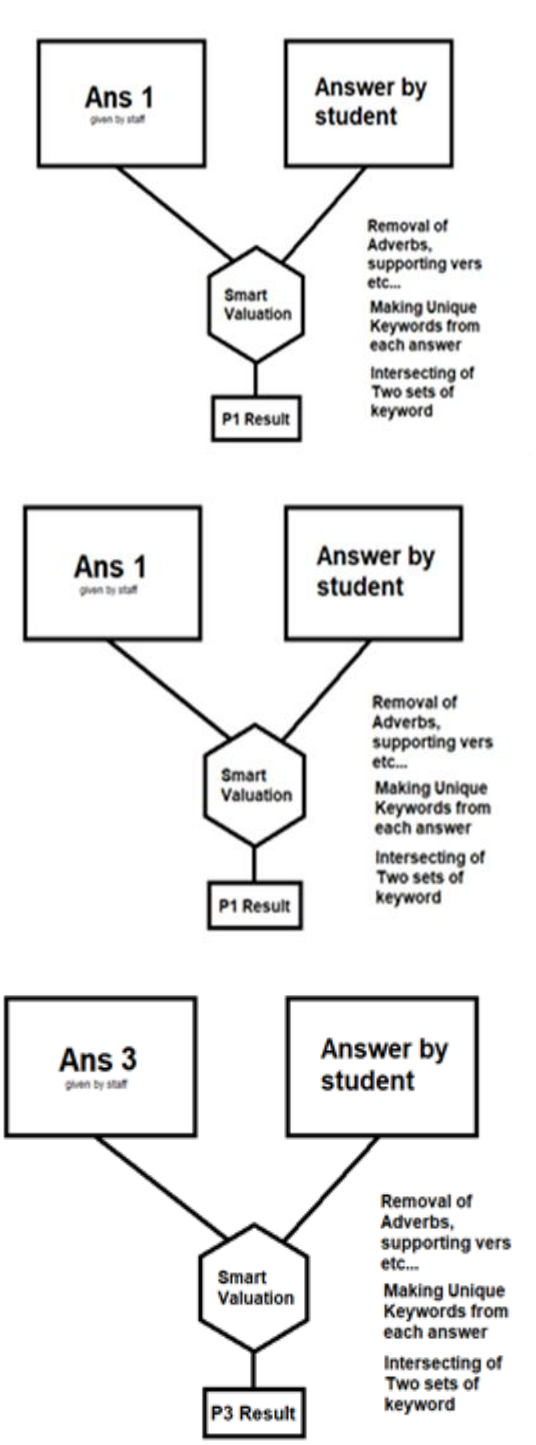


Figure 1. Answer Evaluation

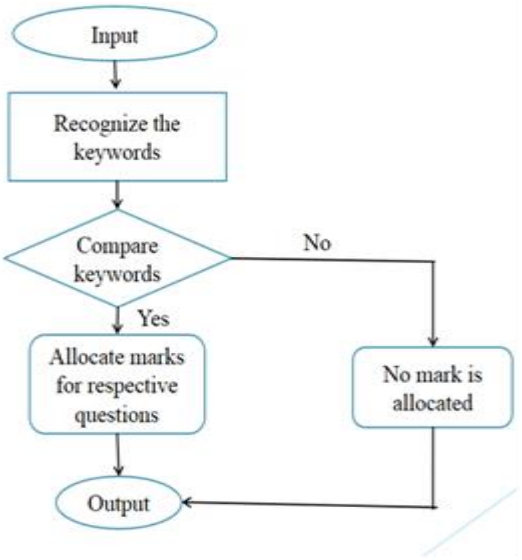


Figure 2. System Implementation

IV. CONCLUSION

Since Answer Sheet Evaluation, system has gain a greater attraction in the field of education, this project proposes an approach to effectively evaluate hand written answer sheets with given marking scheme by subject experts using Optical Character Recognition technique. System is designed to overcome the issues in existing similar systems. Core part of the project was achieved using two methodologies which are keyword extraction and comparison of similarity. Keyword extraction of both student and tutor was done in three steps which were removing adverbs, supporting adverbs, making Unique keywords from each answer, intersecting of two sets of keyword.

V. FUTURE WORK

In the Proposed System, the answer scripts of the student are not stored. In Future, the cloud platform will be used to store them. Various additional modules can be added to the current system, making it even versatile in the way in which the system can accept data that is to be corrected. One example is the addition of a module that would accept voice data from a microphone and correct the same without any human assistance, using the same algorithm.

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Smart Solution for Women Safety Using IOT

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ABSTRACT

Women safety is a very important issue due to rising crimes against women these days. Presently there is indeed no good solution to this problem. The existing applications and devices are not much effective as they need lot of human interaction to operate. These existing devices use to read the human temperature and heartbeat to generate alarm in case of emergency. When a person runs, every human may have different body temperature and heartbeat pattern and thus keeping a fixed threshold for finding out emergency situation and then generating alarm is not correct way and this is where the existing devices are failing to correctly generate alarm in case of emergency. In this paper the device are customized to learn the individual pattern of temperature and heartbeat and then it finds out the threshold for generating alarm. Thus this paper deals to design a wearable women safety device that automatically reads and create patterns such as body temperature and pulse rate during running. If readings are higher than the normal readings then it will automatically call and message more than one person along with the location so that actions can be taken. We have used temperature and pulse sensors that will detect the activity of the woman and that data of sensors will be sent to cloud where machine learning algorithm is applied to analyse the data generated. The data is first collected by sensors in non-danger conditions to train the algorithm, after that data is used for testing to gauge the accuracy and how close it is to our trained data. More is the accuracy more is the surety of danger and the emergency alarm will be there on emergency contacts. Thirdly, this paper deals with scenarios where there is no internet facility. To overcome the problem of internet we have used ZigBee mesh network, which helped the device to send the data to multiple hop distance.

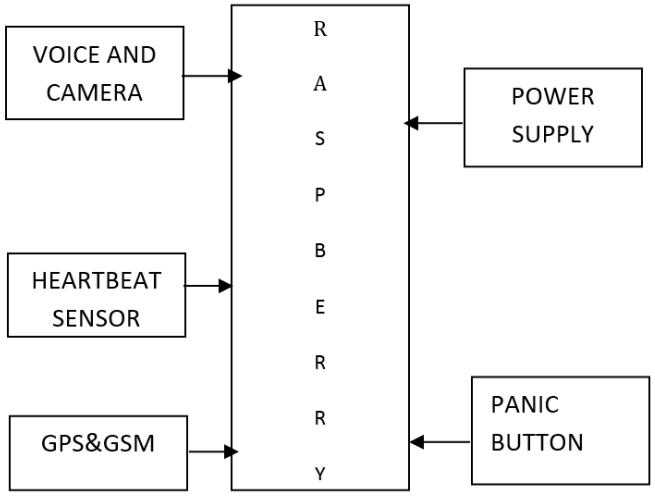
Keywords : IOT, Women Safety, Trained Data, Raspberry Pi, GPS, Zigbee, Charge-Coupled Device, CMOS, FDMA, TDMA

I. INTRODUCTION

Women are still facing unfortunate incidents like molestation, rape, acid attack etc. Many applications and devices are already there in the market but those are ineffective as they need to be manually operated. Since the mental state of the women is affected in danger conditions and sometimes it's not possible to operate them manually. So a solution was required which could eliminate the human effort to operate the device. So we came up with the idea of using machine learning algorithm to detect the danger automatically on the basis of biological changes like temperature change and pulse rate change that occur in human body when it is in danger. So our device contains temperature

and pulse sensors that continuously collect data and send that to cloud for computations. Cloud contains machine learning algorithm (logistic regression) which is trained with the actual data of danger and non-danger conditions and compute the incoming data on the basis of the training given to algorithm. On the basis of prediction done by computations, if danger is there then automatically an emergency alert message and call is sent to emergency contacts along with the location of the victim. This paper deals with scenarios where there is no internet facility. To overcome the problem of internet we have used ZigBee mesh network, which helped the device to send the data to multiple hop distance. By using zigbee mesh network, the proposed device can even work in any remote location where there is no internet.

1.1 Block Diagram



1.2 Literature Survey

[1] IoT based child and women safety:

The proposed system "IoT Based Child And Woman Safety" can be used to locating missing or lost children and also tracking the child movements outside from the home. The system can also be used to locate women who are in danger. We have combined GPS with one of the basic service of a smart phone which is GSM more specifically SMS in one system. Our proposed model contains various sensors which measure different parameters on a regular basis. In case of emergency a message will be sent to parents and/or police, by either pressing the panic button or pronouncing the keyword. The complete system is implemented using Raspberry Pi 3 Model B. Python programming is used interface all the sensors and other hardware.

[2] IoT Based Unified Approach for Women and Children Security Using Wireless and GPS

As the threats for Women and children increasing day by day we are proposing a system that works on the controversy of children and women security using IoT. The proposed system intends to a device wireless technique in the form of embedded device namely Arduino for women that will serve the purpose of alerts and way of communicating with secure channels and it captures the image using electronic camera. So to solve this issue of women safety we develop a wireless sensor kit which is easy to use and which is efficient to provide help to that victim.

[3] Smart security solution for women based on Internet of Things (IoT)

Today in the current global scenario, the prime question in every girl's mind, considering the ever rising increase of issues on women harassment in recent past is mostly about her safety and security. "848 Indian Women Are Harassed, Raped, Killed Every Day!!" That's a way beyond HUGE number! We propose an idea which changes the way everyone thinks about women safety. A day when media broadcasts more of women's achievements rather than harassment, it's a feat achieved! Since we (humans) can't respond aptly in critical situations, the need for a device which automatically senses and rescues the victim is the venture of our idea in this paper.

[4] **Smart girl security system**

Today in the current global scenario, the prime question in every girl's mind, taking into account the ever rising increase of issues on women harassment in recent past, is only about her safety and security. The system resembles a normal belt which when activated, tracks the location of the victim using GPS (Global Positioning System) and sends emergency messages using GSM (Global System for Mobile communication), to three emergency contacts and the police control room. The system also incorporates a screaming alarm that uses real-time clock, to call out for help and also generates an electric shock to injure the attacker for self defense.

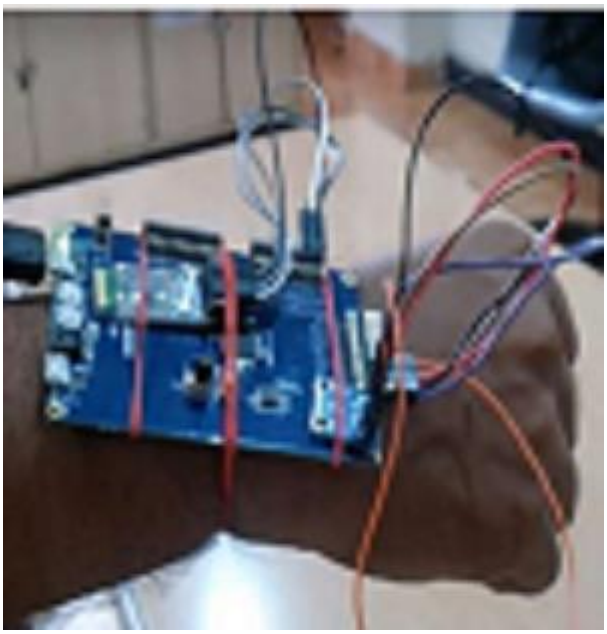
[5] Women safety device with gps, gsm and health monitoring system

In light of the present situation of the metro cities and other big cities, women security has emerged as one of the most important requirements in our country. The device consists of a switch, microcontroller (ATmega328P), GSM module (SIM900), GPS module (Neo6M), buzzer, and pulse sensor (SEN-11574). The main working of this project is that anytime a woman senses danger, all she has to do, is to hold on the button of the device. Once the device is activated, it tracks the place of the women using GPS (Global Positioning System) and sends emergency messages using GSM (Global System for Mobile communication), to already registered mobile number and the police control room. The use of sophisticated components ensures accuracy and makes it reliable.

II. PROPOSED SYSTEM

The proposed system is to design a portable device which resembles a normal belt. When the threshold of the pressure sensor crosses, the device will get activated automatically. Immediately the location of the victim will be tracked with the help of GPS and emergency messages will be sent to three contacts and one to police control room every two minutes with updated location. The screaming alarm unit will be activated and will send out sirens to call out for help. The system is also capable to generate an electric shock to harm the attacker which may help the victim to escape.

2.1 ARCHITECTURE OF PROPOSED SYSTEM



2.1 EXPERIMENT AND SIMULATION SETUP

Camera

A camera module is an image sensor integrated with control electronics and an interface like CSI, Ethernet or plain raw low-voltage differential signaling.A charge-coupled device (CCD) is a device for the movement of electrical charge, usually from within the device to an area where the charge can be manipulated, for example conversion into a digital value. This is achieved by "shifting" the signals between stages within the device one at a time. CCDs move charge between capacitive bins in the device, with the shift allowing for the transfer of charge

between bins.In recent years CCD has become a major technology for digital imaging. In a CCD image sensor, pixels are represented by p-doped MOS capacitors. These capacitors are biased above the threshold for inversion when image acquisition begins, allowing the conversion of incoming photons into electron charges at the semiconductor-oxide interface; the CCD is then used to read out these charges. Although CCDs are not the only technology to allow for light detection, CCD image sensors are widely used in professional, medical, and scientific applications where high-quality image data are required. In applications with less exacting quality demands, such as consumer and professional digital cameras, active pixel sensors (CMOS) are generally used; the large quality advantage CCDs enjoyed early on has narrowed over time.

GPS Module

Global Positioning System (GPS) is able to determine the latitude and longitude of a receiver on Earth by calculating the time difference for signals from various satellites to reach the receiver. In six different orbits approximately 12,500 miles above the earth, 24 MEO (Medium-Earth Orbit) satellites revolve around the earth 24 hours and transmit location every second as well as present time from atomic clocks and by monitoring blood flow through skin when is in contact with the wrist band at each pulse [8]

GSM Modem

GSM is used to send data from control unit to base unit .We can use GSM 300 which operates at frequency 900MHz. It has up link band of 890MHz to 915MHz and down link Band of 935MHz to 960 MHz GSM takes advantages of both FDMA & TDMA. In 25MHz BW, 124 carriers are generated with channel spacing of 200 KHz (FDMA). Each carrier is split into 8 time slots (TDMA). At any given instance of time 992 speech channels are made available in GSM 300 [8].

3. Mathematical Model

Set Theory Analysis:

S be the - Woman and Children safety Application as the

final set

S =identify the inputs as D, Q, E

S = D, Q, E

D = D1 - D given user details

Q = Q1, Q2, Q3 .

Q-gives the bus number which is to be tracked

E= E1, E2, E3 .

E- gives the Button click events

Identify the outputs as O

S = N, C, R

N= N1, N2, N3, N4 - N given Notification

C = C1, C2, C3 . — C gives the Current location

R = R1, R2, R3 — R gives the user details

Identify the functions as F

S = F = F1(), F2(), F3(), F4(), F5(), F6()

F1 (D) :: Get User details

F2 (D) :: Registration

F3 (Q) :: fetch current location

F4 (Q) :: Send current location

F5 (D) :: Send user details

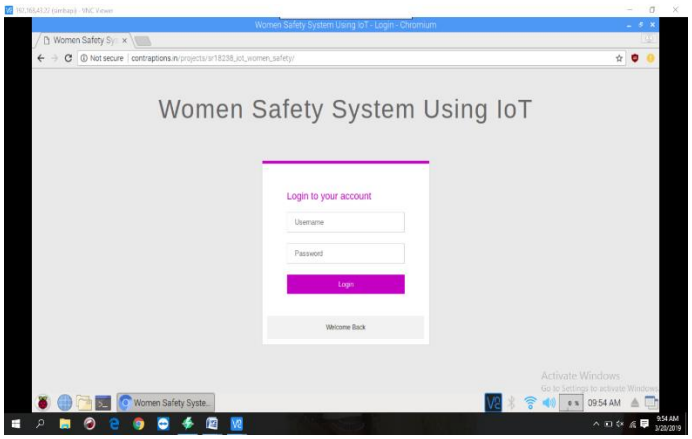
F6(E ,D) :: send notification

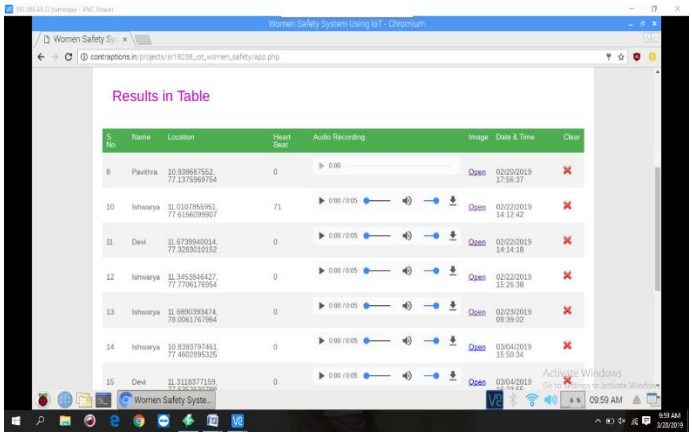
III. FUTURE SCOPE

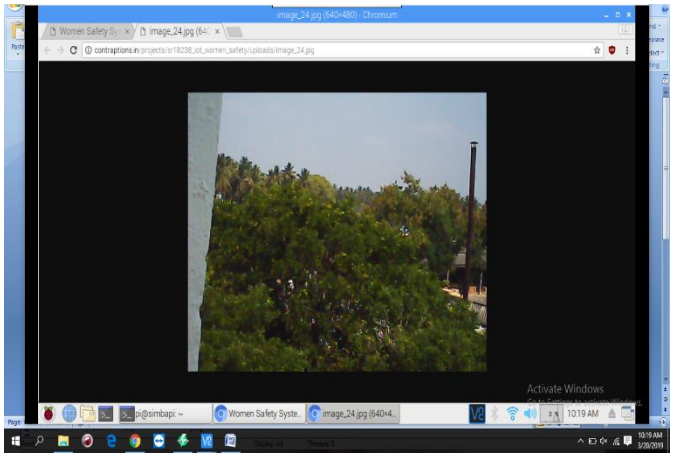
In this paper we have proposed the system for security of women and children. This paper presented a wireless method which will alert and communicate with secure medium. It will also capture image via camera. When the sensor kit button is pressed the camera will capture the image and will collect the information of the user. This information will be sent to the registered phone number along with the image link. This system will

Speed monitoring for children security can also be done by using the GPS tracking mechanism. The bus Unit will locate the bus and all its travelling routes. This system uses Haversine and Trilateration algorithm for tracking the bus. Alert messaging will be done on the registered phone numbers.

IV. RESULT AND ANALYSIS







V. CONCLUSIONS

The proposed system is to ensure the security of the women in the society by providing automatic sensing of threats and send the “HELP & POSITION” to the relatives and the Police Station using Internet of Things. Peace and prosperity lies in the society where women is happy and honored.

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An Efficient Dynamic Multi-Keyword over Encrypted Cloud Storage

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ABSTRACT

The approach of disseminated figuring, data proprietors are awakened to outsource their psyche boggling data organization systems from neighborhood goals to business open cloud for exceptional versatility and financial hold reserves. In any case, for guaranteeing data assurance, unstable data must be encoded before outsourcing, which obsoletes ordinary data use in perspective of plain text keyword look. In this way, engaging an encoded cloud data look for organization is of focal importance. Considering the broad number of data customers and reports in cloud, it is basic for the chase organization to allow multi-keyword question and give result similarity situating to meet the convincing data recuperation require. Related tackles searchable encryption focus on single keyword request or Boolean keyword look for, and on occasion isolate the question things. In this paper, curiously, we describe and handle the testing issue of assurance sparing multi-keyword situated investigate encoded cloud data (MRSE), and set up a game plan of strict insurance necessities for such a sheltered cloud data utilize system to wind up unmistakably a reality. Among various multi-keyword semantics, we pick the capable run of "organize planning", i.e., whatever number matches as could sensibly be normal, to get the similarity between interest request and data chronicles, and further use "inner thing likeness" to quantitatively formalize such rule for closeness estimation. We initially propose a central MRSE plot using secure inward thing figuring, and after that through and through upgrade it to meet differing insurance necessities in two levels of hazard models. Concentrated examination investigating security and adequacy confirmations of proposed arrangements is given, and examinations on this present reality dataset also show proposed plots without a doubt introduce low overhead on computation and correspondence.

Keywords : Cloud computing, Encryption, Inner product similarity, Single Keyword Search, Multi-keyword search, ranking.

I. INTRODUCTION

Online interpersonal organizations (OSNs) are most prominent and it is the motivation behind why a large number of clients gets to Internet. By this interpersonal organizations clients are share their data between the companions effectively. On-request figuring is a sort of Internet-based registering that gives the information, assets and additionally data to PCs and different gadgets. Data is put away and in addition prepared by outsider server farms and the distributed computing and also stockpiling arrangements given to associations and clients with various abilities. Base of distributed computing is a

huge idea of united framework and shared administrations and it is based over dispersion of assets to acquire consistency and economies of scale, same to an administration on a system.

Inside information systems, singular administration providers store private individual data of particular information proprietors. All the data sharing is expert in the perception of solid get to control rules. These information systems have the accompanying essential capacities:

- Contributors together not believe each other in different area
- Have obligation of offering protection to proprietors
- It is critical to share data between suppliers from an application point of view.

In information Networks, information proprietors are allowed to store their documents on number of appropriated servers. It gives administrations to its clients to store and also get to their data in and from number of server frame anyplace and furthermore by any gadget. Giving successful inquiry over circulated documents and moreover give the security to proprietors records it is an exceptionally troublesome assignment. In existing framework a procedure used to take care of this issue called protection safeguarding ordering. The essential goal of PPI is to bolster a worldwide pursuit office which is controlled by an outsider substance. The design of PPI is appropriate for the suppliers, for example, whole get to control over individual records and secures their protection.

PPI [1] is a catalog benefit accessible inside an open cloud. Open cloud has control over various private servers. The data put away over number of private servers by disseminated way. This framework grants diverse clients for discovering documents over conveyed information. For looking proper documents client give a question along related keywords to the PPI [1] [3] server. From that point forward, this open server return gives a rundown of private servers inside the system.

At that point client gets to the private server shown in applicant list and after that client asking for confirmation before looking locally there. In this framework, data put away in plain content way on private server, along these lines client can scan straightforwardly for required records. Yet, security of information is basic; along these lines, in the proposed frameworks, information is put away in scrambled way over private servers. In this manner client needs to verify and after validation, client approaches encoded records from private server. In the wake of acquiring scrambled documents, unscrambling of records are finished by using the KDC. In cryptography, a key conveyance focus (KDC) is a part of a cryptosystem anticipated that would decrease the risks natural in exchanging keys. KDCs consistently work in structures inside which customers may have agreed to use certain administrations at a few times and not at others. KDC give a key to approved clients for decode the documents. When original documents are amassed, then framework executes TF-IDF positioning over records, to acquire best results in positioning arrangement.

II. PROBLEM STATEMENT

Quite number of on-demand data customers and tremendous measure of data documents in the cloud, this inconvenience is trying. It is major for the chase office to permit multi keyword look question and make open result connection situating to see the practical data recuperation essential. To develop the

question yield exactness and notwithstanding improve the customer looking foundation, it is furthermore major for such situating structure to support numerous keywords chase, as single keyword request as often as possible yields exceptional coarse results. The searchable encryption method support to give encoded data urges a customer to steadfastly investigate single keyword and recuperate files of concern.

III. LITERATURE SURVEY

Qin Liu et al. proposed Secure and assurance sparing keyword look for in [1]. It gives keyword insurance, data assurance and semantic secure by open key encryption. The guideline issue of this chase is that the correspondence and computational cost of encryption and unscrambling is more.

Ming Li et al. proposed Authorized Private keyword Search (APKS) in [2]. It gives keyword security, Index and Query Privacy, Fine-grained Search Authorization and Revocation, Multi-dimensional Keyword Search, Scalability and Efficiency. This interest procedure manufactures the chase efficiency using quality chain of significance however before long every one of the attributes are not different levelled.

Cong Wang et al in [3] proposed Secure and Efficient Ranked Keyword Search which lights up get ready overhead, data and keyword insurance, minimum correspondence and figuring overhead. It is not useful for various keyword missions, Also there is a modest piece of overhead in record building.

Kui Ren et al. [4] proposed Secured cushioned keyword look for with symmetric searchable encryption (SSE). It doesn't reinforce soft interest with open key based searchable encryption, furthermore it can't play out numerous keywords semantic chase. The redesigns for feathery searchable document are not capably performed.

Ming Li et al. [5] proposed Privacy ensured searchable distributed storage technique. It is executed using SSE, Scalar-Product-Preserving Encryption and Order-Preserving Symmetric Encryption. It reinforces the security and utilitarian essentials. This arrangement does not reinforce open key based searchable encryption.

Wei Zhou et al. [6] proposed K-gram based feathery keyword Ranked Search. In this proprietor make k-gram soft keyword petition for records D and tuple <I, D> is exchanged to request server (SS) which is implanted to grow channel for size controlling. The mixed record D is exchanged to limit server. In any case, the issue is that, the measure of the k-gram develop cushioned keyword set depends in light of the jacquard coefficient regard.

J. Baek et al. in [7] proposed Secure Channel Free Public Key Encryption with Keyword Search (SCF-PEKS) system. In these methodology bundle servers makes its own particular open and private key join however this procedure encounters outside attacker by KGA.

H. S. Rhee et al. [8] proposed Trapdoor in recognisability Public-Key Encryption with Keyword Search (IND-PEKS). In this outsourcing is done as SCF-PEKS. It encounters outside assailant using KGA and separating the repeat of occasion of keyword trapdoor.

Peng Xu et al. [9] proposed Public-Key Encryption PEFKS with Fuzzy Keyword Search, in this customer makes feathery keyword trapdoor Tw and right keyword trapdoor Kw for W. Customer requests Tw

to CS. By then CS checks Tw with soft keyword document and sends superset of organizing figure messages by Fuzz Test estimation that is executed by CS. The customer strategy Exact Test counts for checking figure works with Kw and recoup the encoded records. The route toward making cushioned keyword document and right keyword rundown is troublesome for immense size database.

Ning et al. [10] proposed Privacy Preserving Multi Keyword Ranked Search (MRSE). It is useful for known figure content model and establishment exhibit over mixed data. It gives low computation and correspondence overhead. The office planning is decided for multi-keyword looks for. The drawback is that MRSE have minimal standard deviation which decreases the keyword security.

IV. PROPOSED SOLUTION

We propose a powerful framework where any approved client can do a pursuit on scrambled information with multiple keywords, without uncovering the keywords he looks for, nor the information of the records that match by the question. Approved clients can make seek forms by distinct keywords on the cloud to recover the pertinent reports. Our proposition framework encourages that a gathering of clients can inquiry the database gave that they have purported trapdoors for the hunt terms that approve the clients to incorporate them in their inquiries. Our proposed framework can play out multiple keyword hunts in a solitary question and positions the outcomes so the client can recover just the most important matches in a requested way. Also, we build up an arrangement of strict protection prerequisites. Among various multi keyword semantics, we select the viable rule of "organize coordinating".

V. SYSTEM OVERVIEW

The framework engineering is worried by making a straightforward auxiliary structure for a framework. It characterizes the general edge of the venture which quickly depicts the working of the structure and the motivation behind the venture stage is to arrange an answer of the issue distinguished by the need document. The underneath Figure 1 demonstrates the framework of the structure. We consider three sections in our framework engineering: Data Owner, Data client and Cloud Server.

- Data Owner is in charge of the making of the database.
- Data Users are the devotees in a gathering who can utilize the documents of the database.
- Cloud Server bargains information offices to confirmed clients. It is fundamental that server be torpid to substance of the database it keeps.

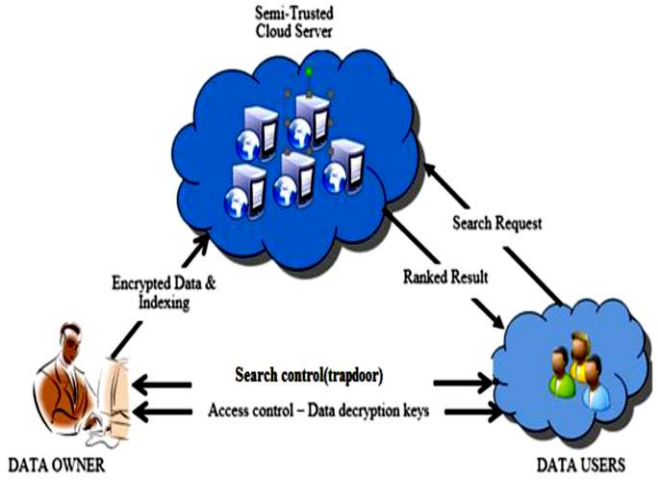


Fig 1: Search over Encrypted Cloud

Information proprietor has measure of information records that he wishes to outsource on cloud server in blended edge. Before outsourcing, information proprietor will at first collect a protected searchable record from a game-plan of shifting keywords removed from the report amassing and store both the

once-over and the encoded document on the cloud server. We attempt the guaranteeing between the information proprietor and clients are finished. To scan the record gathering for a given keyword, ensured client makes and shows a demand in a mystery packaging a trapdoor of the keyword to the cloud server. In the wake of getting the pursuit ask for, the server is in control to search for the record and give back the arranging strategy of reports to the client. We think the guaranteed arranged keyword look dangerous as takes after: the question yield must be returned obliging clear arranged importance standards, to make record recovery accuracy for clients. Regardless, cloud server must review dim or irrelevant about the essential rules themselves as they uncover basic touchy information against keyword protection. To rot trade speed, the client may send conceivable respect k adjacent the trapdoor and cloud server just sends back the top-k most fitting documents to the client's concerned keyword. Plot Goals: To permit arranged yield for expert utilization of outsourced cloud information under the effectively indicated appear, our framework setup ought to quickly complete security and execution validations as takes after.

Multi-keyword Ranked Search: To configuration search for game plans which permit multi-keyword question and give result closeness arranging to productive information recovery, rather than returning undifferentiated outcomes.

Protection Preserving: To shield the cloud server from taking in extra information from the dataset and the record, and to meet security.

Feasibility: Above objectives on support and security ought to be master with low correspondence and estimation overhead. Engineer Matching: "Create arranging" [2] is a broadly engaging resemblance measure which utilizes the measure of question keywords showing up in the response to survey the criticalness of that narrative to the demand. Precisely when clients perceive the correct subset of the dataset to be recuperated, Boolean ask for complete well with the correct pursue require conveyed by the client. It is more versatile for clients to see an outline of keywords displaying their anxiety and recover the most basic reports with a rank request.

VI. METHODOLOGY

A. Stemming:

In phonetic morphology and data recovery, stemming is the way toward decreasing bent (or once in a while determined) words to their pledge stem, base or root shape—for the most part a composed word frame. The stem require not be indistinguishable to the morphological foundation of the word; it is generally adequate that related words guide to a similar stem, regardless of the possibility that this stem is not in itself a substantial root. Calculations for stemming have been considered in software engineering since the 1960s. Many web indexes treat words with an indistinguishable originate from equivalent words as a sort of question extension, a procedure called conflation. Stemming projects are regularly alluded to as stemming calculations or stemmers.

A stemmer for English, for example, should identify the string "cats" (and possibly "catlike", "catty" etc.) as based on the root "cat", and "stems", "stemmer", "stemming", "stemmed" as based on "stem". A stemming algorithm reduces the words "fishing", "fished", and "fisher" to the root word, "fish". On the other hand, "argue", "argued", "argues", "arguing", and "argus" reduce to the stem "argu" (illustrating the case where the stem is not itself a word or root) but "argument" and "arguments" reduce to the stem "argument".

B. Suffix-stripping algorithms:

Suffix-stripping algorithms don't depend on a query table that comprises of curved structures and root frame relations. Rather, a commonly littler rundown of "tenets" is put away which gives a way to the calculation, given an information word shape, to discover its root frame. A few cases of the principles include:

- if the word ends in 'ed', remove the 'ed'
- if the word ends in 'ing', remove the 'ing'
- if the word ends in 'ly', remove the 'ly'

Addition stripping approaches appreciate the advantage of being considerably easier to keep up than savage constrain calculations, accepting the maintainer is adequately educated in the difficulties of etymology and morphology and encoding postfix stripping rules. Addition stripping calculations are here and there viewed as unrefined given the poor execution when managing remarkable relations (like "ran" and 'run'). The arrangements delivered by postfix stripping calculations are restricted to those lexical classes which have surely understood additions with couple of special cases. This, notwithstanding, is an issue, as not all parts of discourse have such an all-around planned arrangement of standards. Lemmatization endeavors to enhance this test.

C. Stop-Words:

In registering, stop words will be words which are sifted through before or subsequent to handling of normal dialect information (text).Though stop words more often than not allude to the most widely recognized words in a dialect, there is no single all inclusive rundown of stop words utilized by all common dialect preparing apparatuses, and in fact not all devices even utilize such a rundown. A few apparatuses particularly abstain from evacuating these stop words to bolster state seek.

Any gathering of words can be picked as the stop words for a given reason. For some web crawlers, these are the absolute most normal, short capacity words, for example, the, is, at, which, and on. For this situation, stop words can bring about issues when scanning for expressions that incorporate them, especially in names, for example, "The Who", "The", or "Take That". Other web crawlers expel the absolute most normal words—including lexical words, for example, "need"— from an inquiry with a specific end goal to enhance execution.

Hans Peter Luhn, one of the pioneers in data recovery, is credited with begetting the saying and utilizing the idea. The expression "stop word", which is not in Luhn's 1959 introduction, and the related terms "stop rundown" and "stoplist" show up in the writing in the blink of an eye a short time later.

A forerunner idea was utilized as a part of making a few concordances. For instance, the principal Hebrew concordance, Meir local, contained a one-page rundown of unindexed words, with no substantive relational words and conjunctions which are like present day stop words.

D. TF-IDF

TF-IDF remains for term recurrence opposite archive recurrence, and the TF-IDF weight is a weight regularly utilized as a part of data recovery and content mining. This weight is a factual measure used to assess how critical a word is to a record in an accumulation or corpus. The significance builds relatively to the quantity of times a word shows up in the archive yet is balanced by the recurrence of the word in the corpus. Varieties of the TF-IDF weighting plan are regularly utilized via web search tools as a focal apparatus in scoring and positioning an archive's importance given a client inquiry.

One of the least difficult positioning capacities is figured by summing the TF-IDF for each question term; numerous more complex positioning capacities are variations of this straightforward model.

TF-IDF can be effectively utilized for stop-words separating in different subject fields including content outline and characterization.

Commonly, the tf-idf weight is formed by two terms: the principal processes the standardized Term Frequency (TF), otherwise known as. The quantity of times a word shows up in a report, isolated by the aggregate number of words in that archive; the second term is the Inverse Document Frequency (IDF), processed as the logarithm of the quantity of the records in the corpus partitioned by the quantity of records where the particular term shows up.

TF: Term Frequency, which measures how much of the time a term, happens in a report. Since each record is distinctive long, it is conceivable that a term would seem significantly more circumstances in long reports than shorter ones. Along these lines, the term recurrence is regularly separated by the report length (otherwise known as. the aggregate number of terms in the record) as a method for standardization:

TF (t) = (Number of times term t appears in a document) / (Total number of terms in the document).

IDF: Inverse Document Frequency, which measures how important a term is. While computing TF, all terms are considered equally important. However it is known that certain terms, such as "is", "of", and "that", may appear a lot of times but have little importance. Thus we need to weigh down the frequent terms while scale up the rare ones, by computing the following:

IDF (t) = log_e (Total number of documents / Number of documents with term t in it).

E. Build Index Tree

Input: the document collection F = ff1, f2... fn g with the identifiers FID = {FID—FID = 1, 2... n}.

Output: the index tree T

1. for each document fFID in F do
2. Construct a leaf node u for fFID,
3. Insert u to CurrentNodeSet;
4. end for
5. while the number of nodes in CurrentNodeSet is larger than 1 do
6. if the number of nodes in CurrentNodeSet is even, i.e. 2h then
7. for each pair of nodes u0 and u00 in CurrentNodeSet do
8. Generate a parent node u for u0 and u00 ,
9. Insert u to TempNodeSet;
10. end for
11. else
12. for each pair of nodes u0 and u00 of the former (2h 2) nodes in CurrentNodeSet do
13. Generate a parent node u for u0 and u00 ;
14. Insert u to TempNodeSet;
15. end for
16. Create a parent node u1 for the (2h - 1)-th and 2h-th node, and then create a parent node u for u1 and the (2h + 1)-th node;
17. Insert u to TempNodeSet;
18. end if
19. Replace CurrentNodeSet with TempNodeSet and then clear TempNodeSet;
20. end while
21. return the only node left in CurrentNodeSet, namely, the root of index tree T ;

F. BDMRS

SK ⟵ Setup () initially, the data owner generates the secret key set SK, including 1) A randomly generated m-bit vector S where m is equal to the cardinality of dictionary, and 2) two (m X m)

invertible matrices M1 and M2. Namely, SK = {S, M1, M2}.

I ⟵ GenIndex (F, SK) First, the unencrypted index tree T is built on F by using

T ⟵ BuildIndexTree (F) Secondly, the data owner generates two random vectors (D'u, D"u) for index vector Du in each node u, according to the secret vector S. Specifically, if S[i] = 0, D'u[i] and D"u[i] will be set equal to Du[i]; if S[i] = 1, D'u[i] and Du"u[i] will be $\{M_1^T D'_u, M_2^T D''_u\}$ set as two random values whose sum equals to Du[i]. Finally, the encrypted index tree I is built where the node u stores two encrypted index vectors Iu=

TD ⟵ GenTrapdoor (Wq, SK) with keyword set Wq, the unencrypted query vector

Q with length of m is generated. If wi "Wq, Q[i] stores the normalized IDF value of wi; else Q[i] is set to 0. Similarly, the query vector Q is split into two random vectors Q' and Q". The difference is that if S[i] = 0, Q? [i] and Q" [i] are set to two random values whose $\{M_1^{-1} D'_u, M_2^{-1} D''_u\}$ sum equals to Q[i]; else Q' [i] and Q" [i] are set as the same as Q[i]. Finally, the algorithm returns the trapdoor TD =

Relevance Score ⟵ SRScore (Iu, TD) With the trapdoor TD, the cloud server computes the relevance score of node u in the index tree I to the query.

G. EDMRS Scheme

The enhanced EDMRS scheme is almost the same as BDMRS scheme except that:

SK ⟵ Setup (): In this algorithm, we set the secret vector S as a m-bit vector, and set M1 and M2 are (m + m') (m + m') invertible matrices, where m' is the number of phantom terms.

I ⟵ GenIndex (F; SK): Before encrypting the index vector Du, we extend the vector Du to be a (m+m') - dimensional vector. Each extended element Du [m+ j], j = 1... m', is set as a random number"j .

TD ⟵GenTrapdoor (Wq, SK) The query vector Q is extended to be a (m + m')- dimensional vector. Among the extended elements, a number of m" elements are randomly chosen to set as 1, and the rest are set as 0.

Relevance Score⟵ SRScore(Iu, TD) After the execution of relevance evaluation by cloud server, the final relevance score for index vector Iu equals to Du ˆA $\Sigma\varepsilon v$, where $v \varepsilon \{j|Q[m + j] = 1\}$

VII. IMPLEMENTATION

A. Data User Module:

Data customers are customers on this system, will's personality prepared to download archives from the cloud that are exchanged by the data proprietors. Since the archives set away on the cloud server could be in tremendous numbers, there is an interest office provided for the customer. The customer should have the ability to do a multi-keyword look on the cloud server. Once, the result appears for the specific interest, these customers should have the ability to send a request to the individual data proprietors of the archive through the system (similarly called trap-passage request) for downloading these records. The data customers will similarly be given a request support screen, where it will tell if the data proprietor has recognized or rejects the request. If the request has been avowed, the customers should have the ability to download the decoded record.

B. Information Owner Module:

In this module, the information proprietors ought to be able to trade the records. The reports are encoded before the records are traded to the cloud. The information proprietors are given another choice to

enter the keywords for the record that are traded to the server. These keywords are utilized for the asking for reason which helps the intrigue return values rapidly. These records when once accessible on the cloud, the information clients ought to be gifted enthusiasm utilizing the keywords. The information proprietors will in addition be furnished with a demand endorsing screen so they can support or reject the demand that is gotten by the information clients.

C. Document Upload and Encryption Module:

In this module, the information proprietors ought to be able to trade the documents. The records are blended before the reports are traded to the cloud. The information proprietors are given a differentiating choice to enter the keywords for the record that are traded to the server. These keywords are utilized for the asking for reason which helps the pursuit return values rapidly. These records when once open on the cloud, the information clients ought to be able to pursue utilizing keywords. The information proprietors will in like way be equipped with a demand endorsing screen so they can support or reject the solicitations that are gotten by the information clients. The record before trade should be encoded with a key so that the information clients can't simply download it without this key. This key will be asked for by the information clients through the trap-gateway. The encryption of these records utilizes RSA figuring so that unapproved clients won't be able to download these documents.

D. Document Download and Decryption Module:

Information clients are clients on this structure, will's character arranged to download records from the cloud that are traded by the information proprietors. Since the records set away on the cloud server could be in tremendous numbers, there is an intrigue office accommodated the client. The client ought to be able to do a multi-keyword search for on the cloud server. Once, the outcome shows up for the particular intrigue, the clients ought to be able to send a demand to the individual information proprietors of the report through the framework (additionally called trap-entryway ask for) for downloading these records. The information clients will in like way be given a demand bolster screen, where it will tell if the information proprietor has perceived or rejects the demand. On the off chance that the demand has been grasped, the clients ought to be able to download the unscrambled document. The record before download should be unscrambled with a key. This key will be asked for by the information clients through the trap-passage ask. Once the key is given amidst the download, the information clients will be able to download the record and utilize them.

E. Rank-Search Module:

This module allows the data customers to look for the reports with multi-keyword rank looking. This model uses the once in a while used rank chasing figuring down present the yield for multi-keywords. "Encourage Matching" rule will be grasped for the multi-keyword chasing. This module in like manner manages making a document for speedier chase.

VIII. EXPERIMENTAL RESULT

Fig. 2 shows look time relationship outline; in thunder graph X-center point exhibits the count by which records are looked for while Y-turn demonstrate time required for looking for question related in ms

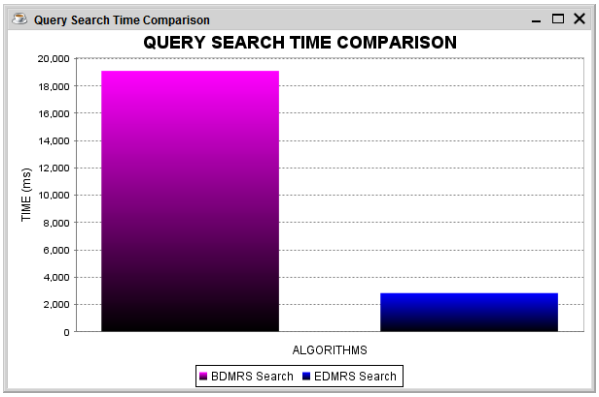


Fig 2: Query Search Time Comparison

IX. CONCLUSION

In this work, firstly we portray and resolve the troublesome of multi-keyword positioned look over scrambled cloud information, and make an assortment of protection necessities. Between various multi-keyword semantics, we select the compelling likeness measure of "facilitate coordinating", i.e., as different matches as likely, to adequately catch the importance of outsourced archives to the question correspondence .In our future work, we will seek supporting other multi keyword semantics over encoded information and checking the honesty of the rank request in the item keywords. For tradition the test of steady multi-keyword semantic without security breaks, we propose an essential thought of MRSE. At that point we give two better MRSE diagrams to acknowledge numerous stringent security necessities in two divergent risk models. Nitty gritty examination contemplating security and effectiveness assurances of proposed plans is given, and trials on this present reality information set demonstrate our future frameworks present low overhead on both calculation and correspondence.

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A Review on Identifying and Ranking Current News Topics

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ABSTRACT

Now a days, social media services such as Twitter huge amount of user-generated data, which has a great potential to contain informative news-related content, In present day times, internet based life administrations, for example, Twitter give a gigantic measure of client created information, which can possibly contain useful news-related substance. Twitter as a new form of social media can potentially contain much useful information, but content analysis on Twitter has not been well studied. Mass media sources such as news media used to inform us about daily events. For these assets to be helpful, we must find a way to filter noise and only capture the content that, in view of its closeness to the news media, is thought about significant. Be that as it may, even after noise is evacuated, data overload may even now exist in the rest of the information. Henceforth, it is advantageous to organize it for utilization. To accomplish prioritization, data must be positioned arranged by evaluated significance thinking about three variables. In the first place, the transient commonness of a specific point in the news media is a factor of significance, and can be viewed as the media center (MF) of a subject. Second, the fleeting predominance of the theme in social media demonstrates its client consideration (UA). Last, the communication between the internet based life clients who notice this theme demonstrates the quality of the network talking about it, and can be viewed as the client connection (UI) around the subject. We propose an unsupervised system SociRank which distinguishes news points common in both web-based social networking and the news media, and after that positions them by significance utilizing their degrees of MF, UA, and UI. Our analyses demonstrate that SociRank improves the quality and assortment of naturally recognized news points.

Keywords : Information Filtering, Social Computing, Social Network Analysis, Topic Identification, Topic Ranking.

I. INTRODUCTION

Now a day, extracting and mining valuable info from online sources has become an important zone in IT. Certainly, data that informs the general populace of step by step events has been given by expansive interchanges sources, explicitly the news media. Gigantic quantities of these news media sources have either surrendered their printed duplicate dispersions or moved to the World Wide Web, or now make both printed variant and Internet shapes at the same time. These news media sources are seen as trustworthy since they are conveyed by capable writers, who are viewed as in charge of their substance. On the other hand, the Internet, being a free and open social affair for information exchange,

has starting late watched an enamoring wonder known as web based systems administration. In web based systems administration, predictable, non-writer clients can disperse unsubstantiated substance and express their eagerness for explicit occasions. Microblogs have ended up being a champion among the most celebrated web based systems administration outlets. One microblogging organization explicitly, Twitter, is used by countless around the world, star viding colossal proportions of customer made data. One may acknowledge that this source conceivably contains information with equal or more essential impetus than the news media, anyway one ought to likewise expect that because of the unconfirmed thought of the source, a considerable amount of this substance is useless. For online long range informal communication data to be of any usage for point distinguishing proof, we should discover a way to deal with channel uninformative information and catch just information which, in light of its substance equivalence to the news media, might be viewed as helpful or important. The mining of important data from online sourceshas turned into a conspicuous research area in data.Innovation lately. Truly, learning that informs theoverall population of day by day occasions has beengiven by broad communications sources,specifically the news media. A significant numberof these news media sources have eithersurrendered their printed version productions ormoved to the World Wide Web, or now create bothprinted copy and Internet forms all the while. Thesenews media sources are viewed as reliable sincethey are distributed by proficient journalists, whoare considered responsible for their substance. Thenagain, the Internet, being a free and open discussionfor data trade, has as of late observed an interestingwonder known as online networking. In online networking, standard, non-journalist users candistribute unverified substance and express theirenthusiasm for specific occasions. The infiltrationof immense measure of data through the WorldWide Web (WWW) has made a developingrequirement for the advancement of procedures forfinding, getting to, and sharing learning. Thekeyphrases help perusers quickly comprehend, sortout, access, and offer data of an archive.Keyphrases are the expressions comprising of atleast one noteworthy words. Keyphrases can befused in the query items as subject metadatatoencourage data look on the web. A direct approach for recognizing Microblogs suchas Twitter reflect the common public's responses tomajor occasions. Bursty themes from microblogsuncover what occasions have pulled in the mostonline consideration. In spite of the fact that burstyoccasion discovery from content streams has beenconsidered some time recently, past work may notbe appropriate for microblogs since compared withother content streams such as news articles andlogical distributions, microblog posts are especiallyassorted and loud. To discover points that havebursty designs on microblogs, a theme demonstratethat at the same time captures two perceptions: posts distributed around the same time are morelikely to have the same theme, and postsdistributed by the same client are more likely tohave the same theme. The previous makes adifference discover event-driven posts while the lastmentioned makes a difference recognize andchannel out "individual" posts. Our tests on a hugeTwitter dataset appear that there are moresignificant and interesting bursty themes in the top-rank.

Small scale websites have turned out to be a standout among the most prevalent online networking outlets. One small scale blogging administration specifically, Twitter, is utilized by a great many individuals around the globe, giving tremendous measures of client created information. One may accept that this source conceivably contains data with equivalent or

more noteworthy incentive than the news media, however one should likewise expect that in view of the unverified idea of the source, quite a bit of this substance is futile. For online networking information to be of any utilization for point identification, we should find an approach to filter uninformative data and catch just data which, in light of its substance similitude to the news media, might be viewed as helpful or profitable.

Online social systems have ended up greatly prevalent; various locales permit clients to associate and share substance utilizing social joins. Clients of these systems frequently set up hundreds to indeed thousands of social joins with other clients. As of late, analysts have proposed looking at the movement organize-a organize that is based on the real interaction between clients, Or maybe than simple fellowship-to recognize between solid and frail joins. While introductory ponders have driven to bits of knowledge on how an action organize is basically distinctive from the social organize itself, a common and vital perspective of the movement arrange has been neglected: the reality that over time social joins can develop more grounded or weaker.

A clear approach for recognizing themes fromdiverse social and news media sources is theapplication of subject modeling. Numerousstrategies have been proposed in this region, such asidle Dirichlet allotment (LDA) and probabilisticidlesemantic investigation (PLSA). Subjectmodeling is, in pith, the disclosure of “topics” incontent corpora by clustering together regularly co-occurring words. This approach, in any case, missesout in the worldly component of predominant themelocation, that is, it does not take into account howsubjects alter with time. Besides, point modelingand other theme location procedures do not ranksubjects agreeing to their ubiquity by taking intoaccount their predominance in both news media andsocialmedia

Firstly, the data is taken from various databases i.e News articles and social networking websites and sorted for the process to start. Now the query results are preprocessed. The preprocessing is followed by key term graph construction. The key term graph is sent for further process called graph clustering. The graph clusters are proceeded for content selection and ranking and now based on the relevance factors the rank of topics is determined. Programmed key phrase extraction strategies have by and large taken either supervised or unsupervised approaches. Supervised strategies extricate key phrases by utilizing at raining report set, in this way obtaining information from a worldwide collection of texts.

To help in the prioritization of news data, news must be positioned in arrange of evaluated significance. The worldly predominance of a specific point in the news media shows that it is broadly secured by news media sources, making it an imperative figure when assessing topical pertinence. This figure may be alluded to as the MF of the theme. The worldly predominance of the point in social media, specifically in Twitter, demonstrates that clients are interested in the point and can give a premise for the estimation of its ubiquity.

We introduce an unsupervised systemSociRankwhich effectively identifies news topics that are prevalent in both social media and the news media, and then ranks them by relevance using their degrees of MF, UA, and UI. Even though this paper focuses on news topics,it can be easily adapted to a wide variety of fields, from science and technology to culture and sports. To the best of our knowledge, no other work attempts to employ the use of either the social media interests of users or their social relationships to aid in the ranking of topics. Moreover, SociRank undergoes

an empirical framework, comprising and integrating several techniques, such as keyword extraction, measures of similarity, graph clustering, and social network analysis. The effectiveness of oursystem is validated by extensive controlled and uncontrolled experiments.

The section I explains the Introduction of SociRank. Section II presents the literature review of existing systems and Section III present proposed system implementation details Section IV presents experimental analysis, results and discussion of proposed system. Section V concludes our proposed system. While at the end list of references paper are presented.

II. LITERATURE REVIEW

Author D. M. Blei, A. Y. Ng, and M. I. Jordan, describe latent Dirichlet allocation (LDA)[1], a generative probabilistic model for collections of discrete data such as text corpora. They says LDA is a three-level hierarchical Bayesian model, in which each item of a collection is modeled as a finite mixture over an underlying set of topics. Each topic is, in turn, modeled as an infinite mixture over an underlying set of topic probabilities. In the context of text modeling, the topic probabilities provide an explicit representation of a document. They also present efficient approximate inference techniques based on variational methods and an EM algorithm for empirical Bayes parameter estimation. We report results in document modeling, text classification, and collaborative filtering, comparing to a mixture of unigrams model and the probabilistic LSI model. LDA is a simple model, and although we view it as a competitor to methods such as LSI and pLSI in the setting of dimensionality reduction for document collections and other discrete corpora, it is also intended to be illustrative of the way in which probabilistic models can be scaled up to provide useful inferential machinery in domains involving multiple levels of structure. Indeed, the principal advantages of generative models such as LDA include their modularity and their extensibility. As a probabilistic module, LDA can be readily embedded in a more complex model a property that is not possessed by LSI. In recent work we have used pairs of LDA modules to model relationships between images and their corresponding descriptive captions.

T. Hofmann proposed a novel method for unsupervised learning, called Probabilistic Latent Semantic Analysis (PLSA) [2], which is based on a statistical latent class model. Author argued that this approach is more principled than standard Latent Semantic Analysis, since it possesses a sound statistical foundation. Tempered Expectation Maximization has been presented as a powerful fitting procedure. Also they experimentally verified the claimed advantages achieving substantial performance gains. Probabilistic Latent Semantic Analysis has thus to be considered as a promising novel unsupervised learning method with a wide range of applications in text learning and information retrieval.

Author T. Hofmann presented a novel method for automated indexing [3] based on a statistical latent class model. This approach has important theoretical advantages over standard LSI, since it is based on the likelihood principle, defines a generative data model, and directly minimizes word perplexity. It can also take advantage of statistical standard methods for model fitting, over fitting control, and model combination. The empirical evaluation has clearly confirmed the benefits of Probabilistic Latent Semantic Indexing which achieves significant gains in precision over both, standard term matching and LSI. Further investigation is needed to take full advantage of the prior information provided by term

weighting schemes. Recent work has also shown that the benefits of PLSA extend beyond document indexing and that a similar approach can be utilized, e.g., for language modeling and collaborative filtering.

Mario Cataldi, Luigi Di Caro proposed a novel topic detection technique [4] that permits to retrieve in real-time the most emergent topics expressed by the community. First, they extract the contents (set of terms) of the tweets and model the term life cycle according to a novel aging theory intended to mine the emerging ones. A term can be defined as emergingif it frequently occurs in the specified time interval and it was relatively rare in the past. Moreover, considering that the importance of a content also depends on its source, we analyze the social relationships in the network with the well-known Page Rank algorithm in order to determine the authority of the users.

In this paper author present a Knowledge Discovery System (KDS) [5] for document processing and clustering. The clustering algorithm implemented in this system, called Induced Bisecting k-Means, outperforms the Standard Bisecting k-Means and is particularly suitable for on line applications when computational efficiency is a crucial aspect. Because of the steady increase of information on WWW, digital library, portal, database and local intranet, gave rise to the development of several methods to help user in Information Retrieval, information organization and browsing. So used some methods like Clustering algorithms are of crucial importance when there are no labels associated to textual information or documents. The aim of clustering algorithms, in the text mining domain, is to group documents concerning with the same topic into the same cluster, producing a flat or hierarchical structure of clusters.

The aim of a linguistic science is to be able to characterize and explain the multitude of linguistic observations [6] circling around us, in conversations, writing, and other media. Part of that has to do with the cognitive side of how humans acquire, produce, and understand language, part of it has to do with understanding the relationship between linguistic utterances and the world, and part of it has to do with understanding the linguistic structures by which language communicates. In order to approach the last problem, author proposed that there are rules which are used to structure linguistic expressions.

Author empirically compare the content of Twitter with a traditional news medium, New York Times, using unsupervised topic modeling. They use a Twitter-LDA model [8] to discover topics from a representative sample of the entire Twitter. They then utilized text mining techniques to compare these Twitter topics with topics from New York Times, taking into consideration topic categories and types. They also study the relation between the proportions of opinionated tweets and retweets and topic categories and types. Our comparisons show interesting and useful findings for downstream IR or DM applications.

Canhui Wang, Min Zhang, Liyun Ru, Shaoping Ma [11] proposed a novel automatic online algorithm for news topic ranking based on an aging theory, using both media focus and user attention. Both media focus and user attention varies as time goes on, so the effect of time on topic ranking has already been included. Inconsistency exists between media focus and user attention, which is analyzed and quantitatively measured in this paper. Topics are ranked by the combination of their media focus and user attention values online automatically. Related news stories of topics are provided for users' quick access. Empirical evaluation on the topic ranking

result indicates that the proposed topic ranking algorithm reflects the influence of time, the media and users.

Wanget al.[11] proposed a method that takes into account the users' interest in a topic by estimating the amount of times they read stories related to that particular topic. They refer to this factor as the UA. They also used an aging theory developed by Chenet al.[12] to create, grow, and destroy a topic. The life cycles of the topics are tracked by using an energy function. The energy of a topic increases when it becomes popular and it diminishes over time unless it remains popular. We employ variants of the concepts of MF and UA to meet our needs, as these concepts are both logical and effective.

Author J. Sankaranarayanan, H. Samet, B. E. Teitler, M. D. Lieberman, and J. Sperling investigate the use of Twitter to build a news processing system, called TwitterStand [13], from Twitter tweets. The idea is to capture tweets that correspond to late breaking news. The result is analogous to a distributed news wire service. The difference is that the identities of the contributors/reporters are not known in advance and there may be many of them. Furthermore, tweets are not sent according to a schedule: they occur as news is happening, and tend to be noisy while usually arriving at a high throughput rate. Some of the issues addressed include removing the noise, determining tweet clusters of interest bearing in mind that the methods must be online, and determining the relevant locations associated with the tweets.

Author E. Kwan, P.-L. Hsu, J.-H. Liang, and Y.-S. Chen, have introduced and evaluated Keyword-based Evolving Graph Sequences [17] for event identification purposes, and demonstrated how social structure in social streams data can be utilized for event identification. Furthermore, also proposed the use of a hidden link (hidden relationship) for event identification. The experimental results show the usefulness of our approach in identifying real-world events in social streams.

In this paper author propose a new method of computing term specificity, based on modeling the rate of learning of word meaning in Latent Semantic Analysis (LSA) [18]. We analyze the performance of this method both qualitatively and quantitatively and demonstrate that it shows excellent performance compared to existing methods on a broad range of tests. They also demonstrate how it can be used to improve existing applications in information retrieval and summarization.

System Architecture

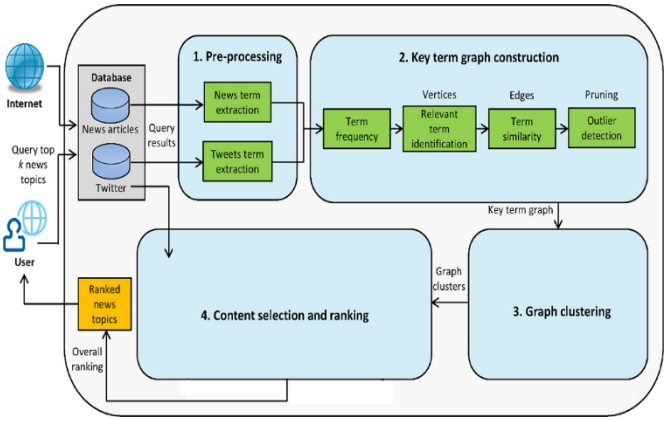


Fig 1. System Architecture

III. RESULT AND DISCUSSIONS

A. Experimental Setup

All the experimental cases are implemented in Java in congestion with Netbeans tools and MySql as backend, algorithms and strategies, and the competing classification approach along with various feature extraction technique, and run in environment with System having configuration of Intel Core i5-

6200U, 2.30 GHz Windows 10 (64 bit) machine with 8GB of RAM

IV. CONCLUSION

We proposed an unsupervised system SociRank which distinguishes news subjects unavoidable in both web based systems administration and the news media, and after that positions them by thinking about their MF, UA, and UI as essentialness factors. The transient transcendence of a particular topic in the news media is seen as the MF of a point, which gives us understanding into its wide correspondences reputation. The worldly predominance of the subject in online networking, specifically Twitter, demonstrates client between est, and is viewed as its UA. At long last, the connection between the online networking clients who say the theme shows the quality of the group talking about it, and is viewed as the UI. To the best of our insight, no other work has endeavored to utilize the utilization of either the interests of online networking clients or their social connections to help in the positioning of points. Solidified, filtered, and positioned news themes from both expert news suppliers and people have a few benefits.

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A Review on Implementation Visual Cryptography and Steganography

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ABSTRACT

Online Banking is an arrangement of administrations gave by a group of organized bank offices. Bank clients may access their funds from any of the part branch or workplaces via internet. The real issue in Internet Banking is the authenticity of the user. Because of unavoidable hacking of the databases on the web, it is hard to believe on the security of the data on the web. To take care of this issue of verification, we are proposing a mechanism which is hybrid of data hiding and visual cryptography. This paper proposes a review on visual Cryptography and Steganography techniques and presenting a new approach for handling the transaction key of a user where the key will be embedded into an a image and later the image will be divided into two shares. At the point when two shares are made, one is put away in the Bank database and the other is kept by the client or sends to picture server. The client needs to introduce the offer amid the majority of his exchanges. This offer is stacked with the main offer to get the first Transaction key. The Correlation technique is utilized to take the choice on acknowledgment or dismissal of the yield and validate the client.

Keywords : Information Security, Steganography, Visual Cryptography, Online Shopping

I. INTRODUCTION

Today, most applications are just as secure as their basic framework. Since the configuration and innovation of middleware has enhanced consistently, their location is a troublesome issue. Therefore, it is quite difficult to make certain whether a PC that is associated with the web can be viewed as dependable and secure or not. The inquiry is the way to handle applications that require an abnormal state of security, for example, center saving money and web managing an account. In a center saving money framework, there is a shot of experiencing manufactured mark for exchange. Furthermore, in the net saving money framework, the secret key of client might be hacked and abused. In this way security is still a test in these applications. Here, we propose review on a system to secure the client data and to keep the conceivable fraud of marks and secret key hacking.

Web Banking has been well known among youthful Internet-astute individuals for a long time, its notoriety is required to become quickly as Internet use becomes globally and individuals find the numerous focal points that it gives. Be that as it may, it might have its own disadvantages. In a center managing an account framework there is a shot of experiencing manufactured mark for exchange. In a net managing an account framework secret key of the client might be hacked and abused. Online exchanges are these days turn out to be extremely normal and there are different assaults exhibit behind this. In

these sorts of different assaults, phishing is distinguished as a noteworthy security risk. Phishing tricks are likewise turning into an issue for internet saving money and e-business clients. The question is the way to handle applications that require an abnormal state of security. Phishing is a type of online data fraud that intends to take touchy data, for example, web based keeping money passwords and Mastercard data from clients. One meaning of phishing is given as "it is a criminal action utilizing social designing procedures. Phishers endeavor to falsely get touchy data, for example, passwords and charge card points of interest, by taking on the appearance of a reliable individual or business in an electronic correspondence". Here we will utilize a portion of the methods to secure the client data and to keep the conceivable phony of secret word hacking. The idea of picture handling a steganography and visual cryptography is utilized. Steganography is the workmanship and exploration of composing shrouded messages in a manner that nobody separated from planned beneficiary knows the presence of the message. Unique message is being covered up with a transporter to such an extent that the progressions so happened in the bearer are not detectable. In steganography computerized pictures can be utilized as a transporter to conceal pictures. Joining mystery picture with a bearer picture gives the concealed picture, the shrouded picture is hard to recognize without recovery, and the vast majority of the steganography procedure are either three or four contiguous pixels around an objective pixel. While the proposed system can use at above all else eight contiguous neighbors with the goal that impalpability esteem becomes greater and the partitioning it into a shares. Add up to number of shares to be made is relying upon the plan picked by the bank. At the point when two shares are made one is put away in the bank database and the other one is kept by the client. The client needs to exhibit the share amid the greater part of his exchange. This impart is stacked to the primary share to get the first picture. At that point interpreting technique is utilized to take the shrouded secret word on acknowledgment or dismissal of the yield and validate the client. The visual cryptography (VC) is a technique for encoding a mystery picture into shares with the end goal that stacking an adequate number of shares uncovers the mystery picture.

The idea of picture preparing and an enhanced visual cryptography is utilized. Picture preparing is a strategy of handling an information picture and to get the yield as either enhanced type of the same picture and/or qualities of the info picture. Visual Cryptography (VC) is the technique for encoding a mystery key into shares with the end goal that, stacking an adequate number of shares uncovers the mystery key.

Naor and Shamir presented a straightforward yet flawlessly secure way that permits mystery sharing with no cryptographic calculation, named as Visual Cryptography Scheme (VCS). Essentially, Visual Cryptography Scheme is an encryption strategy that utilizations combinatorial methods to encode mystery composed materials. The thought is to change over the composed material into a picture and encode this picture into n shadow pictures. The deciphering requires just selecting some subset of these n pictures, making transparencies of them, and stacking them on top of each other. The most straightforward Visual Cryptography Scheme is given by the accompanying setup. A mystery picture comprises of a gathering of highly contrasting pixels where every pixel is dealt with freely. To encode the mystery picture, we split the first picture into adjusted renditions (called as shares) with the end goal that every pixel in an offer now subdivides into n high contrast sub-pixels. To decipher the picture, a

subset S of those n shares are picked and replicated on partitioned transparencies. On the off chance that S is a qualified subset, then stacking every one of these transparencies will permit visual recuperation of the mystery.

II. RELATED WORK

A) Cryptography

The word cryptography is taken from two Greek words which signify "mystery composing". Cryptography is the way toward scrambling the first content by adjusting and substituting the first content, masterminding it in an apparently unintelligible arrangement for others. Cryptography is a successful approach to secure the data that is transmitting through the system correspondence ways. Cryptology is the science that arrangements about cryptography and cryptanalysis. Cryptography is the methodology of sending the messages subtly and safely to the goal. Cryptanalysis is the technique for getting the installed messages into unique writings. By and large, cryptography is exchanging information from source to goal by modifying it through a mystery code. The cryptosystems utilizes a plaintext as information and create a figure content utilizing encryption calculation taking mystery key as information.

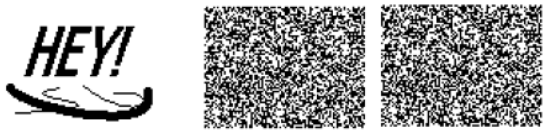
B) Visual Cryptography

Visual cryptography is a cryptographic technique which allows visual information (Image, text, etc.) to be encrypted in such a way that the decryption can be performed by the human visual system without the aid of computers. Image is a multimedia component sensed by human.

C) Techniques for Visual Cryptography

Visual cryptography, the most striking components of this approach is that it can be recuperation mystery picture with no calculation. It abuses human visual framework to peruse the mystery message from some covering offers, therefore conquering inconvenience of complex calculation required in the cryptography. In [19] author presented a basic however flawlessly secure way that permits mystery sharing with no cryptography calculation named as a visual cryptographic plan. The issue of scrambling composed material (printed content, manually written notes, pictures and so on) in a splendidly secure manner which can be specifically by the human visual framework. The thought is to change over the composed material into a picture and encode this picture into n shadow pictures. The deciphering requires just selecting some subset of these n pictures, making transparencies of them and stacking them on top of each other.

- Level 1 concealing utilizing Visual Cryptography



Secret Data share 1 share 2

- Super Imposing Share1 and Share2 to Form the Original Secret Data



The secret Information

The first inspiration was to protect cryptographic keys from misfortune. One of the best known procedures to ensure the information is cryptography. it is a specialty of sending and accepting scrambled messages that can be unscrambled just by the sender or the beneficiary Encryption and decoding are expert by utilizing scientific calculations as a part of such a route, to the point that nobody yet the expected beneficiary can unscramble and read the messages. Visual Cryptography Scheme is a

cryptographic strategy that considers the encryption of visual data with the end goal that decoding can be performed utilizing the human visual framework. We can accomplish this by one of the accompanying access structure plans.

1.(2,2) Threshold VCS conspire This is a least difficult limit plot that takes a mystery message and encodes it in two distinct shares that uncover the mystery picture when they are overlaid. No extra data is required to make this sort of get to structure.

2. (2, n) Threshold VCS conspire this plan scrambles the mystery picture into n shares with the end goal that when any two (or more) of the shares are overlaid the mystery picture is uncovered. The client will be provoked for n, the quantity of members.
3. (N, n) Threshold VCS conspire this plan encodes the mystery picture to n shares with the end goal that when all n of the shares are consolidated will the mystery picture be uncovered. The client will be provoked for n, the quantity of members.
4. (k, n) Threshold VCS conspire This plan encodes the mystery picture to n shares to such an extent that when any gathering of in any event k shares are overlaid the mystery picture will be uncovered. The client will be incited for k, the Threshold,, and n, the quantity of members.
On account of (2, 2) VCS, every pixel P in the first picture is encoded into two sub pixels called offers. Fig.1 signifies the shares of a white pixel and a dark pixel. Take note of that the selection of shares for a white and dark pixel is arbitrarily decided (there are two decisions accessible for every pixel). Neither one of the shares give any insight about the first pixel since various pixels in the mystery picture will be scrambled utilizing autonomous arbitrary decisions. At the point when the two shares are superimposed, the estimation of the first pixel P can be resolved. On the off chance that P is a dark pixel, we get two dark sub pixels; on the off chance that it is a white pixel, we get one dark sub pixel and one white sub pixel.

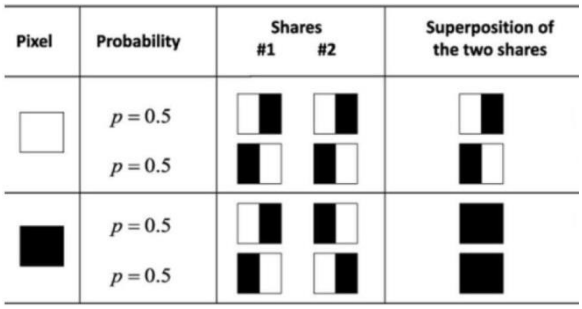


Fig 1. Illustration of 2-out-of-2 VCS scheme with 2 subpixels construction [19].

• Adjustment Technique
Proposed technique considered two consecutive pixels as the one time input in the source image and as a result there shall be four cases in input. These are as follows:

(i) Black and Black, (ii) Black and White, (iii) White and Black, (iv) White and White
To develop a (2, n) visual cryptographic scheme two things are considered as major point of references these are:
(i) Hamming weight of every block in each share should be the same.
(ii) Hamming weight of a black block will be greater than the other blocks in the stacked shares.
Let N is the number of participants (i.e no. of account holders). m=integer part of (n/2), where n= number of total shares. The bank authority has to select the value of n, such that the relation nCm _ min{(N+1)} (where C represents the combination operation) holds.
Hamming weight of each block of each share (H) = Integer part of (nCm)/2; Now Let us consider the four possible cases of input pixels:
(i) Black and Black: In this case arrangement of black pixels in the output block will be different from other blocks. This ensures that after stacking the shares,

Hamming weight of the stacked black blocks will become greater than the other blocks.

(ii) Black and White: Here the all the black pixels will be kept together from the first position of the output block.

(iii) White and Black: Where the all the black pixels will be kept together from the last position of the output block.

(iv) White and White: All black pixels will be kept together in the output block.

Now if the number of pixels in the input image is odd then the last pixel will be kept as it is in the shares.

Because the output media of visual cryptography are transparencies, we treat the white pixels of black-and- white images as transparent. Typically, the black-and-white visual cryptography decomposes every pixel in a secret image into 2×2 block in the two transparencies. According to the rules in fig1, when a pixel is white the method chooses one of the two combinations for white pixels in fig1. To form the content of the block in the two transparencies when a pixel is black it chooses one of the other two combinations. Then the characteristics of two stacked pixels are black and black is black, white and black is black, and white and white is white. Therefore , when stacking two transparencies, the blocks corresponding to black pixels in the secret images are full black, and those corresponding to white pixels are half-black and half-white which can be seen as 50% of grace pixels.

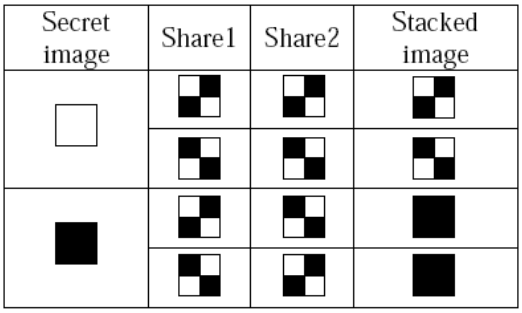


Fig 2. Sharing and Stacking Scheme of Black and White Pixels [19]

D) Comparison of various visual cryptography schemes:

Many research papers have been published using this approach, starting from a binary image moving to grayscale image and finally employing it to color images. Though with each subsequent research paper the quality of the recovered image improved. Detail of various visual cryptography schemes is given in table 4.1 below. One of the promising approaches for color images is proposed by in [7], the proposed technique involves splitting an image into multiple shares.

E) Steganography

Steganography is the act of hiding a record, message, picture, or video inside another document, message, picture, or video. The word steganography joins the Greek words steganos (στεγανός), signifying "secured, disguised, or ensured", and graphein (γράφειν) signifying "composing".

The initially recorded utilization of the term was in 1499 by Johannes Trithemius in his Steganographia, a treatise on cryptography and steganography, camouflaged as a book on enchantment. By and large, the shrouded messages have all the earmarks of being (or are a piece of) something else: pictures, articles, shopping records, or some other cover content. For instance, the concealed message might be in imperceptible ink between the noticeable lines of a private letter. A few executions of steganography that do not have a common mystery are types of security through lack of clarity, while key-subordinate steganographic plans stick to Kerckhoffs' principle.

The benefit of steganography over cryptography alone is that the planned mystery message does not draw in thoughtfulness regarding itself as a protest of examination. Obviously noticeable encoded messages—regardless of how unbreakable—excite intrigue, and may in themselves be implicating in nations where encryption is illegal. Thus, while cryptography is the act of securing the substance of a

message alone, steganography is worried with hiding the way that a mystery message is being sent, and in addition hiding the substance of the message.

Steganography incorporates the disguise of data inside PC records. In computerized steganography, electronic interchanges may incorporate steganographic coding within a vehicle layer, for example, a record document, picture record, program or convention. Media documents are perfect for steganographic transmission on account of their huge size. For instance, a sender may begin with a harmless picture record and conform the shade of each 100th pixel to compare to a letter in the letter set, a change so unpretentious that somebody not particularly searching for it is probably not going to notice it.

F) Least Significant Bits Technique for Steganography[4]

Today, when converting an analog image to digital format, we usually choose between three different ways of representing colors:

- 24-bit color: every pixel can have one in 2^24 colors, and these are represented as different quantities of three basic colors: red (R), green (G), blue (B), given by 8 bits (256 values) each.
- 8-bit color: every pixel can have one in 256 (2^8) colors, chosen from a palette, or a table of colors.
- 8-bit gray-scale: every pixel can have one in 256 (2^8) shades of gray.

LSB insertion modifies the LSBs of each color in 24-bit images, or the LSBs of the 8-bit value for 8-bit images.

Example:

The letter 'A' has an ASCII code of 65(decimal), which are 1000001 in binary.

It will need three consecutive pixels for a 24-bit image to store an 'A':

Let's say that the pixels before the insertion are:

10000000.10100100.10110101,
10110101.11110011.10110111,
11100111.10110011.00110011

Then their values after the insertion of an 'A' will be:

*1000000**1**.1010010**0**.1011010**0**,*
*1011010**0**.1111001**0**.1011011**0**,*
*1110011**0**.1011001**1**.00110011*

(The values in **bold** are the ones that were modified by the transformation)

The same example for an 8-bit image would have needed 8 pixels:

10000000, 10100100, 10110101, 10110101, 11110011, 10110111, 11100111, 10110011

Then their values after the insertion of an 'A' would have been:

*1000000**1**, 1010010**0**, 1011010**0**, 1011010**0**, 1111001**0**, 1011011**0**, 1110011**0**, 1011001**1***

III. PROBLEM DEFINATION

In a core banking system, there is a chance of encountering forged signature for transaction. In the net banking system, the password of customer may be hacked and misused. Thus Security is still a challenge in these applications. Here, we propose a technique to secure the customer information and to prevent the possible forgery of signatures and password hacking.

IV. LITERATURE REVIEW

In [1], new strategy is proposed, that utilizations content based steganography and visual cryptography, which minimizes data sharing amongst shopper and

online shipper however empower effective store exchange from customer's record to vendor's record subsequently shielding purchaser data and avoiding abuse of data at dealer side. The strategy proposed is particularly for E-Commerce however can without much of a stretch be reached out for online and also physical managing an account.

In [3] proposes a novel procedure which endeavors to fathom all the above issues in steganography. In the proposed strategy, rather than substitutions we are utilizing the idea of matches between mystery information and cover picture. What's more, we additionally utilize the idea of altered recurrence for every character in English. The proposed technique is lossless, has limitless payload limit, has key size which is just around 10 to 20 rate of the message estimate and has enhanced security.

In [4], an information concealing plan by basic LSB substitution is proposed. By applying an ideal pixel alteration procedure to the stego-picture acquired by the basic LSB substitution strategy, the picture nature of the stego-picture can be significantly enhanced with low additional computational unpredictability. The most pessimistic scenario mean-square-mistake between the stego-picture and the cover-picture is determined. Trial comes about demonstrate that the stego-picture is outwardly vague from the first cover-picture. The acquired results additionally demonstrate a noteworthy change as for a past work.
In [5], the sender is concealing the information which is to send to the beneficiary as pictures. The picture is a blend of the content which is gotten from the two procedures of the content steganography which has been inferred before. The two procedures utilized are Reflection Symmetry and the Vedic Numeric technique. The sender sends the information into apportioned shape or we can say the information which is sent by the sender is parceled into 2 sections and separate-isolate part is sent to the two procedures. We are doing this as though the entire content is sent to one procedure or Vedic strategy it will expend more memory. In this way, the content in the wake of being prepared by the two procedures is joined to shape an entire content and after that the content is changed over into picture by the different techniques or calculations ex. LSB, network augmentation. In this way, the content is changed over into picture that is sent to the recipient. The model proposed in [6] considers the affectability and covering conduct of the human visual framework by method for a nearby isotropic complexity measure and a concealing model. We look at the addition of this watermark in luminance pictures and in the blue channel of shading pictures. We likewise assess the vigor of such a watermark regarding its installing thickness. Our outcomes demonstrate that this approach encourages the addition of a more powerful watermark while safeguarding the visual nature of the first. Moreover, we show that the most extreme watermark thickness by and large does not give the best identification execution.

In [8] paper, a procedure using picture preparing has been proposed utilizing Steganography and visual cryptography, and afterward partitioning it into shares. In this venture the message or the content document is taken as a contribution from the client who needs to get implanted in the picture record. The picture document can be of the expansions .jpg or .png. The message process is computed utilizing the MD5 calculation and this is affixed with the message. The annexed message is then encoded utilizing the AES calculation. The mystery enters utilized as a part of the AES calculation is scrambled utilizing the RSA calculation. The affixed scrambled message is inserted in the picture utilizing the minimum huge piece calculation. The encoded picture is transmitted. The secret word must be given

before transmitting the picture document. At the beneficiaries side the watermarked picture record is taken as the information. The message in the picture record is removed utilizing the LSB calculation. The removed message is separated into the process and the message part. The message process is figured for the message and is contrasted and the got one. In the event that they are similar then message is said to be verified.

V. PROPOSED SYSTEM

Our project proposes a technique of processing a secret key of a customer and then dividing it into shares. When two shares are created, one is stored in the Bank database and the other is kept by the customer.

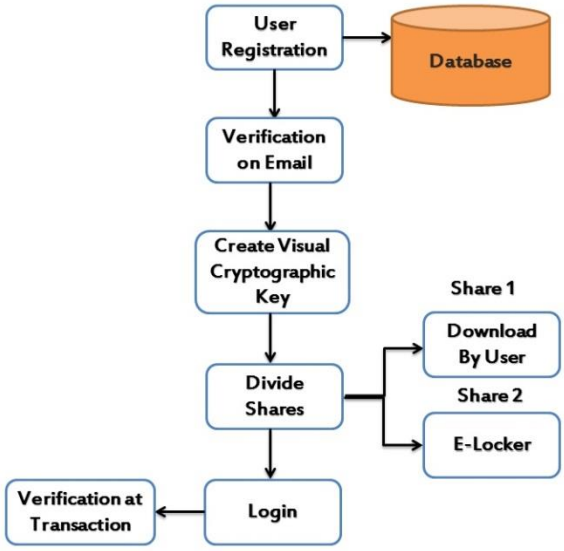


Fig 3. System Architecture

The customer has to present the share during all of his transactions. This share is stacked with the first share get the original secret key. The Correlation method is used to take the decision on acceptance or rejection of the output and authenticate the customer.

VI. CONCLUSION

This system uses Colour Image Visual Cryptography for password protection and it is not able to break this protection with present technology. This system will be a boon for the Core Banking Application and the bank customers are feeling free from the password hacking problems. Once this system is deployed in web Server, all the computer in the network can able to access this application through browser without any software installation in their computer.

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A Review on Dynamic Features Extraction System for Pest Detection

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ABSTRACT

In agriculture pests can destroy the production on land so need to remove pests from soil for better agriculture production. Supervision of farmland pests is a vital to spray agriculture in a timely and appropriate manner, which gives guarantee of good production in agriculture. Here we discussed some methods that are required for gaining dynamic characteristics of pests by utilizing machine vision. Generally these characteristics are collected from farmland. First step is pests and the background images are divided by using color feature and thresholding methods. Second step is applied Gaussian filtering to obtain the shape features and the number of pests. Lastly frame-to-frame differencing method is used to obtain the quantity of pest motion. The experimental results shows that the 99%.accuracy rate. It can provide quantitative information of pest activity for plant protection personnel. Proposed system can also be used in large-scale crop pest supervision.

Keywords : Image Processing; Feature extraction, Gaussianfiltering

I. INTRODUCTION

Pest detection and control is at least as old as agriculture because there has always been a need to keep crops free from pests. A number of techniques so far proposed for pest control in agriculture using wireless sensor network. In japan they conduct an experiment to understand the crop-weather and pest relation using wireless sensor network and independent pest and disease dynamics of peanut crops. It uses many data mining techniques to turn the data into useful information and correlation of crop / pest / disease and climate field. An attempt has been made to understand the hidden relationship between interrelated disease and pest and weather parameters. In the end, they develop a collective prediction model, which could aid future respective improved measures. Real-time monitoring of farmland pests has great significance to online application of appropriate amount of pesticides and the effect of reducing crop pests. In China, traditional pest monitoring methods usually require manual counting of pests' bodies. The counter has to be trained to have a certain requirement for pestknowledge, it is time consuming and labor intensive, the accuracy of the results cannot be guaranteed.

In recent years, there has been a large infection area of crop diseases and insect pest as well as the degree of its seriousness, which caused enormous economic losses to the peasants. Crop losses due to pests and diseases are quite considerable, particularly in the Indian semi-arid conditions [Reddy]. Weather plays an important role in agricultural production. Crop is prone to attack by numerous pest/disease to a much

larger extent than many other crops. Significant crop losses by these diseases have been reported. Farmers will use this WSN technology for their benefits in future. Many agricultural areas could benefit if used properly. Some agriculture areas are still in research and among researchers like pest monitoring and control, immediate need of pesticides, monitor need of water and fertilizer.

Plant disease and insect pests have turned into a dilemma as it can cause significant reduction in both quality and quantity of agricultural products. China is one of the countries which suffer from the most serious plant disease and insect pest infection in the world. In recent decades, the loss caused by plant disease and insect pests is far more severe than that by plant fires, so plant disease and insect pests forecasting is of great significance and quite necessary. The naked eye observation of experts is the main approach adopted in practice for detection and identification of plant disease and insect pests [3]. However, this requires continuous monitoring of experts which might be prohibitively expensive in large farms. Further, in some developing countries, farmers may have to go long distances to contact experts, which take the experts too expensive and time consuming [4]. Automatic detection of plant diseases is an essential research topic as it may prove benefits in monitoring large fields of crops, and thus automatically detect the symptoms of disease and insect pests as soon as they appear on plant leaves. Machine learning based on detection and recognition of plant disease and insect pests can provide clues to identify and treat the plant disease and insect pest's inits early stages [5]. But, machine learning is only a process in the recognition methods. Looking for fast, automatic, less expensive and accurate method to detect plant disease and insect pest cases is of great realistic significance.

We discuss a new pest supervision system in this paper, Here light or sexual attractant to attract pests attached to the pest board are used to accomplish the gathering live pest data by real-time transmission of dynamic image information with 4G wireless network, Identification and Quantity of entire pests are gathered by Image processing technology information. This system is characterized for gathering complete live pest information without killing it. The system can provide a complete and effective pest information to pest monitoring personnel, and meet the requirements for relevant personnel.

There is no doubt that efficient fresh agricultural products supply chain management is the key to improve the competitiveness of fresh produce enterprises, and the appearance of things brings a new opportunity for fresh agricultural products supply chain management. At present, there is still a big gap between theoretical research and practical applications, Especially in China

THE SYSTEM OF ATTRACTING AND ACQUIRING DYNAMIC CHARACTERISTICS OF LIVING PESTS

Below we present the issues present to attract the living pest and its dynamic feature extraction

A) Attracting insects: In farmland the surrounding is very complex and there are different types of insect are present in it. This system, the method of pest's attraction can be categorized into two type's method of light attraction and the method of sexual attractant.

I) light attraction method: This method uses the phototaxis of insects to attract the surrounding insects to the pest board in a dark environment at night, but the drawback of this method is that the

insect type cannot be identified, this method applies only to insect present at night time.

II) Sexual attractant method : This method uses sexual attractants to attract pests attached to the pest board, This method can determines the type of insect, but cannot get the information of other types of pest, and the type of attracted pests is relatively simple, and this method applies to daytime insect information statistics. For different working conditions during the day and night, we choose different methods to attract insects. During the daytime, a specific sexual attractant can be added to the pest board to attract specific pests; during the nighttime, Insects will be attached to the pest board through the insects' photo taxis.

B) Dynamic image acquisition: Most pest control sites are located in remote sites, it is difficult to connect LAN communication. Therefore, this system has a long-distance transmission to the original dynamic image, and provide the real-time original dynamic image for the image processing equipment, gives the guarantee for the later insect identification and the counting.

C) Dynamic feature analysis: From farm pests original image extraction of pest information, like number of pests and the quantity of pest motion.

D) Equipment development and the validation of effectiveness: Here Set up farmland pest automatic monitoring system for getting the original image information, algorithmic analysis the dynamic images of pests, compare the results of experimental and verify the effectiveness of the system. The dynamic feature extraction process of pests here we don't have any damage to the body of pests. Compared with the pest monitoring dead body with damaged body, pest activity controlling consist of Advantages:

I) Assure the integrity of the pests, reduce the error of identification, and enhance the reliability of data.

II) Dead body monitoring can only measure the type and number of insects, but live supervision system can give "activity parameters" that is the insect movement amount, it can reflect the degree of insect activity, After communication with agricultural plant protection personnel, we found that the number of farm pests and the amount of pests movement is the most concern of plant protection personnel. The grater pests and pest motion, the more likely to explode pests, so we can prevent and decrease the possibility of pest disaster.

The section I explains the Introduction. Section III presents the literature review of existing systems and Section IV present proposed system implementation details which includes preprocessing and feature extraction Section V presents experimental analysis, results and discussion of proposed system. Section VI concludes our proposed system. While at the end list of references paper are presented.

II. LITERATURE REVIEW

Here author M. Mari, I. Orovi and S. Stankovi present Compressive sensing principle[1] for recovering missing information in image and compressing of the original data. here author analyze the performance and quality of Compressive Sensing approach applied on images captured by the TrapView automated camera station for pest detection. The reconstruction at the decoder side, if only small number of image samples is available, is tested.

The power of wireless sensor network node[2] is usually provided by a dry battery, which the power

energy is limited, and the life cycle of wireless sensor network is determined by the battery directly. On the basis of the analysis of energy-saving mechanism of wireless sensor networks, have come up with a plant electrolyte power, a new renewable energy, which attains energy from the electrolytes in the body of plants. The plant electrolyte power can be used in the tropical crop pest monitoring system and it can also be widely applied in wireless sensor network node associated with the plant.

Here author used some approaches for finding the position and direction of spider[3]. A spider is first extracted from each captured image by background subtraction and extraction of the largest connected component. The extracted spider image is divided into the body part and the leg part in order to estimate the position and the direction in the following steps. The position of the spider is determined as the center of the body part. The direction of the spider is estimated by a combination of an initialization operation and a sequential computation.

Paper[4] is used help the farmer in detecting and controlling plant diseases, thereby controlling the financial losses. We present a method for automatically recognizing the plant species based on leaf shape for five different species of common garden plants, Anant (Gardeniajasminoides), Aboli (Crossandra), Chandani (Crapejasmine), Jui (Common Jasmine) and Jaswand (hibiscus). The work focuses on identifying garden plants species which will act as an input to a decision support system (DSS) that would be developed for giving advice to farmers as and when required over mobile internet.

Here author did agriculture monitoring[5] of Pakistan land, pest disease monitoring, and different pest control mechanisms. They analyze and classify pest control mechanism in technological, non-technological and integrated solutions. Then compared the pest control mechanisms based on their effectiveness, cost and other performance parameters. Finally, they analyze the feasibility of pest control mechanisms based on the use of WSN for farmers in developing countries.

Data mining techniques and WSN[6] used for agriculture pest or disease prediction. These techniques were used to turn the data into useful information/knowledge/relations/trends and correlation of crop-weather pest/disease continuum. Data driven precision agriculture aspects, particularly the pest/disease management, require a dynamic crop-weather data. An experiment was conducted in a semiarid region to understand the crop-weather-pest/disease relations using wireless sensory and field-level surveillance data on closely related and interdependent pest (Thrips) disease (Bud Necrosis) dynamics of groundnut crop.

This paper introduces the concept of internet of things (IOT) technology[7] to percept information, and discusses the role of the IOT technology in agricultural disease and insect pest control, which includes agricultural disease and insect pest monitoring system, collecting disease and insect pest information using sensor nodes, data processing and mining, etc and proposed A disease and insect pest control system based on IOT.

Identification of pests in the paddy fields [16] is a great challenge in the field of agriculture, therefore effective measures should be developed to fight the infestation while minimizing the use of pesticides. The methods of image analysis are extensively applied to agricultural science, and it provides large protection to crops, which can ultimately lead to better crop management and production. Supervision

of pests infestation relies on manpower, however automatic monitoring has been advancing in order to reduce human efforts.

III. SYSTEM ARCHITECTURE

Image dataset of pests or insects are given as an input for extracting features from them by doing preprocessing on that images. Original images are processed to get the features these features are like color of insect, position of insect, quantity, shape and so on. Then these extracted features are used to identify the test image are insect or not. This can help to improve the agriculture production.

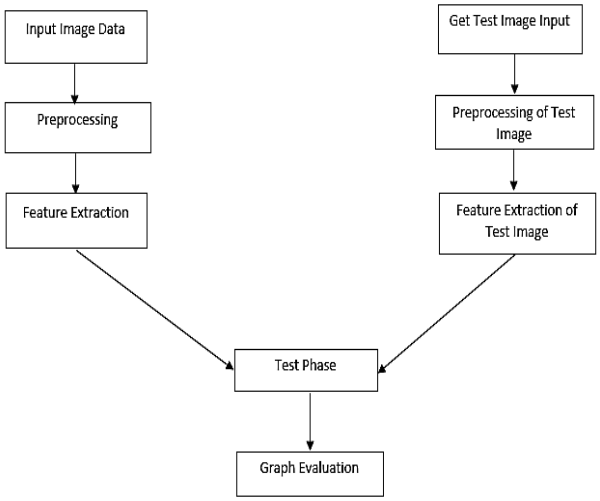


Fig 1. System Architecture

IV. RESULT AND DISCUSSIONS

A. Experimental Setup

All the experimental cases are implemented in Java in congestion with Netbeans tools and MySql as backend, algorithms and strategies, and the competing classification approach along with various feature extraction technique, and run in environment with System having configuration of Intel Core i5-6200U, 2.30 GHz Windows 10 (64 bit) machine with 8GB of RAM

V. CONCLUSION

Here we discussed some factors that affect the agriculture production one of them is pests or disease present in farmland which has more impact on agriculture production. So for improving the production of agriculture we studied some methods like color feature and threshold, Gaussian filtering to obtain the shape features and the number of pests and frame-to-frame differencing method to obtain the quantity of pest motion.

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Carotenoid Content and Weight Gain of *Caulerpa racemosa* (Chlorophyta, Caulerpaceae) at Several Light Intensities

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ABSTRACT

An experiment was conducted done outdoors in the area of the Wet Laboratory of Faculty of Marine Science and Fisheries, HasanuddinUniversity to examine the influence of several light intensity ranges on carotenoid content and weight gain of the seaweed *Caulerparacemosa.* Filtered seawater and styrofoam boxes were the cultivation medium and container, used respectvely. Carotenoid content and the weight gain was analyzed in the Water Productivity and Quality Laboratory of FIKP, UNHAS. Carotenoid content was determined spectrometrically, the weight gain, carotenoids content and water quality parameters were statistically and descriptively analyzed, respectively. Low light intensity of 200 – 300 lux was lower than the saturation point resultedlow weight gain due to photoinhibitionand decreased chlorophyll synthesis, greater respiration activity than photosynthesis.Light intensity range of 500 – 600 lux was exceed the saturation point causecarotenoid damage, low weight gain due to *photorespiration,* decreased nitrate reductase activity, cell damage and death, reducephotosyntheisi and reduce cell size. Light intensity range of 400 – 500 lux was the optimum and saturation point light intensityresultedhigh weight gain. The range of temperature, salinity, pH, ammonium concentration, and magnesium water media during the study was suitable the growth of *C.racemosa.*

Keywords : Carotenoid, *Caulerparacemosa*, Low Light Intensity, Photoinhibition, Photorespiration, Weight Gain

I. INTRODUCTION

Currently, seaweeds are used worldwide formany different purposes. The human consumption of seaweedis common in Asian countries, mainly Japan,China,Korea,Vietnam, Indonesia and Taiwan (Dawes, 1981). *Caulerpa racemosa* is one of the seaweeds that is consumed directly as a vegetable by people in these countries. These species are known as valuable sources of protein, minerals, dietary fibers, vitamins, essential aminoacids, essential fatty acids and carotenoids.

Mass production of *C. racemosa* through cultivation has not been carried, and there is no method or standard cultivation technique has been found out yet. People still rely on extraction from nature for consumption of this species. Recent *C. racemosa* cultivation experiment in Indonesia is done by plugging it down to the sediment of the brackishwater fishpond.

This green alga are autotrophic organisms contain various pigments that absorb certain intensity of light energy to synthesize such kind of biocompounds.

One of the such pigments is carotonoid. Carotenoid also act to protect chlorophyll from photo-oxidation. Algae exposed to light with different intensities will show differences in photosynthetic activity and chemical composition. Hence, light intensity is possible variable whose manipulation might enhance growth and carotenoid production of *C. racemosa*. Therefore some light intensity is tried to be exposed to tallus of *C. racemosa* outdoor and analyze their effect on growth and carotenoid content the species of algae.

The article presented here provides a brief and funfamental study of the influence of different low light intensity ranges on the weight gain and carotenoid content of *C. racemosa.*

II. METHODS AND MATERIAL

STUDY SITE AND TIME

The experiment was carried out for 2 months during the transition of dry season to rainy season (May - July 2015) with a period of 45 days of seaweed growth at the open area, outside the Wet Laboratory, Faculty of Marine Science and Fisheries, Hasanuddin University (FIKP, UNHAS), Makassar, Indonesia

SEAWEED SEED

Seaweed used in this research was *C. racemosa* (Figure 1) obtained at the location of cultivator seaweed cultivation on the coast of Puntondo Village, Mangngara Bombang District, Takalar Regency, South Sulawesi Province, Indonesia. The seeds were then transported to the Wet Laboratory, Fisheries Department, Faculty of Marine and Fisheries, Hasanuddin University. Selected healthy seaweed seedlings were cleaned of sticky dirts.



Figure 1. The Seaweed *Caulerpa racemosa* studied

MEDIA AND CONTAINERS

The physical and biological filtered water and a series of styrofoam boxes (Figure 2) were the cultivation medium and container, respectvely were used.



Figure 2. The container used to Culture *C.racemosa*

As a substrate for the growth of seaweed, the base of the research container is spread with 5 cm brackishwater pond soil sediment, then filled with filtered seawater as high as 30 cm.. Previous to planting the seaweed, the water allowed to stand for 24 hours to precipitate suspended clay particles to get culture media that is free of clay particles causing the turbidity.

SEAWEED CULTIVATION METHOD, TREATMENT AND EXPERIMENTAL DESIGN

The initial weight of 30 g of seedlings were placed in each container filled with water. The seaweed the seaweed is then exposed to direct sunlight with some light intensity being tested. Through setting the number (1 to 3 layered sheets) of the net and the distance above the top of the container the range of desired light intensities were obtained (Figure 3).



Figure 3. Top of the Containers were covered with net to obtain the light intensity range needed

The range of light intensities tested consisted of: 500 - 600 lux, B: 400 - 500 lux, 300 - 400 lux, and 200 - 300 lux, which were measured using Lux Meter. The determination and measurement of light those intensities were carried out twice a day, which is at 11.00 am, then set and measured again at 14.00 noon, when the intensity of sunlight and photosynthesis takes place maximally. All the treatments were designed with Complete Randomized Design (CRD) CRD with three replicates each. Each treatment and replication are placed randomly.

The range of light intensity tested is based on the findings that light intensity range of 380-720 lux is feasible for algae photosynthesis (Dring, 1971), that optimal light intensity for seaweed growth ranges from 333-1000 lux (Wood, 1989), and the maximum growth rate of seaweed is achieved at a light intensity of 600 lux (Mairth *et.al.*, 1986). The standard irradiance of 400 – 500 lux had substantially higher amounts of carotenoid (Walsh et.al., 1997).

WEIGHT GAIN MEASUREMEN

Seaweed wet weight gain was measured at the end of the study using the following formula:
W = Wt - W0; W = weight gain (g) ; Wt = the final weight of seaweed (g)
W0 = the initial weight of seaweed (g)

CAROTENOID CONTENT

Carotenoid content was determined at the end of the study spectrophotometrically with a 480 nm wavelength (Kirk and Allen (1965, by Thirumaranand Anantharaman, 2009) in the Water Productiity and Quality Laboratory of the Fisheries Department, Faculty of Marine and Fisheries, Hasanuddin University and calculated by the following formula:

Carotenoid:(µg/g.FW)=ΔA.480+ (0,114xΔA.663)– (0,638xΔA.645) ;
ΔA= wave length at absorbant

WATER QUALITY PARAMETERS

Water quality parameters consisted of salinity, pH, and temperature were monitored daily. Carbondioxide, ammonia, and magnesium, were analysedat the beginning, middle and end of the study at the Water Quality Laboratory, Department of Fisheries, Faculty of Marine and Fisheries, Hasanuddin University.

DATA ANALYSIS

The weight gain of *C.racmosa* was statistically analyzed using analysis of variance (ANOVA)(Steel

and Torrie, 1993), while caratenoids content and water quality parameters were descriptively analyzed.

III. RESULTS AND DISCUSSION

RESULTS

There was a consistent increase in the carotenoid content of the seaweed *C.racemosa* when the light intensity increased, at light intensity of 200 – 300 lux, 300 – 400 lux, and 400 – 500 lux, that was 2.98%, 4.04, 4.48%, respectively. However, lower carotenoid content (3,62%) was recorded when the plant was exposed to further higher low light intensity (500 – 600 lux), some higher than at lowest light intensity (200-300 lux) wich results 2.98% carotenoid content. Analysis of variance (ANOVA) showed that the average weight gain of *C. racemosa* exposed to light intensity was not significantly different ($p > 0.05$). However, the light intensity range of 400 -500 lux seems to be the optimal light intensity for this seaweed species because it provides a relatively high weight gain (8-50±3.58 g) compared to light with high intensity (500 – 600 lux with 4.40±0.98 g weight gain) and to lower light intensity (300 – 400 lux with 5,60±1,63 g weight gain; 200 – 300 luxwith 4.40±0.98 g weight gain) (Table 1). Havaux*et.al*. (2000 cited by Xu*et.al*. (2016) also noted a decrease in macro algae biomass at high light intensity.

Table 1. Average Weight Gain and Carotenoid Content at Different Light Intensity

Light Intensity Range (lux)	Carotenoid Content (%)	Average Weight Gain (g)
500 – 600	3.62	4.40±0.98
400 - 500	4.48	8.50±3.58
300 – 400	4.04	5.60±1,63
200 – 300	2.98	4.08±4.55

Water temperature recorded at the range of 27 to 31^{o}C, salinity 30 to 35 ppt, pH 7 to 8.1, magnesium concentration was 4804.8 - 5505.5 ppm, ammonium 0.003 - 0.016 ppm. Free carbon dioxide concentration was undetectable.

DISCUSSION

Light intensity affects the chemical composition, pigment content (including carotenoids) and photosynthetic activity of algae. Therefore light intensity affects the growth and composition of algal biomass (Wahidin et al., 2013). The increase in biomass and carotenoid content depends on the intensity of light (Gross, 1991). his change in carotenoid content in seaweed is a physiological response (photoaclimation) triggered by variations in light intensity (Anderson, 1986). Carotenoid content changes with light intensity, and tends to vary according to species in the same way (Goericke and Montoya 1988; Schulteret al., 2000 cited by Grant, 2011) as a mechanism for protecting tissue cells active in photosynthesis from damage caused by the quality and quantity of light that cannot be tolerated.

This photoprotecting pigment concentration increases in order to prevent photoinhibition of the plant tissues (Grant, 2011) which was occurred both at low light intensity (200-300 lux) and high light intensity (500-600 lux). Under low ligh tconditions, carotenoid on the one hand serve as accessory pigments, harvesting light energy and transferring it to chlorophyll a molecules), while underhigh light conditions, they protect chlorophyll *a* of *C.racemosa* from photo-oxidation (Siefermann-Harms,1980). On the other, when the cells of plant exposed to very high ligh intensity (500 – 600 lux), damage or drop of photosynthetic receptor (carotenoid in addition to chlorophyll) was occurred. According to Dawes (1981) algae can grow well in the presence of sufficient light. In addition to chlorophyll and several other photosynthetic pigments, carotenoids are supporting pigments in seaweed in

capturing light energy at certain wavelengths that cannot be captured by chlorophyll. The light is then transferred to chlorophyll for photosynthesis (Zigmantas et. Al., 2002). Photographs of pigment adaptation to light sources lead to changes in growth in addition to cell composition (including the carotenoid pigment content (Rüdigerand López-Figueroa, 1992). According to Geider (2006), the amount and quality of light is very influential in photosynthesis (Geider, 2006; Gammanpila et. Al., 2015), so that it influences cell division and cell enlargement that causes growth.

The condition of light intensity determines biomass productivity and cell growth (Kumar et.al, 2015) because the amount of light received and stored by seaweed has a direct effect on carbon fixation capacity (Kumar et.al, 2015). The solar energy captured then converted into chemical energy (ATP and NADPH) in the process of photosynthesis (Taiz and Zeiger, 2002). Therefore the growth and metabolism of these algae depends on the efficiency of the conversion of light into chemical energy (Richmond, 2004). Biomass is higher at high light intensities compared to biomass at low light intensity (Iwamoto et. Al., 1955; Gammanpila et. Al., 2015). Increasing the weight of *C.racemosa* seaweed from the light intensity range of 200 - 300 lux to 300 - 400 lux then maximum at optimal light intensity 400 - 500 lux.

Light provides energy to transfer electrons from water to NADP and forms NADPH (nicotinamideadeninedinucleotidephosphate) and produces ATP (adenine triphosphate) (Salisbury and Rose, 1969). Low light intensities ranging from 200 - 300 lux are beyond the saturation point (Sorokin and Krauss, 1958 cited by YingYang, 2013) and unfavorable intensities (Van Oorschoot 1955) results in photoinhibition, thus limiting biomass accumulation (Sorokin and Krauss, 1958 quoted by YingYang), 2013). At low light intensities, photosynthesis occurs slowly because only a small amount of ATP and NADPH is produced by light-dependent reactions. In addition, a decrease in light intensity results in a greater increase in respiratory activity than photosynthesis (Iwamoto et al. 1955), which can reduce its weight (Gardner, 1995). The reduction in biomass is also caused by a decrease in chlorophyll synthesis (Pisal and Catfish, 2004; Kumar et al. 2011; Xu et al. 2016).

With increasing light intensity, more ATP and NADPH are made, thus increasing the rate of photosynthesis. However, when the light intensity is above the saturation point for this algae species, photorespiration occurs, which occurs at the same time as photosynthesis (Salisbury and Rose, 1969), where much oxygen is built (oxygen production exceeds CO_2 production during photosynthetic light reactions), so the amount of oxygen exceeds the amount of carbon dioxide produced. Thus, the RuBisCO enzyme oxidizes RuBP (RuBP receives oxygen instead of fixing CO_2) during photosynthesis, causing some of the energy produced by photosynthesis to be in vain (ATP is only spent). The range of light intensity 500 - 600 lux is classified as a saturation point that causes light inhibition (Van Oorschoot 1955; Pulz, 2001), which reduces plant photosynthesis capacity (Iwamoto et.al., 1955; Stigum, 2002), which inhibits growth rates due to damage cells, reduce cell size (diameter) and cause cell death (Loera-Quezada et al., 2011). The barriers of vegetative growth (thallus) from seaweed can also be caused by a decrease in the activity of nitrate reductase (an enzyme that reduces nitrate to ammonium) at high light intensities (Peni et al, 2003) so that ammonium which is a form of nitrogen directly enters the protein metabolism process (Syrett , 1962) concentration is limited in supporting the

growth of *C.racemosa*. The range of light intensity 400 - 500 lux is the optimal light intensity (saturation point) which is a remarkable effect for biomass production and storage. This optimal level of light intensity expresses its photosynthetic ability to fully maximize photographic results in high biomass content (Gammanpilaet.al., 2015). So the light saturation point, the light conditions for maximum biomass storage fall within the range of light intensity 400 - 500 lux.

The recorded water temperature range is considered to support Growth of *C.racemosa*. This is consistent with the opinion of Afrianto and Liviawaty (1993), which states that seaweed grows and develops well below the water temperature range of 26-33°C. The range of salinity is suitable for the growth of *C.racemosa* (Carruterset. Al., 1993; Azizah, 2006). The pH of the water medium is within optimal limits to support the growth of *C.racemosa*. This was confirmed by Setiajiet al. (2012), that the pH of sea water with a range of 8.0 to 8.7 is feasible for the growth of *C.racemosa.* The range of magnesium concentration was optimal for the growth of *C. racemosa* in the range of 135.11-1652-0.42 ppm (Anonim, 2006). The function of magnesium is for cell metabolism and phosphate energy transfer. The ammonium concentration is in the high category. According to Andarias (1992), good ammonium levels for the growth of marine algae are in the range of 0.01-0.03 ppm. The undetectable concentration of carbon dioxide does not mean that there is no carbon source for photosynthesis. Seawater with high carbonate content becomes a source of carbon dioxide, although the concentration is directly used in photosynthesis and the rest in water is very low and cannot be detected by the analytical method used.

IV. CONCLUSION

Carotenoid content of C.racemosa increases to prevent photoinhibition the plant tissues both at low light intensity (200-300 lux) and high light intensity (500-600 lux). When plant exposed to very high light intensity of 500 – 600 lux, damage or drop of carotenoid was occurred.

Low light intensity ranges of 200 – 300 lux was beyond the saturation point resulting in photoinhibition and decreased chlorophyll synthesis so that the respiration rate increases and exceedsphotosyn thesis, , ultimately reduced the biomass. Light intensity range of 500 – 600 lux was above the saturation point which causes photorespiration and light inhibition, reduce photosynthetic capacity of the plant, cell damage, penurunanaktifitasnitrat reduktase, reduce cell size, and finally inhibiting the growth rate and causes cell death. Light intensity range of 400 – 500 lux was the optimum light intensity express the photosynthetic ability to fully utilize the photoenergy, favourable effect for biomass production resulting in high weight gain. The range of temperature, salinity, pH, ammonium concentration, and magnesium water media were considered to support the growth of C. racemosa. Seawater media with high carbonate content is a source of carbon dioxide that is utilized in the photosynthesis.

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Gas Leakage Detection and Alert System using IoT

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ABSTRACT

The Internet of things (IoT) is the system of gadgets, vehicles, and home machines that contain hardware, programming, actuators, and network which enables these things to interface, collaborate and trade information. IoT includes broadening Internet network past standard device, for example, work areas, workstations, cell phones and tablets, to any scope of generally stupid or non-web empowered physical device and ordinary articles. Installed with innovation, these gadgets can convey and connect over the Internet, and they can be remotely observed and controlled [1]. The meaning of the Internet of things has advanced because of union of numerous innovations, ongoing examination, AI, ware sensors, and implanted frameworks. Conventional fields of installed frameworks, remote sensor systems, control frameworks computerization (counting home and building mechanization), and others all add to empowering the Internet of things. A gas spill alludes to a hole of petroleum gas or different vaporous item from a pipeline or other regulation into any territory where the gas ought not be available. Since a little hole may steadily develop a hazardous convergence of gas, spills are perilous. Notwithstanding causing flame and blast dangers, holes can slaughter vegetation, including huge trees, and may discharge amazing ozone harming substances to the environment.

Keywords: IOT, MQ5 sensor, Arduino module, GSM networks.

I. INTRODUCTION

The Internet of Things is a developing theme of specialized, social, and monetary centrality. Customer items, tough goods, cars and trucks, modern and utility segments, sensors, and other regular articles are being joined with Internet availability and amazing information systematic capacities that guarantee to change the manner in which we work, live, and play. Projections for the effect of IoT on the Internet and economy are amazing, with some foreseeing upwards of 100 billion associated IoT gadgets and a worldwide financial effect of more than $11 trillion by 2025. The Internet of Things (IoT) is an essential theme in innovation industry, strategy, and designing circles [1]. This innovation is encapsulated in a wide range of arranged items, frameworks, and sensors, which exploit headways in processing power, gadgets scaling down, and organize interconnections to offer new capacities. The expansive scale usage of IoT gadgets guarantees to change numerous parts of the manner in which we live. For shoppers, new IoT items like Internet-empowered machines, home mechanization parts, and vitality the executive's gadgets are pushing us toward a dream of the "savvy home", offering greater security and vitality effectiveness. IoT frameworks like arranged vehicles, savvy traffic frameworks, and sensors implanted in streets and scaffolds draw us nearer to "brilliant urban areas", which help limit clog and vitality utilization. IoT innovation offers the likelihood to change horticulture, industry, and vitality creation and dissemination by expanding the accessibility of

data along the esteem chain of generation utilizing arranged sensors [3].

II. METHODS AND MATERIAL

System: Input, Output, Function, Success, Failure

Input: Sensor data signal which is not regular or Change in Signal

Output: End User get informed with alert buzzer and Display to LCD

Functions:

1. Access ():- In this module we are going to access the feature provided by the module which Will include Sensor data access.
2. Control ():-In this module we are controlling the Alert System by using System which is connected to hardware or sensor data.
3. Broadcast ():-In this module we are going to broadcast the alert Display to LCD.
4. Success Conditions:

1. If such data which is received through sensors are not stable or are more than threshold it will predict that there is leakage situation

5. Failure Conditions: Desired output is not generated due to following failures.

1. Software Failure
2. Hardware Failure
3. Network Connection Failure

HARDWARE INFORMATION:

1. Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

2. LCD (Liquid Crystal Display)

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

1. The declining prices of LCDs.
2. The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
3. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.

3. BUZZER

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. The first electric buzzer was invented in 1831 by Joseph Henry. They were mainly used in early doorbells until they were phased out in the early 1930s in favor of musical chimes, which had a softer tone. Piezoelectric buzzers, or piezo buzzers, as they are sometimes called, were invented by Japanese manufacturers and fitted into a wide array of products during the 1970s to 1980s. This advancement mainly came about because of cooperative efforts by Japanese manufacturing companies. In 1951, they established the Barium Titanate Application Research Committee, which allowed the companies to be "competitively

cooperative" and bring about several piezoelectric innovations and inventions.

4. Bluetooth Module:

SIM900 GSM Module – This means the module supports communication in 900MHz band. We are from India and most of the mobile network providers in this country operate in the 900MHz band. If you are from another country, you have to check the mobile network band in your area. A majority of United States mobile networks operate in 850MHz band (the band is either 850MHz or 1900MHz). Canada operates primarily on 1900 MHz band.

Simulation Diagram

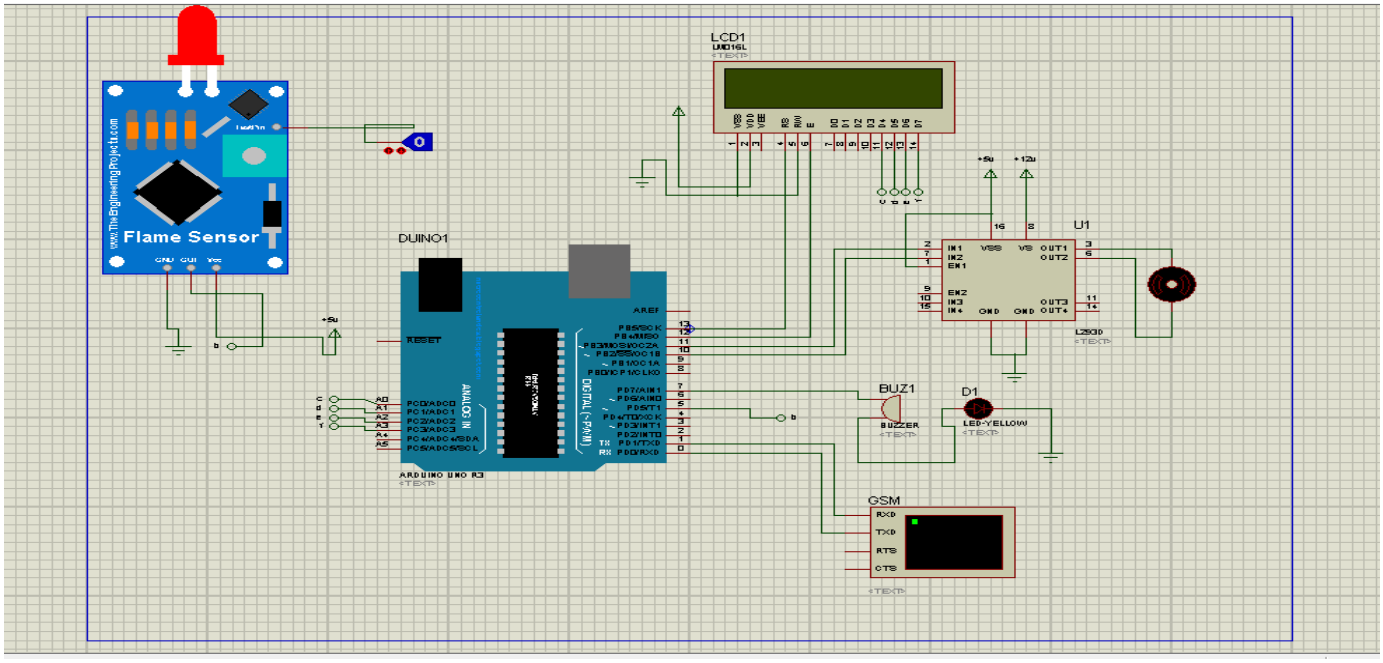


Fig.1: Simulation Diagram

III. LITERATURE SURVEY

Sr. No.	Paper Title	Author Name	Publication Year	Result
1	Internet of Things (IOT) Based Gas Leakage Monitoring and Alerting System with MQ-2 Sensor	Rohan Chandra Pandey, Manish Verma, Lumesh Kumar Sahu	2017	This paper choice of using a real time gas leakage monitoring and Sensing the output levels of gas has been clearly observed by the help of this system.

2	Gas Leakage Detection and Smart Alerting and Prediction Using IoT	Asmita Varma, Prabhakar S, Kayalvizhi Jayavel	2017	The proposed gas leakage detector is promising in the Field of safety.
3	IOT Based Gas Leakage Detection System with Database Logging, Prediction and Smart Alerting	Chaitali Bagwe, Vidya Ghadi, Vinayshri Naik, Neha Kunte	2018	The system provides constant monitoring and detection of gas leakage along with storage of data in database for predictions and analysis. The IOT components used helps in making the system much more cost effective in comparison with traditional Gas detector systems.
4	Internet of Things (IoT) Based Gas Leakage Monitoring and Alerting System with Mq-6 Sensor	Rohan Chandra Pandey, Manish Verma, Lumesh Kumar Sahu, Saurabh Deshmukh	2018	A discussion on how the aims and objectives are met is presented. An overall conclusion IOT based toxic gas detector is it has become more efficient, more applicable to today's applications and smarter.
5	Gas Leakage Detection and Smart Alerting System Using IoT	Shital Imade, Priyanka Rajmanes, Aishwarya Gavali	2018	In this paper we use IOT technology for enhancing the existing safety standards. While making this prototype has been to bring a revolution in the field of safety against the leakage of harmful and toxic gases

Table.1: Literature Survey

IV. PROPOSED SYSTEM

We design and develop an propose system which include some safety factors. A safety has been a major issue in today's day to day life. LPG and CNG i.e. petroleum gas and compressed natural gas are most commonly used in residential and commercial places for cooking purpose and in various vehicles as a replacement for costly fuels like diesel, petrol [7]. These gases are filled in cylinders which are easily un-damageable. But leakage can take place through pipes or regulators or knobs which may cause accidents like suffocation, uneasiness or sometimes

may catch fire and short circuit as well. The main aim of this project is developing a system that can detect gas leakage [8]. On detection it will send an alert SMS and the gas supply knob of cylinder will be switched off automatically.

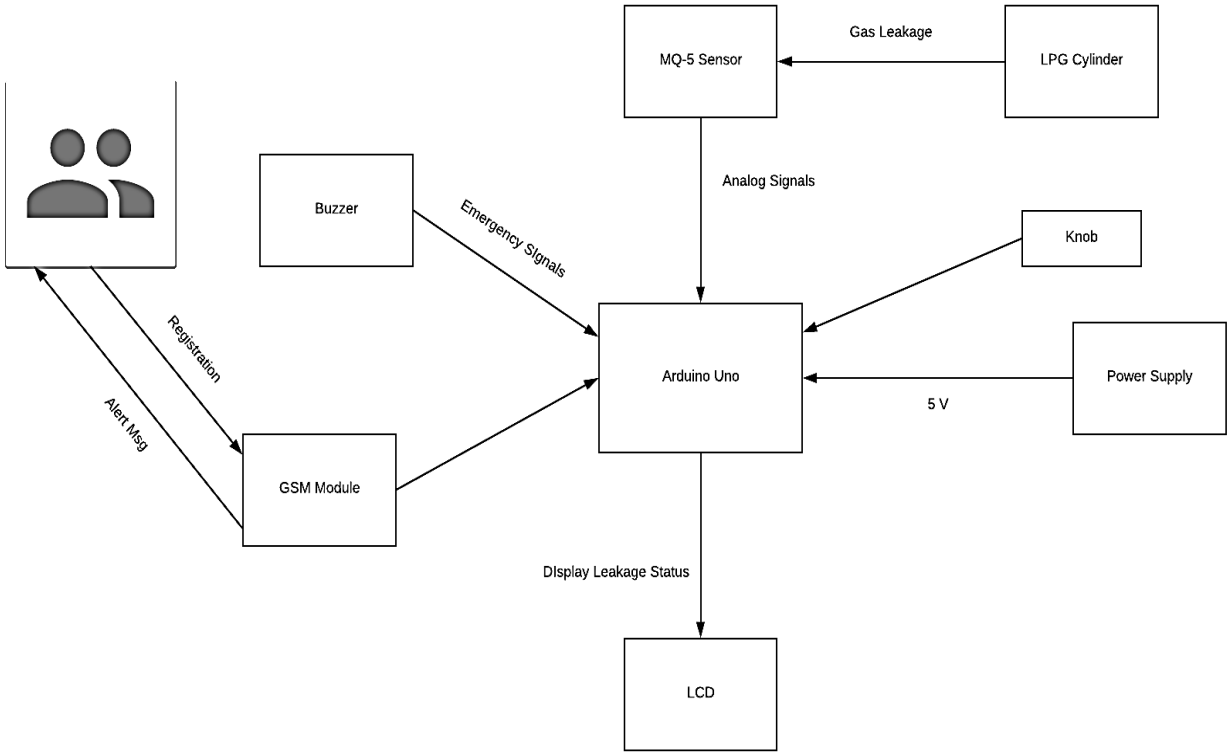


Fig.2: System Architecture

V. CONCLUSION

The advantage of this simple gas leak detector is its simplicity and its ability to warn about the leakage of the LPG gas [11]. This system uses GSM technique to send alert massage to respective person if no one is there in the house and then gas leaks occurs, GSM module is there to send immediate messages to the respective person regarding the gas leak [13]. The main advantage of this system is that it off the regulator knob of the cylinder automatically when gas leakage detected.

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Optimization of Parametric Effect of Ultrasonic Welding

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ABSTRACT

In today's world, aluminium and its alloy is showing promising characteristics for replacing other materials due its excellent properties like light weight, corrosion resistance, high strength and toughness. Conventional welding for these materials creates some challenges like porosity, hot cracking and void formation. Ultrasonic welding gives some ultimate solution to these problems as the material experience only 30% of its melting point temperature. Ultrasonic welding is a creative system for joining metals and composites rapidly and safely owing to a high-frequency vibration consolidated with pressure. The process has a widespread application in electrical, automotive, aerospace, medical and packaging industry. In the present research work, a numerical model is proposed for the evaluation of heat generation due to deformation and friction during welding. The developed model is equipped for predicting the interface temperature and stress distribution during ultrasonic welding and their impacts on sonotrode, anvil and welded parts. The effect of tool (sonotrode) shape also studied. Response surface methodology (RSM) with Box-Behnken design has been implemented to design the experimental setup and establish a co-relation between process parameters viz. pressure, amplitude and welding time with the output response as tensile strength. RSM is coupled with desirability function is utilized to optimize the parameters for a desired tensile strength of the joint. The result of numerical model is compared with the experimental value and found to be in good agreement.

Keywords : Ultrasonic Welding, FEM, RSM, Desirability Function, Thermocouple

I. INTRODUCTION

Ultrasound is the oscillating sound wave having a frequency more than 16 KHz which is well above the human hearing. It can be used for welding of wide range of materials with a frequency more than 20 KHz with vibrational amplitude of more than 10 μm resulting with an ultrasonic energy. Substantial increasing in quality and performance improvements is achieved by using ultrasonic energy in machining technological.

FUNDAMENTAL PRINCIPLE

Ultrasonic metal welding is a solid state joining process used to weld thin metal sheets, foils and wire. The principle of this welding operation follows from creation of an oscillating shear force (ultrasonic vibrations) under moderate pressure (normal force) at the interface between the mating surfaces, to separate liquids contaminants, voids, oxide layer and offer new contact at many points.

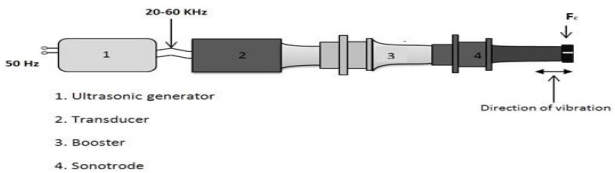


Fig 1. Principle of ultrasonic welding

The vibrations are applied parallel to the weld contact area. As shown in figure a supply of 50 Hz electrical energy is supplied to the ultrasonic

generator which amplifies it up to 20 KHz – 60 KHz electrical energy and the same provided to the piezoelectric transducer which converts electrical energy into mechanical vibrations which is then enhanced by booster and transferred up to the sonotrode. When the vibrations reached to the contact area and results in oscillation causing an increase in diffusion across the weld interface and produces weld similar to that of diffusion welding.

WEDGE-REED SYSTEM

In the wedge-reed system demonstrated in Figure (a), the components are the generator, transducer, and wedge and reed arrangement of segments, used to deliver the ultrasonic vibrational energy and provide it to the work piece that are clamped between the sonotrode tip and anvil. A pneumatic, pressure driven or electrical gadget can be utilized for applying the normal force by controlling the upwards and downwards motion of the sonotrode. Typically, the amplitude which is in the range of 10 to 100 μm can be varying as per the tool design. The purpose of the wedge is to enhance the amplitude and that is transfer by the reed to the sonotrode tip.

LATERAL DRIVE SYSTEM

This type of ultrasonic welding system is more commonly used, as shown in Figure (b) the system comprises of a generator, transducer, booster and sonotrode. Sometimes, the combination of sonotrode and booster which is then connected to the transducer is termed as welding stack. In a same way to the wedge-reed framework, the transducer creates a vibration of the piezoelectric plates. The booster expands the vibrational amplitude relying upon the input and serves as a mounting for the welding stack. The sonotrode can further expand the amplitude up to the welding range. In this system, the sonotrode is attached parallel to the direction of vibration of the tool. Hence, the vibration energy is transmitted to the workpiece in a transverse way. The parts, generally sheets or foils were clamped between moving sonotrode and stationary anvil in lap configuration. The ultrasonic vibration of the sonotrode is in the parallel direction to the part surface, generating a scrubbing movement at mating surfaces. The action creates heat due to friction caused by the relative movement in the mating parts, as a result of which shear deformation occurs at the zone with subsequent weld formation.

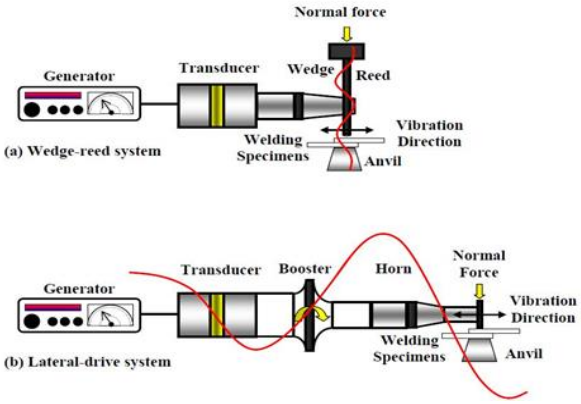


Fig 2. Types of ultrasonic metal welding system, **(a)** Wedge reed system, **(b)** Lateral drive system.

SUMMARY

The above chapter highlights the necessity of Ultrasonic welding in the area of manufacturing. The chapter also gives a brief idea about different types of ultrasonic welding and their uses.

II. MECHANICS OF ULTRASONIC WELDING SHEAR FORCES ACTING AT THE SONOTRODE TIP

The chapter will be discussing the mechanics of the ultrasonic metal welding. A numerical analysis has been done for the applied loads and deformation of the workpiece, sonotrode and anvil under the same load. The figure 3.1 shows in more details about the process, where the only external force applied is the clamping force applied at the top of the sonotrode used the kept the materials in contact. As a result of

the applied clamping force, the knurl pattern made on the sonotrode were inserted into the top part and helps the system to transfer vibration into the weld interface in synchronize with sonotrode. From the figure, it is shown that the not only the normal force F_N but also the net shear force F_I is also applied at weld interface as a result of the transverse vibration of the sonotrode.

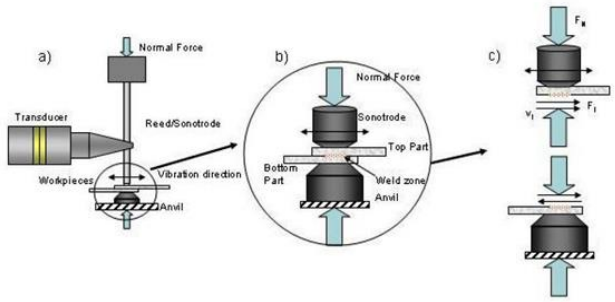


Fig 2. Force morphology of the Wedge Reed System

The model developed in the study is for a spherical sonotrode where the compressive stresses were not uniform and is time dependent. The study can also be applied for other shaped sonotrodes. To calculate the Shear force at weld interface we first needs to concentrate on the few factors like the component of the normal force F_N, heating of the workpiece and sonotrode tip during welding, and the impact of the part geometry on welding. The heating caused during welding were calculated from heat flux equations at the deforming area of weld interface and the frictional area where the parts are in contact.

However, these complex stresses will be extinct within a small distance leading to a uniform stress distribution throughout the cross section but during welding the portion subject to a shear stress. Hence, a combined compressive and shearing model is assumed for the plastic deformation of the material. To analyze this combined stress Tresca's yield criteria is used as stated below:

$$Fs \le \sqrt{\left(\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_s}\right)^2\right)} \times A_s = \tau_y \times A_s \qquad (3.1)$$

Where:

F_s = Shear force at the sonotrode tip.

Y(T) = Temperature dependent yield strength

A_s = Sonotrode area in contact with the top part

F_N = Normal force on the sonotrode

From the condition if *Fs* is less than R.H.S then top part will vibrate with the sonotrode simultaneously, but if it's equal then tip sticking will occur.

CONTACT STRESSES AT INTERFACE

Contact stress is nothing but the compressive stresses generated by the sonotrode which is effectively distributed over the larger area of the top part. The magnitude of the contact stress depends upon the thickness of the top part as it spreads out with larger area. In case of a spherical sonotrode shape, the contact stress is maximum towards the center.

SHEAR FORCES AT WELD INTERFACE

For calculating the forces at the interface one first needs to consider the dynamics of the part geometry, as we know that at the mating part a combined shear-normal force is applied, so let us first assume both the bottom and top part are rigid and length is reduced up to the sonotrode contact area. The bottom part is fixed with the anvil while the top part moves with the sonotrode. This will allow the dynamics of the part considered single body motion, without any chances of resonance occurs for the case of the larger body. During welding, a thin area of plastic deformation is resulted with intense shearing and bonding occurs between the parts. It is considered that the top part vibrates in same amplitude with the sonotrode and same can be simply expressed as:

$$\xi(t) = \xi_0 \sin(f t) \qquad (3.2)$$

Where:

f = frequency of vibration

ξ_0 = sonotrode amplitude

As top part oscillates with the sonotrode, so their acceleration is same and can be expressed as:

$$\frac{\partial^2 \xi}{\partial t^2} = -f^2 \xi_0 \sin(ft) \tag{3.3}$$

With the increase in deflection of the top part the sonotrode forces are also increases, hence maximum acceleration has to be considered.

$$\begin{aligned} m \times \xi_{max} &= Fs - F_I \\ As \times d \times \rho \times f^2 \times \xi_0 &= Fs - F_I \end{aligned} \tag{3.4}$$

Where:

ρ = density of the material

m = mass of the top part

As it said earlier that the anvil is fixed and so as the bottom part is fixed to the anvil, so anvil force F_A is equal to the interface force F_I. Now let us consider for an extended length of the part, which in a direction parallel to the vibration and the force developed is in one direction. The force for extension F_{EX} has its maximum when the deflection is maximum at the end.

$$m \, x\xi_{max} = Fs - F_I - F_{EX} \tag{3.5}$$

As top part moves with the sonotrode, so the extension of the top part is also excited by sonotrode frequency and velocity. So the force of extension as a function of part length can be expressed as follows:

$$F_{EX} = E \times A \times \frac{f}{c} \times \xi_0 \times \tan\left(\frac{f}{c} \times l\right) \tag{3.6}$$

Where:

E = young's modulus

A = area perpendicular to the vibration

c = wave velocity (longitudinal)

l = extension length

By solving the Eq 3.5 for calculating shear force Fs s compare with Eq 3.1 which says the parts has a plastic limit although it is considered to be rigid.

$$m \times \xi_{max} + F_{EX} + F_I \le \sqrt{\left(\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_s}\right)^2\right)} \times A_s \tag{3.7}$$

Now for the interface forces

$$F_I = \sqrt{\left(\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_s}\right)^2\right)} \times A_s - m \times \xi_{max} - F_{EX} \tag{3.8}$$

From the R.H.S of the expression which has three parts with the first part depends upon temperature and normal force, while the second is constant for a given material and geometry. Now F_{EX} will became very high for top part extension in anti-resonance case in return it will make interface force F_I very small by making the weld impossible. It is essential to have some amount of interface force for the welding to be accomplished.

FORCES AT WELD INTERFACE

The interface forces are hugely depends upon the process of welding, so let us first discuss the welding process in brief:

Before welding the parts when comes in contact surface impurities present on surface which restricts the bonding to take place with the application of static normal force, which is not sufficient for the net plastic deformation required in zone. When the ultrasonic vibration starts the surface asperities comes in contact and undergoes a shear deformation. The process generates an adequate amount of localize heat resulting in softening of material and at the end of the total cycle the deformation spreads upto the entire area allowing metal to metal joining.

The interface area consists of three parts:

1. A_W is the weld area, where the whole plastic deformation of the material takes place and joint is formed. It can also termed as deformation zone area A_{DZ}.
2. A_{FR} is the frictional area situated adjacent to A_W, here no welding occurs but plastic deformation takes place.

3. ANC non-contact area, where the surface are not in contact.

At the deformation zone area the limit for the contact stresses will be given as:

$$\frac{F_N}{A_{DZ}} \leq \frac{F_N}{A_W + A_{FR}} << \frac{F_N}{\lim_{A_{NC} \to A_{DZ}}} \quad (3.9)$$

From the Eq 3.9,

$\frac{F_N}{A_{DZ}} = \sigma_S$ is the contact stress or normal stress applied at the weld zone. A differential element is assumed from the weld interface for the calculation of welding force FW, now of critical yield shear stress can be calculated as:

$$\tau_Y(T) = \frac{dF_W}{dA} = \sqrt{\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_{DZ}}\right)^2} \quad (3.10)$$

From the above Eq it has been seen that stress depends upon temperature, by integrating welding force can be calculated

$$F_W = \int_{A_W(t)} \sqrt{\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_{DZ}}\right)^2}\, dA \quad (3.11)$$

With integrating time dependent weld area, as the normal stress depends upon the temperature and normal force we can calculate the welding force depending upon time, temperature and normal force:

$$F_W(T,t,F_N) = \int_{A_W(t)} \sqrt{\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_{DZ}}\right)^2}\, A_W(t) \quad (3.12)$$

There are two types of frictional forces arises in the welded area and its surroundings, one is the shear force responsible for welding and other is the friction force responsible for heating the circumference but does not actively involved in joining process.

As there is also a frictional force applied at welding area along with the welding force, so the interface force will be written as $F_I = F_W + F_{FR}$, but the frictional component of the force is difficult to calculate as it depends upon the vibration and coefficient if friction which increases with increase in weld area. Now the frictional force can be termed as:

$$FFR = \mu s \times \sigma N \times AFR \quad (3.13)$$

where:

μ_s = coefficient f static friction.

It's very difficult calculate the Eq 3.13 as neither the exact value σ_N nor the frictional area were known. So the frictional force can also be written as:

$F_{FR} = \mu_s \times F_N$ (3.14) When the thickness of the material increases frictional area expands along with contact stresses. As the top size reduces with both the parts considered to be rigid and surfaces in contact were undergo plastic deformation during yield conditions arrive. The expression for the compressive stress can be deliberate by the ratio of normal force to the sonotrode area/deformation zone area. The extensions of both the parts were assumed to be elastic rods. The forces acting on the surfaces are equal and opposite in direction because the bottom part along with anvil was fixed. Hence, the top part equation of motion can be written as:

$$m \times \xi_{max} = F_s - F_w - F_{FR} - F_{EX}$$

By substituting the value of Fs in Eq 3.1 and by rearranging the Eq 3.15

$$(m \times \xi_{max}) + F_w + F_{FR} + F_{EX} \leq \sqrt{\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_s}\right)^2} \times A_s \quad (3.16)$$

It is mandatory that the L.H.S of Eq 3.16 needs to be smaller than the R.H.S; otherwise sticking of the sonotrode will takes with the top part as a result of yielding.

HEAT GENERATION DURING WELDING

A substantial amount of heat is generated in the material parts, sonotrode and anvil due to plastic deformation at weld interface during ultrasonic metal welding. This generated heat with the change in temperature has a significant influence on material

properties. The aim of this study is to generate a governing equation with the required assumption to give a good approximation for calculating the vibrational power dissipated at the weld interface.

During the initial period of welding, when the knurl pattern were engaged with top part plastic deformation also occur but very small in magnitude as compared to plastic deformation during welding so it is neglected. The heat generation is divided into two parts for the suitable evaluation of the model; one is the heat generation due to deformation of the material at the welding zone and the other is the heat generation due to friction which is confined to the surrounding of the welded zone.

HEAT GENERATION AT THE WELD INTERFACE DUE TO DEFORMATION OF THE MATERIAL

Initially plastic deformation will start in small patches and distributed randomly across the deformation zone. Similarly the power is also distributed in evenly in patches over the entire volume of the zone. If we consider the patches are equal in size and dissipates an equal amount of power, than the total power can be calculated by integrating:

$$\frac{P_{total}}{V_{DZ}} = \frac{\int dP}{V_{DZ}} \tag{3.17}$$

For the calculation heat that is developed in deformation patches. Its needs go for a thin layer of shear elements at the plastic deformation zone. The shear element which is elastic in property with the work done on strained volume is given by product of shear angle and shear stress. This can assumed to be highest stress for the case of perfectly plastic material with no work hardening. Hence, the work done on the deformed volume can be written as:

$$\frac{dW}{dV} = \tau_y \times \gamma \tag{3.18}$$

where:

γ= angle of deformation

The work done on the deformation volume is for a particular period of time is equal to the change in angle during the same amount of time, which can be explained by the ratio of top part deflection to the thickness of the deformed layer.

$$\frac{\Delta dW}{\Delta t} \times \frac{1}{dV} = \tau_y \times \frac{\Delta \xi}{\Delta t \times dy} \tag{3.19}$$

As we know that the rate of change of work done is the power, similarly the rate of change of amplitude is the average acoustic speed for amplitude of ξ_0 and frequency of f_w id given by:

$$\frac{\Delta W}{\Delta t} = P$$
$$\frac{\Delta \xi}{\Delta t} = v_{avg} = \frac{1}{T}\int_0^T \left| f \times \xi_0 \cos(ft) \right| = 4 \times \xi_0 \times f_w \tag{3.20}$$

Where:

f = frequency Vibration

T = time period of vibration

By substituting the Eq 3.20 in Eq 3.19 and solving, we can get the expression for power dissipated:

$$\frac{dP}{dV} = \tau_y \times \frac{v_{avg}}{dy} \qquad \text{.....(3.21)}$$

As the deformed element thickness is constant, so the differential volume dV can be substituted by dA × dy with multiplying both side by dy one can get:

$$\frac{dP}{dA} = \tau_y \times v_{avg}$$

or

$$dP = \tau_y \times v_{avg} \times dA \tag{3.22}$$

Now, by substituting the value of average differential power from Eq 3.22 in Eq 3.17:

$$\frac{P_{total}}{dA} = \frac{\int dA \times \tau_y \times v_{avg}}{V_{DZ}} \tag{3.23}$$

Similarly for the Eq 3.10 the integration would be applied for weld area A_w time and by replacing V_{DZ} by $A_{DZ} \times dy$ and multiplying both side by dy:

$$\frac{P_{total}}{A_{DZ}} = \frac{\tau_y \times A_w(t) \times v_{avg}}{A_{DZ}} = \frac{F_w(t) \times v_{avg}}{A_{DZ}} \quad (3.24)$$

Now the expression 3.24 gives the amount of vibrational power which generated due to plastic deformation in the welding zone area. As we know that the heat flux is the power dissipated over unit area, so the Eq 3.24 can be rewritten by putting the value of weld force from Eq 3.12 and also the average speed from Eq 3.20, the expression for the heat flux in the deformation zone area can be written as:

$$Q_w = \frac{\sqrt{\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_{DZ}}\right)^2}\, A_W(t)}{A_{DZ}} \times 4 \times \xi_0(t) \times f_w \quad (3.25)$$

From the expression, the time dependence of the amplitude is only for the initial period of the weld cycle, during this period the amplitude of the sonotrode is not equal to amplitude at the weld interface.

HEAT GENERATION IN THE WELD INTERFACE DUE TO FRICTION

Heat generation in the surrounding of the welded zone can be calculated by the ratio of power dissipated per unit frictional area. The power dissipated can simply expressed by the product of average speed to the friction force:

$$\frac{P_{FR}}{A_{FR}} = F_{FR} \times v_{avg} \quad (3.26)$$

Now, substituting the value average speed from Eq 3.20 and the value of friction force form Eq 3.14, one can get the expression for the heat flux due to friction as:

$$Q_{FR} = \frac{\mu_s \times F_N \times 4 \times \xi_0(t) \times f_w}{A_{FR}} \quad (3.27)$$

The heat flux due to friction is needs to be applied outside the weld area at the friction area, which is assumed to be twice the radius of weld area. The average interface speed is also changes by the shear deformation which is used in both the heat flux equations; the average speed needs to be considered as constant for most part of the weld cycle.

III. FINITE ELEMENT MODELLING OF ULTRASONIC WELDING

Finite element modeling (FEM) is a numerical method to find out the approximate solutions of the given problem. It divides the complex problems into simpler parts called finite elements. It helps in getting to obtain the appropriate solution for the define problem. There were various FEM based software in the present scenario such as ANSYS, SYSWELD, ABACUS, PROE, DEFORM, etc.

MODELING THE TEMPERATURE DISTRIBUTION

The temperature distribution modeling in weld interface, sonotrode, anvil is attempted in this study. A Two-dimensional rectangular Co-ordinate system was chosen due to complexity of the model. The different material properties (ASM Handbook volumes 1 and 2, 1998) considered in the present study for work piece, sonotrode, and anvil are presented in Table.1.

Table 1 Thermal and Physical properties for workpiece, sonotrode, and anvil

Material	Thermal conductivity (k) W/m^0c	Specific heat in (C) in J/kg^0c	Density (ρ) in kg/m^3	Young's modulus (E) in GPa	Poisson's ratio	Co-eff. Of thermal expansion in $0c-1$

Steel (sonotrode, anvil)	24.3	460	7800	210	0.3	1.51×10^{-5}
Al(workpiece)	183	896	2700	70	0.35	2.43×10^{-5}

HEAT FLUX DUE TO DEFORMATION

The expression which has already been derived in Eq 3.25 is used for the calculation of heat flux in the deformation zone.

$$Q_w = \frac{\sqrt{\left(\frac{Y(T)}{2}\right)^2 - \left(\frac{F_N}{2A_{DZ}}\right)^2}\, A_W(t)}{A_{DZ}} \times 4 \times \xi_0(t) \times f_w$$

As shown in Fig. 3.2, the variation of yield strength is experimentally found out by De Varies. So the average temperature dependent yield strength for a temperature limit of 0 to 600 is given as follow:

$$Y_T = \frac{\left[\int_0^{600} (-0.649T + 326.5)\times10^6\, dT\right]}{\Delta T}$$

$$= \frac{\left[\left((-0.649T^2/2) + 326.5T\right)\times10^6\right]_0^{600}}{\Delta T}$$

$$= 83.126\times10^6\ N/m^2$$

(4.2)

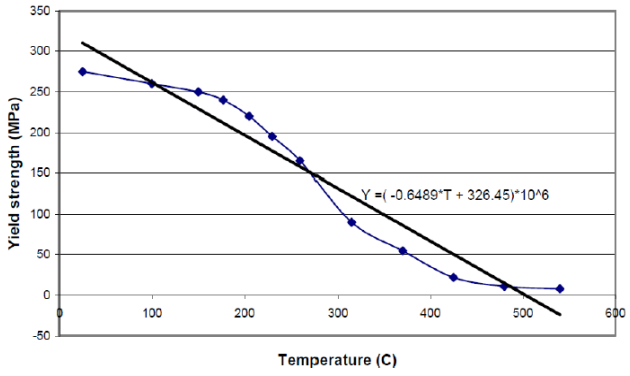


Fig 4.

Yield strength variation with respect to temperature

So the heat flux due to deformation for a clamping pressure of 1.8 bar is given by

$$Q_w = \sqrt{\left(\frac{83.125\times10^6}{2}\right)^2 - \left(\frac{1.8\times10^5}{2}\right)^2} \times 4\times37\times10^{-6}\times20000$$

$$= 12.30 \times 10^6\ W/m^2$$

The expression for heat flux due to friction is derived in Eq 3.27, for a clamping force of 17.82 N, coefficient of friction of 0.3 amplitude of 37 μm corresponding to 80% dB, by putting all these values:

$$Q_{FR} = \frac{\mu \times F_N \times 4 \times \xi_0 \times f_w}{A_{FR}}$$

$$= \frac{0.3\times17.82\times4\times37\times10^{-6}\times20000}{99\times10^{-6}} = 2.82\times10^6\ W/m^2$$

The above calculate value of heat flux due friction is applied to the friction area which is two time the deformation zone area.

SIMULATION OF FE MODEL

Fig. 5 shows the dimension and boundary conditions for the for the developed axisymmetry model used for the analysis in ANSYS® APDL. It is shown in the figure that deformation area from origin upto 2.5 mm where the heat flux due to deformation is applied and from 2.5 mm to 5 mm heat flux due to friction is applied. The thickness of the sheet is chosen as 0.5 mm of commercial available Aluminum sheet, while sonotrode and anvil material is chosen as mild steel. The material properties for the required thermal analysis and structural analysis are listed in Table 4.1.

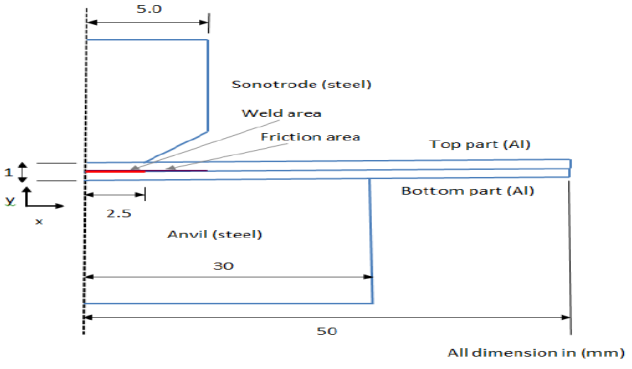


Fig 5. Axisymmetry model with boundary conditions

BOUNDARY CONDITIONS

The initial condition for temperature T_0 is assuming room temperature as 30^0.

The heat loss due to convection to the surrounding is applied at the surface areas of the material parts which have not in contact with either sonotrode or anvil are listed below, as shown in Fig. 6. The convection heat coefficient is assumed as 5 J/m^{0}C.

- Q(conv.)= Q(50, Y), $0 \le y \le 0.5$
- Q(conv.)= Q(50, Y), $0 \le y \le -0.5$
- Q(conv.)= Q(x, 1), $2.5 \le x \le 50$
- Q(conv.)= Q(x, -1), $30 \le x \le 50$

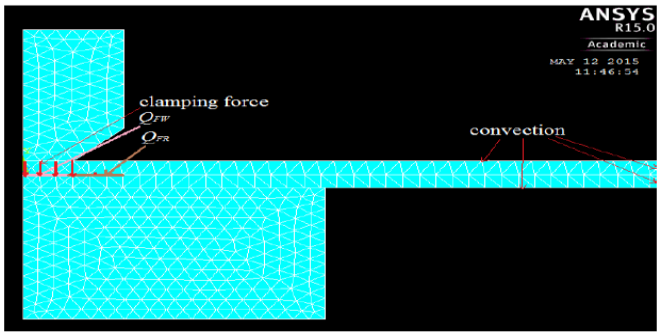


Fig 6. Elementary view of the FE model with applied loads.

TRANSIENT THERMAL ANALYSIS

The contact resistance of the faying surface is a component of burden, temperature and normal yield quality in contact materials. A triangular six-noded 2D structural solid element (plane 35) is chosen performing thermal analysis. The triangular shape makes it appropriate to model unpredictable mesh. Fig. 4.4 shows the shape, node position, and the coordinate system of the element. It has one degree of freedom, temperature change at every node. The 6-noded thermal element is pertinent to a 2-D transient or steady state thermal investigation. The mesh size picked was fine and contact is created between sonotrode with the top surface of workpiece, top workpiece with bottom workpiece, and bottom surface of workpiece with anvil.

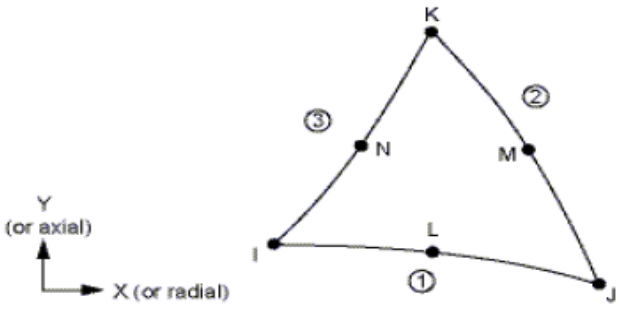


Fig 7. Shape and position of nodes for Plane 35 element

A surface to surface contact is established with the help of a 2-D three noded contact element (CONTA172) and 2-D target segment (TARGE169) was utilized to denote the respective contact surfaces. The simulation is first carried out for conical shape sonotrode and then extended to exponential shape and stepped shape.

As shown in Fig, the thermal loads like heat flux due to deformation were applied in weld area of 20 mm^2 while the heat flux due to friction was applied in frictional area 60mm^2. The loss of heat due to convection was applied on the borders of the parts, which are not in contact with either sonotrode or anvil. For 2-D geometry, the areas are assumed to be lines. A full transient analysis was carried out for a time period of 0.5 sec with time steps of 0.1 sec.

TRANSIENT STRESS ANALYSIS

The clamping force is applied on the nodes of the sonotrode as shown in Fig. 4.3, which are in contact with the top surface of the workpiece. The displacementt of the anvil is set as zero in all degrees of freedom. The element type is switched from thermal to structural for the Plane 35 element, and that is converted to a six-noded 2-D triangular structural solid (plane 2). The node location, shape and geometry of the plane are similar to the Fig. 4.4.

Full transient analysis was chosen with time step size of 0.001 for a time period of 0.5 sec.

The simulation was repeated for three different shape of the sonotrode with constant material properties and dimension of the work piece and anvil. The results gathered from the structural and thermal analysis were presented in the subsequent section.

IV. RESULT AND DISCUSSION

TEMPERATURE DISTRIBUTION IN THE MODEL

As discusseda earlier, the simulation was carried out for three different models having different shape of the sonotrode and the resultsware presented in this ssection. The maximum temperature reached for the conical shape is 169.238 ^{0}C at the end of weld time for a pressure of 1.8 bars. Fig. 4.5 shows the distribution of temperature for a conical shape sonotrode. It shows that the temperature reaches its maximum at the deformation zone and spreads more in the workpiece as compared to the sonotrode and anvil; this is because of the fact that the thermal conductivity of Aluminum is more as compared to mild Steel. The sonotrode and anvil experience a maximum temperature of 152.656 ^{0}C.

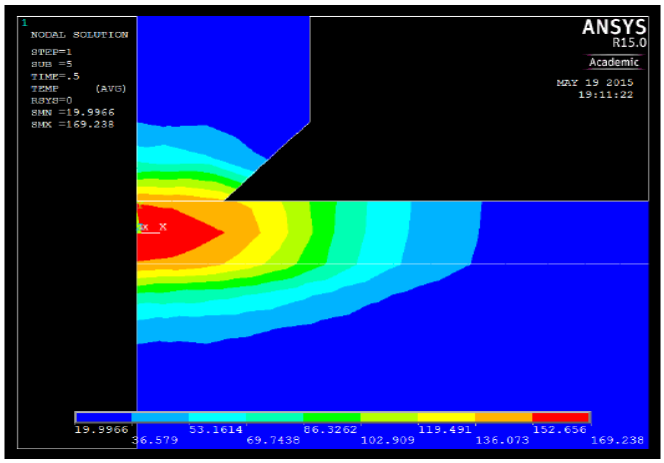


Fig 8. Temperature distribution in the model with conical shaped sonotrode

Fig. shows the distribution of temperature in an exponential shaped sonotrode with a maximum temperature of 171.439 ^{0}C at the end of the weld time. The maximum temperature in the sonotrode and anvil have reached upto 154.612 ^{0}C.

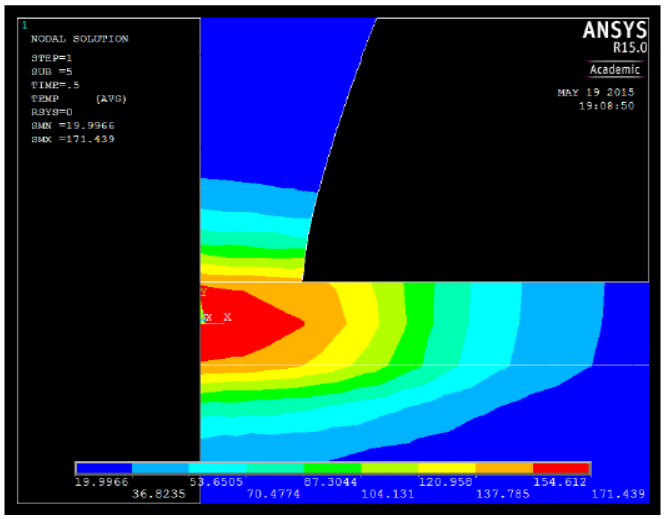


Fig 9. Temperature distribution in the model with exponential shaped sonotrode

Fig. shows the distribution of temperature in a stepped shaped sonotrode with a maximum temperature of 182.069 ^{0}C at the end of the weld time. The maximum temperature in the sonotrode and anvil have reached upto 165.171 ^{0}C.

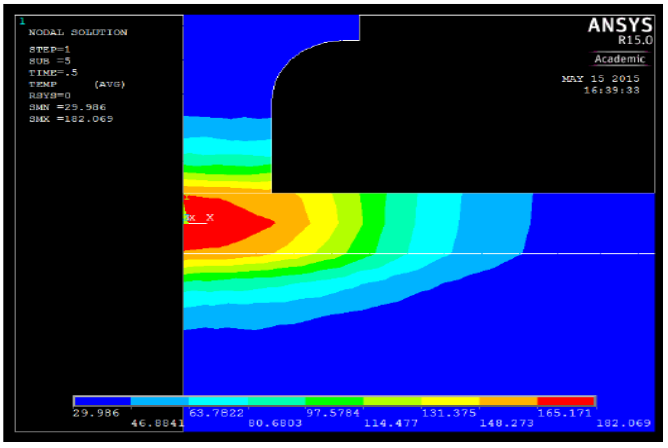


Fig 10. Temperature distribution in the model with stepped shaped sonotrode

Fig. shows the temperature variation with workpiece thickness. The variation ofttemperature from the center of the weld to the top or bottom surface of the workpiece is around 18.019 ^{0}C along the vertical

direction. This observation can be used to forecast the area of heat affected zone in Y direction.

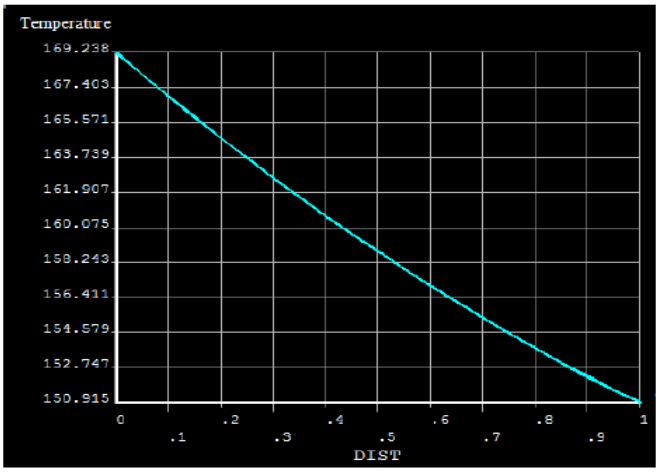


Fig 11. Temperature variation in the workpiece thickness

Fig. shows the change of temperature from origin to distance of 30 mm along X-direction. It can be seen that magnitude of temperature rapidly rises from a distance of 10 mm to the origin. The temperature in the figure is exactly from the weld interface. Fig. 4.10 shows the rise in temperature with each time step during welding in the weld interface. From the figure it can be summarized that the rise in temperature is directly proportional to the welddtime during welding.

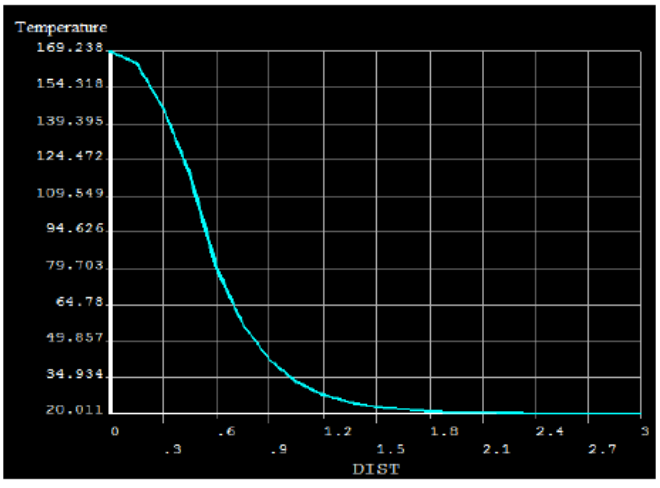


Fig 12. Temperature variation in weld interface along X-direction

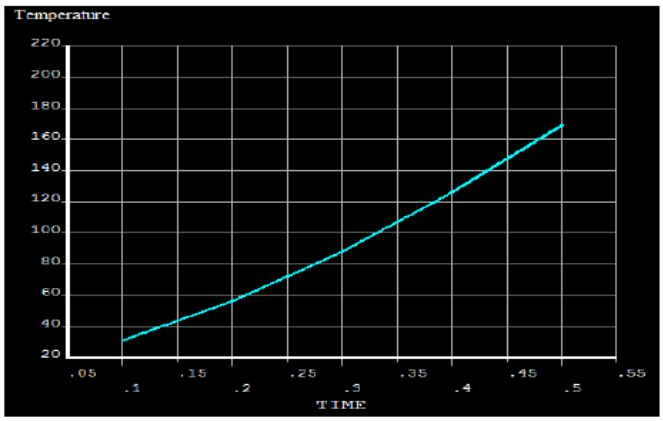


Fig 13 Temperature variation in the weld interface with each time step

STRESS DISTRIBUTION IN THE MODEL

Similar to the thermal analysis, the simulation was carried out for three different shape of the sonotrode and the resultsware presented in this ssection. The maximum Von Mises stress reached for the conical shape is 5.31□10⁶ N/m^2 at the end of weld time. Fig. 4.11 shows distribution of stress for a conical shape sonotrode. It shows that the stress is maximum at the point of action of the clamping force, where the sonotrode meets with the top surface of the work piece and also in the bottom part where it touches the top surface of the anvil.

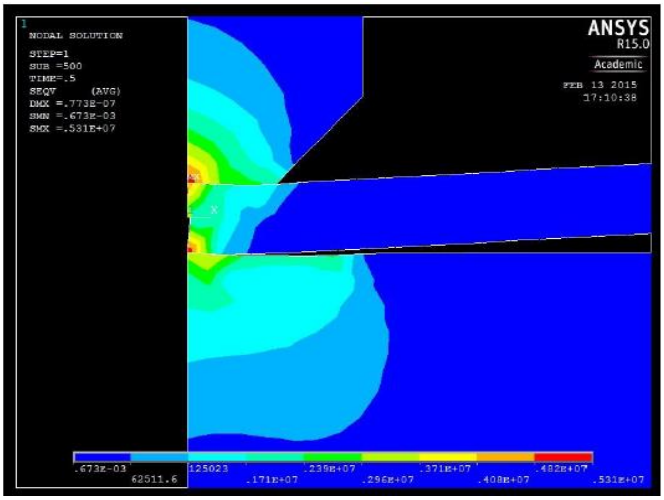


Fig 14. Stress distribution in model with conical shaped sonotrode

It can be seen, with the application of force the bottom work piece moves away from the anvil during welding. This could be because of improper clamping

method adapted during welding. So a proper fixture needs to be design to hold the parts during welding. Fig. 13 shows the distribution of Von Mises stress in an exponential shaped sonotrode with a maximum of 5.82 10^6 N/m^2 at the end of the weld time.

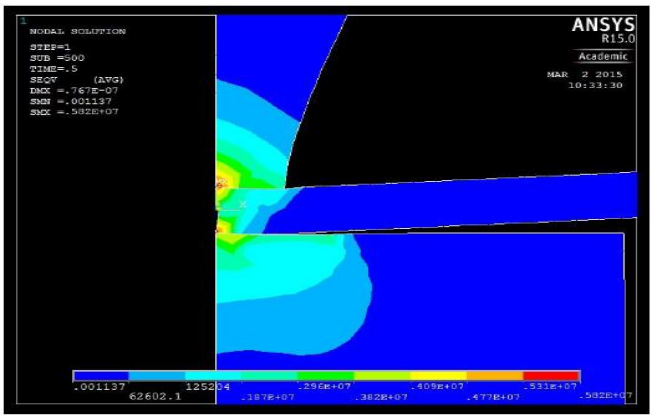


Fig 15. Stress distribution in model with exponential shaped sonotrode

Fig. shows the distribution of Von Mises stress in an exponential shaped sonotrode with a maximum of 6.27 10^6 N/m^2 at the end of the weld time. It can be seen from the figure that the Von Mises stress is more intense at the sonotrode because of the complexity of the model.

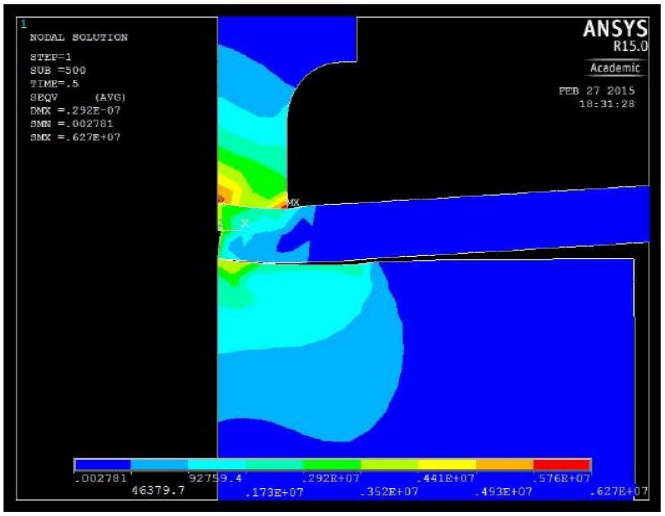


Fig 16. Stress distribution in model with exponential shaped sonotrode

Table 2. Temperature and stress distribution from the numerical model

Sonotrode Shape	Temperature in ^{0}C	Von Mises Stress in N/m^2
Conical Shape	169.238	5.31 x10^6
Exponential Shape	171.439	5.82 x10^6
Stepped Shape	182.069	6.27 x10^6

V. EXPERIMENTATION AND OPTIMIZATION TECHNIQUE

RESPONSE SURFACE METHODOLOGY

It is a statistical tool used to establish a relationship between several controllable variables with one or more responses. The method was introduced by G.E.P. Box and K.B. Wilson. A series of experimental run are performed within the selected range to identify the best set of parameters which gives the optimum result for response variables. It assumes a second-degree polynomial consists of factors with coefficients for analysis. If the response variable linearly depends upon the factors, then it can be articulated by a first order polynomial but if there is any curvature in response surface then a second order model should be followed. A second order polynomial with Z as response variable is expressed by:

$$Z = \pm a_0 \pm a_1 x \pm a_2 y \pm a_3 x^2 \pm a_4 y^2 \pm a_5 xy \pm e \quad (5.1)$$

where:

Z = response variable

x, y = controllable factors

e = experimental error

a_0, a_1, a_2 … = coefficients

In this work, from the vast literature survey three controllable factors such as pressure, amplitude,

welding time at three levels were selected for conducting the experiment. A Box Behnken Design (BBD) is considered which gives a total of 17 experimental runs with 5 center points. Tensile strength of the welded joint is chosen as the response. The Factors and their levels are listed in Table 3

Table 3 Factors with levels

Factor	Unit		Levels	
		-1	0	+1
Pressure	Bar	1.4	1.6	1.8
Amplitude	%	21	24	27
Weld time	Sec	0.4	0.45	0.5

EXPERIMENTAL PROCEDURE

The experiments were performed on 3000 W, 20 KHz ultrasonic welding machine on a 0.5mm thickness Aluminum sheet, the experimental setup is shown in Fig. The pressure required for the welding is received from a compressor, where the maximum limit is set up to 18 bar prior to the welding. The holding time for the experiment is set as 0.3 sec. On the contact surface of the anvil and sonotrode knurl pattern were made to prevent sliding of the workpiece during welding. Fig. shows, specimens prepared for welding as per ASTM standards (D1002-01). Prior to the welding, the specimens were thoroughly cleaned with acetone to remove the surface impurities which can affect the joint strength. For each factorial combination, two trails of welded specimens were generated and the average of both the trials were also calculated and tabulated in Table 3 Fig. shows the ultrasonically welded specimens of 0.5 mm Aluminium sheet.

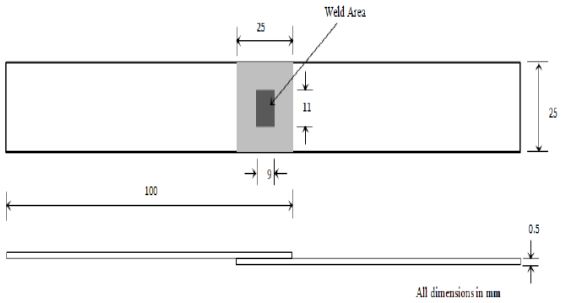


Fig 17. ASTM Standard (D1002-01) specimen



Fig 18. Ultrasonically welded specimens

Table 3. Experimental table

Exp. no	Pressure	Amplitude	Weld Time	Tensile Strength		
				Trial 1	Trial 2	Avg
1	1.4	21	0.45	74.15	68.06	71.065
2	1.8	21	0.45	90.01	84.38	87.045
3	1.4	27	0.45	83.73	78.89	81.31
4	1.8	27	0.45	83.38	81.97	82.675
5	1.4	24	0.4	83.23	71.77	77.55

6	1.8	24	0.4	86.39	92.58	89.375
7	1.4	24	0.5	88.45	80.64	84.565
8	1.8	24	0.5	92.74	94.17	93.21
9	1.6	21	0.4	86.79	80.31	83.195
10	1.6	27	0.4	74.73	86.55	80.64
11	1.6	21	0.5	90.21	79.56	84.885
12	1.6	27	0.5	85.19	79.74	82.465
13	1.6	24	0.45	87.91	86.73	87.32
14	1.6	24	0.45	87.82	81.4	84.61
15	1.6	24	0.45	86.45	85.9	86.52
16	1.6	24	0.45	87.21	80.93	84.52
17	1.6	24	0.45	86.44	84.51	85.67

The tensile strength of the joint is measured in a Computerized Tensile testing Machine with a constant cross head displacement of 5 mm/min. It was observed that, a ductile fracture occurs at the periphery of the weld except a few specimens which have poor weld quality. Some of the fractured specimens are shown in Fig.

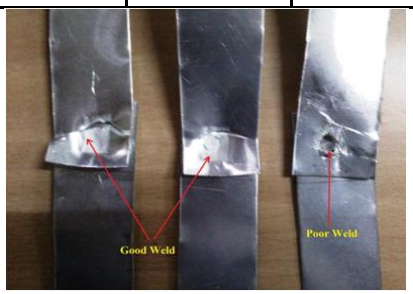


Fig 19. Fractured Specimens

Table 4 ANOVA for Tensile strength

Source	**Sum of**	**df**	**Mean**	**F Value**	**p-value**	
	Squares		**Square**		**Prob > F**	
Model	345.17	8	43.15	11.41	0.0012	significant
A-Pressure	178.27	1	178.27	47.16	0.0001	
B- Amplitude	0.33	1	0.33	0.075	0.7914	
C-weld time	25.99	1	25.99	6.88	0.0306	
A*B	53.77	1	53.77	14.22	0.0055	
B*C	9.025*E-3	1	9.025*E-3	2.089*E-3	0.9648	
A*C	2.53	1	2.53	0.67	0.4372	
A^2	3.69	1	3.69	0.98	0.3519	
B^2	72.49	1	72.49	19.17	0.0024	
$_C2$	9.34	1	9.34	2.47	0.1546	
Residual	30.24	8	3.78			
Lack of Fit	20.99	4	5.25	2.27	0.2236	not significant
Pure Error	9.26	4	2.31			
Core Total	375.42	16				

Fig. shows the surface plot of tensile strength with pressure and amplitude. It illustrates that with the increase in pressure tensile strength increases as surface asperities come closer which helps the Vander Waal forces act better which leads to better bonding. With the increase in amplitude the strength also increases but after a certain level it slightly decreases as the heat energy is directly proportional to the square of the amplitude. The relation between amplitude and heat energy is given below:

$$Q_{avg} = \frac{f \times \xi_0^{\,2} \times E''}{2} \qquad (5.2)$$

where:

Q_{avg} = Heating rate

f = frequency

ξ_0 = applied strain (proportional to amplitude)

E'' = Complex loss modulus of the material

Hence, a little increase in amplitude causes a substantial increase in the heat and material in the deformation zone gets softer which sometimes leads to the joining of the parts with the anvil or sonotrode results in improper welding. Fig. 5.5 and Fig. 5.6 shows the surface plot of tensile strength with welding time and pressure and tensile strength with welding time and amplitude, it can be seen that with increase in welding time and pressure strength increases, this is because as weld time increase it gives sufficient time for scrubbing action and disrupt the contaminants results in better weld. The developed regression equation for maximizing tensile strength of the joint in terms of coded form is given as below:

Tensile strength = +85.62 + 4.72*A + 2.2*B + 1.80*C - 3.67*A*B

- 0.80*A*C - 0.94*A² - 4.15*B² + 1.49*C² (5.3)

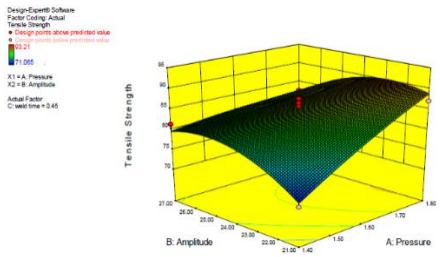


Fig 20. Surface plot of Tensile strength with Amplitude and Pressure

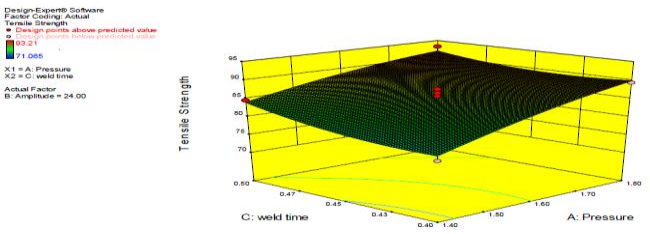


Fig 21. Surface plot of tensile strength with Weld time and Pressure

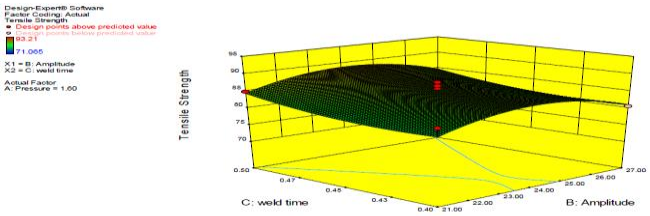


Fig 22. Surface plot of tensile strength with Weld time and Amplitude

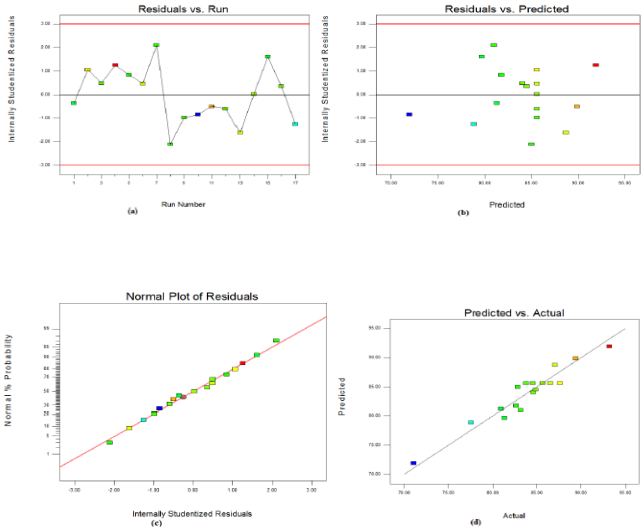


Fig 23. Residual plots for Tensile strengths **(a)** Residuals vs. Run, **(b)** Residuals vs. Predicted,Normal plot of residuals, **(d)** Predicted vs Actual

Fig. shows the residual plots for tensile strength of the joint. The residuals versus experimental run plot indicate that the runs are evenly scattered around the mean line, this helps in checking for the hidden variables that may influence the response during welding. The residual versus predicted graph shows a random scattering of the values, it checks for constant variance. In the normal plot, the runs are arranged in a straight line which indicates that the residuals are following a normal distribution. The plot between predicted values versus actual value of responses indicates that the values are very close to each other and distributed near the man line.

OPTIMIZATION USING DESIRABILITY FUNCTION

The method was introduced by Derringer and Suich. In this method, the individual responses are altered into a corresponding desirability value and the range of desirability value varies between zero to one. When the value of the response is at its target value, which is the most desired place, then the desirability value is assigned to one. If the value of response is outside recommended tolerance range which is not desired, then its desirability value is assumed as zero.

In this study higher-the-better criterion is chosen for the tensile strength of the joint. The individual desirability value for this criterion can be calculated by the formula given below:

$$If \quad \hat{y} \le y_{\min}, \qquad d_i = 0 \tag{5.4}$$

$$If \ y_{\min} \le \hat{y} \le y_{\max}, \qquad d_i = \left(\frac{\hat{y} - y_{\min}}{y_{\max} - y_{\min}} \right)^r \tag{5.5}$$

$$If \quad \hat{y} \ge y_{\max}, \qquad d_i = 1 \tag{5.6}$$

Here $y^{\wedge}$ represents the value of responses, min y represents the lower acceptable limit of $y^{\wedge}$, max y represents the upper acceptable limit of $y^{\wedge}$ and r represents desirability function index, which needs to assign formerly as per the consideration of optimization solver. So when the equivalent response is estimated to be nearer to the target, then the function index is set to a higher value. In this study, y_{max} is taken as the highest observed value of the response 93.21 MPa and y_{min} is taken as the lowest observed value of the response 71.065 MPa. The calculated value of process variables and the response is tabulated in Table 5.4 as per the descending order of the calculated desirability value. It was observed that the optimal parameter setting for tensile strength of the joint is pressure 1.8 bar, amplitude 22.75 µm, weld time 0.5 sec. The calculated value of tensile strength of the joint at optimal parameter setting is 92.6065 MPa having a desirability value of 0.973.

Table 5 Desirability Table

Number	Pressure	Amplitude	weld time	Tensile Strength	Desirability
1	1.80	22.75	0.50	92.6065	0.973
2	1.80	22.80	0.50	92.6048	0.973
3	1.80	22.70	0.50	92.6045	0.973
4	1.80	22.73	0.50	92.5958	0.972
5	1.80	22.77	0.50	92.5439	0.970
6	1.80	23.13	0.50	92.51	0.968
7	1.80	23.22	0.50	92.4876	0.967

8	1.80	23.06	0.50	92.4789	0.967
9	1.80	23.35	0.50	92.4511	0.966
10	1.80	22.68	0.50	92.4221	0.964
11	1.78	22.41	0.50	92.2718	0.958
12	1.80	23.55	0.40	90.6312	0.884
13	1.80	22.73	0.40	90.6306	0.884
14	1.80	23.73	0.40	90.6252	0.883
15	1.80	24.06	0.40	90.6217	0.883
16	1.80	22.11	0.40	90.6074	0.882
17	1.80	22.73	0.40	90.4968	0.877
18	1.80	22.59	0.40	90.4172	0.874
19	1.80	22.68	0.41	90.4079	0.873
20	1.80	22.72	0.41	90.3949	0.873
21	1.80	24.29	0.41	90.3081	0.869
22	1.80	22.60	0.41	90.3073	0.869
23	1.80	21.97	0.45	90.058	0.858
24	1.80	22.69	0.42	90.0044	0.855
25	1.80	22.75	0.43	89.9779	0.854

Fig. 24 shows the surface plot for desirability with amplitude and pressure, it can be seen that the maximum desirability value reached at pressure of 1.8 bar and amplitude of 22.75 µm.

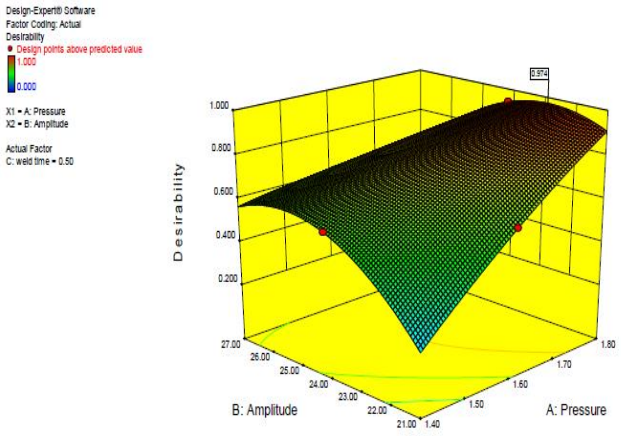


Fig 24. Surface plot for Desirability with Amplitude and Pressure

VALIDATING THE FE MODEL FOR TEMPERATURE DISTRIBUTION

The temperature at the weld interface is measured during welding with the help of a data acquisition system. The data acquisition system consists of a K-type thermocouple (sensor), a DAQ card, a computer with analyzing software. The thermocouple is capable of measuring a temperature range from -180 ^{0}C to +1260 ^{0}C. Fig. shows, the set up for ultrasonic metal welding with temperature measurement attachment.



Fig 25. Experimental set up with temperature measurement attachment

The experiments were conducted at the optimum parameter setting which is evaluated in next chapter. The parameters were set as pressure of 1.8 bar, amplitude at 80% (37.08 µ), and weld time at 0.5 sec.

The experiment at same level of parameter is repeated for 3 times and the maximum value of temperature observed is 176.223 ^{0}C with comparing to the model result of maximum temperature 182.069 ^{0}C which was generated in stepped sonotrode shape, a relative error of 3.32% observed. The data gathered from the software is listed in Table 5.5. A graph is plotted for temperature against time in Fig.

Table 6. Temperature readings with time from lab view software

Si. No.		Temperature (^{0}C)	
	Trial 1	Trial 2	Trial 3
1	29.759544	29.309207	30.524261
2	30.517624	29.333454	30.495402
3	30.358214	29.356395	30.470985
4	30.857415	39.738548	30.413762
5	**176.22367**	**154.31596**	**174.81667**
6	145.17256	123.44487	147.25466
7	91.280436	98.276223	97.756236
8	83.521031	81.943958	85.685131
9	77.393324	63.612485	76.798424
10	73.239116	55.117937	71.836616
11	68.400442	47.973039	68.592462
12	65.860792	42.293895	62.860792
13	63.071146	39.059449	61.071146
14	60.522932	36.584705	57.522932
15	57.650652	36.215455	55.650652
16	55.130103	34.882099	53.130503
17	53.395178	33.268054	51.395178
18	51.252142	32.494824	50.394752
19	49.475485	31.692761	49.632425
20	46.258419	31.293433	47.788949
21	45.413527	30.882567	46.279405
22	44.125496	30.563878	45.294345
23	43.985753	30.403711	44.297961
24	42.751466	31.801993	43.047485
25	41.445751	34.032967	42.070274
26	40.236554	32.636755	41.227193
27	40.449971	32.418425	40.449971

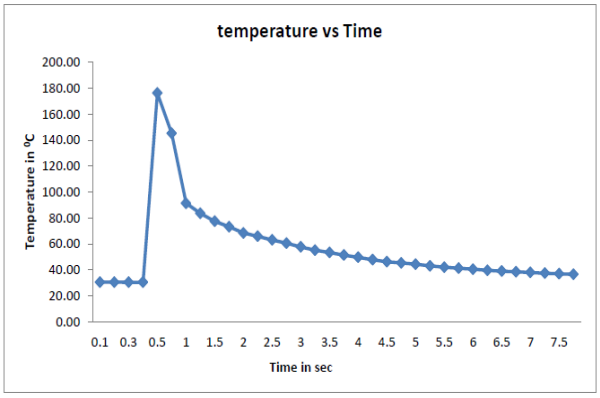


Fig 26. Observed temperature variation with time

VI. CONCLUSION

SUMMARY OF THE FINDINGS

After carrying out a systematic study the following extrapolation can be summarized:

1. An FEM based analysis is done for ultrasonic welding by taking Aluminium as workpiece material and mild steel as sonotrode and anvil material. The model can predict the temperature and stress distribution with different shape of the sonotrode.
2. It can be also understood from the study that the temperature distribution at the work piece is more as compared to the sonotrode and anvil as the thermal conductivity of Aluminum is more as compared to steel and thermal load is applied at the center of the weld.
3. If we compare between different sonotrode shapes then we can see that the temperature generated by stepped shape 182.069^{0}C is maximum as compared to exponential and stepped shape. Similarly, stress generated due to clamping force for the stepped shape 0.627×10^7 N/m^2 is maximum.
4. The proposed RSM model gives the importance of the process variables such as pressure, amplitude, and weld time on the tensile strength of the joint.
5. From the desirability function the optimum parameter setting is obtained as pressure 1.8 bar, amplitude 22.75 μm, weld time 0.5 sec with a desirability value of 0.974.
6. The temperature generation from the FE model is validated by conducting experiment and found out as 176.22 ^{0}C, with a relative error of 3.32%.
7. The research work offers an effective guideline to select optimum parameter settings for achieving desired tensile strength.

RECOMMENDATION AND FUTURE SCOPE

From the current work it was found out that the conical shape generates minimum value of temperature and stress, so the shape of the tool is recommended when a welding required for soft and thin material. Whereas stepped shape sonotrode is recommended for relatively thick material. For the joining of 0.5 mm Aluminium foil in 3000 W machine, it is recommended that the value of amplitude should be less than 22 μm.

The present research work is carried out for Aluminium as workpiece material and mild steel as sonotrode and anvil material. Still there is a vast area to explore for this novel welding process. Hence, future work can carried out in the following direction:

1. Ultrasonic welding of dissimilar materials with suitable experimental design and parameter setting.
2. Effect of shape of the anvil on the welding process.

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To Study of The Physico-Chemical Parameters of GIRNA Project Near Panzangaon, Tal- Nandgaon, District- Nashik (M.S.) India

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ABSTRACT

This investigation reveal as the Physico-chemical parameters of Girna project were monitored over period of one year July 2007 to June 2008. The fresh water of the Girna project is mostly used for the drinking and Agricultural purposes. The study of different parameters like Temperature, Rain fall, pH, Turbidity, T.D.S., Dissolved Oxygen, Dissolved carbon dioxide, Total hardness, calcium, Magnesium, and Chloride were well studied and suggest that the quality of water is not polluted.

Keywords : Physico-Chemical Parameters, Girna Project, and Pollution

I. INTRODUCTION

The water is very important compound of the any ecosystem. Lakes, dams, ponds are important for fresh water habitats throughout many regions of the world, although the amount of water in them constitutes only a minute fraction of the total fresh water resource on Earth. A large proportion of the fresh water is stored as ice at higher altitudes and around the poles or as groundwater as the less than 0.5% is available for use by organisms, including for human civilization.

However, increasing of human population have resulted in accelerating demands of water supply for the drinking, industrial process, hygiene and agriculture. Fresh water has become a scarce commodity due to over exploitation and pollution of water. Increasing population and its necessities have lead to the deterioration surface and subsurface water.

Among various water resources on earth, oceans account for 97.6%, ice caps and glaciers, 1.87%; groundwater, 0.5%; rivers, lakes and inland seas, 0.02%; soil moisture, 0.01%; and atmosphere, 0.0001%. There are three major global resources of water: a) precipitation over the earth's surface in the form of the rain, dew, and snow; b) surface water; as river and lakes; and c) underground water. The water bodies having still water are referred to as "lentic". Those water bodies having running water re called "lotic" These two ecosystem differ considerably in ecological, chemical and physical characteristics.

The water of good quality is required for living organisms. The quality of water resources is usually described according to its physical, chemical, and biological characteristic for the good quality of water resources large numbers of physicochemical and biological parameters are to be studied and must be found in normal range.

II. METHODS AND MATERIAL

The study of this water body specifically and collected the samples from different places of the Girna project. This project is located 74^0 -39' North Latitude and 20 ^{0} 29' E Longitude. The people of

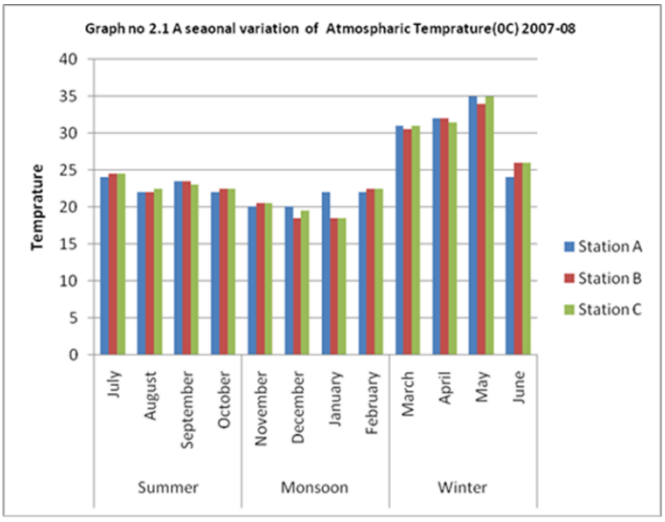
Nashik district and Jalgaon district were facing the problem of scarcity of water. The total catchment area of this project is 5552 hectors. Girna project built on the Girna River. The started of this project in the year 1955 and its completed in the year 1965.

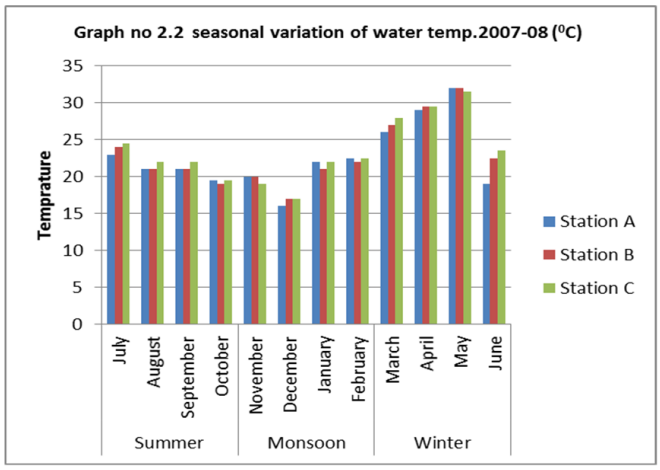
The study period of one year from July-2007 to June 2008, the total period of rain fall data was collected from the project office at Chalisgaon. The Atmospheric temperature (AT) was measured and recorded with the help of mercury thermometer. The water temperature, pH, Dissolved oxygen (DO), Dissolved carbon dioxide were recorded by using advanced water analysis portable kit.

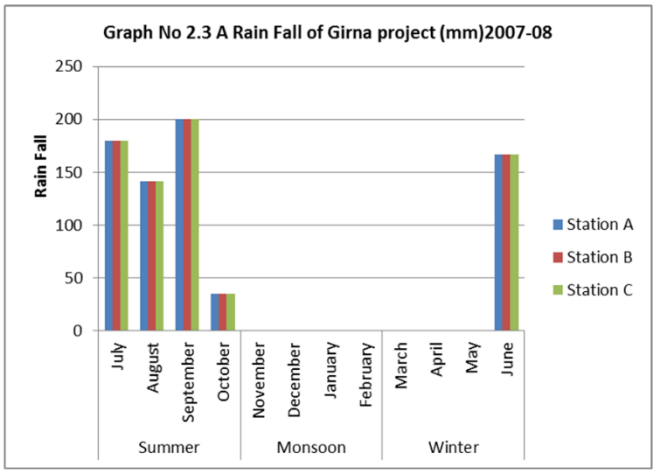
All studied parameters were analyzed when the sample was collected on spots. As early as possible 6 am. to 8 am., early morning collect the sample from station A and station B , the distance between station 1.5 to 2 km. The total estimation analyzed in the laboratory immediately like calcium, magnesium and chloride.

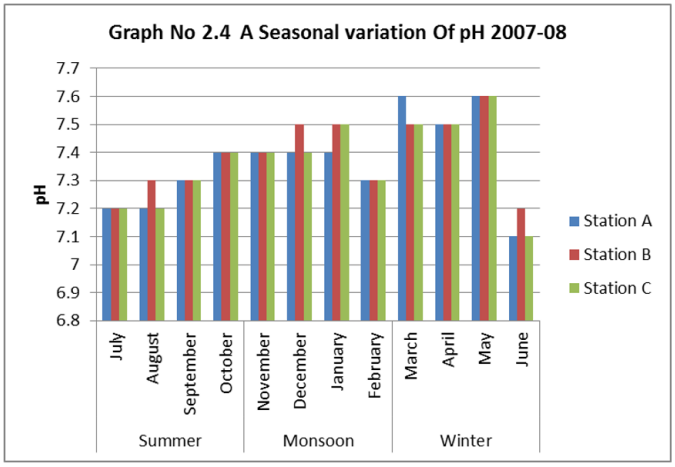
III. RESULTS AND DISCUSSION

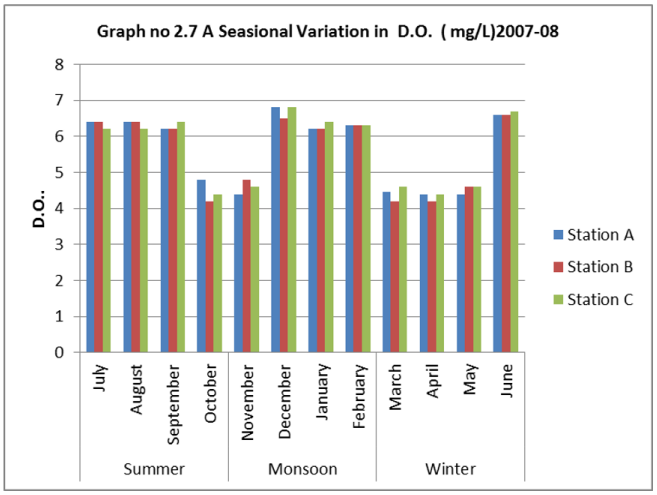
The Physico-chemical parameters such as Rain fall, Atmospheric temperature (AT) , water temperature, pH, Turbidity, T.D.S., Dissolved oxygen (DO), Dissolved Carbon Dioxide , Calcium, Magnesium and Chloride were analyzed from station A , station B and station C of the Girna project near Panzangaon, Dist-Nashik. All Physico-chemical parameters were analyzed and discussed seasonally and its variations across are graphically shown in the fig.

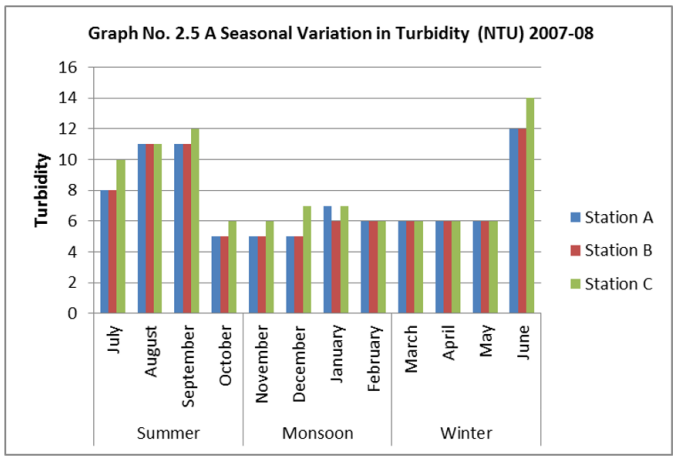


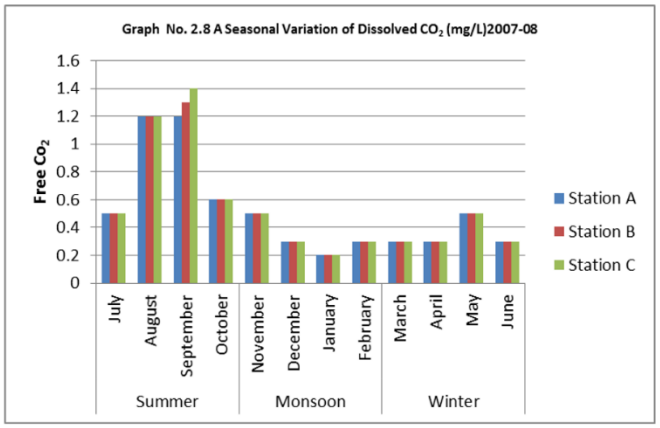


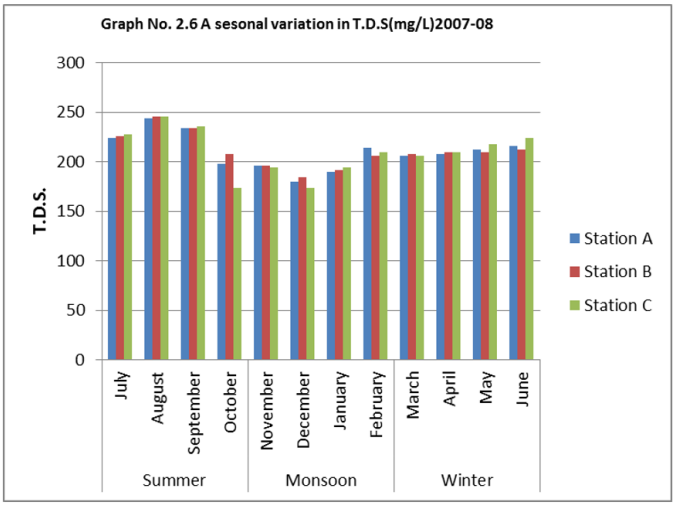


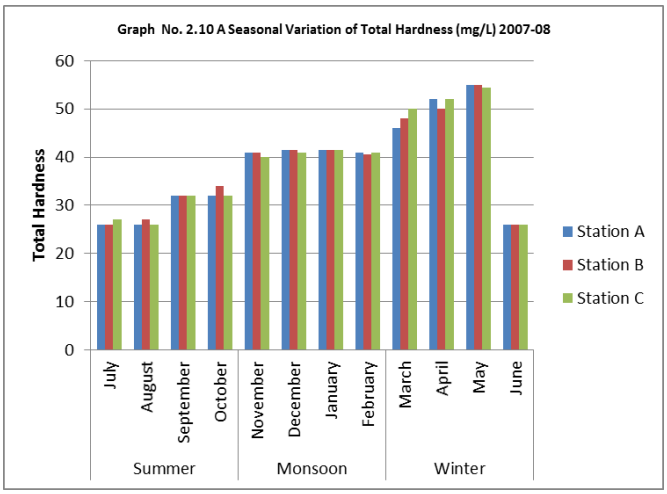

Graph No 2.4 A Seasonal variation Of pH 2007-08
pH
7.7
7.6
7.5
7.4
7.3
7.2
7.1
7
6.9
6.8
July
August
September
October
November
December
January
February
March
April
May
June
Summer
Monsoon
Winter
Station A
Station B
Station C

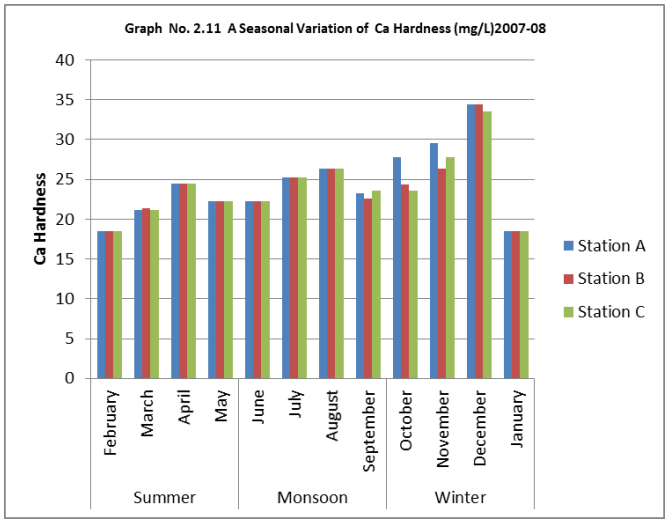

Graph no 2.7 A Seasional Variation in D.O. (mg/L)2007-08
D.O..
8
7
6
5
4
3
2
1
0
July
August
September
October
November
December
January
February
March
April
May
June
Summer
Monsoon
Winter
Station A
Station B
Station C


Graph No. 2.5 A Seasonal Variation in Turbidity (NTU) 2007-08
Turbidity
16
14
12
10
8
6
4
2
0
July
August
September
October
November
December
January
February
March
April
May
June
Summer
Monsoon
Winter
Station A
Station B
Station C


Graph No. 2.8 A Seasonal Variation of Dissolved CO2 (mg/L)2007-08
Free Co2
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
July
August
September
October
November
December
January
February
March
April
May
June
Summer
Monsoon
Winter
Station A
Station B
Station C


Graph No. 2.6 A sesonal variation in T.D.S(mg/L)2007-08
T.D.S.
300
250
200
150
100
50
0
July
August
September
October
November
December
January
February
March
April
May
June
Summer
Monsoon
Winter
Station A
Station B
Station C


Graph No. 2.10 A Seasonal Variation of Total Hardness (mg/L) 2007-08
Total Hardness
60
50
40
30
20
10
0
July
August
September
October
November
December
January
February
March
April
May
June
Summer
Monsoon
Winter
Station A
Station B
Station C



Rain fall :

In the present study of the rainfall July -2007 to June 2008 was recorded. The maximum rain fall was recorded in the Monsoon was 200 mm.at all the stations in the month of September and minimum 32 mm. in the month of July.

Atmospheric temperature:

The atmospheric temperature was similar at both the sampling stations, they have distance between stations A and station B, 1.5 to 2.00 km. The atmospheric temperature during the July 2007 to 2008 recorded maximum in summer 35^{0}C at the station A and station C. In the month of May 2008 and minimum was 22.5 ^{0} C, at station B and station C in the month of December and January 2008. The maximum atmospheric temperature recorded in monsoon 26 ^{0} C at B station in the month of June and minimum was 23.5 ^{0} C at the station B in the month of September2007. In the winter the maximum temperature was recorded 22.5^0 C at station C in the month of October 2008 and minimum 18.5^0 C at station A and station B in the month of January.

Water temperature:

In present investigation the temperature of water was similar almost of all the sampling stations A station B and station C. During the period July 2007 to June2008 the water temperature recorded in summer maximum 32^{0}C at station C and minimum 22^{0}c at the station B in the month of February 2008. The maximum water temperature in monsoon was 24.5 ^{0} C at station C and station B in the month of July 2007 and minimum temperature was 21 ^{0}C at the station A and station B in the month of August and September 2007. The maximum water temperature recorded in winter was 22^0 C at station A and station C and minimum was 16^0 C at station A in the month of December 2007.

Hydrogen ion concentration (pH):

The present investigations of the pH at the station A, Station B and station C, varied from 7.1 to 7.6. In the year July 2007 to June 2008 the pH recorded in summer maximum value was 7.6 at all stations in the month of May 2008. The minimum pH 7.3 at all stations in the month of February 2008.The maximum pH recorded in the monsoon in July 2007 to June was 7.3 at the station C and minimum 7.1 at the station A and station C in the month of July 2007. The maximum pH recorded in winter in July 2007 to 2008 was 7.5 at all stations in the month of November , December and January 2008 at the station B and station C and minimum 7.3 at all stations in the month of October and November 2007.

Turbidity:

The present investigation of the turbidity at station A and b. In the year July 2007 to June 2008 the turbidity recorded in summer maximum value was 6 NTU at all stations in the month of February to May 2008. The maximum turbidity recorded in the monsoon in the July 2007 to June 2008 was 14 NTU at station C in the month of June 2008 and the minimum 7 NTU at the station A and B in the month of July 2007. The maximum turbidity recorded in winter in July 2007 to June 2008 the turbidity was 7 NTU at station C in the month of January 2008 and

minimum 5 NTU at the station A and station B in the month of October and December.

T.D.S:

The present investigation of the T.D.S. at the station A station B and station C in the year July 2007 to June 2008.The maximum T.D.S was recorded 218 mg/L at all stations in the month of May 2008 and minimum 214 mg /L at the station A in the month of February 2008.The maximum T.D.S was recorded in the monsoon in July 2007 to 2008 was 246 mg/L at the station B in the month of August 2007 and minimum 212 mg /L at the station A in the month of June 2008.The maximum T.D.S was recorded in winter in July 2007 to June 2008 was 208 mg/L at the station B in the month of October 2007 and minimum174 mg/L at the station C in the month of December2007.

Dissolved Oxygen:

The present investigation the dissolved oxygen at station A , station B and station C was varied. In the year July 2007 to June 2008 the dissolved oxygen recorded in summer maximum value was 6.3 mg/L at the stations .in the month of February 2008 and minimum was 4.2 mg / L at stations A in the month of March to April 2008. The maximum 6.3 mg/L was recorded in monsoon at the station C in the month of June 2008 and minimum 6.2 mg/L at the station B in the month of August and September 2007.The maximum dissolved oxygen in winter during July 2007 to June 2008 was 6.8 mg/L at the station A and station C in the month of December 2007 and minimum 4.2 mg/L at the station B in the month of October 2007.

Dissolved Carbon Dioxide:

In the present study dissolved carbon dioxide at station A station B and station C was varied. During the period of July 2007 to June 2008 dissolved carbon dioxide in summer maximum 0.5 mg/L at all stations in the month of May 2008 and minimum value was 0.3 mg/L at all stations . The maximum dissolved carbon dioxide recorded in monsoon in July 2007 to June 2008 was 1.4 mg/L at all stations in the month of September 2007 and minimum 0.3 mg/L at all stations in the month of June 2008. The maximum dissolved carbon dioxide recorded in winter in July 2007 to June 2008 was 0.6 mg/ at all stations in the month of October 2007 and minimum 0.2 mg/L at all stations in the month of January and February 2008.

Calcium:

In present investigation the calcium hardness was varied at station A, station B and station C. In the year July 2007 to June 2008 the calcium hardness in summer maximum value was 34.6 mg/L at the station A and station B in the month of May 2008 and minimum value was 22.6 mg/L at the station B in the month of February 2008. The maximum calcium hardness recorded in the monsoon in the year July 2007 to June 2008 was 24.5 mg/L at all stations in the month of September 2007 and minimum 18.5 mg/L at all stations in the month of June, July 2008. The maximum calcium hardness recorded in winter July 2007 to June 2008 was 26.4 mg/L at all stations in the month of January 2008 and minimum 22.3 mg/L at all stations in the month of October and November 2007.

Magnesium:

In the present study the magnesium hardness at station A station B and station C was varied. . In the year July 2007 to June 2008 the Magnesium hardness in summer maximum value was 25.60 mg/L at the station A and station C in the month of May 2008 and minimum value was 18.8 mg/L at the station A in the month of February 2008 The maximum magnesium hardness recorded in the monsoon in the year July 2007 to June 2008 was 12.9 mg/L at station

A, B and C in the month of June and September and minimum 8.5 mg/L at all stations in the month of August 2007.The maximum magnesium hardness recorded in winter in July 2007 to 2008 was 16.8 mg/l at the station A and C in the month of December 2007 and minimum 12.5 mg/L at the station C in the month of October 2007.

Chloride:

The present investigation the chloride at station A and station B and station C was varied. In the year July 2007 to June 2008 the chloride recorded in summer maximum value was 26.3 mg/L at all stations in the month of May 2008 and minimum value was 13.10 mg/L at all stations in the month of February and march 2008. The maximum chloride recorded in the monsoon in the year July 2007 to June 2008 was 22.5 mg/L at all stations in the month of June and minimum 13.30 mg/L at all stations in the month of July to September 2007. The maximum chloride recorded in the winter in the year July 2007 to June 2008 was 21.28 mg/L at all stations in the month of November, December and January and minimum 11.40 mg/L at all stations in the month of October 2007.

IV. CONCLUSION

The study of water sample of different station A, B and C of Girna Project reveals that the value of Physico-Chemical parameters were below the permissible limit given by the World Health Organization . Hence the water of Girna Project is fit for the consumption by the human beings.

V. ACKNOWLEDGEMENT

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Plagiarism Detection Based on Neural Network

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ABSTRACT

Being a developing issue, plagiarism is commonly described as literature theft and academic dishonest nature in the writing, and it must be avoided and adhere to the moral standards. Plagiarism occur in scholastics, paper publication, music, work of art developing quickly, so the recognizing plagiarism is essential. While the most recent couple of year's plagiarism detection tools have been utilized predominantly in research conditions, refined plagiarism programming and instruments are presently quickly rising. In this paper, we give an outline of various plagiarism programming and apparatuses to take care of the plagiarism issue. We propose an element classification conspire that can be utilized to examine plagiarism discovery programming and plagiarism recognition instruments. This plan depends on the product's general qualities, devices qualities, and apparatuses property.

Keywords: Plagiarism Detection, Plagiarism Types, Plagiarism Techniques, Plagiarism Algorithms

I. INTRODUCTION

Plagiarism is the demonstration that the unique word and thoughts of another person are perceived as one's own, as an ethical offense and often as a legitimate offence. Plagiarism has turned into a noteworthy worry since the foundation of training evaluation. Since we entered the web time, the quick, immense, and simple access of data has additionally raised the issue of plagiarism. Plagiarism exists in a wide range of situations and is regularly hard to demonstrate or explain. From an innovative instructive point of view, the ascent of the web as a data sharing stage has given understudies more approaches to get to electronic materials. In the meantime, article banks and secretly composing administrations known as Paper Mills" showed up. As indicated by a web review by the Coastal Carolina University, the rundown of Paper Mills in the US has taken off from 35 of every 1999 to more than 250 of every 2006, and to date, the figure is yet rising. In opposition to prevalent thinking, understudies are not by any means the only ones who face investigation.

Apart form allegations of scholastic wrongdoing, plagiarism can also cause hardships related money and notoriety. There have been various outrages

where notable creators in the distribution business have been found to be counterfeiting, and others where even government clergymen have been found stealing their ph.D proposal. Similarly, there have been situations in which scholastics have reused huge pieces of content to fund recommendations.

As more data becomes available on the web more and more, the sheer measurement of data for manual examination winds up overpowering. Subsequently, algorithmic technique were familiar with the reuse, creation and distinguishing evidence of help content. This is the place where engineered plagiarism has started to pick up significantly, as this would most likely offer a highly successful and skilled arrangement at a lower economic expanse than using HR.

In the good 'old days, plagiarism must be differentiated by relying on information without any help. As discernment changes from individual to individual and the immense measure of materials is difficult to achieve, the way toward distinguishing plagiarism inside content can be a difficult assignment.

The utilization of plagiarism detection frameworks has turned into standard practice in numerous advanced education establishments. In the UK, numerous colleges have been exhorted by the Joint Information Systems Committee (JISC) to receive the online administration Turnitin. It gives a closeness check against its very own database that contains documents of all recently submitted understudy papers, and access to web diaries and books. The content likeness detection calculations utilized in business frameworks are business privileged insights, yet basic experiments which contain some dimension of rewording and structure changes have demonstrated that it is conceivable to sidestep detection.

The insufficiency of existing frameworks has started an investigation into plagiarism detection. There are different methodologies of plagiarism detection and they, as a rule, contain three principal stages: 1) content pre-handling, 2) separating and 3) detection.

Be that as it may, existing methodologies are generally restricted to correct examinations between suspicious counterfeited writings and potential source writings at the character or string level. The precision of these methodologies is yet to achieve an attractive dimension and plagiarism keeps on influencing numerous territories, particularly in the field of training and distributing.

The greatest test in the plagiarism detection field is that most methodologies are lacking at recognizing writings with generous semantic and syntactic changes. For a human, it is straightforward writings which convey comparable importance notwithstanding when they are modified utilizing diverse words and structures. Notwithstanding, PCs can't comprehend messages along these lines, particularly when programmed detection depends on careful content coordinating. A conceivable answer for this test lies in the examination territory of computational phonetics, which gives methods to helping the further etymological investigation. The utilization of such procedures is yet an underexplored territory in the plagiarism detection field. To reveal insight into the current plagiarism detection approaches, this postulation from now on proposes the utilization of etymological systems to research the more profound importance of content in plagiarism detection.

II. LITERATURE REVIEW

Allan et al. [4] exhibited a system for identification of plagiarism. The development of the web, with bottomless data online, exacerbates the issue even. The creators have discovered four diverse approaches to approach plagiarism discovery. They continued to pursue comprehensive looking and took the center ground technique instead of thoroughly or accidentally searching for sentences on the web in a study paper. They found the manifestation of thought they had acquired.

Francisco et al. [5] state that research facility work assignments are essential for software engineering learning. The study showed that 400 understudies duplicate a similar research in illustrating their assignment at the same time during the last 12 years. This has made the instructors to give careful consideration on finding the plagiarism. In this way, they constructed a discovery device for plagiarism. This device had the full range of tools to help administrator to manage the work of the research facility. To quantify the similarities between two assignments, they used four comparability criteria.

Hermann et al. [6] state that research facility work assignments are essential for software engineering learning. The study showed that 400 understudies duplicate a similar research in illustrating their assignment at the same time during the last 12 years. This has made the instructors to give careful consideration on finding the plagiarism. In this way, they constructed a discovery device for plagiarism. This device had the full range of tools to help administrator to manage the work of the research facility. To quantify the similarities between two assignments, they used four comparability criteria.

Jinan et al. [9] concentrated on the instructive setting and confronted comparable difficulties. They show the most competent method for checking cases of plagiarism. What's more, they intended to fabricate learning networks of understudies, educators, organization, and personnel and staff all teaming up and developing solid connections that give the establishment to understudies to accomplish their objectives with more noteworthy achievement. They additionally advanced data sharing. They gave consistent coordination heritage and different applications in some simple, modifiable, and reusable way Learning gateway may give a help device to this learning framework. In any case, fabricating and adjusting learning gateway is certifiably not a simple errand. This paper recognizes the plagiarism of java understudy assignments in the product.

Plagiarism can be differentiated by an understanding of sentences and paragraphs from paper, which can also be found with the help of web indexes. They pointed this out to create a free software that can be used to identify plagiarism in their classed by any teacher or encouraging partner. Nathaniel et al. [9] characterize plagiarism as a major problem affecting copyrighted records/materials. They state that plagiarism is expanded nowadays because of the productions in on the web. They suggested a new discovery technique for plagiarism called SimPaD. The reason for this strategy is to contrast sentence by sentence to create similarities between two archives. Examinations show that SimPaD increasingly accurately identifies plagiarized reports and outstrips existing approaches to plagiarism recognition.

III.PROPOSED SYSTEM

Fig. 1 demonstrates the framework engineering of the proposed framework. In our proposed methodology client inputs a solitary record for plagiarism checking.

At first, pre-handling is performed on the archive in which superfluous space inside the report, uncommon characters, and so forth are evacuated and after that stopword expulsion process is performed in which the catchphrases, for example, an, a, the, numbers in records and other stopword are expelled. At that point stemming prepared is performed in which ing, ed, and so on of every catchphrase is evacuated. Toward the end, just word reference watchwords have stayed in the information report.

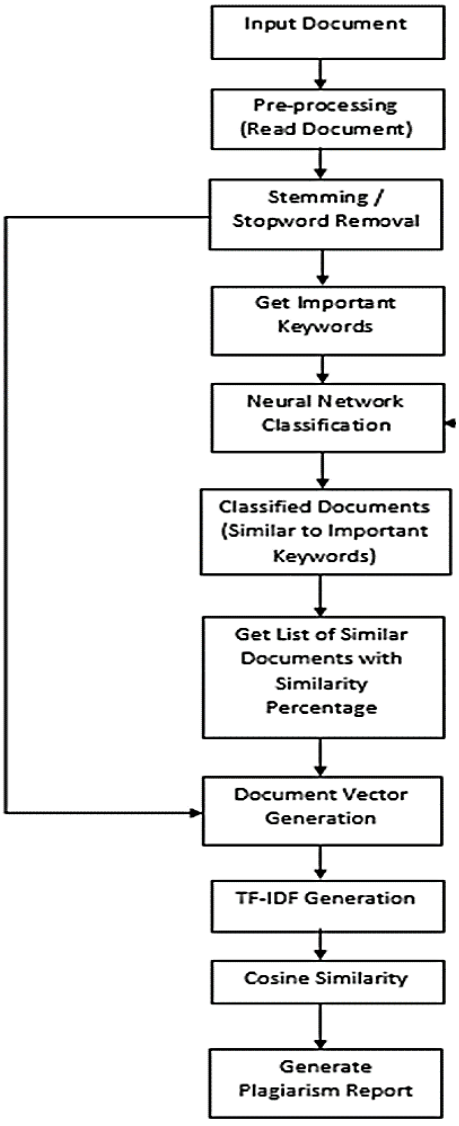


Figure 1. System Architecture

In the wake of getting word reference catchphrase from the archive, imperative watchwords isolated out (catchphrases having check more noteworthy than edge k). This best k watchword set is passed to neural system classifier which performs arrangement on recently put away reports in the database in two classes, for example, records containing top k catchphrases (state class 1) and archives which don't contain top k watchwords (state class 0). At that point, we use archives containing top k catchphrases (class 1) for further handling.

After this, the record vector of Input archive and class 1 report is produced. At that point, TF-IDF of all record is created lastly cosine closeness is determined between information archive and class 1 reports. In the event that comparability is found between information archive and some other report, at that point input record is mark as plagiarism record and likeness rate is determined.

IV. IMPLEMENTATION

Algorithm: *TF-IDF*

To figure the TF-IDF vector for a solitary record (a website page), we take that report and process the TF-IDF score for every interesting word. For every remarkable word, or term, we:

TF: Term Frequency

The term Frequency (TF) is a proportion of how much of the time a term shows up in a report. We register it utilizing this calculation:

$$\mathrm{TF}(\text{term}, \text{document}) = \frac{\text{Number of times the term appears in doc}}{\text{Total number of words in a doc}}$$

Notice the more the term shows up in the record, the higher the TF score. This ideally bodes well: if the client's hunt inquiry is "doughnuts" and in the event

that "doughnuts" seems ordinarily in the site page, at that point the page is most likely about doughnuts and is something the client will need to peruse.

IDF: Inverse Document Frequency

The Inverse Document Frequency (IDF) measures how every now and again a term shows up in all records utilizing this recipe.

$$\text{IDF(term)} = \begin{cases} 0 & \text{if term doesn't appear in any doc} \\ \ln\left(\frac{\text{Total number of docs}}{\text{Number of docs containing the term}}\right) & \text{Otherwise} \end{cases}$$

Note that when registering the TF for a specific term, we will acquire an alternate TF per each report. Conversely, when registering IDF, we do as such by taking a gander at each record, rather than any single one.

Additionally see that if a word shows up in a wide range of records, the IDF score is littler. This is because we do not need extremely basic words like "the" or "of" to truly be recognizing element of any record.

We take the log since it appears to function admirably practically speaking: measurably, just a little bunch of words will be normal over a dominant part of records and we need to punish those words more.

Algorithm- Neural Network

1. Network Contribution Phase:

A passage input is divided into sentences. Then clauses from each sentence were parsed. After that the phrases are retrieved for each clause after punctuations are eliminated and the POS and semantic role of each word is extracted and labeled for each phrase.

2. Network Learning Phase:

In order to avoid too fast increase in energy for frequently used words, the initial weight of each connection is defined as,

$$W_{ij} = \frac{w_{base}}{f_{ij}}$$

w_{base} is the value of the initial weight.

f_{ij} is the no. of times neuron i & j are connected for the input passage in the network construction phase.

3. Information Recall Phase:

Each neuron has stronger bond with some neurons than the others after learning. By activating one of the word neuron, neurons of the related phrases, clauses, sentences and concepts are also activated.

V. CONCLUSION

In this paper we portrayed the creative examination on distinguishing proof of plagiarism course performed on unique and modified content entries. The proposed structure coordinated phonetic and factual attributes with AI calculations. Rather than following a customary beast compel pair-wise correlation approach, the trial concentrated on fitting individual writings into their separate class designs. The outcomes demonstrated that the distinguishing proof of plagiarism course can be effectively performed utilizing factual and etymological highlights. These highlights demonstrated promising outcomes notwithstanding when they were tried on physically revised writings that are trying for people to recognize. Specifically, the measurable highlights including the utilization of language models can achieve a high exactness. The syntactic element utilized in SVM-tree bits additionally conveyed critical outcomes. This satisfied the fourth and last target, which was to propose and assess a structure for distinguishing proof of plagiarism bearing.

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Privacy Preserving in Database Service using Non-Colluding Cloud Architecture

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ABSTRACT

In the present scenario, businesses and people are outsourcing database to accomplish helpful administrations and minimal effort applications. To provide sufficient functionality for SQL queries, many secure database schemes have been proposed. However, the proposed schemes are vulnerable to privacy leakage to cloud server. The main reason is that database is hosted and processed in cloud server, which is beyond the control of data owners. For the numerical range query (“>”, “<”, etc.), the schemes cannot provide sufficient privacy protection against the practical challenges. Portions of the difficulties faced are privacy leakage of statistical attributes and access patterns. Furthermore, increased number of queries will inevitably leak more information to the cloud server. In this paper, we propose a two-cloud architecture for secure database, with a series of intersection protocols that provide privacy preservation to various numeric-related range queries. Security analysis shows that privacy of numerical information is strongly protected against cloud providers in our proposed scheme.

Keywords : Cloud Computing, Database, Privacy Preserving, Range Query

I. INTRODUCTION

In the present circumstances as it can be seen cloud has taken the control over the IT business with its innumerable advantages. It holds the possibility to change an extensive segment of the IT business, making software considerably more appealing as a service. The growing industry of cloud has provide a service paradigm of storage/computation outsourcing helps to reduce users’ burden of IT infrastructure maintenance, and reduce the cost for both the enterprises and individual users. Security is the chief concern of the cloud computing. Cloud clients confront security dangers both from outside and inside the cloud. However, due to the privacy concerns that the cloud service provider is assumed semi-trust, it becomes a critical issue to put sensitive service into the cloud, so encryption or obfuscation are needed before outsourcing sensitive data to cloud.

The privacy challenge of outsourced database is two-hold.

1) Sensitive data is stored in cloud, the corresponding private information may be exposed to cloud servers.
2) The data and queries of the outsourced database should be protected against the cloud service provider.

This divide-and-conquer mechanism can know any private information from one single isolated part of the knowledge. In this paper, a secure two-cloud database service architecture is introduced, where the two clouds are non-colluding and both of them knows only part of knowledge. Based on this architecture, a series of interaction protocols for a client to conduct numeric-related query over encrypted data from remote cloud servers is proposed. The numeric-related query includes common query statements, such as greater than, less than, and between.

II. PROBLEM STATEMENT

A. Existing System

In existing system, the perspective for privacy assurance and the data not only include permanently stored information that is the database, but also each temporary query request.

Additionally and importantly, as the assumption in some existing works, we assume that the two clouds A and B are non-colluding: Cloud A follows the protocol to add required obfuscation to protect privacy against cloud B, so that cloud B cannot obtain additional private information in the interactions with Cloud A. No private information is delivered beyond the scopes of protocols.

Disadvantages

a. While providing efficient cross server storage verification and data availability insurance, the entire focus is on static or archival data.
b. The capability of handling dynamic data remains unclear, which inevitably limits full applicability in Server storage scenarios.

B. Proposed System

In the proposed system the two-cloud scheme, the detailed interaction protocols will be provided to realize range query with privacy preservation on outsourced encrypted database. The proposed mechanism can preserve the privacy of data and query requests against each of the two clouds.

Specifically, Cloud A only knows the query request type and the final indexes, but due to dummy items appending, Cloud A cannot accurately understand the finally satisfied index set for each single request.

For Cloud B, it knows the satisfied indexes of each single request, but after the proposed operations, it does not know the relationship of the corresponding items. Moreover, Cloud B can hardly distinguish whether two received columns are generated from one or more columns in the original database.

III. LITERATURE SURVEY

[1] Two- Cloud Secure Database for Numeric-Related SQL Range Queries with Privacy Preserving.

This paper deals with Client Module, Storage Service Module, Query Service Module and Cloud Service Provider Module. It also ensures the privacy preservation of data contents, statistical properties and query pattern with the support of range queries.

[2] Achieving Collaborative Cloud Data Storage byKey-Escrow-Free Multi-Authority CP-ABE Scheme with Dual-Revocation.

The Multi-Authority Ciphertext-Policy Attribute-Based Encryption (MA-CP-ABE) is an data access control for large-scale collaborative cloud storage service is addressed in this paper.

[3] Privacy Preserving Data Storage Technique in Cloud Computing.

This paper shows how exactly the privacy is preserved and availability of information in cloud computing. The distribution of information among the multiple available Cloud service providers is done in order to preserve the privacy.

[4] RAAC: Robust and auditable access control with multiple attribute authorities for public cloud storage. K. Xue, Y. Xue, J. Hong,W. Li, H. Yue, D. S.Wei, and P. Hong.

This paper is based on how to achieve a robust and efficient access control for public cloud storage.The Ciphertext-Policy Attribute-Based En-Cryption (CP-ABE) is the methodology used in this paper.

[5] "CryptDB: protecting confidentiality with encrypted query processing.
R. A. Popa, C. Redfield, N. Zeldovich, and H. Balakrishnan.

In this, paper the proposed CryptDB, a framework to defend the private information in databases. CryptDB fundamentally includes utilizing the range queries productively finished the encrypted information utilizing a novel SQL-aware encryption system.

IV. METHODS AND MATERIAL

This section describes the potential threats and the privacy requirements when the database is outsourced to public cloud. The stored data contents and the query processes. Although there are many data encryption schemes, some fail to provide sufficient privacy preservation after statistical analysis. Repeated and large-amount query processes not only leak the access patterns, but also disclose the stored encrypted data progressively.

The privacy issues we consider in this paper are as follows:

1. Potential Threats and Privacy Requirements.
2. Data contents Module.
3. Query pattern Module.
4. Privacy of Item Values Modules

1. Potential Threats and Privacy Requirements

This section describes the potential threats and the privacy requirements when the database is outsourced to public cloud. The stored data contents and the query processes. Although there are many data encryption schemes, some fail to provide sufficient privacy preservation after statistical analysis: Repeated and large-amount query processes not only leak the access patterns, but also disclose the stored encrypted data progressively.

2. Data contents Module

Besides the static properties can disclose the private information of data contents, such properties themselves are already sensitive and private for the client. Order Preserving Encryption (OPE), which is widely used in constructing the secure database, with support of range queries, directly exposes the statistical information in the encryption field. Furthermore, the leakage of statistic properties is part of the nature of outsourced cloud database service: the cloud can learn the statistical properties (like order) by repeated query requests. As an example, Fig. 3 describes such an attack: After two simple queries over one same column, the order relationship of some data in certain column can be determined. There are also some other direct and indirect scenarios to leak statistical properties. In this way, even though the order property is not exposed to the semi-trusted

cloud at the beginning, the cloud can gradually find out the order information after many query requests.

3. Query Pattern Module

The query pattern also contains privacy information, as they can reveal the client's purpose of the query. Even worse, such pattern can leak some statistical properties, as discussed above. Based on the above discussion, we assert that an outsourced secure database providing numeric-related queries should prevent the following private information from being obtained by the honest-but-curious clouds.

4. Privacy of Item Values Modules

An ideal scheme is required to make nothing of the statistical properties be leaked to the curious clouds. However, the privacy leakage of statistical properties in a practical outsourced database system is inevitable, as returning subset of data rather than universe requires knowledge for filtering. For instance, if the client wants to retrieve a from the outsourced database, a cloud server without any knowledge of the order can only return all items of the database to the client, which is not usable.

V. CONCLUSION

In the presented two-cloud architecture a series of interaction protocols for outsourced database service is provided, which ensures the privacy preservation of data contents, statistical properties and query pattern. At the same time, with the support of range queries, it not only protects the confidentiality of static data, but also addresses potential privacy leakage in statistical properties or after large number of query processes. Security analysis shows that it can meet the privacy-preservation requirements. Furthermore, performance evaluation result shows that the proposed scheme is efficient. In the future work, it is required to enhance the security while ensuring practicality, and to extend the proposed scheme to support more operations, such as "SUM/AVG".

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An Analytical Review on High Performance Cloud Computing in Big Data

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ABSTRACT

Cloud computing is the product of the traditional computer technology and network technology development integration. Such as grid computing, distributed computing, parallel computing, utility computing, network storage, virtualization, and load balancing. To perform integrating multiple relative low-cost computing entities into one perfect system with powerful computing ability via the network and with the help of the SaaS, PaaS, IaaS, MSP and other advanced business models distributing this powerful computing ability to the hands of the end user. Cloud computing system mainly uses MapReduce model. The core design idea of MapReduce is to divide and conquer the problem and calculate on data rather than push data to calculate which effectively avoids many communication costs generated during data transmission.

Keywords: Big Data, Cloud computing, High-performance, HPC.

I. INTRODUCTION

With the advent of the digital age, the amount of data generated, stored and shared has been on the rise. From data warehouses, web pages and blogs to audio/video streams, all of these are sources of massive amounts of data. The result of this proliferation is the generation of massive amounts of pervasive and complex data, which needs to create efficiently, stored, shared and analysed to extract useful information [1, 15, 16].

Since innovations in data architecture are on our doorstep, the 'big data' paradigm refers to very large and complex data sets (i.e., petabytes and Exabyte's of data) that traditional data processing systems are inadequate to capture, store and analyse, to seek to glean intelligence from data and translate it into competitive advantage. As a result, Big data needs more computing power and storage provided by cloud computing platforms.

II. BIG DATA MANAGEMENT

The architecture of Big Data must synchronize with the support infrastructure of the organization. To date, all of the data used by organizations are stagnant. Data increasingly sourced from various fields that are disorganized and messy, such as information from machines or sensors and abundant sources of public and private data [2]. Previously, most companies were unable to either capture or store these data, and available tools could not manage the data in a reasonable amount of time. However,

the new Big Data technology improves performance, facilitates innovation in the products and services of business models Big Data technology aims to minimize hardware and processing costs and to verify the value of Big Data before committing significant company resources [3]. Correctly, managed Big Data are accessible, reliable, secure, and manageable. Hence, Big Data applications can apply in various complex scientific disciplines (either single or interdisciplinary), including atmospheric science, astronomy, medicine, biology, genomics, and biogeochemistry[16]. In the following section, we briefly discuss data management tools and propose a new data life cycle that uses the technologies and terminologies of Big Data.

A. Management Tools

With the evolution of computing technology, large volumes can manage without requiring supercomputers and high cost. Many tools and techniques are available for data management, including Google BigTable, Simple DB, Not Only SQL (NoSQL), Data Stream Management System (DSMS), MemcacheDB, and Voldemort [3]. However, companies must develop specialized tools and technologies that can store, access, and analyze large amounts of data in near-real time because Big Data differs from the traditional data and cannot store in a single machine. Furthermore, Big Data lacks the structure of traditional data [4]. For Big Data, some of the most commonly used tools and techniques are Hadoop, MapReduce, and Big Table. These innovations have redefined data management because they efficiently process large amounts of data efficiently, cost-effectively, and promptly. The following section describes Hadoop and MapReduce in further detail, as well as the variousprojects/frameworks that are related to and suitable for the management and analysis of Big Data [5, 6].

B. Hadoop

Hadoop written in Java and is a top-level Apache project that started in 2006. It emphasizes discovery from the perspective of scalability and analysis to realize near-impossible feats. Doug Cutting developed Hadoop as a collection of open-source projects on which the Google MapReduce programming environment could apply in a distributed system. Presently, used on large amounts of data with Hadoop; enterprises can harness data that was previously difficult to manage and analyse. Hadoop used by approximately 63% of organizations to manage a vast number of unstructured logs and events (Sys.con Media, 2011).

C. HDFS

This paradigm applied when the amount of data is too much for a single machine. HDFS is more complicated than other file systems given the complexities and uncertainties of networks [22]. The cluster contains two types of nodes. The first node is a name-node that acts as a master node. The second node type is a data node that acts as a slave node. This type of node comes in multiples. Aside from these two types of nodes, HDFS can also have secondary name-node. HDFS stores files in blocks, the default block size of which is 64 MB. All HDFS files are replicated in multiples to facilitate the parallel processing of large amounts of data.

III. PROCESSING OF BIG DATA IN CLOUD COMPUTING

Cloud computing as an essential application environment for big data has attracted tremendous attention from the research community. Remarkable

progress of Big data networking has also reported in this area. In this section, we introduce Big data research issues and solutions related to Cloud Computing [18, 20]. Individually, we are interested in the following topics: opportunities and challenges of Big data networking in Cloud Computing, cloud resource management of big data, and performance optimization of big data in Cloud Computing.

Data is the central element of communication and collaboration on the Internet and all the applications that built on this platform. The immense popularity of data-intensive applications like Facebook, LinkedIn, Twitter, Amazon, eBay, and Google+ contributes to increasing requirement of storage and processing of data in the cloud environment [20].

Therefore, they require high-performance processors to do the job. The cloud provides an excellent platform for big data storage, processing, and analysis, addressing two of the primary requirements of big data analytics, high storage, and high-performance computing [21].

The cloud-computing environment offers development, installation, and implementation of software and data applications 'as a service.' Three multi-layered infrastructures namely, platform as a service (PaaS), software as a service (SaaS), and infrastructure as a service (IaaS) exist. Infrastructure-as-a-service is a model that provides computing and storage resources as a service. On the other hand, in case of PaaS and SaaS, the cloud services provide software platform or software itself as a service to its clients [19].

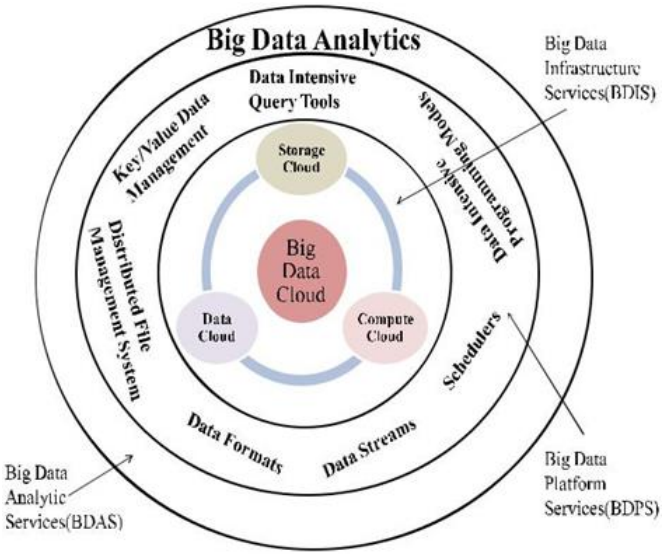


Figure 1. Big Data Cloud Computing

Since innovations in data architecture are on our doorstep, the 'big data' paradigm refers to very large and complex data sets (i.e., petabytes and exabytes of data) that traditional data processing systems are inadequate to capture, store and analyze, to seek to glean intelligence from data and translate it into competitive advantage [16]. As a result, Big data needs more computing power and storage provided by cloud computing platforms. In this context, cloud providers, such as IBM, Google, Amazon, and Microsoft, provide network-accessible storage priced by the gigabyte-month and computing cycles priced by the CPU-hour.

Although big data is still in the preliminary stages, comprehensive surveys exist in the literature [1, 9–11, 20]. This survey article aims at providing a holistic perspective on big data and big data-as-a-service (BDaaS) concepts to the research community active on big data-related themes, including a critical revision of the current state-of-the-art techniques, definition, and extensive researches issues. Following this introductory section, Sect. 2 presents related work approaches in the literature, including the architecture and possible impact areas. Section 3 demonstrates the business value and long-term

benefits of adopting big data-as-a-service business [18].

Another significant challenge is the delivery of Big data capabilities through the cloud. The adoption of Big data-as-a-service (BDaaS) business models enables the efficient storage and management of massive datasets and data processing from an outside provider, as well as the exploitation of a full range of analytics capabilities (i.e., data and predictive analytics or business intelligence provided as service-based applications in the cloud).

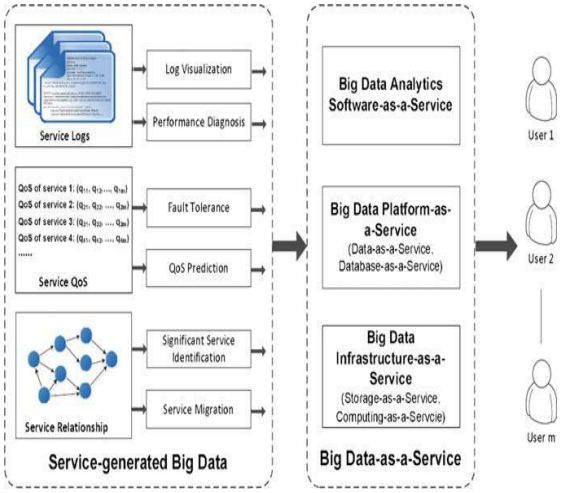


Figure 2. Service-Generated Big Data and Big Data-As-A-Service

IV. PERFORMANCE OPTIMIZATION

Performance optimization is yet another classic and essential topic in cloud computing because appropriate optimization techniques will provide better application experiences with comparable or even less system resource consumption, compared to non-optimized cases.

A dataflow-based performance analysis tool for big data cloud, i.e., Hitune, presented in [Dai11]. Hitune shown to be useful in assisting users doing Hadoop performance analysis and system parameter tuning. Limitations of existing approaches, such as Hadoop logs and metrics compared and discussed. A few interesting case studies on Big data processing in cloud computing environment depicted [17, 18] . Efforts of the Fujitsu laboratory based on the data store and complex event processing, as well as workflow description in distributed data processing.

A recent online cost-minimization algorithm depicted in [Zhang10]. The proposed work specifically focused on real-time cost minimizations for uploading massive and dynamic data onto the cloud. The two online algorithms have achieved competitive cost reduction ratios [19]. However, the proposed methods evaluated on a limited scale. The proposed algorithms need further evaluated at more extensive and more competitive scales, e.g., data streaming applications with larger topologies.

V. PERFORMANCE OPTIMIZATION

In scientific applications, data commonly represented by a multi-dimensional array-based data model. For instance, the widely used Community Earth System Model (CESM) software package consists of four separate modules simultaneously simulating the earth atmosphere, ocean, land surface, and sea-ice, and each module uses the multi-dimensional arrays data model [9]. A typical example is a 3-dimensional temperature data with longitude, latitude, and time dimensions. It is often needed to compute the moving average, median, lowest and highest temperature with specified conditions such as areas and periods. Such computed results will further correlated with the computed results from other parameters, such as the humidity and wind velocity, to predict weather conditions [10].

The current way of conducting such processing is to read the required data (e.g., a sub-array of the affected area) from storage servers to compute nodes, perform computations on desired data with specified conditions, such as those data shown in a shaded area, and then write the output back to storage [7,8]. For CESM, an experimental test shows that the data access and movement time for the calculation of the moving average, median, lowest and highest degrees can occupy 88.2%, 95.4%, 96.6%, and 96.6% of the total execution time on a cluster, where 128GB of data retrieved to 272 nodes for processing.

CESM has data retrieval and processing phases and computing and simulation phases, as many scientific Big data applications do. The basic idea of the new decoupled HPC system architecture is to change the conventional architecture to handle these two phases differently on different nodes. Such architecture decouples nodes into compute nodes and data processing nodes [14, 15]. These nodes are mapped with computation-intensive operations and data-intensive operations respectively. Computation-intensive operations executed on massive compute nodes. Data-intensive operations executed on dedicated data processing nodes. In other words, the decoupled architecture reshapes the current pattern of retrieve - compute - store cycles into retrieving (generate) - reduce - compute - reduce - store cycles as shown in Figure 1, where the reduce phases are designed to conduct offloaded data-intensive operations and reduce data size before moving data across the network. This retrieval, reduce, compute, and store phases can be pipelined to overlap the I/O, communication, and computation times. From one point of view, the decoupled architecture is an enhanced framework of MapReduce [10], where one node with its local storage does not conduct the reduction, but a set of (data) nodes and the global storage so that that parallel computing features can maintain. From another point of view, the data nodes are the data-access accelerators, to speed up data accesses and reduce data size before sending data across the network.

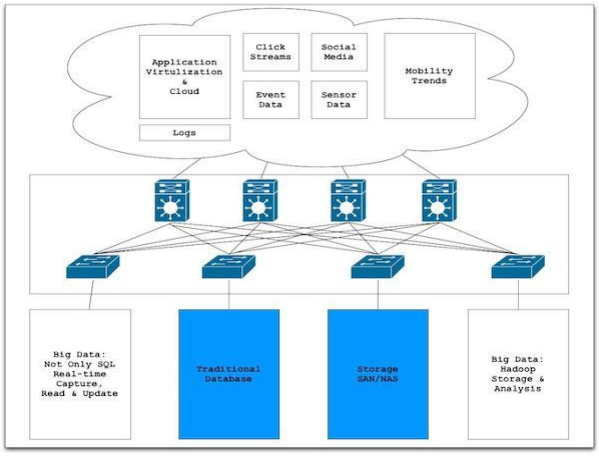


Figure 3. General Framework of Big Data Networking.

VI. CHALLENGES

While the rise of big data yields enormous opportunities for individuals, organizations and the society, it also raises significant privacy and ethical issues [16, 17]. These issues are factors that may lead to situations in which the underlying analytic models and infrastructures are likely to impact privacy negatively from both a legal and an ethical perspective and hence represent possible obstacles for the big data's potential to be fully realized.

Big data analytics essentially requires very high computing capabilities to drive data into meaningful insights. High-performance data analytics, HPDA, seeks to widen the HPC and Big data analytics application domains by augmenting with other related technologies [17,19]. However, varied and complex requirements of big data analytics pose many challenges at micro as well as macro level. At the micro level, there are unusual and specific issues about statistical modelling of big data. At the macro

level, big data analytics challenged by the complexities of working computational prototypes.

- **Data storage and management:** Since big data are dependent on extensive storage capacity and data volumes grow exponentially, the current data management systems cannot satisfy the needs of big data due to limited storage capacity. Also, the existing algorithms are not able to store data efficiently because of the heterogeneity of big data.

- **Data Transmission and Curation:** Since network bandwidth capacity is the major drawback in the cloud, data transmission is a challenge to overcome, especially when the volume of at enormous huge. For managing large-scale and structured datasets, data warehouses and data marts useful good approaches. Data warehouses are relational database systems that enable the data storage, analysis, and reporting, while the data marts are based on data warehouses and facilitate the analysis of them. In this context, NoSQL databases introduced as a potential technology for large and distributed data management and database design. The significant advantage of NoSQL databases is the schema-free orientation, which enables the quick modification of the structure of data and avoids rewriting the tables.

- **Data processing and analysis:** Query response time is a significant issue in big data, more time needed when traversing data in a database and performing real-time analytics. A flexible and reconfigured grid along with the big data pre-processing enhancement and consolidation of application and data-parallelization schemes more efficient active approaches for extracting more meaningful knowledge from the given data sets.

- **Data privacy and security:** Since the host of data or other critical operations performed by third party services or infrastructures, and security issues witnessed concerning big data storage and processing. The current technologies used in data security are mainly static data-oriented, although big data entails the dynamic change of current and additional data or variations in attributes. Privacy-preserving data mining without exposing sensitive personal information is another challenging field to investigate.

VII. CONCLUSION

The information-driven economy relies on the actionable insights extracted from data analytics. The era of data revolution has paved a way to the need of convergence of paradigms like High-Performance Computing and Big Data Analytics. The amalgamation of these paradigms is a herculean task involving various aspects of data management and computing efficiency. HPC with Big data has given rise to the evolution of the data storage technologies and computing models. The transformation of traditional analytical paradigms to cater to the requirement of the intense data applications and High-Performance Computing is the need of the hour.

The convergence of the paradigms "High-Performance Computing" and "Big Data Analytics" can lead to a sustainable solution for the data-driven applications. The continuous flow of "real" data which is the predominant type of data seen in data-intense applications needs to be handled by a different architectural platform termed as "Real Time Analytical Framework." The computational requirements of these newer models are different

from the traditional models, and hence the evolution of the models becomes the critical challenge of High-Performance Data Analytics.

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Design and Synthesis of Novel Molecular Scaffolds of Bicaultamide Derivatives for the Treatment of Prostate Cell Cancer

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ABSTRACT

Prostate cancer is a major cause of male death worldwide and the identification of new efficient treatments is constantly needed. Different non-steroidal androgen receptor antagonists are approved also in the case of castration-resistant cancer forms. Using a rational approach and molecular modelling studies to modify the structure of antiandrogen drug bicalutamide, a new series of phenylsulfonyl-benzamide derivatives was designed and synthesised. Their antiproliferative activities were evaluated in four different human prostate cancer cell lines and several new compounds showed significantly improved IC50 values in the low μM range. The cytotoxicity profile was also evaluated for the novel structures in the HEK293 cell line.

Keywords : Bicaultamide, Prostate Cell Cancer, IC50, HEK293, Prostate cancer, CRPC

I. INTRODUCTION

Prostate cancer (PC) is one of the major causes of male death worldwide, representing the second most common cancer in males.[1] Prostate cancer is a major cause of male death worldwide and the identification of new efficient treatments is constantly needed. An estimated 1.1 million men worldwide were diagnosed with prostate cancer in 2012, accounting for 15% of the cancers diagnosed in men, with almost 70% of the cases (759,000) occurring in more developed regions.

Prostate cancer is the development of cancer in the prostate, a gland in the male reproductive system. Most prostate cancers are slow growing; however, some grow relatively quickly[2]. The cancer cells may spread from the prostate to other area of the body, particularly the bones and lymph nodes.

PC cell growth is strongly dependent on androgens, therefore blocking their effect can be beneficial to the patient's health. Such outcomes can be achieved by antagonism of the androgen receptor (AR) using anti-androgen drugs, which have been extensively explored either alone or in combination with castration [3](**1**), Flutamide (**2**) hydroxyflutamide (3), bicalutamide (4), Enzalutamide (5), Curcumin (6), nilutamide (7) and RU56279 (8) are all non-steroidal androgen receptor antagonists (AR) approved for the treatment of PC.

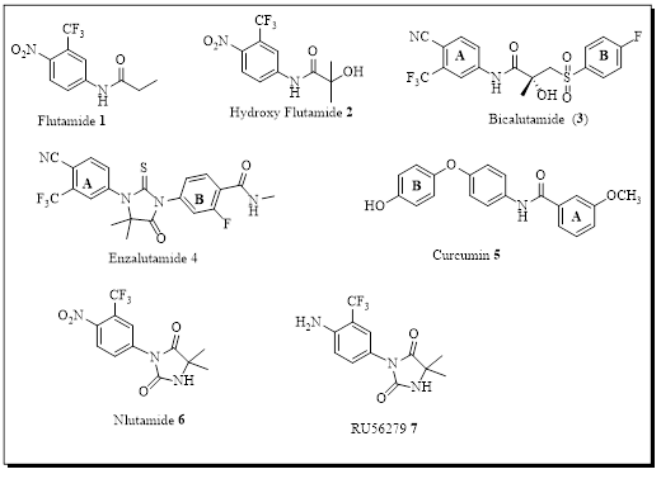


Figure 1 : Structures of various anti androgens used currently for the treatment of prostate cancer

In many cases, after extended treatment over several years, these anti-androgens become ineffective and the disease may progress to a more aggressive and lethal form, known as castration resistant prostate cancer (CRPC). The major cause of this progressive disease is the emergence of different mutations on the AR, which cause the anti-androgen compounds to function as agonists, making them tumour-stimulating agents [4]

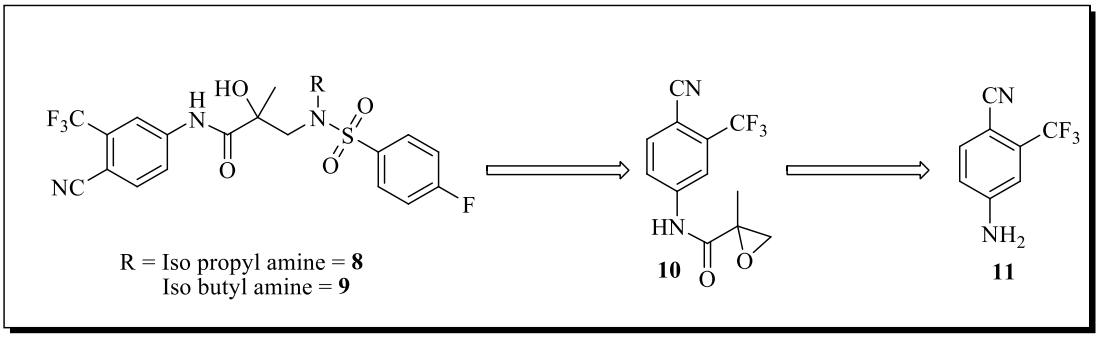
Among the drugs used for the treatment of PC, bicalutamide and enzalutamide selectively block the action of androgens while presenting fewer side effects in comparison with other AR antagonists[5-6]. Non-steroidal ligands are more favorable for clinical applications because of the lack of cross reactivity with other steroid receptors and improved oral bioavailability. Among them, Bicalutamide is the most potent and tolerated drug of choice administered either as monotherapy o8ikl\r with adjuvant castration or luteinizing hormone-releasing hormone.

Structurally these are comprised of two differently substituted aromatic rings, named ring A and ring B, connected by a linker, either linear (Bicalutamide-like compounds) or cyclic Enzalutamide (like compounds), recently, a novel 4-(4-benzoylaminophenoxy) phenol anti-androgen scaffold, derived from the natural pigment Curcumin, has been reported, in which a central phenyl group is acting as linker connecting two different aromatic rings.

One of the most common mutations found for bicalutamide is W741L in helix 12 of the receptor,[7] which allows the protein to adopt its closed agonist conformation even in the presence of the antagonist: with this mutation, due to some residual structural flexibility in 1, ring B can bend to occupy an inner portion of the ligand-binding domain, thus allowing the closure of the receptor into its agonist conformation. Treatment with enzalutamide induces instead a F876L mutation in the AR, which also confers an antagonist to agonist switch in activity for the drug.[8] Second generation antiandrogen ARN-509 (Fig. 1), which is now in Phase III clinical trials.[9]
However it was reported recently that these anti-androgens tend to become ineffective due to adaptive mutations on the structure of the androgen receptor, which renders them agonistic.

II. METHODS AND MATERIAL

In the present chapter we reported the design and synthesis of novel molecular scaffolds of Bicaultamide, wherein the steric strain in the linker is increased by derivatisation of secondary amine as illustrated in **Scheme 1**. The retrosynthetic analysis illustrates the synthesis of N-substituted sulphonamidesfrom substituted aromatic amines.Aromatic amines on condensation with methacrolyl chloride, followed by epoxidation and aminolysis with aliphatic amines yielded the amino alcohols. Further sulphonylation with aromatic sulphonyl chlorides gave novel analogues of Bicalutamide. Similar synthesis was repeated with secondary benzyl amines as starting materials. All the compounds were characterized by, IR, mass, 1H and 13 C NMR and then screened for biological activity against anti-cancer cell lines.

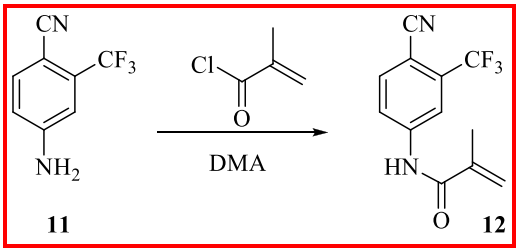


Scheme 1: Retrosynthetic analysis of N-Substituted analogues of Bicalutamide from aromatic amines

In the present chapter we reported the design and synthesis of novel molecular scaffolds of Bicaultamide for biological evaluation

Accordingly the substituted phenyl amine **11** was treated with commercially available methyl acrolyl chloride in DMA for 30 min to give substituted amide **12** in 66.8 % yield.

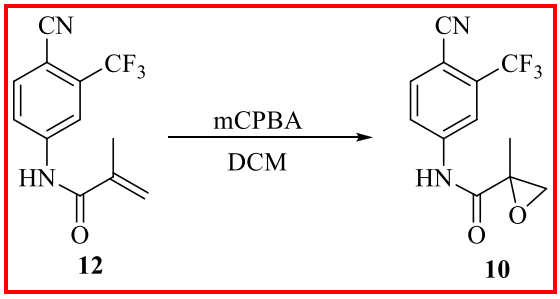
Scheme 2:



In the ^{1}H NMR of **12** signals corresponding to newly introduced olefin group resonated at 5.79-5.74 ppm as a multiplet and the methyl group at 1.98 ppm as a singlet and rest of the protons resonated at expected chemical shifts indicated the methyl acrolyl amide formation. ES1-MS:*m/z* found 277.32 $(M+Na)^+$ gave further confirmation for the stucture of **12**.

The methyl acrolyl amide **12** on treatment with m-chloro perbenzoic acid in CH_2Cl_2 at 0 ^oC for 4 h, yielded the corresponding racemic epoxide mixture **10** in 58.8% yield.

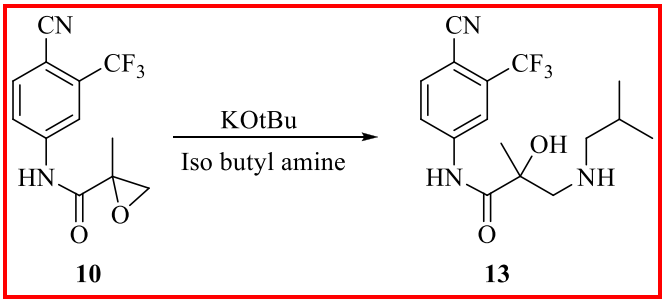
Scheme 3:



The epoxide was confirmed by the loss of olefinic protons at 5.79-5.74 ppm and presence of terminal epoxide protons at 2.96-2.66 ppm appear in the ^{1}H NMR and ESI-MS: m/z found 271.02 (M+H)+ further confirmed the product.

The opening of epoxide **10** in base condition epoxide **10** on treatment with isobutyl amine in presence of a potassium *tert*-butoxide in reflux for 3 h, gave the N-alkyl 1,2-amino alcohol **13** in 71.4% yield.

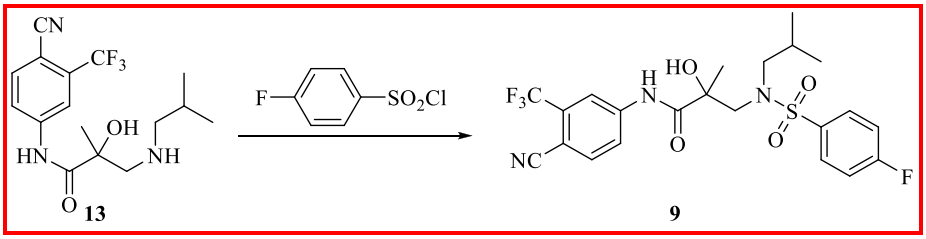
Scheme 4:



In the ^{1}H NMR of **13** the signals corresponding to the isobutyl group appeared at 1.63-1.59 ppm and 0.92-0.89 ppm respectively and ESI-MS: m/z found 344.12 (M+H)+ further confirmed the product.

The N-alkyl 1,2-amino alcohol **13** which were further converted to the p-fluoro sulphonamide **9** on reaction with sulphonyl chloride in CH_2Cl_2 at 0 °C for 6h in 54% yield.

Scheme 5:

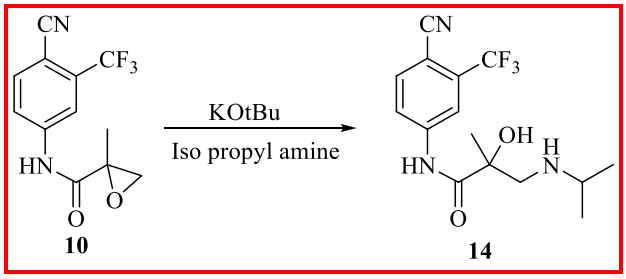


The ^{1}H NMR of **9** the signals corresponding to the newly introduced aromaticgroup appeared at 7.8-7.3 ppm and ESI-MS: m/z found at 524.12 (M+Na)+ confirmed the sulphonamide.

To understand the role of the alkyl chain attached to the amine we prepared various analogues wherein the isobutyl chain was replaced with isopropyl chain. Thus the epoxide mixture **10** on ammonolysis with isopropyl amine in the presence of base i.e potassium tert-butoxide gave the N-isopropyl 1,2-amino alcohols **14** in 70.0 % yield, with loss of epoxide protons at 2.96-2.66 ppm. The amino alcohols on treatment with sulphonyl chloride were converted into sulphonamide **8** in 58.0 % yield.

The opening of epoxide **10** in base condition epoxide on treatment with isopropyl amine in presence of a potassium *tert*-butoxide in reflux for 3 h, gave the N-alkyl 1,2-amino alcohol **14** in 70.0% yield.

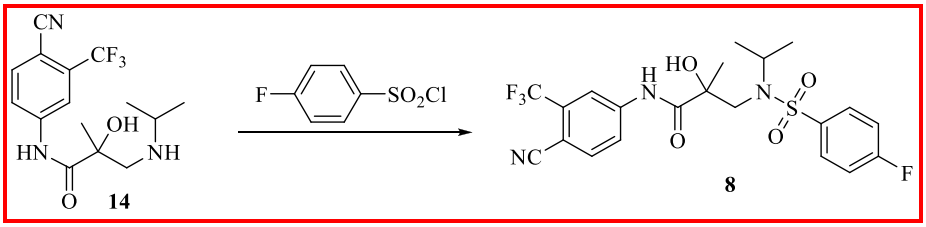
Scheme 6:



In the ^{1}H NMR of **14** the signals corresponding to the isopropyl group appeared at 1.11-0.98 ppm and 2.85-2.83 ppm respectively and ESI-MS: m/z found 330.11 (M+H)+ further confirmed the product.

The N-alkyl 1,2-amino alcohol **14** which were further converted to the p-fluoro sulphonamide **8**, on reaction with sulphonyl chloride in CH_2Cl_2 at 0 °C for 6h in 58% yield.

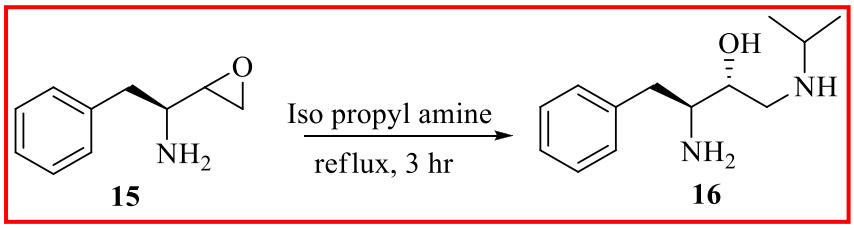
Scheme 7:



The ^{1}H NMR of **8** the signals corresponding to the newly introduced aromaticgroup appeared at 7.6-7.3 ppm and ESI-MS: m/z found at 510.28 (M+Na)+ confirmed the sulphonamide.

The opening of epoxide **15** in base condition epoxide on treatment with isopropyl amine in presence of a potassium *tert*-butoxide in reflux for 3 h, gave the N-alkyl 1,2-amino alcohol **16** in 60.3 % yield.

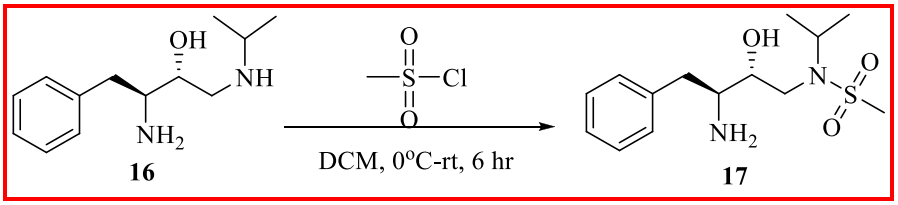
Scheme 8:



In the ^{1}H NMR of **16** the signals corresponding to the isopropyl group appeared at 2.43-2.36 ppm and 0.94-0.91 ppm respectively and ESI-MS: m/z found 223.23 (M+H)+ further confirmed the product.

The N-alkyl 1,2-amino alcohol **16** which were further converted to the methane sulphonamide **17** on reaction with methyl sulphonyl chloride in CH_2Cl_2 at 0 °C for 6h in 53.33% yield.

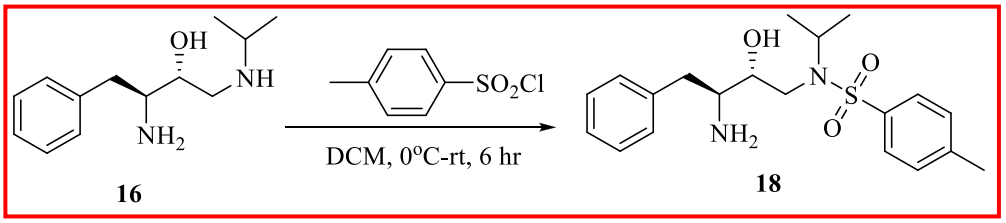
Scheme 9:



The ^{1}H NMR of **17** the signals corresponding to the newly introduced methyl group appeared at 3.03 ppm and ESI-MS: m/z found at 301.22 (M+H)+ confirmed the methane sulphonamide.

The N-alkyl 1,2-amino alcohol **16** which were further converted to the p-methyl sulphonamide **18** on reaction with sulphonyl chloride in CH_2Cl_2 at 0 °C for 6h in 82.0% yield.

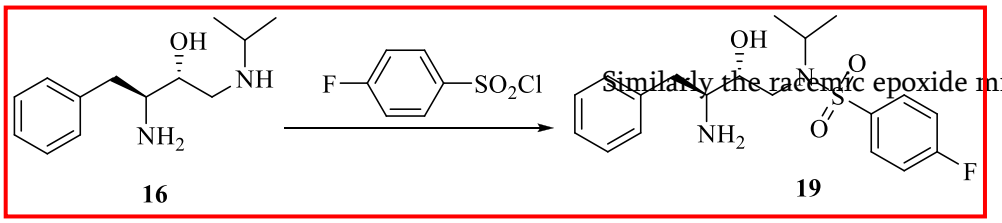
Scheme 10:



In the ^{1}H NMR of **18** the signals corresponding to the p-methyl group appeared at 3.88 ppm and 0.92-0.89 ppm respectively and ESI-MS: m/z found 399.02 (M+Na)+ further confirmed the product.

The N-alkyl 1,2-amino alcohol **16** which were further converted to the p-fluoro sulphonamide **19** on reaction with sulphonyl chloride in CH_2Cl_2 at 0 °C for 6h in 65.5% yield.

Scheme 11:



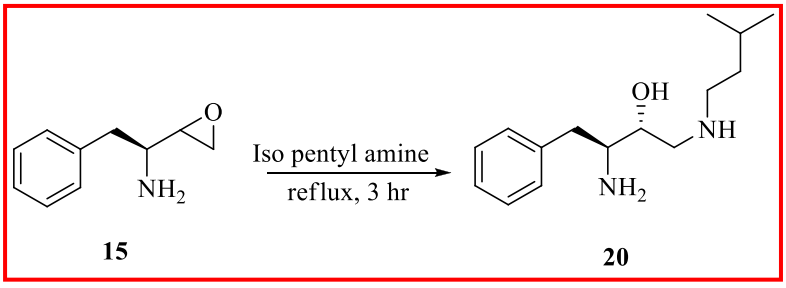
Similarly the racemic epoxide mixture on treatment

In the ^{1}H NMR of **19** the signals corresponding to the aromatic group appeared at 7.87-7.82 ppm and 7.44-7.38 ppm respectively and ESI-MS: m/z found 403.35 (M+Na)+ further confirmed the product.

In the next design we relieved the steric strain in the phenyl ring attached to the amine by removing the methyl group. Thus the racemic epoxide mixture **15** on treatment with isopentyl amine in the presence of potassium tert-butoxidein THF in reflux gave the corresponding 1,2-amino alcohol which was converted to the corresponding sulphonamides 21, 22 and 23 on treatment with methane sulphonyl chloride, p-methyl and p-fluoro sulphonyl chloride respectively in 57.3 %, 62.8 % and 49.7 % yields. These sulphonamides were further confirmed by mass and NMR respectively.

The opening of epoxide **15** in base condition epoxide on treatment with isopentyl amine in presence of a potassium *tert*-butoxide in reflux for 3 h, gave the N-alkyl 1,2-amino alcohol **20** in 78.0% yield.

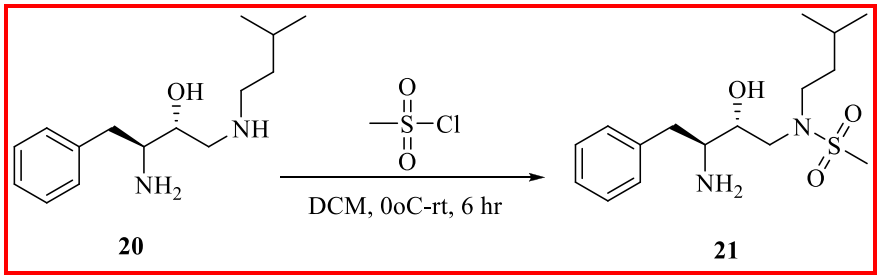
Scheme 12:



In the ^{1}H NMR of **20** the epoxy protons are disappeared and newly formation of corresponding to the isopropyl group appeared at 0.89-0.71 ppm respectively and ESI-MS: m/z found 251.25 (M+H)+ further confirmed the product.

The N-alkyl 1,2-amino alcohol **20** which were further converted to the N-methyl sulphonamide **21** on reaction with methane sulphonyl chloride in CH_2Cl_2 at 0 °C for 6h in 57.3 % yield.

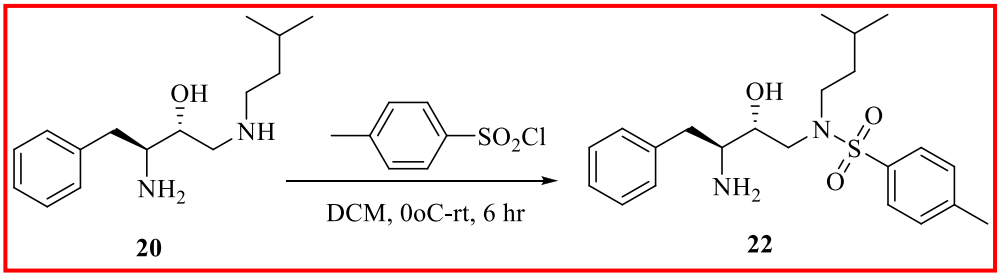
Scheme 13:



The ^{1}H NMR of **21** the signals corresponding to the newly introduced sulphonyl methyl group appeared at 3.03 ppm and ESI-MS: m/z found at 329.14 (M+H)+ confirmed the sulphonamide.

The N-alkyl 1,2-amino alcohol **20** which were further converted to the p-methyl sulphonamide **22** on reaction with sulphonyl chloride in CH_2Cl_2 at 0 °C for 6h in 62.8% yield.

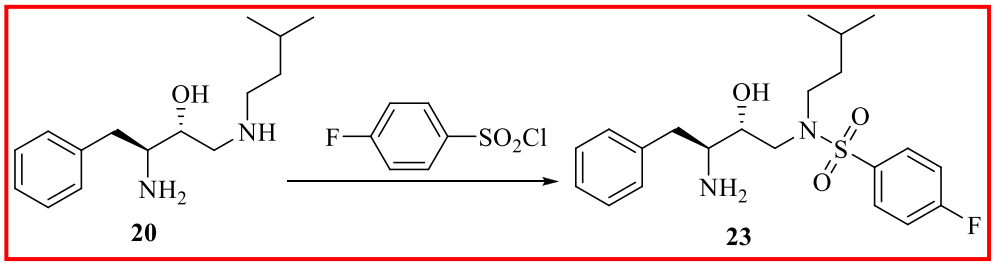
Scheme 14:



The ^{1}H NMR of **22** the signals corresponding to the newly introduced aromatic group appeared two set of proton signal at 7.64-7.61 ppm and 7.39-7.36 ppm. The mass spectrum ESI-MS: m/z found at 405.32 (M+H)+ confirmed the sulphonamide.

The N-alkyl 1,2-amino alcohol **20** which were further converted to the p-fluoro sulphonamide **23**, on reaction with sulphonyl chloride in CH_2Cl_2 at 0 °C for 6h in 49.7% yield.

Scheme 15:

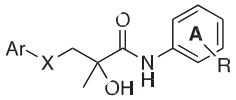


The ^{1}H NMR of **23** the signals corresponding to the newly introduced aromatic group appeared at 7.85-7.80 and 7.44-7.38 ppm and ESI-MS: m/z found at 409.42 (M+H)+ confirmed the sulphonamide.

Results:

MTTassay;

All the compound shave been tested at 8 different concentrations.*MEC: minimum effective concentration that sign I ficantly cross es vehicle control threshold ;**AC50: concentration at which 50% of maximum effect is observed;*** Geometricmean.



Compound	Ar(Bring)	X	R(Aring)	MTTtest		Antiproliferativedata
				MEC(mM)*	AC50(mM)**	Abs.IC50(mM)***
45a(R-	4-F-Ph	SO2	4-CN,3-	19.2	54.3	47.05
44e(*S*-	4-CN-Ph	O	4-CN,3-	21.8	32.8	27.41
22c	3-CF3-Ph	S	4-CN,3-	18.4	36.6	7.23
22d	2-CF3-Ph	S	4-CN,3-	14.7	25.8	6.16
23c	3-CF3-Ph	S	4-NO2,3-	13.2	26.1	7.04
23d	2-CF3-Ph	S	4-NO2,3-	1.71	2.73	5.17
27b	4-CF3-Ph	O	4-CN,3-	11.3	23.9	9.15
28m	4-CN,2-	O	4-NO2,3-	10.6	20.2	6.71
33d	2-CF3-Ph	SO2	4-NO2,3-	22.7	32.6	26.50
42b	4-CF3-Ph	S	4-CN,3-	49.6	61.2	12.24
42c	3-CF3-Ph	S	4-CN,3-CF3	26.6	34.6	13.43

Discussion and conclusion:

In the present chapter we reported the design and synthesis of novel molecular scaffolds of Bicaultamide, wherein the steric strain in the linker is increased by derivatisation of secondary amine as illustrated in **Scheme 1**. The retrosynthetic analysis illustrates the synthesis of N-substituted sulphonamidesfrom substituted aromatic amines.Aromatic amines on condensation with methacrolyl chloride, followed by epoxidation and aminolysis with aliphatic amines yielded the amino alcohols. Further sulphonylation with aromatic sulphonyl chlorides gave novel analogues of Bicalutamide. Similar synthesis was repeated with secondary benzyl amines as starting materials. All the compounds were characterized by, IR, mass, 1H and 13 C NMR and then screened for biological activity against anti-cancer cell lines.

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Benchmark for Drug Tracking using GPS

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ABSTRACT

The Internet has revolutionized the way in which ordinary people conduct their everyday business. People can bank pays bills, manage investments, order various products, and obtain information on an infinite number of topics online. It is not surprising that such an innovation would provide a vehicle for the layperson to educate them and guide the direction of their health. Nor is it surprising that the healthcare industry would seize this opportunity to modernize a commonplace function-prescription dispensation. Many internet pharmacies offer overnight shipping, allowing customers to avoid the delay of regular mail. Internet pharmacies can offer privacy that is often lacking in a traditional pharmacy. However, there is need to consider critically the ethical principles in the use of cyber medicine. The development of online pharmacies has prompted regulatory and monitoring actions at the federal, state, and professional organization levels. The sale of online medications in the international system is potentially dangerous and requires international regulation. Here is an overview of online pharmacies, their potential benefits, the organizations involved in regulating these sites, and the major controversies surrounding online pharmacies.

Keywords: Drug Tracking, Online Pharmacies, Laws of Pharmacy, Prescription

I. INTRODUCTION

Internet has evolved into a self-organizing media, capable of multiple interactions within. A large number of consumer products including drugs are being advertised and sold over the Internet. [1]Though the marketing of drugs over the Internet is an inevitable outcome of the booming e-economy, it poses unique ethical, legal and quality challenges - the prime cause being the anarchic structure of the Internet. These challenges are important from the consumer, physician and regulator perspectives.

Amongst the many commercial activities that are now flourishing in this environment are Internet Pharmacies (e-Pharmacies, Cyber Pharmacies), providing a variety of products (e.g. health and beauty products) as well as prescription drugs. Some pharmacies only dispense drugs with a valid prescription, some provide online consultations for prescribing and dispensing medicines, and some dispense medications without a prescription. [2] There are a number of reasons that may lead patients to the use of the internet in search of medical care. It acts as a second opinion or second doctor for desperate patients. Also, it gives insight into patient

problems, as well as the drugs that could cure them. [3] More so, the hospital pharmacy is usually located in hospitals (government-owned or private) and provides in-house pharmaceutical care to patients. Hospital pharmacists are those that function within a hospital pharmacy system and are tasked with the dispensing of prescriptions, the purchase of medicines, and the testing of these medicines (World Health Organization, 1994). In the hospital pharmacy, access to medical records make it easy to influence the selection of drugs based on allergies or previous problems encountered. Subsequently, the power to control the process of going into the acquisition of drugs and other pharmaceutical devices, help in ensuring the supply of premium quality drugs. Furthermore, Hospital pharmacies, which are owned by the government, have little or no problems with financing projects due to backing from the government (El Tayeb, n.d.).

Also, the community pharmacies may not have the permission to dispense certain drugs which may be due to the nature of such drugs and the prices of drugs are not as subsidised as those in hospital pharmacies (Postnikoff, n.d.). The proposed system aims to connect and serve as an intermediary between hospital pharmacies and drug manufacturers, through a platform that allows the order of drugs with the click of a button, and simultaneously keeps track of what drugs have been ordered and in what quantity.

It is an android application for online checking availability of medicines at medical stores in order to get the required need of drug within the double quick time. The current trend of research on online pharmacy, online medicines, medicines identifier. Even now, a day's patient prefers to prescribe medicines form medical stores. Online pharmacy takes more than couple of days for delivery. Therefore, this research is to study and to develop algorithms that will solve the problem for patient who roam for required drug. Here we are introducing the solution to find availability of that medicine in the nearby shops. It is aimed towards saving the time of searching medicine by visiting nearby shop. Global positioning system (GPS) is used to locate the user and accordingly shows the results.

II. LITERATURE REVIEW

A. Laws of Pharmacy

According to Supreme Court statement, except in emergency cases, doctor cannot consult through phone. As far as India is concerned, there are no dedicated e-health and telemedicine laws in India. There are no well-defined dedicated laws for online pharmacies. The laws applicable are:

- Drug and Cosmetics Act 1940,
- Drugs and Cosmetic Rules 1945,
- Pharmacy Act 1948,
- Indian Medical Act 1956 and
- Laws related to e-commerce are defined under the Information Technology Act, 2000.

B. Role of Prescription

Online pharmacies will promote drug abuse, drug misuse, self-medication, etc. Self-medication is a rampant practice in India, and online sale of drugs would only encourage it.

- Any medication taken without the supervision of doctors may be dangerous and even potentially life-threatening.
- A prescription issued by a doctor cannot be re-used randomly. There is a danger that scheduled drugs can be re-ordered and misused by the consumer.
- The D&C Act 1940, and the D&C Rules 1945 has guidelines on the sale of Schedule H and Schedule X drugs. These can be sold only on prescription, and there are specific rules, including for labeling and bar coding.

Schedule X drugs include narcotics and psychotropic substances. Chances of drug abuse and addiction are higher with the Schedule X category. Schedule X drugs require meticulous storage and dispensing records. The prescription has to be in duplicate and one copy of which is to be retained by the licensed pharmacist for 2 years.

C. Comparison of Local Pharmacy And Online Pharmacy

Price: The prices for medications from an online pharmacy are less because there is no particular production unit, there is no physical store for the medications storage and dispensing, and the company has a large network of retailers to draw from, or a combination of factors.

Convenience: Prescription can be submitted at any time, there is no need to rush to the pharmacy during business hours and do not have to wait in any long lines. However, there are also disadvantages. If it is not the same website every time, one may not be aware of any potential drug interactions, it can be difficult to find someone to answer any specific questions about medications.

Local pharmacies are small independently owned business rather than a pharmacy within one of the large chains and they have staff during regular business hours, and many have an online counterpart as well. The large chains do use locals for a large portion of their workforce.

Pharmacist is responsible for dispensing the right medicines and even counselling a patient about side effects and dosage. In the online space, where the medicines are delivered at the patient's home, there is no possibility of an interaction between a patient and a pharmacist.

D. Measures To Be Taken To Avoid The Misuse Of Online Pharmacy

Before preventing the misuse of online pharmacy, patients should stop the nonmedical use of prescription drugs like stimulants, sedatives or opiod pain relievers. Patients can take steps to ensure that they use prescription medications appropriately by:

- Never change a dosing regimen without first discussing it with the doctor
- Never using another person's prescription, and never giving his or her prescription medications to others.
- Storing prescription stimulants, sedatives, and opioids safely patients should properly discard unused or expired medications

Schedule H and schedule X drugs cannot be sold without prescription because it is easy for local pharmacy stores to verify the authencity of a prescription, as it contains details like registration number of medical practitioner and name of the hospital and there is no such checking by online stores.

- According to the report of high-level government, the physicians should digitally sign committee since doctor's prescription is mandatory for purchasing drugs, online pharmacies will need to mandatorily display the portal link on their homepage for authencity verification by patients or customers and the prescriptions.
- In certain countries like United States, England, Sweden, Denmark and Finland have accurate, regular, and systematic plans to use electronic prescription system, and health ministry of these countries was responsible for coordinating and leading the electronic health.
- It is suggested to use experiences and programs of the leading countries to design and develop the electronic prescription systems.

III.PROPOSED SYSTEM

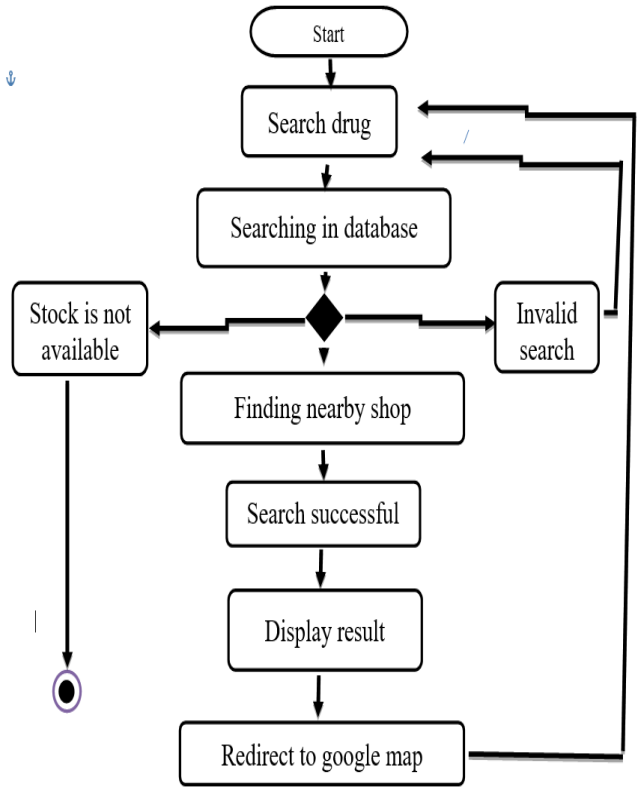


Figure 1. Flowchart for Proposed System

For medicine related work, many online pharmacy stores sell medicine online. In this user/patient have to upload their prescription and have to wait until the product is deliver, which takes at least couple of days and may be more. So, we are improvising above situation and developing an app that find user nearby location using GPS for tracking those Medical stores that have that prescribed medicine available.

GPS is need if we are deal with the locations weather it is nearby location or we find route and many applications using GPS to find different location. That benefits to save more time and efforts. Therefore, we implement GPS for the same reason.

IV.CONCLUSION

Despite the fact that online pharmacy is more subject than nearby pharmacy particularly in remote regions, it ought to be planned to build up standards and direction like transfer of filtered solutions. Patients ought to know on utilization of doctor prescribed prescriptions. It is great to embrace the plans and projects of driving nations to structure and build up the e-pharmacy framework.

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A Review on Methods for Prevention of SQL Injection Attack

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ABSTRACT

Web applications generally interact with backend information to retrieve persistent data and then present the information to the user as dynamically generated output, like HTML websites. This communication is commonly done through a low– level API by dynamically constructing query strings within a general-purpose programming language. SQL Injection Attack (SQLIA) is one of the very serious threats to web applications. This paper is a review on preventing technique for a SQL injection attack which can secure web applications against SQL implantation. This paper also demonstrates a technique for preventing SQL Injection Attack (SQLIA) using Aho–Corasick pattern matching algorithm.

Keywords : SQL Injection attack, Pattern matching, Aho-Corasick algorithm

I. INTRODUCTION

SQL Injection Attacks have been one of the danger's hazards for Web applications [1]. Web applications that are vulnerable against SQL blend may allow an attacker to improvement finish access to their databases. Since these databases now and again contain delicate customer information, the going with security encroachment can interweave markdown intimidation, loss of puzzle information, and twisting. Now and then, attackers can even use a SQL imbuement nonappearance of protection to dismantle control of and fall the framework that has the Web application. Web applications that are frail against SQL Injection Attacks (SQLIAs) are paying little respect to what you look like at it. To get directly to the point, SQLIAs have plausibly in view of discernible manhandled individuals, for instance, Travelocity, Ftd.com, and Surmise Inc. SQL implantation gathers a class of code-imbuement attacks in which data gave by the customer is joined in a SQL ask for in such a course, to the point that bit of the customer's information is regulated as SQL code. By utilizing these vulnerabilities, an attacker can submit SQL summons unmistakably to the database. These strikes are a certifiable peril to any Web applications that get responsibility from customers and solidify it into SQL ask for to a major database. Most Web applications used on the Web or inside huge business structures work in this manner and could thusly are defenseless against SQL imbuement. A champion among the most gainful instruments to shield against web ambushes uses Interruption Discovery System (IDS) and Network Intrusion Detection System (NIDS). An IDS uses mishandle or assortment from the standard range to ensure against attack. IDS that usage trademark assertion framework makes a gage of customary utilize outlines. Abuse perceiving affirmation reasoning uses especially known cases of unapproved provoke to presume and find happening as intended in every way that really matters unclear kind of

strikes. These sorts of cases are called a signature. NIDS is not helping for the affiliation sorted out applications (web strike), in light of how NIDS are functioning lower level layers [2].

II. LITERATURE SURVEY

Beuhrer [3] has depicted a system to frustrate and to keep away from SQL blend attacks. The strategy relies upon looking, parse tree of the SQL verbalization before the union of client responsibility with the one that following after idea of duty, at run time. In another paper [3] author proposes a system to keep this sort of control and consequently dispose of SQL injection vulnerabilities. The system depends on looking at, at run time, the parse tree of the SQL proclamation before incorporation of client contribution with that subsequent after consideration of info. The solution is proficient, adding around 3 ms overhead to database inquiry costs. Also, it is effectively received by application software engineers, having an indistinguishable syntactic structure from current mainstream record set recovery strategies. This usage limits the exertion required by the software engineer, as it catches both the proposed inquiry and genuine question with negligible changes required by the developer, tossing a special case when fitting. This structure execution is needed to restrict the endeavor the planner needs to take; since, it in this way gets, both the true blue address and the proposed ask for and that additionally, with irrelevant changes in a general sense to be finished by the item manufacture.

Saltzer and Schroeder [4] propose a security structure against the strikes like SQL Injection. They proposed a structure utilizing unmistakable stages. One of them was the shield defaults, on which the positive destroying is poor or takes after, confers that a traditionalist course of action must be secured around wrangle about why articles ought to be open, instead of why they ought not. Data speak to today a significant resource for organizations and associations and must be secured. The vast majority of an association's delicate and exclusive data dwells in a Database Management System (DBMS). The concentration of this proposition is to create propelled security answers for ensuring the data living in a DBMS. This procedure [5] is to build up an Intrusion Detection (ID) component, actualized inside the database server that is equipped for distinguishing strange client solicitations to a DBMS. The key though is to learn profiles of clients and applications interfacing with a database. A database asks for that strays from these profiles is then named as peculiar. A noteworthy segment of this work includes prototype usage of this ID instrument in the PostgreSQL database server. Author additionally propose to enlarge the ID system with an Intrusion Response motor that is fit for issuing a proper reaction to an abnormal database ask. In a far-reaching system, a couple of articles will be deficiently considered, so a default of nonappearance of consent is more secure. A layout or use mess up in an area that gives unequivocal concur tends to bomb by declining endorsement, a secured condition, since it will be immediately observed. On the other hand, a setup or use misuse in a framework that explicitly rejects get to tends to bomb by allowing get to, a mistake which may go unnoticed in standard utilize. This oversee applies both to the outward appearance of the insistence framework and to its hidden execution.

A new paper [6] introduces a scientific categorization of intrusion detection frameworks that is then used to overview and orders various research prototypes. The scientific categorization comprises an arrangement first of the detection standard, and second of certain operational parts of the intrusion

detection framework accordingly. The frameworks are likewise assembled by the expanding trouble of the issue they endeavor to address. These groupings are utilized presciently, pointing towards various ranges of future research in the field of intrusion detection.

Yusufovna [7] has demonstrated the use of information tunneling approaches for IDS. The fast advancement of innovation and the expanded network among its segments forces new digital security challenges. To handle this developing pattern in PC attacks and react dangers, industry experts and scholastics are uniting keeping in mind the end goal to construct Intrusion Detection Systems (IDS) that join high exactness with low unpredictability and time productivity. An intrusion detection framework works by deciding if an arrangement of activities can be esteemed as an intrusion on a premise of at least one shows of intrusion. This model [7] portrays a rundown of states or activities as great or terrible (potential intrusion). These ID strategies can be actualized into two distinctive framework categorizations. Anomaly detection framework which is recognized organize movement conduct and abuse detection framework which constructs its detection in light of marks or pattern matching, likewise depicted as learning based. The display article gives a review of existing Intrusion Detection Systems (IDS) alongside their fundamental standards. Likewise, this article contends whether data mining and it's center component which is information disclosure can help in making Data mining based IDSs that can accomplish higher exactness to novel sorts of intrusion and show more powerful conduct contrasted with customary IDSs. Interruption disclosure can be named as of seeing activities that endeavor to risk the security, consistency, and transparency of the advantages of a framework. IDS show is shown and what's more its impediment in picking security infringement is displayed in this paper.

Halfond and Orso [8] had displayed an improvement for disclosure and repulsiveness of SQLIA. This technique made depended on upon the approach that ordinary to perceive the malignant demand before their execution inside the database. To accordingly produce a model of the certifiable or right request, the static piece of the strategy utilized the program examination. This could be conveyed by the application itself. The system utilized the runtime looking for an examination of proficiently made demand and to check them against the static edge appear. Halfond and Orso [9] had proposed a system for countering SQL imbuement. The framework really joined the traditionalist static examination and runtime checking for revelation and stoppage of unlawful demand before they are executed on the database. The structure gathers an immediate model of the honest to goodness request that could be made by the application in its static parts. The system assessed the dynamically made demand for consistency with statically construct appears in its dynamic part. W. G. J. Halfond ET. al. [10] proposed another, much-mechanized methodology for guaranteeing existing Web applications against SQL implantation. This technique has both handled and reasonable positive conditions over most existing structures. From the discovered perspective, the system is secured around the first idea to make sure pulverizing and the probability of vernacular structure noteworthy evaluation. From the sensible point of view, the method is the right and valuable and has irrelevant methodology necessities.

This paper [11] depicts a straightforward, effective calculation to find all events of any of a limited number of watchwords in a string of content. The

calculation comprises of building a limited state pattern matching machine from the catchphrases and afterward utilizing the pattern matching the machine to process the content string in a solitary pass. Development of the pattern matching machine requires significant investment relative to the whole of the lengths of the catchphrases. The quantity of state advances made by the pattern matching machine in handling the content string is autonomous of the number of catchphrases. The calculation has been utilized to enhance the speed of a library bibliographic pursuit program by a factor of 5 to 10.The strategy proposed in this paper appropriate for applications in which we are searching for events of substantial quantities of watchwords in content strings. Since no extra data should be added to the content string, hunts can be made over self-assertive documents. Some data recovery frameworks figure a list or concordance for a content document to permit hunts to be led without scanning the greater part of the content string. In such frameworks rolling out improvements to the content, the document is costly in light of the fact that after each change the record to the record must be refreshed. Thus, such frameworks work best with long static content documents and short patterns.

III. RELATED WORK

A. Types of SQL Injection Attacks

In this area, we appear and examine the changed sorts of SQL Injection Attacks. The unmistakable sorts of strikes are everything considered not performed in the partition; a solid piece of them are utilized together or continuously, subordinate upon the particular objectives of the attacker. Note besides that there are boundless groupings of each strike sort.

1. Tautologies

Redundancy based attacks are among the minimum troublesome and best-known sorts of SQLIAs. The general target of a redundancy-based ambush is to mix SQL tokens that make the request prohibitive decree constantly evaluate to genuine. This system implants announcements that are always bona fide so the request reliably return comes interminable supply of WHERE condition.

Injected query: select name from user_details where username = "abc" and watchword = or1 = 1.

2. Piggybacked

In this attack, an interloper tries to inject additional inquiries close by the primary request, which are said to "piggy-back" onto the main inquiry. Along these lines, the database gets various SQL inquiries for execution additional request is added to the principal request. This ought to be conceivable by using an inquiry delimiter, for instance, ";", which deletes the table decided.

Injected Query: select name from user_details where username = ‘abc’; droptable acc –

3. Timing attack

In this sort of attack, the attacker induces the information character by character, dependent upon the yield kind of real/false. In time-based ambushes, attacker displays a deferment by implanting an additional SLEEP (n) call into the inquiry and after that viewing if the site page was truly by n seconds.

4. Union Queries

SQL licenses two requests to be joined and returned as one result set. For example, SELECT col1, col2, col3 FROM table1 UNION SELECT col4, col5, and col6 FROM table2 will return one result set involving the delayed consequences of the two request using this framework, an attacker can trap the application

into returning data from a table not exactly the same as the one that was arranged by the creator. The mixed inquiry is associated with the primary SQL request using the catchphrase UNION as a piece of demand to get information related to various tables from the application.

Original query: select acc-number from user_details where u_id = 500
Injected query: select acc-number from user_details where u_id = '500' union select pin from acc_details where u_id='500'

5. Blind SQL injection attacks

Attacker commonly tests for SQL implantation vulnerabilities by sending the data that would achieve the server to create an invalid SQL question. If the server at that point restores a slip-up message to the client, the attacker will attempt to make sense of portions of the primary SQL request using information grabbed from these bungle messages.

B. Aho–Corasick Algorithm

In programming building, the Aho– Corasick figuring is a string looking estimation envisioned by Alfred V. Aho and Margaret J. Corasick. It is a kind of word reference matching estimation that discovers parts of a constrained course of action of strings (the "dictionary") inside a data content. It organizes all strings in the meantime. The multifaceted idea of the count is straight in the length of the strings notwithstanding the length of the looked content notwithstanding the number of yield matches. Observe that since all matches are found, there can be a quadratic number of matches if every substring matches (e.g. word reference = an, aa, aaa, aaaa and input string is aaaa).

Calmly, the estimation builds up a restricted state machine that brings after a tire with additional associations between the diverse inside center points. These extra internal associations allow speedy moves between failed string matches (e.g. a sweep for cat in a tire that does not contain cat, yet rather contains truck, and along these lines would miss the mark at the center point prefixed by ca), to various branches of the tire that offer a run of the mill prefix (e.g., in the past case, a branch for trademark might be the best parallel move). This allows the machine to move between string matches without the necessity for backtracking.

As soon as the string word reference is known early, (e.g. a PC disease database), the improvement of the system can be performed once detached and the joined machine set away for later use. For this circumstance, its run time is immediate in the length of the commitment notwithstanding the number of facilitated sections. The Aho– Corasick string matching estimation confined the preface of the primary UNIX charge fgrep.

Illustration:

For this situation, we will consider a vocabulary involving the going with words: {a,ab,bab,bc,bca,c,caa}.

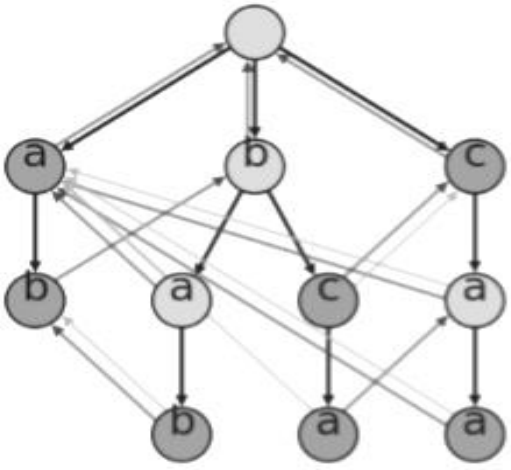


Figure 1.1 Aho– Corasick data structure created from the foreordained word reference

The diagram underneath is the Aho– Corasick data structure created from the foreordained word reference, with each line in the table addressing a center point in the tire, with the fragmented way demonstrating the (stand-out) plan of characters from the root to the center point.

The data structure has one center point for each prefix of each string in the word reference. So if (bca) is in the vocabulary, at that point there will be center points for (bca), (bc), (b), and (). If a center is in the vocabulary then it is a blue center point. Else it is a diminish center point.

There is a dull composed "youth" bend from each center point to a center whose name is found by appending one character. So there is a dull bend from (bc) to (bca).

There is a blue composed "expansion" round fragment from each center point to the center that is the longest possible strict postfix of it in the graph. For example, for center point (caa), its strict postfixes are (aa) and (an) and (). The longest of these that exist in the chart is (a). So there is a blue roundabout fragment from (caa) to (a). The blue bends can be figured in straight time by on and on exploring the blue twists of a center's parent until the point that the intersection center point has a tyke matching the character of the goal center point.

There is a green "dictionary expansion" round section from each center to the accompanying center in the word reference that can be come to by taking after blue bends. For example, there is a green curve from (bca) to (an) in light of the way that (an) is the primary center point in the word reference (i.e. a blue center) that is accomplished when taking after the blue roundabout fragments to (ca) and subsequently on to (a). The green bends can be enrolled in coordinate time by more than once crossing blue round sections until a filled in center point is found, and remember this information.

At each movement, the present center is connected by finding its adolescent, and if that doesn't exist, finding its expansion's tyke, and if that doesn't work, finding its postfix's expansion's tyke, and so on, finally culmination in the root center point if nothing's watched some time as of late.

Right when the figuring accomplishes a center point, it yields all the word reference areas that end at the present character position in the data content. This is done by printing every center point came to by taking after the vocabulary expansion joins, starting from that center point, and continuing until the point that it accomplishes a center with no word reference postfix associate. In like manner, the center point itself is printed, in case it is a word reference area.

IV. PROPOSED SYSTEM

In web security issues, SQLIA has the best by and large need. Basically, we can compose the territory and killing movement strategies into two general classes. Regardless approach is trying to perceive SQLIA through checking Anomalous SQL Query structure utilizing string matching, outline matching, and address managing. In the second approach utilizes information conditions among information things which are all the more unwilling to change for perceiving toxic database works out. In both, the classes, immense bits of the specialists proposed different game plans with joining information mining and interruption zone structures. Hal delicate et al built up a system that uses a model– based way to deal with overseeing recognize unlawful inquiries previously they are executed on the database.

William et al proposed a structure WASP to check SQL Injection Attacks by a strategy called positive dirtying. Srivastava et al offered a weighted assembling tunneling approach for perceiving information base ambushes. The devotion of this paper is to propose a procedure for seeing and predicting SQLIA utilizing both static stage and component organize. The eccentricity SQL Queries are exposure in the static stage. In the dynamic stage, if any of the demand is seen as irregularity question then the new case will be delivered utilizing the SQL Query and it will be added to the Static Pattern List (SPL).

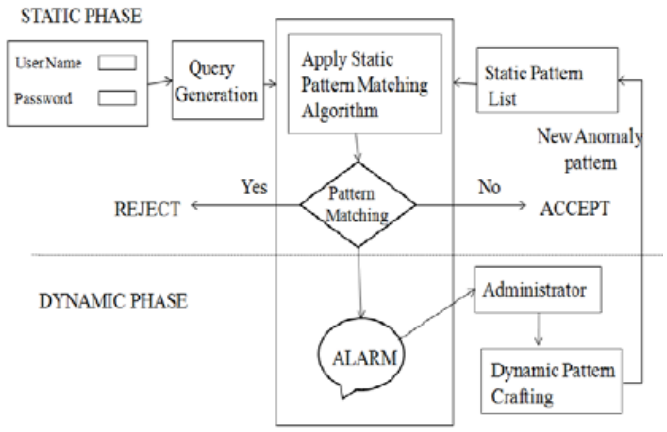


Figure 1.2 Architecture of SQLIA Detection

V. CONCLUSIONS

In this paper, we have proposed a scheme for the detection and prevention of SQL Injection Attack. We thought a strategy for insistence and slaughtering development of SQL Injection Attack (SQLIA) using Aho– Corasick configuration matching figuring. The system is completely robotized and perceives SQLIAs utilizing a model-based approach that hardens static and segment examination. This application can be utilized with different databases.

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Lean Six Sigma for Quality and Performance Improvement of POH Process of Wagon Wheel CTRB

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ABSTRACT

Due to high competition in present world, every end user of a product demand their products to be delivered to them on time with good quality. Hence it is an objective of every industry to satisfy their customer requirements. In the long run, this can be achieved by continuous and constant process improvements. Lean Six Sigma is an overall quality improvement approach combining and capitalizing the strengths of Six Sigma and Lean Management improvement programs. In CTRB periodic overhaul, several process steps and workplaces are required for the job, the movement of inventory between the workplaces can be very time consuming unless it is suitably planned. The major areas that need great attention in this system are WIP (work in process), Takt time and process variability. In this study, focus is on the application of lean tools and techniques with their principles coupled with six sigma DMAIC methodology. The objective of this study is to identify the best possible tools and techniques to tackle premature failure of CTRBs whilst in service due to early presence of defects which are closely associated to the POH process. It also discusses the methodology generally adopted, tools and techniques used and benefits obtained. By mapping current state of the POH process and takt time, future state improvement can be done in order to reduce cycle time using Lean tools such as Poke-Yoke, Jidoka, 5S, SMED.

Keywords : Periodic Overhaul (POH), Cartridge Tapered Roller Bearings (CTRBs), DMAIC, Lean, Six Sigma

I. INTRODUCTION

Today, organisations strive for an improved level of process capability and manufacturing quality to achieve the bottom-line objectives of generating a profitable margin and sustainable competitiveness and share in the market. Lean Six Sigma is a quality improvement strategy that helps companies achieve these results. The main portion of this work will be dedicated to a case study analysis of the Periodic Overhaul (POH) process at PratapNagar Railway Wheel and CTRB workshop. Based on a variety of literature and case study review, a Lean Six Sigma model will be developed and implemented at the facility.

To satisfy a growing demand and expectation from customers while coping with increasing product complexity and limited resources, organisations must improve on a continuous basis. As products become more complex, the number of components at the sub-assembly level becomes increasingly large, leading to a higher probability of defective assembly; as a result, there is a drive for superior component quality. Moreover, processes need to have a greater capacity and efficiency to provide a greater throughput to meet requirement.

This project focuses on the approach and application of the Lean Six Sigma methodology. Time has been devoted on literature review and studying a variety

of cases to develop a thorough understanding of the methodology. The knowledge acquired has been applied continuously throughout the course for the work

II. BACKGROUND

PratapNagar railway workshop is the first state owned railway by ruler of Vadodara and pioneer to lay the first NG railway line between Dabhoi to Miyagaon in 1963. It was then materialized in 1973 when the complete track formation was upgraded. The foundation stone of PratapNagar workshop was laid by his highness Lord Chelmsford, Viceroy and Governor General of India on 25th March 1919.the workshop started in 1922.The workshop is currently being used for repairing and overhaul of coaches and wagons. PratapNagar Workshop consists of eight workshops. In the Wheel CTRB (Cartridge Tapper Roller Bearings) repair shop, POH (Periodic Overhaul) of High Precision E-Type CTRBs for CASNUB 22 HS bogies takes place. Cast Steel CASNUB 22HS-bogie is a type of railway bogie commonly used in freight stock/ wagons.



Figure 1 : CASNUB 22HS-Bogie

The main function of CTRB is to support axial and radial forces. The inner and outer ring raceways are segments of cones, the rollers are tapered so that the conical surfaces of the raceways, and the roller axes, if projected, would all meet at a common point on the main axis of the bearing. This geometry makes the motion of the cones remain coaxial resulting with no sliding motion between the raceways and the OD of the rollers. Pairs of tapered roller bearings are used in wagon wheel bearings where they must cope simultaneously with large vertical and horizontal forces. Tapered roller bearings are commonly used for moderate speed, heavy duty applications where durability is required.

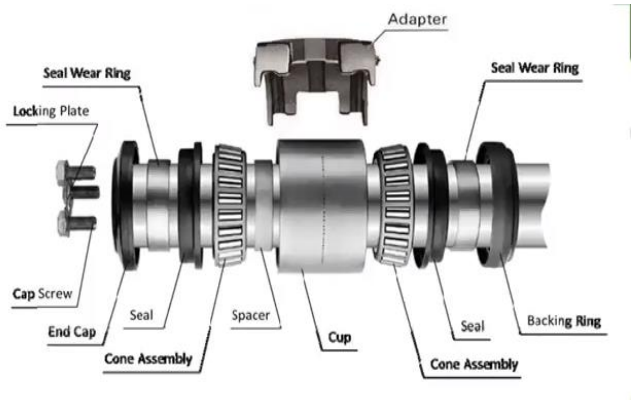


Figure 2 : EXPANDED VIEW OF CTRB

The components of CTRB unit are first dismantled in the dismantling unit. Due to long exposure to the environment and working conditions, grease gets hardened. First the unit is dipped in Kerosene oil to soften the grease. Stripping off of softened grease is done through centrifugal action by a Centrifugal Grease Purging (CPG) machine. Final cleaning is done in a tank where the bearing is subjected to kerosene oil and compressed air jet. When clean the components are inspected, checking for some defects. Defective bearings are rejected and the rest are passed on to greasing and assembly where each cone is filled with grease. Under normal circumstances, the predicted fatigue life of CTRBs is 25 years according to NBC Bearings which is the major supplier of bearings to Western Indian Railways (WIR). However, they are often condemned prematurely due to avoidable mistakes in the over hauling process. Accurate determination of the causes of bearing premature rejection must be done to make suitable recommendations for eliminating the cause. In contrast to fatigue life, this premature failure could be caused by incorrect fitting, improper mounting, improper handling, poor lubrication etc.

PROBLEM STATEMENT

In a 12 week period from August to October 2018, 553 CTRBs were condemned before their set life span. 25% of the bearings were prematurely rejected hence affecting WIR operations as a projected 2.4 Crore (US$332 000) can be wasted annually.

AIM

To improve the quality and performance of the POH process of CTRB at PratapNagar Railway Wheel CTRB workshop using lean six sigma.

OBJECTIVES

- Identify and eliminate causes of premature rejection of CTRBs
- Optimise the performance and quality of the POH process of CTRB.
- Maintain the improved POH process of the Wheel CTRB workshop for sustainability.

SCOPE

Only investigate the effect of the POH process to the lifespan of CTRB hence:

- Only focus on the eight frequently occurring defects that are associated to the POH process.
- Some other defects that occur due to mechanical or chemical effects whilst the bearing is in service are beyond the scope of this study.
- What happens to the rejected bearings is beyond the scope of this study

III. FINDINGS OF LITERATURE REVIEW

The DMAIC coupled with Lean techniques can be employed to achieve the efficient use of resources and to minimize non-value added activities in the process. Combining and capitalizing the strengths of Six Sigma and Lean Management improvement programs. The overall objective being to continuously improve in order to satisfy a growing demand and expectation from customers while coping with increasing product complexity and limited resources. All in all, literature review revealed that Lean Six Sigma implementation can provide a breakthrough improvement in any industry, Railway Industry included.

IV. RESEARCH GAP

LSS has been used for high quality and performance improvement in numerous industries. There is however no model to measure the success of LSS deployment. There is a need to design a model to measure the impact of LSS implementation on organizational overall performance. The researcher believes that the model will assist new adopters of LSS to anticipate and additionally examine the impact of LSS on their operational overall performance.

V. METHODOLOGY

DEFINE PHASE

Define is the first step and decide what is required to be done. It brings a good understanding to everybody the need of project, its impact and implementation procedure. It should be clear what we want to achieve at the end.

Project Charter

It is a contract between the project team and its sponsors. It created a shared understanding about the project and the project goal. It mentioned mission, problem statement, possible gains, constraints and assumptions. It also mentioned important persons, key dates during the project and the project status. The charter included reasons for undertaking the project, objectives and constraints of the project.

Value Stream Mapping (VSM)

Because of unfamiliarity with the POH process at the start of the project, the researcher decided to apply the Value Stream Mapping (VSM) technique to map out the process and identify the main problems of the process. VSM proved to be particularly useful for obtaining a bigger picture of the POH process, it also revealed general problem areas associated with the process.

The VSM captured the entire process, beginning with the dismounting of the CTRBs from the wheels and ending with the mounting of the serviced CTRB on the wheels. The VSM illustrated the physical movement of inventory and information. A time study was done on the entire process and the process cycle time (C/T) and available time (AT) for each process step was derived and listed on the map. The process map was developed based on timing results and observations made on-site at the Wheel and CTRB Workshop facility. Interactions with the workers at the workshop also provided with valuable information.

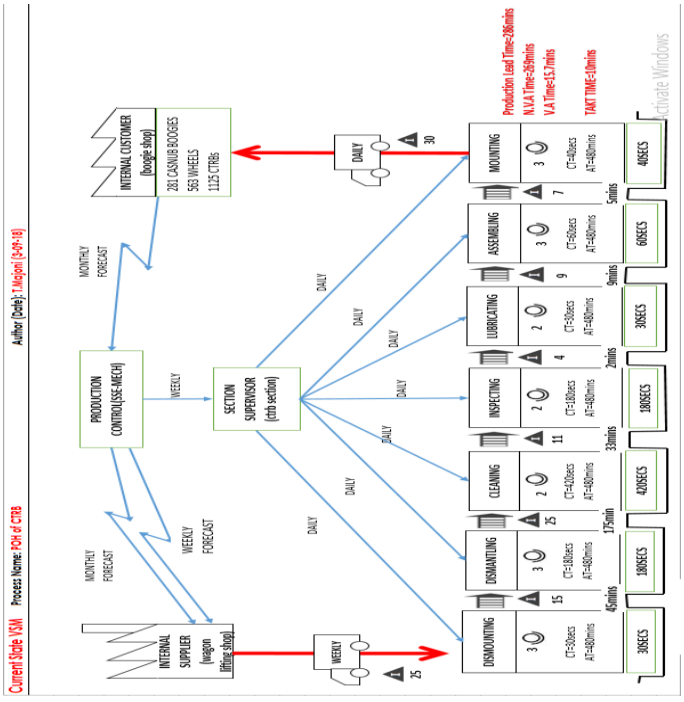


Figure 3 : Current Value Stream Map

A comprehensive understanding of the process was acquired upon completion of the VSM. In the process of developing the map, a list of findings, major areas of focus and concern were identified and summarized as follows:

- The process is running at a slower rate relative to the demand.

$$T_{ct} > T_{kt}$$

This leads to bottlenecks in the process, affecting the overall process performance.

- Due to the difference of Tkt and Tct there is a high build-up of Work-In-Progress (WIP).
- The non-value-added time of the POH process was found to be 4.4 hours, compared to 15.7 minutes of value-added operations.

These findings narrowed the focus for the researcher and helped to define and pinpoint the problems faced. Based on the observations of the uneven process flow and the high number of WIP level, the POH process was found to be inefficient, accounting for the large proportion of time dominated by non-value added activities. The inefficiency of the process and the unacceptable defects associated to this process imposed a negative effect on the company's objective of reducing all NVA activities (Integrated Management System Policy 2017 of PratapNagar Workshop). From this analysis, the objectives for the case were set clearly. The goals were to achieve an even, levelled-out flow as well as to improve the performance and quality of the POH process by eliminating non value adding activities that leads to CTRBs being condemned prematurely.

MEASURE PHASE

The development of the process map and the problem definition from the Define phase enabled the researcher to proceed to the Measure phase. The

researcher identified from the Define phase that 25% prematurely condemned bearings and process inefficiency were the major problem areas to focus on for the case. In the Measure phase, the goal is to validate and further develop the identified problem areas, as well as to gain a deeper understanding of the problems. To achieve this goal, the researcher continuously collected raw data and conducted further analysis.

CTRB Rejection Data and Analysis

To tackle the rejection rate problem, 12 weeks of yield-defect figures for the CTRBs were collected. After a thorough examination of the data, the researcher compiled an overall yield-defect graph and the defect breakdown Pareto chart for the POH process, as shown in Fig 4 and 5 respectively. The poor yield and the high rejection rate as indicated by the high DPMO gave an indication of the incapability and ineffectiveness of POH of CTRBs.

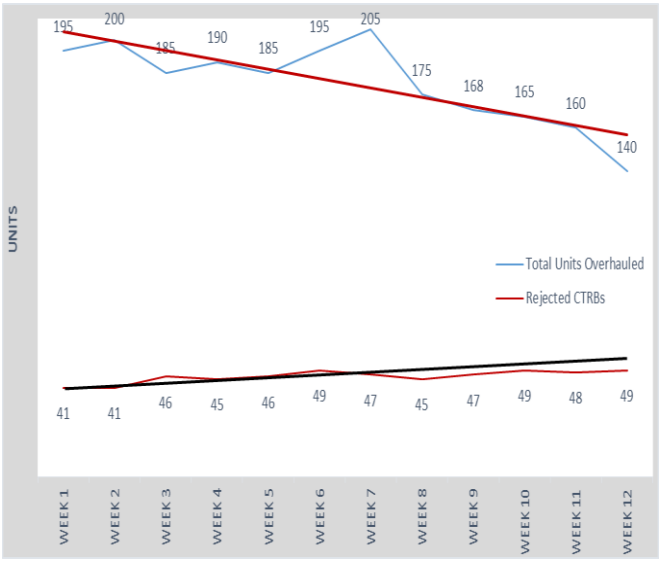


Figure 4 : Overall POH process Yield-Defect graph

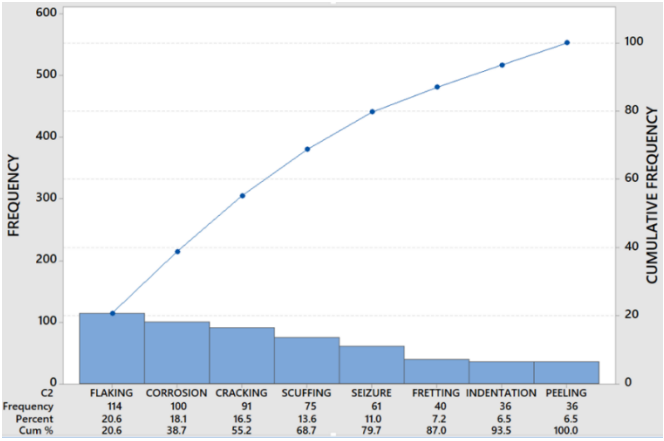


Figure 5 : defective chart for rejected CTRBs

Based on the Pareto chart, 55.2% of the condemned bearings were due to flaking, corrosion and cracking. These are the most frequently occurring defects that result in condemnation of the bearings, therefore in consultation with the Management it is agreed upon to apply Lean techniques using Six Sigma to eliminate these defects.

Data Compilation of CTRB components wise

Of the components the most critical components are the cup, cone assembly and the spacer ring. CTRB component wise data was collected to identify components which showed the highest frequency of being defective resulting in rejection of the bearing. The chart showed that 83% of the condemned bearings in the period were due to defective cup, spacer ring and cone assembly. This is not by coincidence since flaking, corrosion and cracking (55.2% of the defects) directly attack these components.

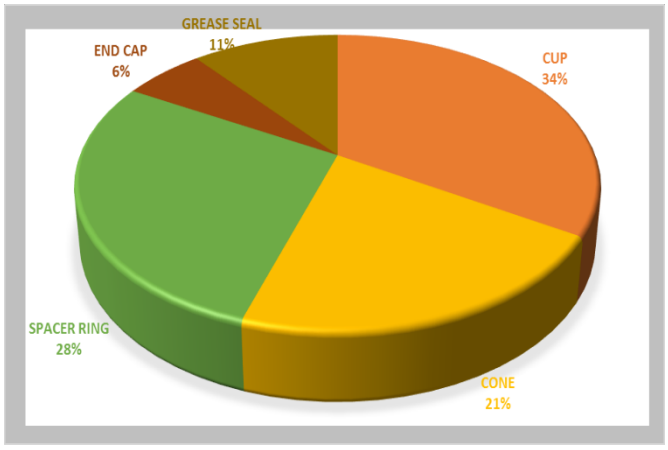


Figure 6 : CTRB Component Wise Cumulative Rejection

Sigma Level Calculation

Sigma level calculation is important to understand capability of POH process. Theoretically, the higher the sigma level the better is the performance. The six sigma level means 3.4 defects per million opportunities. The data collected in this project is discrete data therefore sigma level calculated is using DPMO method.

$$DPMO = \frac{553x1\,000\,000}{8x2160}$$

$$= \mathbf{32002.31}$$

Current Sigma Level *(DC Montgomery 6th edition):*

$$\sigma = 0.8406 + \left(\sqrt{(29.37 - 2.221x\,ln[DPMO])}\right)$$

$$= 0.8406 + \left(\sqrt{(29.37 - 2.221x\,ln[32002.31])}\right)$$

$$= 3.36$$

$$\approx \mathbf{3.4}$$

The Integrated Management System Policy (IMSP 2017) of PratapNagar Workshop emphasise the need for continuous improvement and the need for process capability for sustainability. Therefore even a slight increase in sigma level is a welcome change for WIR.

ANALYSE PHASE

The objective is to identify the root cause of POH process variation based on information and data collected in Measure Phase. Additional data is also collected to find out cause of the problem. The data is analysed to check if there are consistent with the problem definition and also to identify the root cause. Three components of the CTRB namely Cup, Cone Assembly and Spacer ring; three types of defects namely Flaking, Corrosion and Cracking are considered for further study to arrive at root cause.

Material Analysis of CTRBs Critical Components

Primarily, high carbon chromium steel is used for the spacer rings and rolling elements. NBC bearings are of SUJ2 class of non stainless steel. The chemical composition of the SUJ2 is approximately the same as that of AISI 52100. AISI 52100 bearing steel is a high carbon, chromium containing low alloy steel. AISI 52100 bearing steel is one kind of special steel with features of high wear resistance and rolling fatigue strength etc.

ELEMENT	Fe	Cr	C	Mn	Si	S	P
CONTENT/ %	96.5-97.3	1.3-1.6	0.98-1.1	0.25-0.45	0.15-0.3	≤0.025	≤0.025

Figure 7 : AISI 52100 Chemical Composition

The cup is forged, rolled and machined from bearing quality case hardened steel. NBC bearings uses AISI 8620 to make the cup component of the CTRB. AISI 8620 alloy steel is flexible during hardening treatments thus enabling improvement of case/core properties

ELEMENT	Fe	Cr	C	Mn	Si	S	P	Mo	Ni
CONTENT/%	96.8-98	0.4-0.6	0.18-0.23	0.7-0.9	0.15-0.35	≤0.004	≤0.035	0.15-0.35	0.4-0.7

Figure 8 : AISI 8620 Chemical Composition

- ✓ AISI 52100 stainless steel resist corrosion twice as much as many grades of steel alloys. Hence it can

be concluded that the Spacer Ring and Cone Assembly are not prone to oxidation.

- ✓ AISI 8620 can be oxidised due to its relatively low content of Cr. Hence we can conclude that the Cup is relatively more prone to oxidation.

All in all, the cone assembly and spacer ring are affected mainly by flaking and cracking whereas the cup is affected by corrosion, flaking and cracking.

POH Process Stability

Control chart is one of the most widely-used tools in the industry for providing an on-line process-monitoring mechanism. As a graphical display, the control chart shows the occurrences of process variability and instability. A specific type of attribute control chart called the p-chart is employed in evaluating the stability of the process. Constructed with the collected yield-defect data for CTRBs

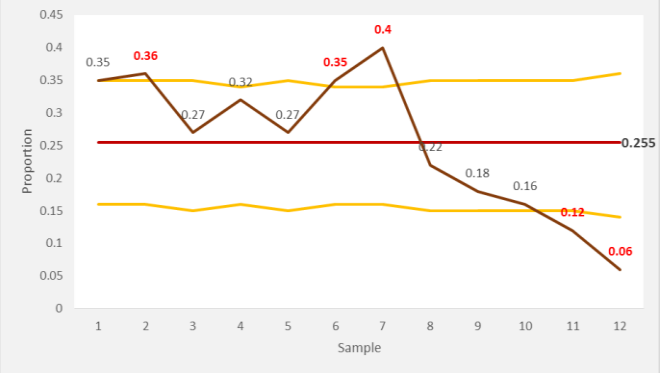


Figure 9 : p-chart for rejected CTRBs

From the Control Chart, the average proportion of CTRBs which are rejected prematurely is 0.255. In other words, it is 25.5% of the total bearings that undergo POH process. Highlighted points fell outside of the 3σ limits hence the process is unstable and is out of statistical control.

Process Failure Mode Effect Analysis (PFMEA)

When engineers at PratapNagar workshop planned the POH process of CTRBs they envisioned a process which is free of errors due to either chance or assignable causes. Unfortunately, errors and especially errors propagated when there is involvement of humans can be quiet catastrophic and costly. PFMEA is a structured analytical tool used in this study to analyse the POH Process. This is achieved by analysing each process step to identify risks and possible errors from many different sources. In order to achieve the objective of this study it is important to identify errors and their effects for each process step as early as possible.

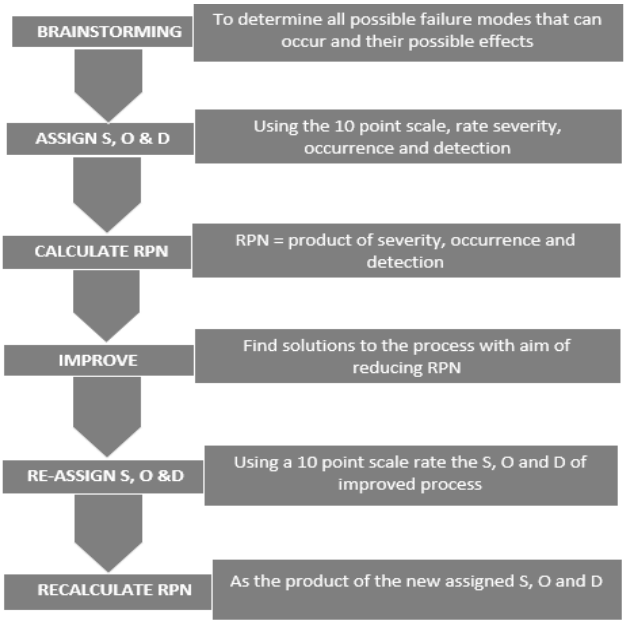


Figure 10: PFMEA Methodology

IMPROVE PHASE

In analysis phase the reasons of premature condemnation of CTRBs due to flaking, cracking and corrosion and also the reasons for process variability and inefficiency were identified. The root causes leading to poor quality and performance of the POH process were identified. And th

- Improper Handling
- Entry of Moisture
- Poor storage
- Contamination

} **HOUSE KEEPING**

- Excessive mounting/assembly load
- Imbalanced work flow due to high Tct

In improvement phase solutions are identified and implemented with the help of lean tools.

5s

One of the most powerful Lean Tools and a cornerstone of any successful implementation. Lean tool for organising workplace in a clean, efficient and safe manner to enhance productivity, visual management and to ensure the introduction of standardised working resulting in minimised errors in the process. 5S is split into 5 phases, each named after a different Japanese term beginning with the letter "S" i.e.

SEIRI Sort - Separating of the essential from the nonessential items.

SEITON Straighten - Organizing the essential materials a designated place.

SEISO Sweep - Cleaning the work area.

SEIKETSU Standardise - Establishing a system to maintain and make 5S a habit.

SHITSUKE Sustain - Establishing a safe and sanitary work environment.

Step 1: Seiri (sort)

In this step the team organised and eliminated unnecessary items within the Workshop. This had to do with JIT, "just what is needed, in the quantity needed, only when needed". The programme ran under the name "Red Tag Campaign (RTC)" whereby tags were placed on items not required in the shop floor. The RTC is a strategy employed to identify potentially unnecessary items in the shop floor, evaluate their usefulness and treat them appropriately



Figure 11 : Disposed CTRB components

Step 2: Seiton (set in order)

Seiton means setting in order the necessary elements so that they are easy to find and use by anyone within the shop floor. The concept of setting in order can be summarised in one sentence as "a place for everything and everything in its place"

Focus: Dedicated permanent storage areas for all necessary equipment and items in the shop floor.



Figure 12 : CTRB Components set in order

Step 3: Seiso (sweep)

Involves cleaning everything in the shop floor, keeping it clean daily and using cleaning to inspect the workplace and equipment for malfunctions,

leakages etc. Accumulation of dust or file metal shavings can easily lead to contamination of bearing components leading to defects, faulty equipment and even accidents. The causes can be eliminated by appropriate cleaning on a daily basis.

Focus: Maintain a clean and safe working conditions thus letting people be responsible for the equipment they are using

Step 4: Seiketsu (standardise)

No activity would be performed per say, this stage does not refer to an activity, but rather a state or condition. Seiketsu would consist of building a strong set of procedures to maintain the first 3S. In fact, it is the state that exists when the first 3S are properly maintained. When implementing Seiketsu the team made sure to follow the three steps as follows:

- Decide who is in charge of maintaining the needed conditions to maintain the first 3S
- Avoid setbacks by means of integrating daily maintenance.
- Check the level of maintenance

Focus: Establish standardised 5S system

When the same problem occurs again and again, it's time to go to the next level: prevention

Step 5: Shitsuke (sustain)

Basically an extension of Seiketsu (standardise). Shitsuke (sustain) means turning all activities already carried out in previous steps into a habit, that is the fact of maintaining the correct procedures within the shop floor.

Focus: Formalise 5S system work area policy

5S Conclusion

When fully implemented, 5S will help maintain a clean work area leading to reduced contamination, correct ambience to eliminate entry of moisture in grease and bearing components, enable proper storage and handling of all equipment used in the POH process. It will also create positive impression on customer (boogie shop), and increase efficiency in the CTRB Workshop. Not only will employees feel better about where they work, the effect on continuous improvement (IMSP 2017) can lead to less waste, better quality and faster lead times.

POKA-YOKE

Poka Yoke is a simple technique that is normally a simple and often inexpensive device that prevents defects from being made or highlights a defect so that it is not passed to the next operation. Poka yoke is to be implemented so that there is no excessive loading when assembling and mounting CTRBs on the wheel axle.

The bearing assembly is pushed onto the bearing journal by a hydraulic press. Normally 12-15 tonne/square inch pressure is required to push the bearing to its position. An assembled CTRB weighs 32kg, to prevent misalignment a pilot sleeve is be fastened to the end of the axle to keep the bearing parts together and protect them from damage. The pilot sleeve is removed when the bearing is in its position. If excessive force is applied on the bearing the bearing will be forced to the journal collar and this will lead to premature cracking of the bearing components.

To prevent the bearing to be forced onto the journal collar before the hydraulic presser stops, the pilot sleeve is modified from its original form.

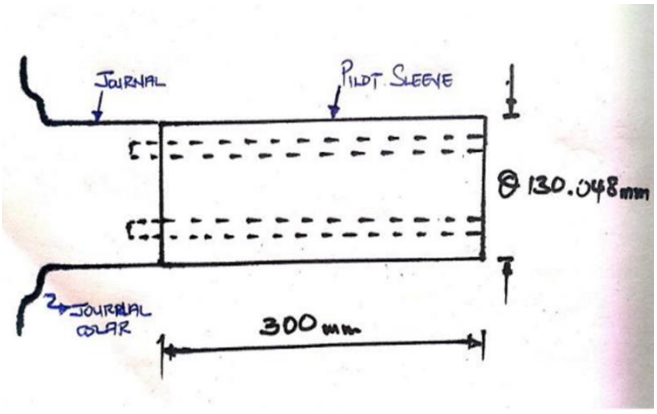


Figure 13 : Original form Pilot Sleeve

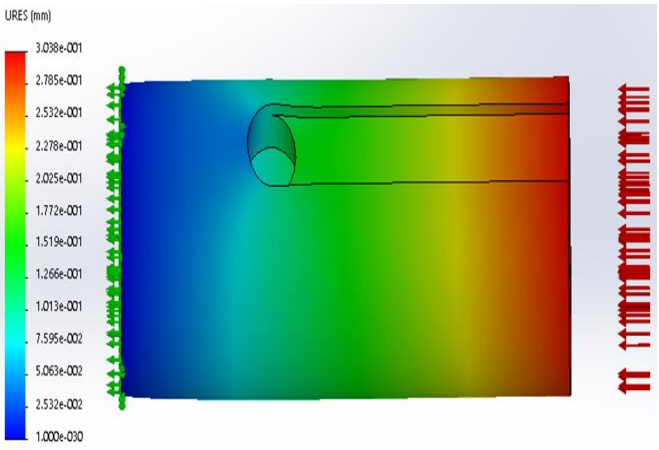
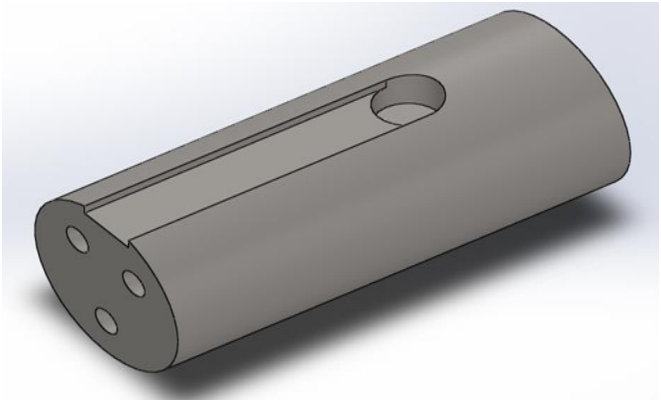


Figure 14 : Modified Pilot Sleeve

A 10mm deep groove is milled on the surface of the sleeve and at the end of the groove a 20mm blind hole is drilled. On the pushing tube which is part of the hydraulic press, a flexible 40mm diameter pin is attached on a hinge such that it moves along the groove on the sleeve, figure 4.12. To stop the motion of the hydraulic press, the hinged pin falls into the drilled hole at the end of the groove. This will alert the operator to retract the hydraulic presser and prevent excessively loading the bearing against the journal collar.



With the small modification on the pilot sleeve, the CTRB will be protected from excessive force which pushes it on to the journal collar. This will eliminate premature cracking of the bearing due to excessive loading on mounting. This motion stop Poka-Yoke will take physical action to prevent excessive mounting load hence it is a control Poka-Yoke.

SINGLE MINUTE EXCHANGE of DIE (SMED)

SMED is a lean tool which is used to reduce setup time and provide quick changeover. The main aim of SMED is to reduce the time wasted in changeover steps by performing some activities while the process is running, and to integrate and reduce the time required to perform internal tasks. The SMED places the tasks into two categories which are internal and external activities. External activities being those activities performed while the process is running. The internal activities on the other hand are activities which are done while the process is not running.

The POH process is running at a slower rate relative to the demand, $T_{ct} > T_{kt}$. This is resulting in bottlenecks in the process affecting process performance, leading to high WIP. The main reason observed why there is such a huge time discrepancy is because of change over time. High change overs are

observed in Dismantling, Cleaning and Mounting steps of the POH process. In the mounting step, change over occurs when switching from axle to axle and also when switching from left wheel to the right wheel of the same axle. To improve the changeover time SMED is employed. The SMED is going to follow the framework:

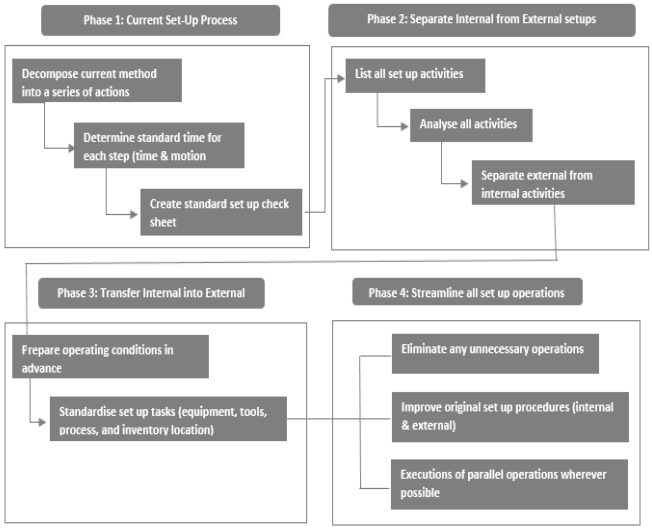


Figure 15 : SMED Framework

Eliminated Task	Reason	Time/s saved	Frequency/day	Total Time saved/s
Creating space to put the bearing units	Due to sustainable 5S in the shop floor, the work space is always clear.	*39*	*3*	*117*
Movement to collect dismantling tools	All frequently used tools are placed within arm's reach in the shop floor,	*30*	*3*	*90*
Loosen the clamp	Use a bench vice that can hold the bearing unit facing sideways rather than the clamp which holds the unit facing upwards	*5*	*30*	*150*
Secure the bearing unit upside down	Use a bench vice that can hold the bearing unit facing sideways rather than the clamp which holds the unit facing upwards	*7*	*30*	*150*
	TOTAL TIME SAVED	**81**		**507**

Figure 16 : Dismantling Eliminated Activities

Eliminated Task	Reason	Time/s saved	Frequency/day	Total Time saved/s
Remove excess grease from previous shift from the centrifugal grease purging machine	The machine will be cleaned to remove excess grease at the end of each shift. This is in line with the implemented 5S philosophy.	*60*	*1*	*60*
Switch off the machine to remove excess grease	Under the 5S philosophy, the machine will be able to sustain continuous 40second purging without stopping to remove excess grease.	*15*	*30*	*450*
Start the machine for the second purging cycle	Under the 5S philosophy, the machine will be able to sustain continuous 40second purging without stopping to remove excess grease.	*20*	*30*	*600*
	TOTAL TIME SAVED	**95**		**1110**

Figure 17 : Cleaning Eliminated Activities

Eliminated Task	Reason	Time/s saved	Frequency/day	Total Time saved/s
Collecting of all equipment and material needed for mounting	All frequently used tools are placed within arm's reach in the shop floor.	*47*	*2*	*94*
Check the oil level of the hydraulic presser	The oil will be checked daily after each shift.	*4*	*1*	*4*
	TOTAL TIME SAVED	**51**		**98**

Figure 18 : Mounting Eliminated Activities

SMED Conclusion

	Before SMED	After SMED	Time save
Total Cycle time /shift	437mins (7hrs)	324.5mins (5hrs)	112.5mins (2hrs)

The implementation of SMED saved 227 seconds from the initial 942 seconds (Chart 4.2). This has

reduced T_{ct} from 15.7 mins to 11 mins. All in all this new T_{ct} is approx. 60 seconds more than T_{kt} of 600seconds.

$$T_{ct} \approx T_{kt}$$

Improve Phase Recommendations

SN	COMPONENT	EFFECT	Root CAUSES	COUNTER MEASURE
1	**Cone, Spacer Ring, Cup**	Flaking	Contamination, excessive mounting load, inclined mounting, eccentric mounting,	-Ensure a clean working environment by implementing 5S. -Modify the pilot sleeve (POKA-YOKE)
2	**Cone, Spacer Ring, Cup**	Cracking	Excessive mounting load	-Modify the pilot sleeve (POKA-YOKE)
3	**Cup**	Corrosion	Entry of moisture, improper storage conditions, improper handling,	-Ensure a clean working environment and culture by implementing 5S. -PPC should always be worn in the shop floor including hand gloves when handling CTRBs
4	**Process Inefficiency**	High WIP	Imbalanced work flow, reduced equipment run rate, unnecessary stoppages	-Eliminate unnecessary activities to reduce process set-up times by employing SMED coupled with 5S for clean working area

Figure 19 : recommended Solutions

CONTROL PHASE

Now the bigger question is, how are we going to sustain our improvements? Now that the process problems are fixed and improvements have been recommended, the team must ensure that the updated process maintains the gains. Focus is on creating a monitoring plan to continue measuring the success of the updated process and developing a response plan in case there is a dip in performance. Once in place the team hands over all these plans to the process owner for ongoing maintenance.

Performance Monitoring

There has been a significant increase in the number of units overhauled per shift. Previously, 30 bearings would undergo POH process per shift but now 39 bearings are overhauled per shift fig 20. However as expected, the condemned bearings are still as before i.e. 25%. This is because the bearings overhauled now were once overhauled before improvements were made. This is however projected to reduce to 12% after a period of 24-36 months from February 2019. Fig 21 show the number of bearings condemned in March 2019 after some process improvements were made.

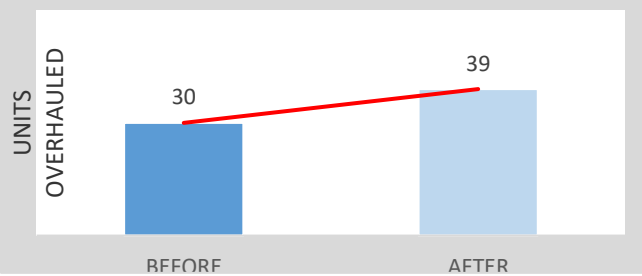


Figure 20 : CTRBs overhauled per shift

DAY	WEEK 1	WEEK 2	WEEK 3	WEEK 4
MON	*6*	*8*	*9*	*7*
TUES	*10*	*11*	*14*	*12*
WED	*10*	*13*	*12*	*9*
THUR	*9*	*10*	-	*11*
FRI	*12*	*12*	*13*	*10*
SAT	*11*	*9*	*11*	*8*
TOTAL rejected	58	63	59	57
TOTAL overhauled	**247**	**244**	**211**	**244**
% Rejected	**23.48%**	**25.82%**	**27.96%**	**23.36%**

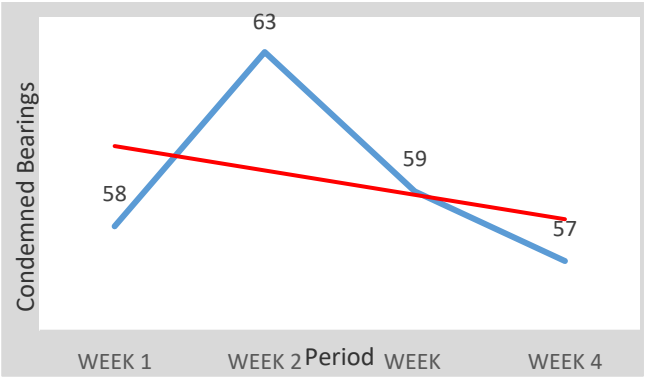


Figure 21 : Condemned bearings in March 2019

After this data collection, overall yield-defect graph for the POH process, as shown below was created.

The trend lines are almost parallel relative to fig 4 mainly due to the increase in the number of units overhauled per shift.

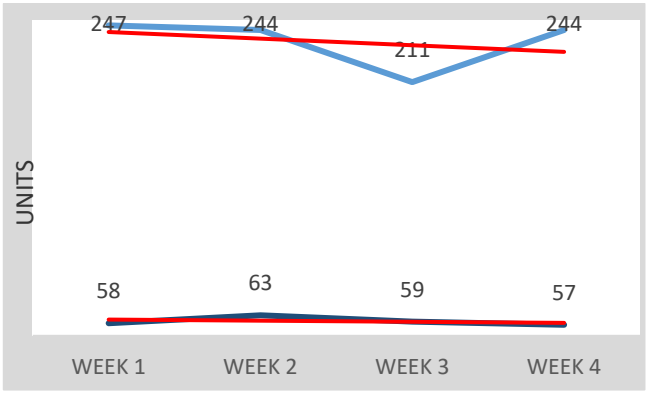


Figure 22 : Overall yield-defect graph for March 2019

Due to limited time to monitor the changes in the process, the changes in DPMO and sigma levels will be very small. The projection is that after 24-36 months from implementation the changes will be big

$$DPMO = \frac{237x1\,000\,000}{8x946}$$
$$= \mathbf{30\,306}$$
$$\boldsymbol{\sigma = 0.8406 + \left(\sqrt{(29.37 - 2.221x\,ln[DPMO])}\right)}$$
$$\boldsymbol{= 0.8406 + \left(\sqrt{(29.37 - 2.221x\,ln[30\,306])}\right)}$$
$$\boldsymbol{= 3.48}$$
$$\boldsymbol{\approx 3.5}$$

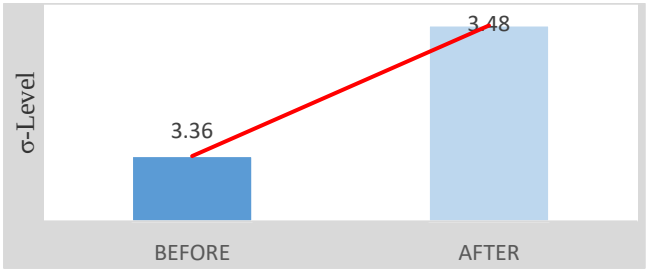


Figure 23 : Sigma Level Changes

DPMO has reduced by 5.3% which indicate that the performance of the POH process of CTRBs has improved. Percentage improvement of sigma level is 0.6%. These percentages are relatively small because of some limitations already highlighted. Moreover some of the solutions are not yet implemented. Further increase in sigma level needs implementation of all recommended solutions.

Control Plan

Organisations are good at rallying around chronic problems and finding solutions. But the long term discipline in sustaining solutions is a totally different story, all too often a process will slowly return to its original state as the path of least resistance takes control. This is where control plans play a vital role in sustaining process improvements over the long run. A guide to continued monitoring of the process and the response plan for each of the measures being monitored. It describe the CTQ characteristics of the POH process. Through this system of monitoring and control VOB and VOC will be met and the process variations will be reduced. This plan is not a replacement of detailed operator instructions in the form of work instruction or standard operating procedures.

STEP	EQUIPMENT	CTQ	SPECS	SIZE	FREQ	RESPONSE
DISMOUNTING	*Hydraulic extractor*	*time*	*<49.5mins/shift*	*Daily yield*	*All units*	With help of wagon lifting shop keep exact records of reasons of step delays.
DISMANTLING	*Hydraulic press*	*time*	*<117mins/shift*	*Daily yield*	*All units*	If delayed request for more personnel to avoid WIP build-up.
CLEANING	*Kerosene tank*	*time*	*<165mins/shift*	*Daily yield*	*All units*	Keep exact records of delays
	CP Machine	*time*		*Daily yield*	*All units*	Keep records of delays and maintenance especially of CP Machine
LUBRICATION	*Lubricating gun*	*time*	*<165mins/shift*	*Daily yield*	*All units*	If delayed, only lubricate what can be assembled in that same shift
ASSEMBLY	*Assembly presser*	*time*	*<19.5mins/shift*	*Daily yield*	*All units*	Keep exact records of the reasons for assembly delays if they occur
MOUNTING	*Hydraulic press*	*time*	*<110mins/shift*	*Daily yield*	*All units*	To avoid WIP, get the daily demand from boogie shop and keep exact records of delays

Figure 24 : Control Plan

As mentioned, in this phase, performance monitoring after implementation of some recommended solutions was done in March 2019 i.e. for 4 weeks.

Performance monitoring indicated that recommended solutions are effective and resulted in improvement if fully implemented. Therefore the recommended solutions were standardised and documented fig 24. With this the dissertation study was closed.

VI. CONCLUSION

The DMAIC approach can be followed to identify the causes of different industrial problems, measure the process capability, analyse the potential causes of demoted quality, implement improvements and control the process such that long-term improvements can be sustained. Lean tools and techniques can be employed to achieve the efficient use of resources and to minimize non-value added activities in the process. Combining and capitalizing the strengths of Six Sigma and Lean Management improvement programs. The overall objective being to continuously improve in order to satisfy a growing demand and expectation from customers while coping with increasing product complexity and limited resources.

All in all it can be concluded that the following can be achieved by implementing LSS:

- PROCESS CAPABILITY: the uniformity of the process
- SUSTAINABILITY: the economically sound processes that minimise negative environmental impacts whilst conserving energy and natural resources.
- COMPETITIVENESS - avoiding penalties for non-compliance products, lowering costs of production, increasing productivity, and consequently reduced amount of WIP
- CUSTOMER SATISFACTION - increased customer satisfaction due to increased timeliness and reduced lead time.
- EMPLOYEE MORALE- increased comfort and better organization, lack of overtime,
- DEMING'S 5TH POINT OF QUALITY: continuously improve the process of production to minimise waste and improve on productivity and efficiency.
- OTHER- the possibility of taking more orders during a prescribed period.

All in all, Lean Six Sigma implementation can provide a breakthrough improvement in any industry, Railway Industry included.

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Immediate Effect of Yoga Postures v/s Physiotherapy Exercises Along With K-Taping on Pain in Dysmenorrhea

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ABSTRACT

Background : Dysmenorrhea is defined as the cramping pain accompanying menstruation. They are further classified into two types based on pathophysiology. Primary dysmennorhea is widely prevalent in the general population. More than 50% of teenagers and 30-50% of menstruating women suffer from varying symptoms, such as, uterine cramps, nausea, backache, diarrhoea, giddiness, syncope and fainting. Apart from pharmacological treatment physical exercises have been suggested as non-pharmacological treatment. It is seen that exercises have analgesic effect in a nonspecific way. Various forms of exercise (for.eg. Yoga and physiotherapy) have shown different results in pain relief and premenstrual syndrome. exercise have been shown as preventive measures as well.

Objectives:

1. To assess the effectiveness of yoga poses along with k-taping on Pain in primary dysmenorrhea.
2. To assess the effectiveness of physiotherapy exercises along with k-taping on Pain in primary dysmenorrhea.
3. To compare the effectiveness of yoga poses v/s physiotherapy exercises along with k- taping in primary dysmenorrhea on Pain.

Materials and Methodology:

This was a experimental study that included 30 female participants who were suffering from dysmenorrhea. The subjects were randomly dividing in to 2 groups; group A were given physiotherapy exercise and group B were given yoga postures.

Both the group of participants received k-taping. These interventions were given on the day of menstruation. Pre and post pain evaluation were done by NPRS.

Result and Conclusion:

The study concludes that both yogic postures and physiotherapy exercises helped in immediate reduction of pain in primary dysmennorhea.

Yogic postures along with k-taping helped in pain reduction Physiotherapy exercises along with k-taping helped in reduction of pain.

Keywords : Dysmenorrhea, Pain, Yoga, Physiotherapy, K-Taping, Immediate Effect.

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I. INTRODUCTION

Dysmenorrhea is defined as the cramping pain accompanying menstruation. They are further classified into two types based on pathophysiology.
Primary dysmenorrhea refers to one that is not associated with any identifiable pelvic pathology.
Spasmodic pain is attributed to myometrial contractions due to increased PGF2a secreted under progesterone effect.
Primary dysmenorrhoea is widely prevalent; more than 50% of teenagers and 30–50% of menstruating women suffer from varying degrees of discomfort. The severe incapacitating type which interferes with a woman's daily activities affects only about 5–15% of the population. Its prevalence is higher amongst the more intelligent and sensitive working-class women. Both the local and systemic symptoms are apparently the result of increased levels of prostaglandins (F2a) in the menstrual fluid. This results in uterine cramping, nausea, vomiting, backache, diarrhoea, giddiness, syncope and fainting.[1]

Primary dysmenorrhoea occurs in ovulatory cycles; hence, it makes its appearance a few years after menarche with at least 6–12 months of painless periods. It is most intense on the first day of menses and progressively lessens with menstrual flow. It often lessens with passage of time and after childbirth.[1]

Backache, abdominal bloating fatigue and breast heaviness are the most common symptoms. These levels are highest during the first two days of menses, when symptoms peak. The risk factors for dysmenorrhea are; age <20 years, nulliparity, heavy menstrual flow, smoking, high/upper socioeconomic status; attempts to lose weight, physical activity, disruption of social networks, depression and anxiety.[11]
Based on this understanding, pharmacological therapies for primary dysmenorrhoea focus on alleviating menstrual pain and relaxing the uterine muscles by using non-steroidal anti-inflammatory drugs (NSAIDs) or oral contraceptive pills.[1]

Apart from pharmacological treatment physical exercises have been suggested as non pharmacological treatment. It is seen that exercises have analgesic effect in a non specific way.

Various forms of exercise have shown different results in pain relief and premenstrual syndrome. Exercise have been shown as preventive measures as well.

Yoga is now an alternative therapy which helps in prevention of many health problems. The word yoga is derived from the sanskrit root yuj meaning to join,bind. Yoga poses now are a common choice to a healthier lifestyle.[2] Yoga's potential mental and physical health benefits are reductions in sympathetic nervous system tone, increases in vagal activity and lowering inflammation; all of which could have favourable endocrine and immune consequences. The physical benefits of yoga are linked to the release of â-endorphins and the shift caused in neurotransmitter levels linked to emotions such as dopamine and serotonin.[3] Very few studies suggested that yoga reduced the severity and duration of pain in primary dysmenorrhea.

Physiotherapy exercises and modalities have also shown pain relief in dysmenorrhea. Non-invasive, and minimally invasive interventions that have been proposed for obtaining relief from dysmenorrhea symptoms include acupuncture and acupressure, biofeedback, heat treatments, transcutaneous electrical nerve stimulation (TENS), and relaxation techniques.[4] Transcutaneous electrical nerve stimulation (TENS) is a non pharmacological and noninvasive pain-relief method that has demonstrated effectiveness for a variety of conditions,

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including labor pain, primary dysmenorrhea, and pain following obstetric and gynecologic surgery.[5]
Kinesio taping is a newer technique which is non pharmacological and non invasive pain relief method.Taping therapy eases pain by contracting relevant muscles or improving blood circulation through tape attached to the skin. Kinesio taping is a technique which is based on the body's own natural healing process and is used for anything from headaches to foot problems and everything in between. [6]

II. MATERIALS AND METHODOLOGY

Study location : Study was conducted in Dr.D.Y.Patil college of physiotherapy, Pune.
Sampling method : Purposeful sampling was done.30 females suffering from dysmenorrhea were screened and selected. Age group selected were 18-40 years old. Females with any history of recent abdominal surgeries, Any respiratory condition, Skin conditions were excluded from this study.
Procedure and data collection: 30 samples were randomly divided into group A and group B. NPRS was recorded before the intervention.
Group A were given physiotherapy as intervention in which 5 minutes of warm up in the form of neck flexion,extension and rotation, trunk flexion and extension, shoulder rotations, wrist movements, hip movements, ankle movements. Then are asked to perform stretching of neck, biceps, triceps,tensor fasica lata, pelvic muscles, quadriceps, tendo achillies . Each exercise is held for the total of 3 times with 10 seconds hold.[8] This step is followed by stretching of specific muscles like stretching the connective tissue around the pelvis, hip flexors and muscles in the inner thigh.[8]

After the stretching, now they were asked to perform kegals exercises for 20 reps with 10 secs hold each. Followed by 5 minutes of relaxation in the form of diaphragmatic breathing.

Group B then received yoga poses such as; supta svatikasana, supta baddhakonasana, adhomukha virasana, adhomukha svastikasana, paschimottanasana. Each pose was held for 5 minutes followed by 5 minutes of shavasana.[7]

After these intervention,NPRS was recorded again.

The values were statistically analysed using primer software, where paired t-test was used for the values and graphs were formed.**Study location :** Study was conducted in Dr.D.Y.Patil college of physiotherapy, Pune.
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Followed by 5 minutes of relaxation in the form of diaphragmatic breathing.

Group B then received yoga poses such as; supta svatikasana, supta baddhakonasana, adhomukha virasana, adhomukha svastikasana, paschimottanasana. Each pose was held for 5 minutes followed by 5 minutes of shavasana.[7]

After these intervention, NPRS was recorded again.

The values were statistically analysed using primer software, where paired t-test was used for the values and graphs were formed.

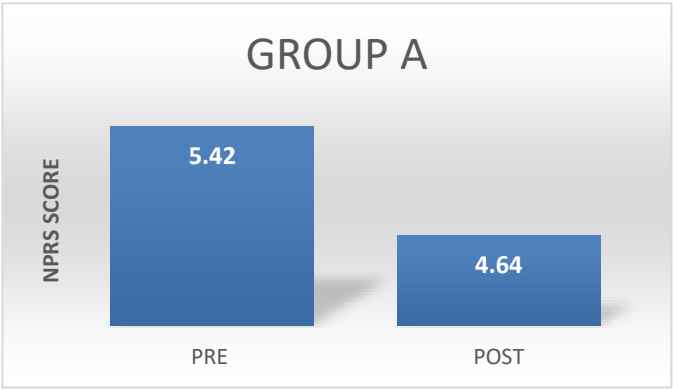
III. RESULTS AND DISCUSSION

In this study 30 females suffering from dysmenorrhea were selected and divided into group A(n=14) and group B(n=16) randomly and NPRS was recorded before and after the intervention and then were compared and graphically represented.

Table 1 : Comparison of Pre And Post Values of Pain (NPRS) For Group A.

PAIN	PRE	SD	POST	SD	MEAN DIFFERENCE	P VALUE	T VALUE
GROUP A	5.42	1.223	4.64	4.643	0.78	O.OOO	6.904

GRAPH 1 : PRE v/s POST NPRS SCORE FOR GROUP A



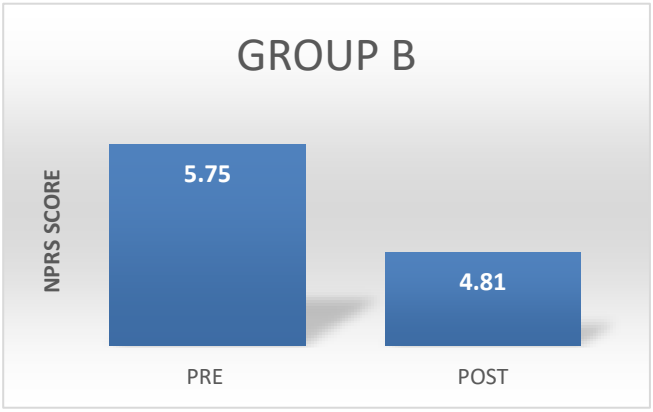
INTERPRETATION:

According to the above data recorded pre and post of intervention. there was a highly significant decrease (p value < 0.05) in NPRS score in Group A. This graph shows group A mean NPRS score where pre treatment mean was 5.42 which decreased to 4.64 post treatment, with the mean difference found to be 0.78.

Table 2 : Comparison of Pre And Post Values Of Pain (NPRS) In Group B.

PAIN	PRE	SD	POST	SD	MEAN DIFFERENCE	P VALUE	T VALUE
GROUP B	5.75	1.125	4.812	1.216	0.938	O.OOO	8.474

GRAPH 2 : PRE v/s POST NPRS SCORE FOR GROUP B.



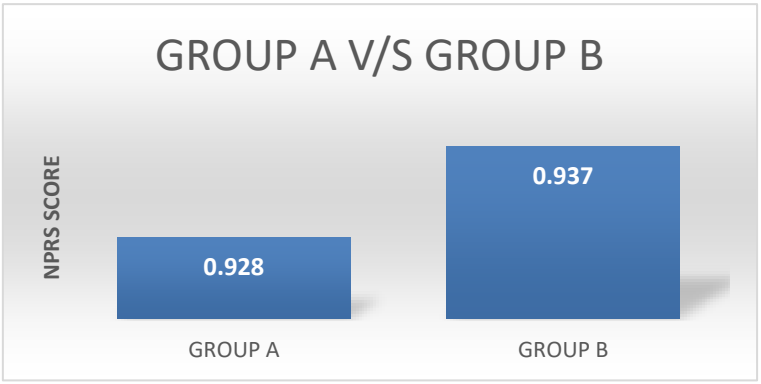
INTERPRETATION:

According to the above data recorded pre and post of intervention. there was a highly significant **decrease** (p value < 0.05) in NPRS score in Group B. This graph shows group B mean NPRS score where pre treatment mean was 5.75 which decreased to 4.812 post treatment, with the mean difference found to be 0.938.

Table 3 : Comparison of Group A Vs Group B For Pain (NPRS).

PAIN	MEAN	SD	P VALUE	T VALUE
GROUP A	0.916	0.2673	0.948	-0.066
GROUP B	0.937	0.4425		

GRAPH 3 : GROUP A VS GROUP B FOR PAIN (NPRS).



INTERPRETATION:

Table 3 and graph 3 shows comparison of pre and post values of NPRS among group A and group B . According to the above data recorded before and after of intervention there was no significant difference (p value < 0.05) in pain between Group A and B .

DISCUSSION

The aim of this study was to compare the effect of yoga postures and physiotherapy exercises along with k-taping in primary dysmennorhea. 30 samples were screened,selected and divided in 2 groups by purposive sampling. Pre value of all outcome measures were noted. Group A (n=14) received physiotherapy and Group B (n=16) received yogic postures as intervention. After the intervention, the data was recorded in a tabular form and represented graphically.

In Group A, the results showed that the pain had reduced significantly ($p<0.000$) before and after treatment.

In Group B, the results showed that the pain had reduced significantly ($p<0.000$) before and after treatment.

When the comparison of both the groups were performed, both the groups showed similar amount of pain reduction. They showed no significant difference in the data recorded.($p<0.005$).

Study conducted by Zahra Rakhshaee (2011) said that yoga is believed to reduce pain by helping brain's pain center to regulate the gate controlling mechanism located at spinal cord and secretes natural painkillers in the body9. A similar study by Nag U et al. studied the effect of yoga on progesterone levels and pain relief in dysmenorrhea said that the yoga poses in dysmenorrhea,revealed that there was a significant reduction in pain in experimental group as compare to the control group.3

Previous studies have shown that physiotherapy protocol, have shown to increase local blood supply, which apparently favors more rapid elimination of prostaglandins which has been suggested to decrease the duration and intensity of menstrual pain.2

In the same study it is also showed that specific stretching of the hip abductors,connective tissue around the pelvis and hip flexors (Billig's exercises) helped in reduction of the dysmennorhic pain to radiate to the lower limbs and lumbar region2.

Along with these exercises both the groups received k taping. K taping is an auxiliary treatment that maximizes natural recovery ability. This technique is said to promote three effects: to normalize muscular function; to increase lymphatic and vascular flow; and to diminish pain.10 In a study done by Chaegil Lim et al (2013) showed that the kinesio taping would have stimulated the tactile fibres in the skin suppressing the pain sensitizing action of prostraglandin in the spinal cord thus reducing the pain.10.

In this study both the groups have shown reduction in abdominal swelling. Su Ying Tsai (2016) studied that after yoga programme, there was significant reduction in abdominal bloating and other symptoms of dysmennorhea.13

Priya Kananet al (2013) shown that physiotherapy protocol, have shown to increase local blood supply, which apparently favors more rapid elimination of prostaglandins.

Both the groups when paired along with k-taping technique, will help the in lifting the skin and that decreases the pressure and increases the lymphatic drainage which helps in reduction of swelling.10

It can be further concluded that both the interventions may provide immediate relief for the symptoms of dysmenorrhea and can be used as the alternative therapy.

These interventions could be given individually or in combination with each other as it may suit the person.

Inculcating physical exercises and yogic practise might help in reduction of the symptoms of dymenorrhea.

IV. CONCLUSION

The study concludes that both yogic postures and physiotherapy exercises helped in immediate reduction of pain in primary dysmennorhea. Yogic postures along with k-taping helped in pain reduction Physiotherapy exercises along with k-taping helped in reduction of pain. Both can be used as an alternate and non pharmacological therapy for dysmenorrhea

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Effect of Aerobic and Anaerobic Exercise on Static and Dynamic Balance in Physiotherapy Students

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ABSTRACT

The aim of the study is to evaluate and compare the effects of aerobic and anaerobic exercise on static and dynamic balance in healthy physiotherapy students. 30 subjects were selected and were divided into two groups (n= 15). Assessment was done by stork standing balance test and modified BASS test for static and dynamic balance before the experiment. After completion of the initial balance measurement, group-A subjects were given aerobic exercise which included 15 minutes of Modified Bruce protocol and group-B subjects were given 3 forms of aerobic exercises for 2 weeks alternate days. Post this exercise protocol, balance was reassessed on day 15. Significant changes were found in the pre and post exercise balance scores. Both static and dynamic balance showed improvement but static balance was better improved after aerobic exercise than anaerobic exercise and dynamic balance was better improved after anaerobic exercise than aereobic exercise. Also Aerobic and Anaerobic Exercise showed more improvement in static balance than dynamic balance. Thus, this study concludes that both aerobic and anaerobic exercise showed statistically significant improvement in the static and dynamic balance.

Keywords : Static Balance, Dynamic Balance, Aerobic Exercise, Anaerobic Exercise, Physiotherapy Students.

I. INTRODUCTION

"The condition in which all the forces acting on the body are balanced such that the center of mass is within the stability limits and boundaries of the base of support(BOS)" **Balance** is the process of maintaining the center of gravity within the body's base of support[1]**Static balance** is ability to maintain postural stability and orientation with center of mass over the base of support when the body is at rest and **Dynamic balance** is the ability to maintain postural stability and orientation with the center of mass over the base of support while the body parts are in motion.[2]Maintenance of balance or postural stability requires the individual to maintain center of gravity within the base of support.[3] Postural control requires correct afferent inputs and efferent outputs from muscles and joints involved[4]For this an intact sensory information should be obtained from visual, vestibular and somatosensory system.[5]This information is received by central nervous system which in turn generates appropriate motor actions for balance corrections.[6]

Studies have shown that muscle fatigue and muscle weakness can impair postural stability and can cause sway and put individual at a risk of fall.[7,8,9]

Skeletal muscle gets its energy from Adenosine-triphosphate (ATP).[10] Only small amount of energy is stored in the cells to carry out few seconds of exercise which means body needs to generate energy in the

form of ATP.[11]To restore the limited ATP, chemical reactions add phosphate group back to ADP to generate ATP which is called phosphorylation. If this occurs in the presence of oxygen forming pyruvate as end product then it is called as aerobic metabolism and if it occurs without oxygen forming lactic acid as end product then it is called as anaerobic metabolism or glycolytic metabolism .[10]

ATP-PCR anaerobic systemconsist of adenosine-triphosphate and phosphocreatine. Phosphocreatine breaks to give phosphate and energy with the help of enzyme creatine kinase[11], which is then used to generate ATP. This system provides energy for the first 3-15 seconds and the power is greatest of all the energy system.

When the activity continues beyond 15 seconds, **Glycolytic anaerobic system** comes into action. Glycolysis means breakdown of glucose which consist of series of enzymatic reactions. Pyruvic acid is the end product of glycolysis which can then breaks through kreb cycle. This energy system provides energy till 30 seconds of sustained activity through fast glycolysis and at 45 seconds of sustained activity there is a decline in the energy output. Activity beyond this period requires third energy system called **Oxidative energy system (Aerobic system)**[11] Glycogen, fats and proteins are utilized according to their availability and intensity of exercise. ATP is resynthesized in the mitochondria and metabolism of oxygen depends upon the number and concentration of mitochondria and cells. It provides the energy from 2nd minute of the sustained activity and it is therefore for the longer duration activity.

Several researches have shown the positive effect of exercise on balance. The purpose of the study is to compare and find the effects of aerobic and anaerobic exercise on the static and dynamic balance as both muscle weakness and fatigue have negative effects on balance in normal healthy individuals. So, it is important to assess balance and find which exercise protocol is more effective in improving the balance.

II. METHODS AND MATERIAL

Study location: Dr D Y Patil college of physiotherapy was taken as study place.

Sampling method: Purposeful sampling was done. 30 subjects were selected of age group 18- 25 years. Subjects with recent fracture, subluxation, dislocation, any neurological condition and cardiovascular condition were excluded from this study.

Data collection: 30 subjects were selected which were divided into 2 groups ; Group A (Aerobic exercise group) and Group B(Anaerobic exercise group). Pre exercise static and dynamic balance assessment by stork standing balance test[12] and Modified BASS test[13] respectively. Aerobic and anaerobic exercise protocol was given to Group A and Group B respectively for 2 weeks on alternate days. Aerobic protocol included **Modified Bruce treadmill protocol[14]** for 15 minutes and anaerobic exercise protocol included **single leg vertical jump** for 30 seconds continuously followed by **3 minutes rest**, immediately after rest subjects would perform **single leg hop** for 30 seconds. After rest period of **3 minutes** subject would perform **depth jump** for 30 seconds[15]. On day 15, subjects were reassessed for static and dynamic balance with stork standing balance test and Modified BASS test.

Data was analyzed using “primer” statistical package software. 30 physiotherapy students were included in the study.The data was entered into excel spread sheet, tabulated and subjected to statistical analysis.

Table 1 : Effect of aerobic exercise on static balance

Stork standing balance test	Mean	Mean difference	Standard deviation	T value	P value
Pre	8.267	-6.667	2.086	-5.953	0.001
post	14.93		3.474		

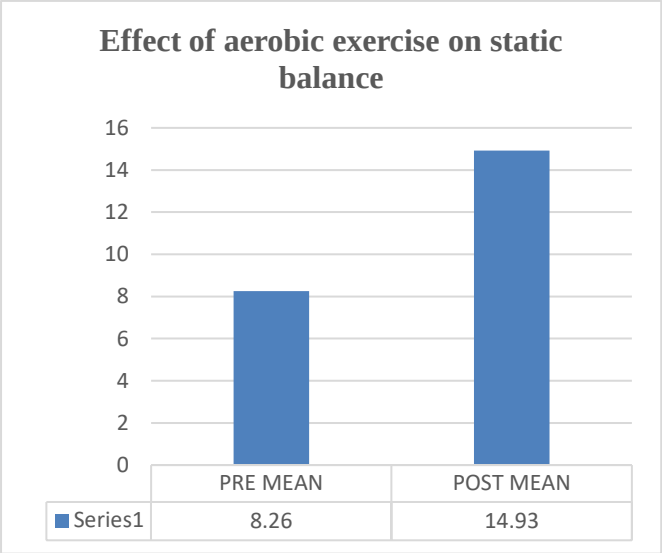


Figure 1 : Effect of aerobic exercise on static balance

Interpretation: Table 1 and figure 1 shows pre and post mean of static balance of the aerobic group. The Pre-mean of static balance was 8.267 which changed to 14.93 in post with mean difference of -6.667. Pre-Standard Deviation was 2.086 which changed to 3.474. The data was analyzed using paired t test which gave t value = -5.953 and p=0.001. Thus, the study is statistically significant. And shows significant improvement in static balance.

Table 2 : Effect of aerobic exercise on dynamic balance

MODIFIED BASS TEST	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	T VALUE	P VALUE
PRE	83.27	-3.867	9.982	-6.05	0.001
POST	87.13		9.687	2	

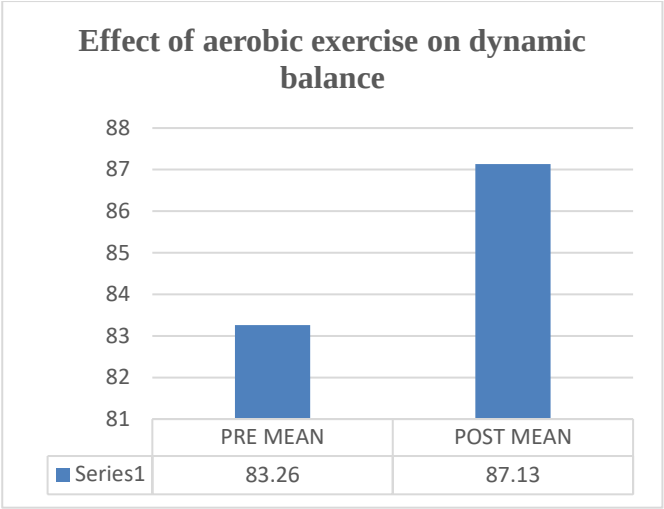


Figure 2 : Effect of aerobic exercise on dynamic balance

Interpretation: Interpretation: Table 2 and figure2 shows pre and post mean of static balance of the aerobic group. The Pre-mean of dynamic balance was 83.27 which changed to 87.13 in post with mean difference of 87.13. Pre-Standard Deviation was 9.982 which changed to 9.687. The data was analyzed using paired t test which gave t value = -6.052 and p=0.001. Thus, the study is statistically significant. And shows significant improvement in dynamic balance.

Table 3 : Effect of anaerobic exercise on static balance

STORK STANDING BALANCE TEST	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	T VALUE	P VALUE
PRE	8.6	-8.267	1.404	-16.466	0.001
POST	16.87		1.767		

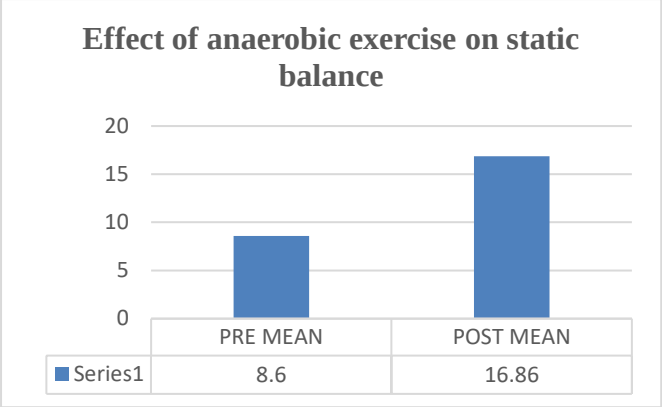


Figure 3: Effect of anaerobic exercise on static balance

Interpretation: Table 3 and Graph 3 shows pre and post mean of static balance of the aerobic group. The Pre-mean of static balance was 8.6 which changed to 16.87 in post with mean difference of -8.267. Pre-Standard Deviation was 1.404 which changed to 1.767. The data was analyzed using paired t test which gave t value = -16.466 and p=0.001. Thus, the study is statistically significant **And shows improvement in static balance.**

Table 4: Effect of anaerobic exercise on dynamic balance

MODIFIED BASS TEST	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	T VALUE	P VALUE
PRE	89.53	-5.267	4.34	-19.750	0.001
POST	94.8		4.443		

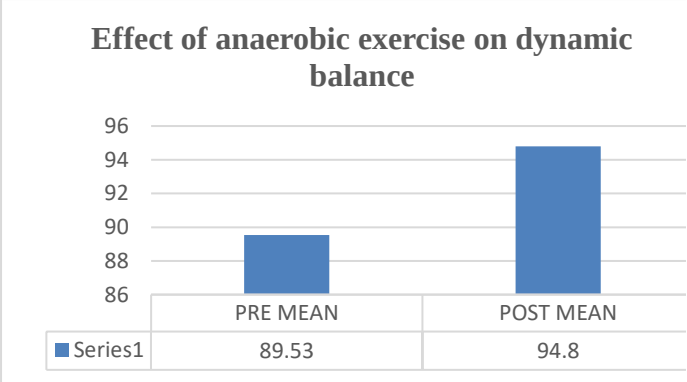


Figure 4: Effect of anaerobic exercise on dynamic balance

Interpretation: Table 4 and Graph 4 shows pre and post mean of static balance of the aerobic group. The Pre-mean of dynamic balance was 89.53 which changed to 94.8 in post with mean difference of -5.267. Pre-Standard Deviation was 4.34 which changed to 4.443. The data was analyzed using paired t test which gave t value = -19.750 and p=0.001. Thus, the study is statistically significant.**And shows improvement in dynamic balance.**

Table 5: Comparison of the effect of aerobic and anaerobic exercise on static balance

STATIC BALANCE IN GROUP:	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	T VALUE	P VALUE
AEROBIC	9.993	1.667	2.187	2.206	0.036
ANAEROBIC	8.267		1.944		

Interpretation: Table 5 shows Mean of the difference in static balance in aerobic and anaerobic group which is 9.993 in aerobic group and 8.267 in anaerobic group. The mean difference of aerobic and anaerobic group is 1.667. the data was analyzed using t test which gives t= 2.206 and p= 0.036 which is significant. This indicates aerobic group showed more improvement in static balance than anerobic group.

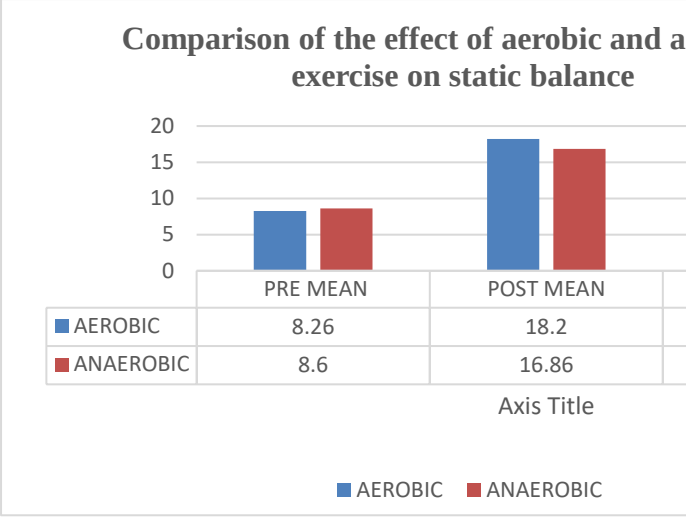


Figure 5: Comparison of the effect of aerobic and anaerobic exercise on static balance

Interpretation: Graph 5 shows pre and post mean of static balance after aerobic and anaerobic exercise.The pre-mean of static balance after aerobic exercise is 8.26 which changed to 18.2 and the pre-mean of static balance after anaerobic exercise is 8.6 which changed to 16.86. The mean difference of aerobic group is 9.94 and of anaerobic group is 8.26which shows aerobic group showed more improvement in static balance than anaerobic group

Table 6: Comparison of the effect of aerobic and anaerobic exercise on dynamic balance.

DYNAMIC BALANCE IN GROUP:	MEAN	MEAN DIFFERENCE	STANDARD DEVIATION	T VALUE	P VALUE
AEROBIC	3.867	-1.4	2.475	-2.022	0.053
ANAEROBIC	5.267		1.033		

Interpretation: Table 6 shows Mean of the difference in dynamic balance in aerobic and anaerobic group which is 3.867 in aerobic group and 5.267 in anaerobic group. The mean difference of aerobic and anaerobic group is -1.4. The data was analyzed using t test which gives t= -2.022 and p= 0.053 which is not significant. This indicates anaerobic group showed more improvement in dynamic balance than aerobic group.

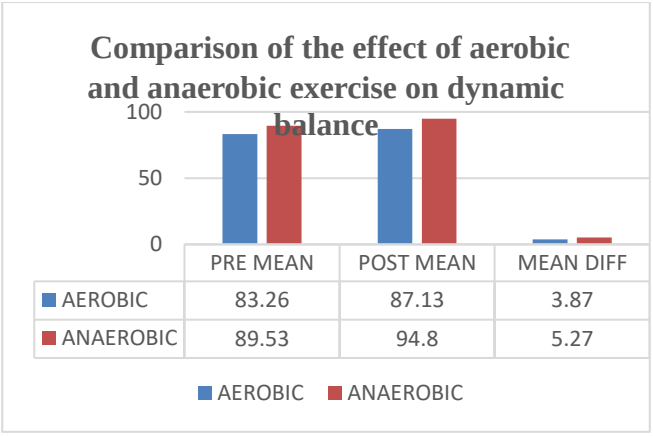


Figure 6: Comparison of the effect of aerobic and anaerobic exercise on dynamic balanceInterpretation

Graph 6 shows pre and post mean of dynamic balance after aerobic and anaerobic exercise. The pre-mean of dynamic balance after aerobic exercise is 83.26 which changed to 87.13 and the pre-mean of dynamic balance after anaerobic exercise is 89.53 which changed to 94.8. The mean difference of aerobic group is 3.87 and of anaerobic group is 5.27. which shows anaerobic group showed more improvement in dynamic balance than aerobic group.

III. DISCUSSION

The aim of the study was to compare the effect of aerobic and anaerobic exercise on static and dynamic balance in physiotherapy students. At the end of the study it was determined that the ability to maintain the balance was improved in both aerobic and anaerobic group. The results were significant with p value 0.001. Also, Static balance was more improved after aerobic exercise than after anaerobic exercise with mean difference of 1.667 and p value 0.036 which is statistically significant and Dynamic balance

was more improved after anaerobic exercise than after aerobic exercise with mean difference of -1.4 and p value 0.053 which is not significant.

Similar to this study, Eslamian et al(2005) performed a study on effects of aerobic versus strengthening exercises on improvement of balance, bone mineral density and quality of life in post-menopausal women with osteoporosis which stated increased muscle force, balance and improved quality of life after 6 months exercise program.[12] Another study performed by Kiani et al (2018) on effects of aerobic exercises on balance in diabetic neuropathy patients showed significant improvement in balance when aerobic exercises were given with the traditional balance training. As it affects the progression of neuropathy 14 Jakobsen et al(2011) showed reduction in COP path length and postural sway after 12 weeks of high intensity interval running.

Contradicting to the above mention studies, Mathew et al (2016) performed a study on effect of high intensity cycling training on postural sway during standing under rested and fatigued conditions in healthy young adults showed that after 3 and 6 weeks of high intensity cycling training did not improve the postural stability during the rested conditions. However, 6 week of high intensity training showed improvement in maintaining balance in the fatigued condition. Similar to this study, Hassonlovei et al (2014) reported that 6 weeks of moderate intensity cycling training did not show any effect on anteroposterior sway during rested condition for which the reason stated was that the cycling does not involve body movement as whole which train the balance ability.

As both the groups showed improved postural stability by eliciting neuromuscular changes such as muscle strength, firing rate and synchronization.A combination of both aerobic and anaerobic exercise protocol is recommended for those who need to improve balance, specifically, aerobic exercise to improve static balance and anaerobic exercise to improve dynamic balance. Also, aerobic and anaerobic Exercise showed more improvement in static balance than dynamic balance)

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Improving Accuracy for Diabetes Mellitus Prediction Using Data Pre-Processing and Various New Learning Models

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ABSTRACT

Data mining in medical data has successfully converted raw material into useful information. This information helps the medical experts in improving the diagnosis and treatment of diseases. Type II Diabetes Mellitus is one of silent killer diseases worldwide. According to World Health Organization, 346 million people are suffering from diabetes worldwide. Diagnosis or prediction of Diabetes is done through various data mining technique such as association, classification, clustering and pattern recognition. The study led to related open issues of identifying the need of a relation between the major factors that lead to the development of diabetes. This is possible by mining patterns found between the independent and dependant variable in the dataset. This paper compares classification accuracies of various machine learning models. Objective of paper is to find whether a person has diabetes or not and what features are highly responsible for diabetes. As due to its continuously increasing occurrences more and more families are influenced by diabetes mellitus. Most diabetic people know little about their health. In this study, we have proposed novel model on data mining techniques for predicting type 2 diabetes mellitus. Diabetes often referred to by doctors as metabolic disease in which the person has high blood glucose (blood sugar), because of inadequate insulin production.

Keywords : Machine learning, Diabetes, Sugar, Data Analysis Diabetes, Support vector machines, Prediction algorithms, Classification algorithms

I. INTRODUCTION

In this paper we describe the recent work at diabetes mellitus prediction with the help of machine learning alogrithms and Machine learning is a powerful artificial intelligence tool that make sense of a complicated world. And its transforming a wide variety of industries. It's becoming gradually ubiquitous with more and more and more application that we can't even think of them.

Most people probably already know that email provider uses a machine learning algorithm to identify spam. From past few years Google, Tesla and other are building self-driving system that will soon augment or replace the human drivers. And E-commerce giant like Amazon and technology companies like Braintree are using it in conjunction with other tools to stop credit card fraud.

Mining is one of the most significant applications of Machine learning. More often during analyses or, possibly, when trying to establish relationships between multiple features people become prone to making mistakes.

This makes them tiresome for them to find a solution to certain problems. Here comes Machine learning which can be utilized to apply successfully to these problems, improving the Data efficiency of the

system and designs of machines. The same set of features represents every instance of any dataset that is used by machine learning algorithms. The features can be Continuous, Discreet or Binary. Whenthe instances of the dataset are provided with known labels (corresponding correct output) that learning is known as Supervised Machine learning. While in case of Unsupervised learning instances are without known labels. By implementing these unsupervised (clustering) learning algorithm researchers anticipate to discover unknown, but useful classes of items. In supervised learning, the gathered data after preprocessing feed to the algorithm which analyze the data and build a model which then predicts the result on new data, example problems are Classification and Regression.

In contrast with Unsupervised learning the gathered data is un-label therefore algorithm analyze the data and create the model by deducing the structure present in the input data, example problems are clustering, reduction in dimensionality and learning rule for association. Reinforcement machine learning is another different kind of machine learning technique where learning is taking place by interacting with the environment. Here learner is not provided what actions to take, as in most forms of machine learning, but instead it discovers by it-self which actions produces the most reward by trying them.

A reinforcement learning agent learns from the outcomes of its actions, rather than from being explicitly taught and selection of its actions depends upon its past experiences (exploitation) and also by new choices (exploration), which is mandatorily trial and error learning. In Robotics Reinforcement learning is common, where the collection of sensors readings at one point in time is a data point, and the algorithm decide the robot's next action. In the Internet of Things (IoT) applications also a natural fit into it. Here in this paper, we are predicting if a person will develop diabetes and analyze the model created by using simple but powerful algorithms like Naïve Bayes, Logistic Regression and Decision Tree and Random Forest. The data we have chosen is from a Pima Indian Diabetes study.

1.1 OBJECTIVES OF PAPER

Due to increasing cost of health care, it is useful to assist patients to control diabetes by themselves. In many instances, early information related to diabetes may help in avoidance, curing and appropriate treatment of the disease.

The need for avoidance and better management of type II diabetes has been an important issue since ages. Medical practitioners and researchers have investigated and continue to find solutions to overcome this disease. Various researches and studies are done on predicting the blood glucose levels for Type II diabetes patients for a short term. Most of the predictions helped to decide the diet control and physical activity in order to maintain a good life.

The main focus of our paper is to investigate the possible solutions for the group of people who are at a risk of developing type II diabetes in future.

Improving accuracy will be one main job of our paper

LIMITATIONS OF EXISTING WORK

a) Unfortunately OAD(oral antidiabetic drugs) approach alone fails to achieve adequate glycemic control within 1 year for the majority of patients. It is extremely difficult for patients to modify lifelong habits, and most will ultimately require

pharmacotherapy to restore normoglycemia.

b) Most of the models have been developed to diagnose diabetes and predict the blood sugar level for a short term. However, according to the authors knowledge, there are hardly any system developed to predict the onset of diabetes in the long run.

c) Compulsory to do preprocessing : Many researches are done on the prediction and diagnosis of diabetes.

After the literature survey, we have found that most of the data mining techniques applied on the PIDD were pre-processed.

The PIDD has eight attributes out of that a couple of attributes contain values that square measure out of the traditional vary.
Also there are many missing values i.e. the value is 0 instead of an actual value.
Therefore, the pre-processing of information is critical for economical data processing of patterns within the PIDD.

d) Accuracy of result obtained: The proposed cascaded model with categorical data obtained the classification accuracy of 93.33 % when compared to accuracy of 73.62 % using C4.5 .Hence the accuracy is not greater than 95% which is also one of the drawback of proposed works.

1.2 METHOD AND APPROACHES

Due to rising price of health care, it's helpful to help patients to manage polygenic disorder by themselves.

In several instances, early info associated with polygenic disorder would possibly facilitate in rejection, curing and appropriate treatment of the disease.

Many computer programs or systems were developed and are being developed by emulating human intelligence that could be used to assist the users or patients in managing diabetes.

We assessed completely different systems like AI systems, mobile applications and specially designed devices for the prediction and designation of polygenic disorder.

The focus of this paper is to investigate for a model to predict and diagnose diabetes in the long run.

Most of the models are developed to diagnose polygenic disorder and predict the glucose level for a brief term.

S. No	Attributes	Type
1	Number of Times pregnant	Continuous
2	Plasma glucose concentration 2 hours in an oral glucose tolerance test	Continuous
3	Diastolic blood pressure (mm Hg)	Continuous
4	Triceps skin fold thickness (mm)	Continuous
5	2-Hour serum insulin (mu U/ml)	Continuous
6	Body mass index (weight in kg/(height in m)^2)	Continuous
7	Diabetes pedigree function	Continuous
8	Age (years)	Numeric
9	Class variable (0 or 1)	Discreet

However, as some researchers indicate, there are a number of impossible values, such as 0 body mass index and 0 plasma glucose.

Furthermore, one attribute (2-hour se- rum insulin) contains almost 50% impossible values.
To keep the sample size fairly massive, this attribute is removed from analysis.

There ar 236 observations that have a minimum of one not possible worth of aldohexose, blood pressure, triceps skin thickness, and body mass index.
There are nine variables, including the binary response variable, in this dataset; all other attributes are numeric-valued.

1.3. DATA ANALYSIS METHOD

1.3.1. DATAVISUALIZATION

Data visualization is a very general term that describes any effort to assist individuals perceive the importance ofinformation by putting it in a visual context. Patterns, trends and correlations that may go unobserved in text-based information are often exposed and recognized easier with the help of Data Visualization Techniques. It is also very useful for finding outliers and anamolies in data. The attributes are given below as a correlation matrix:
Correlation Matrix

II. METHODS AND MATERIAL

A. TOOLS USED

2.1 PYTHON

Python is AN taken, object-oriented, high-level programming language with dynamic semantics. Its high-level inbuilt knowledge structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's easy, simple to find out syntax emphasizes readability and so reduces the value of program maintenance.

Python supports modules and packages, which inspires program modularity and code utilise.
The Python interpreter and also the intensive customary library square measure on the market in supplyor binary kind for complimentary for all major platforms, and might be freely distributed.

Often, programmers fall gaga with Python as a result of the augmented productivity it provides. Since there's no compilation step, the edit- test-debug cycle is implausibly quick. Debugging Python programs is easy: a bug or unhealthy input can ne'er cause a segmentation fault.

Instead, once the interpreter discovers a slip-up, it raises AN exception.
When the program does not catch the exception, the interpreter prints a stack trace.
A supply level program permits review of native and world variables, analysis of discretional expressions, setting breakpoints, stepping through the code a line at a time, and so on.
The program is written in Python itself, testifying to Python's introspective power.
On the opposite hand, often the quickest way to debug a program is to add a few print statements

to the source: the fast edit-test-debug cycle makes this simple approach very effective.

2.2 SCIKIT LEARN

What is scikit-learn?
Scikit-learn is maybe the foremost helpful library for machine learning in Python.
It is on NumPy, SciPy and matplotlib, this library contains a lot of effiecient tools for machine learning and statistical modeling including classification, regression, clustering and dimensionality reduction.

Please note that scikit-learn is employed to create models.
It shouldn't be used for reading the information, manipulating and summarizing it.
There are better libraries for that (e.g. NumPy, Pandas etc.)

2.2.1 COMPONENTS OF SCIKIT-LEARN:

Scikit-learn comes loaded with a lot of features. Here are a few of them to help you understand the spread:

- Supervised learning algorithms: Think of any supervised learning algorithm you might have heard about and there is a very high chance that it is part of scikit-learn.
- Starting from Generalized linear models (e.g Linear Regression), Support Vector Machines (SVM), Decision Trees to Bayesian methods – all of them are part of scikit-learn toolbox.
- The unfold of algorithms is one in every of the massive reasons for prime usage of scikit-learn.
- I started exploitation scikit to unravel supervised learning issues and would suggest that to individuals newscikit / machine learning furthermore.

- Cross-validation: There are various methods to check the accuracy of supervised models on unseen data.
- Unsupervised learning algorithms: Again there is a large spread of algorithms in the offering – starting from clustering, factor analysis, principal component analysis to unsupervised neural networks.
- Various toy datasets: This came in handy while learning scikit- learn.
- Feature extraction: Useful for extracting features from images and text

2.3 MACHINE LEARNING

Machine learning (ML) may be a class of algorithmic program that permits package applications to become a lot of correct in predicting outcomes while not being expressly programmed.

The basic premise of machine learning is to create algorithms which will receive {input knowledge|input file|computer file} ANd use applied mathematics analysis to predict an output whereas change outputs as new data becomes available.

2.3.1 TYPES OF MACHINE LEARNING ALGORITHMS

Just as there square measure nearly limitless uses of machine learning, there is no shortage of machine learning algorithms.

They range from the fairly easy to the extremely complicated.
Here are a few of the most commonly used models:

This class of machine learning algorithm involves identifying a correlation -- generally between two variables -- and using that correlation to make predictions about future data points.

Decision trees.
These models use observations concerning bound actions ANd establish an optimum path for incoming at a desired outcome.

K-means clustering.
This model teams a mere range of information points into a selected range of groupings supported like characteristics.

This information set is extracted from a bigger info originally closely-held by the National Institute of polygenic disease and organic process and excretory organ Diseases.

The purpose of the study is to analyze the connection between the polygenic disease diagnostic result and an inventory of variables that represent physiological measurements and medical attributes.

The data set within the UCI repository contains 768 observations and nine variables with no missing values reported.

S. No	Attributes	Type
1	Number of Times pregnant	Continuous
2	Plasma glucose concentration 2 hours in an oral glucose tolerance test	Continuous
3	Diastolic blood pressure (mm Hg)	Continuous
4	Triceps skin fold thickness (mm)	Continuous
5	2-Hour serum insulin (mu U/ml)	Continuous
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However, as some researchers indicate, there are a number of impossible values, such as 0 body mass index and 0 plasma glucose.

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III. DATA ANALYSIS METHOD

3.1. DATAVISUALIZATION

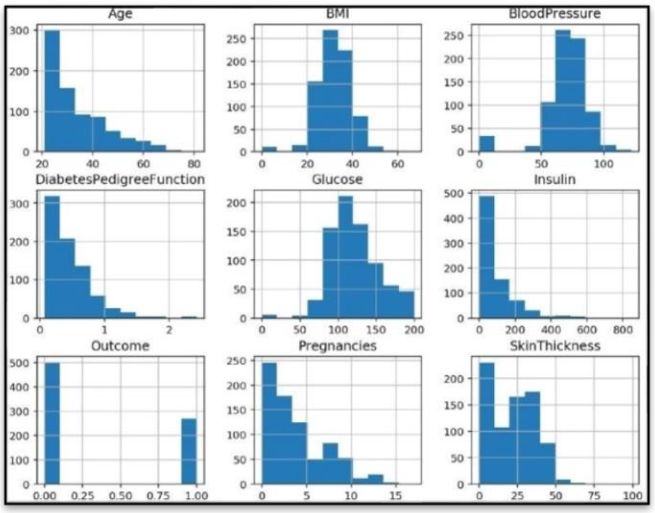
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Techniques. It is also very useful for finding outliers and anamolies in data. The attributes are given below as a correlation matrix:

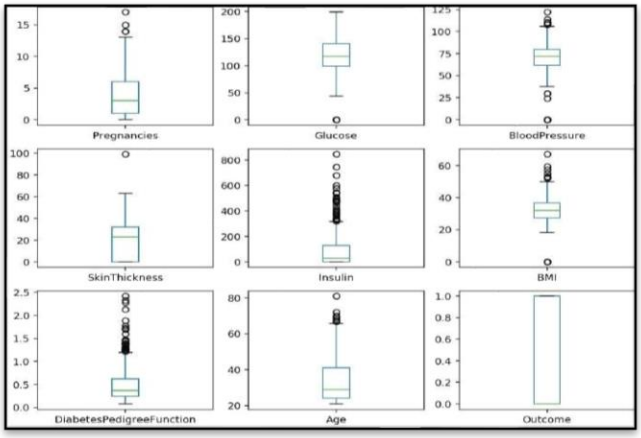
Correlation Matrix



3.1.1. HISTOGRAM



3.1.2.BOX PLOT



3.2. DATA PRE-PROCESSING

To improve the quality of the results obtained after mining and the effectiveness of the complete mining process, data pre-processing is done. Researchers and practitioners realize that in ord er to use data mining tools on the database effectively, data pre-processing is essential for successful data mining. After observing the Pima Indians.

Diabetes dataset, we found the need to pre-process the data in two steps.

Firstly, it's seen that the informationset has the worth zero for missing data.

We removed all the instances that had the worth zero for a selected field wherever having a zero as a worthwas not possible.Therefore, the instances that have missing values were eliminated.

By removing the irrelevant and redundant features we make feature subset and this process termed as feature subset selection. This helps in reducing the dimensionality of the data and help to operate effectively and faster.

In this paper, we have imputed missing data with mean and deleted the externous correlated features which contribute to the better comprehensibility of the produced classifier and the better understanding of the learned concept.

The Prepared data after cleaning, used for training and testing the model.

The data is split seventieth for coaching and half-hour for testing.

Then we train the algorithm on 70% of the data set and keeping the test data aside. This training process will produce the training model based on the logic and the algorithm and the values of the features in the training data. Then test the model on the unseen data to evaluate the model. If we trained the model on the entire set of data, then it produces a good result on the test data as it has seen the biases and when we use this model to the real world data, then it will perform poorly as it is unaware of the biases present in the real world data.

Therefore, we keep the testing data separated from training data so that it produces better results.

3.3. PREDICTIONS AND ANALYSIS BASED ON COLLECTED DATA:

We are using the machine learning workflow to process and transform Pima Indian diabetes data to create prediction model. This model must predict which people are likely to develop diabetes, using Logistic Regression, Decision Tree, AdaBoostClassifier, Support Vector Machine and K Nearest Neighbors.

3.3.1. NAÏVE BAYES

The Naïve Bayes algorithm is a simple probabilistic classifier that calculates a collection of probabilities by investigating frequency and combination of values in a given data set. The algorithm is based on applying Bayes theorem with the "naïve" assumption of independence between every pair of features. Due to simple structure of Naive Bayes, construction of it is very simple and also has several advantages. Moreover, the inference (classification) is achieved in a linear time (while the inference in Bayes networks with a general structure is known to be NP-complete). Also, it does not require much larger data set smaller data set can also be used.

Finally, the construction of naive Bayes is incremental, in the sense that it can be easily updated (namely, it is always easy to consider and take into account new cases in hand). Suppose Ci be diabetes risk group i and N be input variables that are used in a model and under the assumption of all variables are independent.

To predict a class of diabetes risk, a model of Naive Bayes can be defined by

$$P(C_i|\,N) \quad = \quad \frac{P(N\,|C_i) \;\times\; P(C_i)}{P(N)}$$

Where is a posterior probability of a training data set with variable N that will be.

3.3.2. LOGISTIC REGRESSION

Despite its name, Logistic regression is basically a linear model for classification rather than regression. It is also known as the logit regression, maximum-entropy classification (MaxEnt) or the log- linear classifier. In this model, we use logistic regression to model probabilistically described outcomes of a single trial. It is a basic model which describes dichotomous output variables and can be extended for disease classification prediction. Suppose there are N input variables where their values are indicated by m1, m2, m3,…,mN.

Let us assume that the P probability of that an event will occur and 1- P be a probability that event will not occur. Logistic regression model is given by

$$\log\left(\frac{P}{1-p}\right) = \text{log it}\,(P) = \beta_0 + \beta_1 m_1 + \cdots + \beta_N m_N$$

Where β0 is that the intercept and β1, β2, … .
, βN are regression coefficients.

3.3.3 DECISION TREE

It creates a binary tree. The decision tree approach is most useful in the classification problem.

With this method, a tree is constructed to model the classification process.

It consists of three types of nodes root node, child node, and leaf node. The algorithm starts with defining a root node from the most relationship between every input and output variables. Next, the child node is selected by calculating Information Gain (IG). IG(parent, child) = Entropy(parent) – [P(x1) × Entropyx1 + Px1×Entropyx1+…3 Entropy(Ci) = –P(xi) log P(xi) and P(xi) is the probability of child node i. Node having the highest IG will become the parent for next generation. This process is repeated until it gets a leaf node and completed decision tree. The stopping criteria for decision tree is that all the sample for a given node belong to the same class, there aren‟t remaining attributes for any further partitioning and there aren‟t any leftover sample. It requires little data preparation. While different techniques typically require data normalization, creation of dummy variables and blank values to be removed.
Note but that this module doesn't support missing values.

Decision trees tend to over-fit on data having a vast number of features.

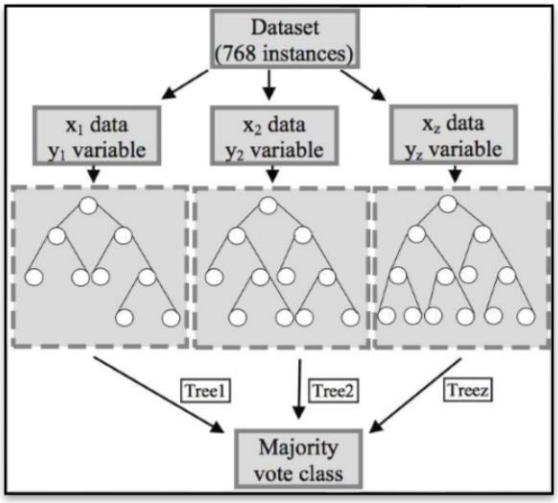
Obtaining the right ratio of samples to a number of features is important since a tree with few samples in high dimensional space is very likely to over-fit.

3.3.4. RANDOM FOREST

Random Forest is an ensemble algorithm which was modeled from trees algorithm and Bagging algorithm. It is developed by Breiman, he found that the algorithm can potentially improve classification accuracy.

It also works well with a data set with a vast number of input variables. The algorithm begins by creating a combination of trees which each will vote for a class. The figure below presents how to model the Random Forest.

Suppose that there are X data and Y input variables in a data set where the real data used in this paper compose of 768 data and 9 input variables. Let z be the number of sampling groups, xi and yi be a number of data and variables in group i where i is equal to 1, 2, ... and z. Each sampling group is as followed:

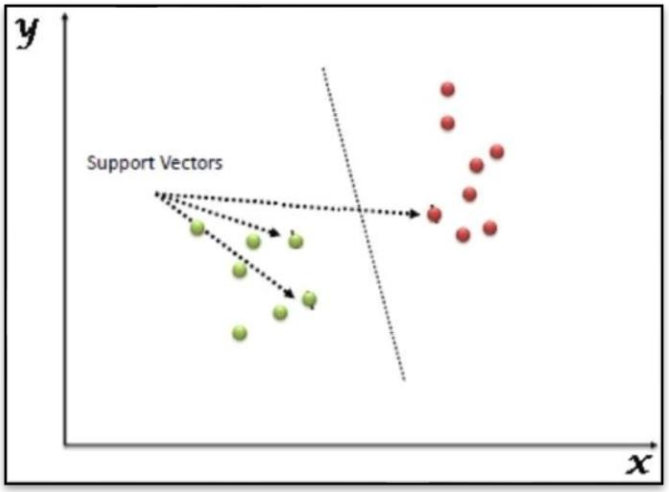


xi variables where xi is not greater than X are selected randomly from X.
yi variables where yi is not greater than Y are selected randomly from Y.

A tree is grown and gives a prediction class. After Step one to three was recurrent for z times, these trees become a forest. Then the classification will be elected by a majority vote of all trees within the forest. Note that all data have to be returned to the data set before selecting a new sampling group.

3.3.5. SUPPORT VECTOR MACHINE

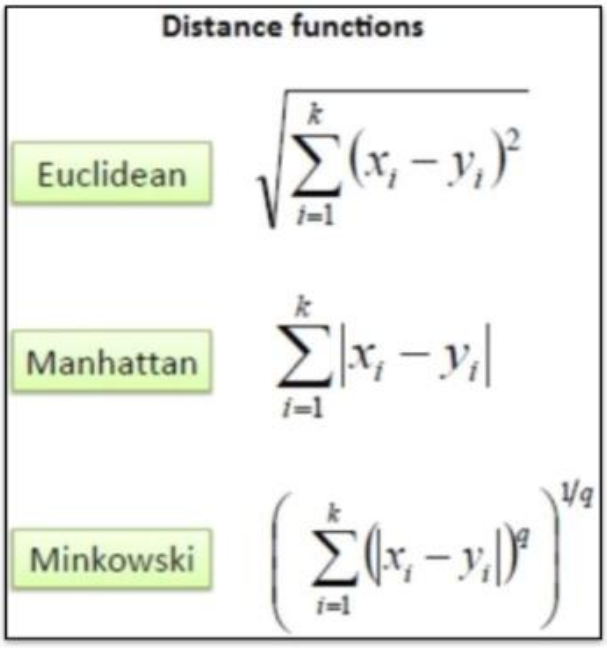
SVM could be a supervised machine learning algorithmic rule which may be used for each classification or regression challenges. However, it is mostly used in classification problems. In this algorithmic rule, we plot each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. Then, we tend to perform classification by finding the hyper-plane that differentiate the two categories.



3.3.6. K NEAREST NEIGHBORS – CLASSIFICATION

K nearest neighbors could be a straightforward algorithmic rule that stores all offered cases and classifies new cases supported a similarity live (e.g., distance functions).

A case is classified by a majority vote of its neighbors, with the case being assigned to the class most common amongst its K nearest neighbors measured by a distance function.

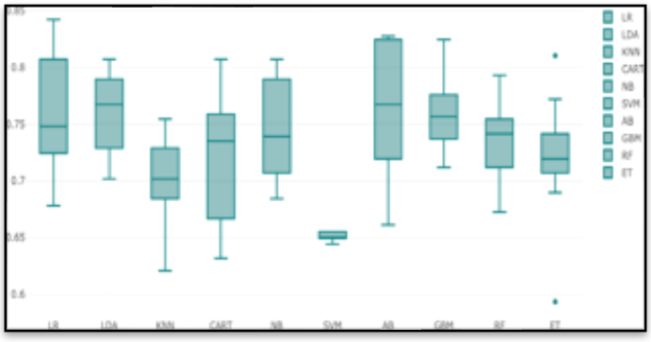


IV. IMPLEMENTATION AND PROPOSED SYSTEM RESULTS

4.1. CLASSIFICATION

ACCURACY ON NON-PROCESSED DATA

1. LR: 0.758904 (0.049893)
2. LDA: 0.760510 (0.034873)
3. KNN: 0.698048 (0.041546)
4. CART: 0.723790 (0.052410)
5. NB: 0.744962 (0.041601)
6. SVM: 0.651037 (0.003678)
7. AB: 0.760687 (0.063215)
8. GBM: 0.757121 (0.031491)
9. RF: 0.737944 (0.035908)
10. ET: 0.720816 (0.053628)

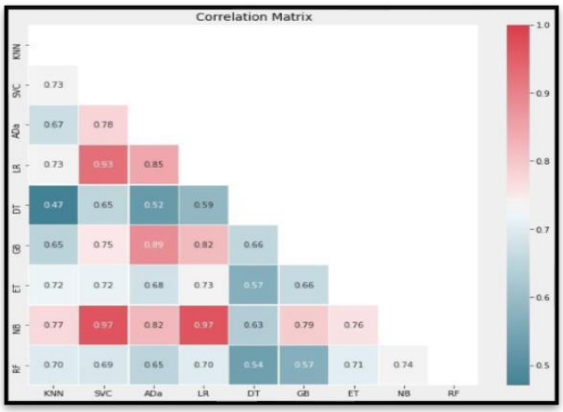


4.2. CLASSIFICATION ACCURACY ON PROCESSED DATA

We have used constant dataset for the comparison. The following table shows the accuracy results on non-processed data for the various techniques used :

TECHNIQUE	ACCURACY
LogisticRegression	81.81%
KNeighborsClassifier	79.22%
SVC	81.81%
DecisionTree	84.41%
AdaBoostClassifier	81.81%
GradientBoosting	76.62%
VotingClassifier	83.11%

4.3. CORRELATIONS MATRIX FOR ERRORS:



V. RESULTS AND DISCUSSION

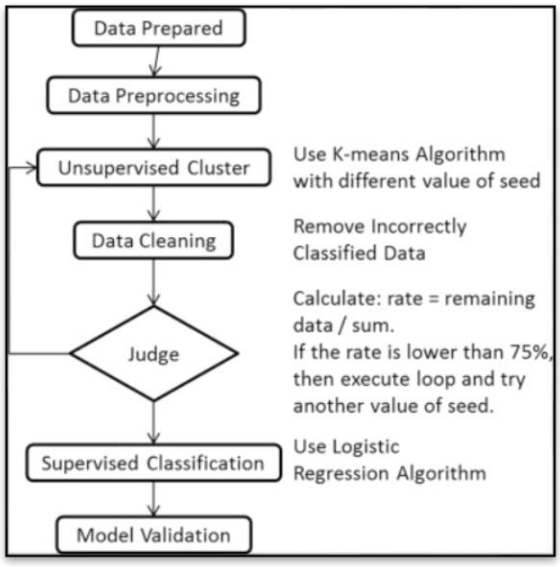
This paper focused on the importance of data pre-processing for data mining. We used the PIMA Indian polygenic disorder Dataset for the study. The data was initial classified while not pre-processing it and therefore the results were noted. Then constant set knowledge of knowledge of information} was pre-processed that's the removal of missing values and data discretization. Classification was done once the 2 step method of information pre- process. After the comparison between the accuracies of classification on non-processed and pre-processed data, it showed that the classification accuracy increases when the data is pre-processed. Hence the info mining accuracy depends tons on the pre-processing of information.

COMPARISON WITH EXISTING STUDY RESULTS

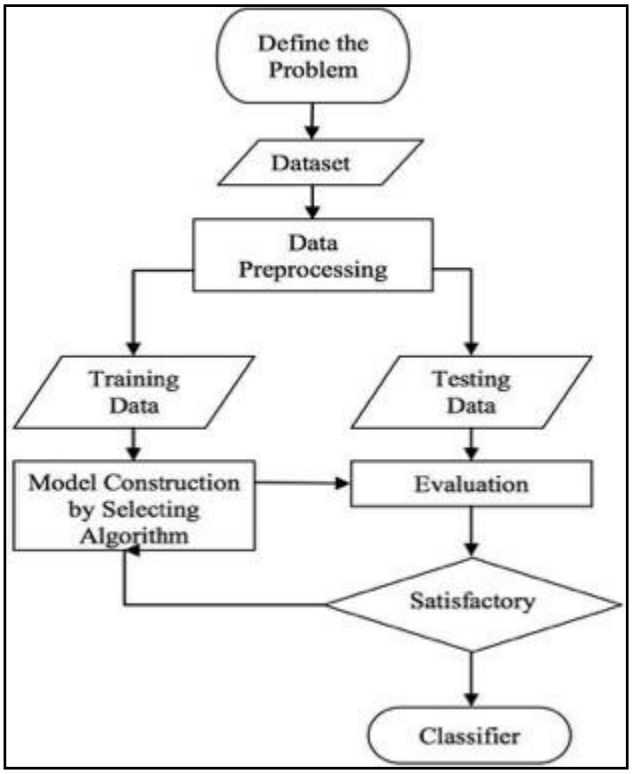
In recent years, using the data mining technique has been used with increasing frequency to predict the possibility of disease. Many algorithms and toolkits have been created and studied by researchers. These have highlighted the tremendous potential of this research field. In this section, a few important works that are closely related to the proposed issue are presented.Based on several studies, we found that a commonly used dataset was the Pima Indians Diabetes Dataset from the University of California, Irvine (UCI) Machine Learning Database. Patil proposed a hybrid prediction model (HPM), which used a K-means clustering algorithm aimed at validating a chosen class label of given data and used the C4.5 algorithm aimed at building the final classifier model, with 92.38% classification accuracy. Ahmad compared the prediction accuracy of multilayer perception (MLP) in neural networks against thde ID3 and J48 algorithms. The results showed that a pruned J48 tree performed with higher accuracy, which was 89.3% compared to 81.9%.

Marcano-Cede˜no proposed artificial metaplasticity on multilayer perceptron (AMMLP) as a prediction model for diabetes, for which the best result obtained was 89.93%. All the studies presented above used the same Pima Indians Diabetes Dataset as the experimental material. The Waikato Environment for Knowledge Analysis (WEKA) toolkit was the primary tool which most researchers chose.In order to obtain more useful and meaningful data, we realized that the preprocessing methods and parameters should be chosen rationally. Vijayan V. reviewed the benefits of different preprocessing techniques for predicting DM. The preprocessing methods were principal component analysis (PCA) and discretization. It concluded that the preprocessing methods improved the accuracy of the naive Bayes classifier and decision tree (DT), while the support vector machine (SVM) accuracy decreased. Wei analyzed risk factors of T2DM based on the FP-growth and Apriori algorithms. Guo proposed the receiver operating characteristic (ROC) area, the sensitivity, and the specificity predictive values to validate and verify the experimental results.On the basis of an effective prediction algorithm, we need an appropriate way to make the model convenient for everyone.

EARLIER METHOD



NEW METHOD



VI. CONCLUSION

In this paper, various investigations on prediction and diagnosis of type II diabetes mellitus using data mining techniques are present. Various classification techniques area unit used once pre-processing of the info. In this paper we have done a comparison of the accuracy of classification done on non- processed and pre-processed data. We have come back to a conclusion that the pre- processed information offers us a higher accuracy results instead of non-processed information.

This shows the importance of pre- processing in the data mining.

TECHNIQUE	ACCURACY
LogisticRegression	81.81%
KNeighborsClassifier	79.22%
SVC	81.81%
DecisionTree	84.41%
AdaBoostClassifier	81.81%
GradientBoosting	76.62%
VotingClassifier	83.11%

USING EARLIER TECHNIQUES

TECHNIQUE	ACCURACY
LogisticRegression	78.2%
Naïvebay	74.9%
KNN	67.6%

FUTURE WORK AND LIMITATIONS

For future work, it is necessary to bring in hospital's real and latest patients' data for continuous training and optimization of our proposed model. The quantity of the dataset should be large enough for training and predicting. Some advanced algorithms and models should be applied in the study of DIABETES MELLITUS. Grading forecasting standards are also necessary for potential diabetes patients. Developing a series of rules and standards is a valid method to prevent people from developing DIABETES MELLITUS. Based on that, a more effective model for predicting DIABETES MELLITUS and grading potential patients is presented. This will help to lower the growth rate of diabetes and eventually decrease the risk of developing DIABETES MELLITUS.

The Pima Indian Diabetes dataset we used in the research have only the numeric parameters. Sometimes medicine dataset may contain different data formats like text, images (x-ray, EGC report) and dates and time. Artificial neural network accepts only numeric data formats. The other machine learning algorithms can be used for handling the text and image data types.

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Hand Gesture Based Voice Announcement System

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ABSTRACT

Micro controller primarily based speaking for dumb and deaf is meant to offer the signs, that are preloaded within the device. it's microcontroller-based device, which provides the alert sounds simply by using Hand gesture device, that are given some redefined messages like requesting water, wash area etc.., here the person will simply offer the predefined gesture that indicates the sign of Water(example) then the device sounds constant with some output volume. Microcontroller is that the heart of the device. It stores the information of wants of the person. in order that it will build use of knowledge keep whenever the person uses this device. This device helps deaf and dumb individuals to announce their necessities. By this the one that is close to will perceive their want and facilitate them. this protects the time to grasp one another and ease in communication. This device is meant to produce with a larger advantage manufacturing voice-based announcement for the users i.e., the user gets the voice that pronounces his want as and once it's needed. "Speech" and "gestures" are the expressions, that are largely utilized in communication between men. Learning of their use begins with the primary years of life. In human communication, the use of speech and gestures is totally coordinated. Machine gesture and language recognition is concerning recognition of gestures and language using gloves.

Keywords : Arduino uno, MEMS Sensor, Speaker.

I. INTRODUCTION

In recent years, for human computer interactions hand gesture recognition is used mainly. They play an important role in gaming and control application i.e. 3- D mouse, tele-robotics & virtual reality controlling. Rather than this, it is also used in those applications which aid the physically challenged community as dumb people. So, primary requirement for conversion of sign people to speech is Hand-gesture recognition. Hand-gesture recognition project is very useful for dumb-deaf people; it can also be used by the patients with half of their bodies paralysed as they couldn't speak & even for those patients who can only move their fingers.

II. LITERATURE SURVEY

L. Anusha, Y. Usha Devi "**Implementation of Gesture Based Voice and Language Translator for Dumb People [1]** Dumb persons communicate through gestures which are not understood by the majority of people. Gesture is a movement of part of the body, especially a hand or the head, to express an idea or meaning. This paper proposes a system that converts gestures given by the user in the form of English alphabets into corresponding voice and translates this English voice output into any other Microsoft supported languages. The system consists of MPU6050 for sensing gesture movement, Raspberry pi for processing, three button Keypad and speaker. It is implemented by using trajectory recognition

algorithm for recognizing alphabets. Raspberry pi generates voice output for the text in multiple languages using voice RSS and Microsoft translator. When tested, the system recognized A-Z alphabets and generated voice output based on the gestures in multiple languages.

Chinmaya R. Naguri "**Recognition of Dynamic Hand Gestures From 3d Motion Data Using Lstm And Cnn Architectures**" [2] Hand gestures provide a natural, non-verbal form of communication that can augment or replace other communication modalities such as speech or writing. Along with voice commands, hand gestures are becoming the primary means of interaction in games, augmented reality, and virtual reality platforms. Recognition accuracy, flexibility, and computational cost are some of the primary factors that can impact the incorporation of hand gestures in these new technologies, as well as their subsequent retrieval from multimodal corpora. In this paper, we present fast and highly accurate gesture recognition systems based on long short-term memory (LSTM) and convolutional neural networks (CNN) that are trained to process input sequences of 3D hand positions and velocities acquired from infrared sensors. When evaluated on real time recognition of six types of hand gestures, the proposed architectures obtain 97% F-measure, demonstrating a significant potential for practical applications in novel human-computer interfaces.

III. PROPOSED SYSTEM

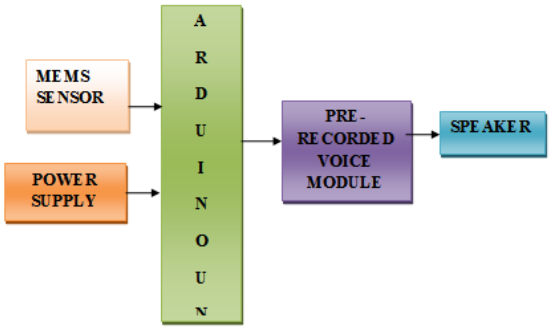


Fig 1. Block Diagram

Microcontroller is that the heart of the device. It stores the information of wants of the person. in order that it will create use of knowledge keep whenever the person uses this device. This device helps deaf and dumb folks to announce their needs. By this the one who is close to will perceive their want and facilitate them. this protects the time to know one another and ease in communication. This device is meant to produce withbigger advantage manufacturing voice primarily based announcement for the users i.e., the user gets the voice that pronounces his want as and once it's needed. "Speech" and "gestures" are theexpressions, that are principally employed in communication between people at large. Learning of their use begins with the primary years of life. In human communication, the utilization of speech and gestures is totally coordinated. Machine gesture and signing recognition is concerning recognition of gestures and signing using gloves.

IV. OBJECTIVES

- It allows deaf and dumb people to communicate with others.
- It is a best device for these people to overcome their disability They can express their views to others.

V. CIRCUIT DIAGRAM

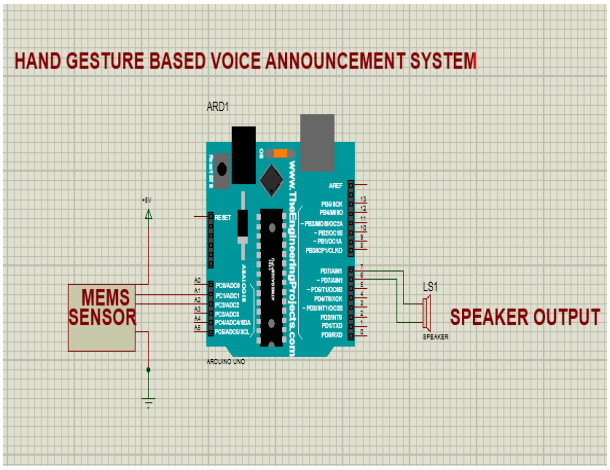
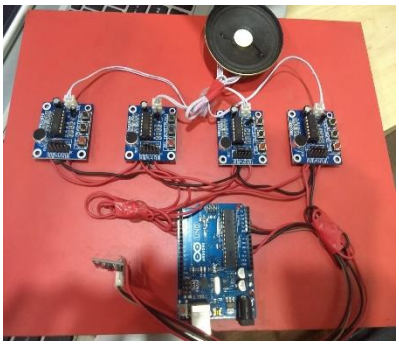


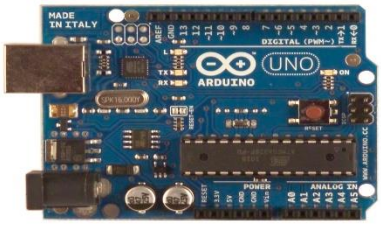
Fig.2 circuit diagram of hand gesture based voice announcement system

VI. RESULT

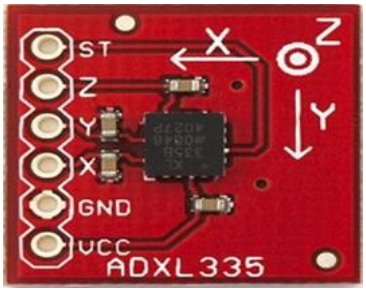


ARDUINO UNO

MicrocontrollerATmega328
Operating Voltage5V
Input Voltage (recommended) 7-12V
Input Voltage (limits) 6-20V
Digital I/O Pins 14 (of which 6 provide PWM output)
Analog Input Pins 6
DC Current per I/O Pin 40 mA
DC Current for 3.3V Pin 50 mA
Flash Memory 32 KB (ATmega328) of which 0.5 KB used by bootloader S
RAM 2 KB (ATmega328)
EEPROM 1 KB (ATmega328)
Clock Speed 16 MHz



MEMS SENSOR



VII. CONCLUSION

The main aim of the project is to reduce the communication gap between deaf or mute community and normal people. This system is proposed to improve lifestyle of dumb/ deaf persons. This project is also favourable for degrading the communication difference between the blind person and the dumb person. All over the project is effective and efficient because it is using the ARDUINO UNO microcontroller and voice module. This paper is helpful for the industry of people working in the area of designing systems based on microcontroller.

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Integrating Blockchain for Data Sharing and Collaboration in Mobile Healthcare Applications

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ABSTRACT

Empowered by portable and wearable innovation, individual wellbeing information conveys tremendous and expanding an incentive for human services, profiting both consideration suppliers and medicinal research. The protected and advantageous sharing of individual wellbeing information is urgent to the improvement of the connection and joint effort of the social insurance industry. Looked with the potential security issues and vulnerabilities existing in current individual wellbeing information stockpiling and sharing frameworks, just as the idea of self-sovereign information proprietorship, we propose a creative client driven wellbeing information sharing arrangement by using a decentralized and permissioned square chain to ensure protection utilizing channel development plan and upgrade the personality the board utilizing the participation administration upheld by the blockchain. A portable application is sent to gather wellbeing information from individual wearable gadgets, manual information, and therapeutic gadgets, and synchronize information to the cloud for information offering to medicinal services suppliers and health care coverage organizations. To save the coordinate of wellbeing information, inside each record, a proof of honesty and approval is forever retrievable from cloud database and is secured to the blockchain arrange. In addition, for versatile and execution contemplations, we receive a tree-based information preparing and clumping strategy to deal with expansive informational indexes of individual wellbeing information gathered and transferred by the portable stage.

Keywords: Blockchain Network, Integrate, Utilizing.

I. INTRODUCTION

It is an extremely energizing time for medicinal services and data innovation (IT). Because of upgrades in hereditary research and the progression of accuracy prescription, human services is seeing an imaginative way to deal with malady avoidance and treatment that consolidates an individual patient's hereditary cosmetics, way of life and condition. All the while, IT progression has created extensive databases of wellbeing data, gave instruments to follow wellbeing information and drew in people more in their very own medicinal services. Consolidating these progressions in social insurance and data innovation would encourage transformative change in the field of wellbeing IT.

As of late, the ascent of wearable innovation and the Internet-of-Things has conveyed extraordinary chances and difficulties to the human services area. Empowered by distributed computing and enormous information examination, the information gathered from individual gadgets adds to huge wellbeing information and profitable experiences can be

inferred. Emergency clinics and therapeutic foundations can utilize this information to connect with other Electronic Health Record (EHR) information, for example, clinical notes, to encourage wellbeing observing, ailment judgments and treatment. Medical coverage organizations can make. Point by point and vital approaches as per singular qualities, profiting clients to pick adaptable protection designs as indicated by their necessities. To deal with wellbeing information sharing between organizations, there is a requirement for a protected information sharing framework. Be that as it may, there are a few difficulties identified with protection, security, and interoperability. In the first place, wellbeing information are very security delicate, particularly as more information are putting away in an open cloud, raising the dangers of information presentation. Second, current frameworks utilize incorporated design, which requires unified trust.

II. METHODS AND MATERIAL

System: Input, Output, Function, Success, Failure

Input: Sensor data signal which is not regular or Change in Signal

Output: End User get informed with alert SMS and app notification of Disaster alerts and Prediction data.

Functions:

1. Access ():- In this module we are going to access the feature provided by the module which Will include Sensor data access.

2. Control ():- In this module we are controlling the Alert System by using System which is connected to hardware or sensor data.

3. Broadcast ():- In this module we are going to broadcast the alert popup Message by Real time SMS alert system And Android App Notification.

4. Success Conditions:

1. If such data which is received through sensors are not stable or are more than threshold it will predict that there is Disaster situation

5. Failure Conditions: Desired output is not generated due to following failures.

1. Software Failure
2. Hardware Failure
3. Network Connection Failure

HARDWARE INFORMATION:

Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

Heartbeat sensor:

The heartbeat sensor is based on the principle of photo phlethysmography. It measures the change in volume of blood through any organ of the body which causes a change in the light intensity through that organ (a vascular region). In case of applications where heart pulse rate is to be monitored, the timing of the pulses is more important. The flow of blood volume is decided by the rate of heart pulses and since light is absorbed by blood, the signal pulses are equivalent to the heart beat pulses.

Bluetooth Module:

It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications.It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air. It uses serial communication to communicate with devices. It communicates with microcontroller using serial port (USART).

III. LITERATURE REVIEWS

Adiseshu Hari, Manoj Jaitly, Yuh-Jye Chang, Andrea Francini [1] A smartphone can be configured to look like any Universal Serial Bus (USB) peripheral and can be managed remotely through its wireless data connection. By virtue of these features, smartphones are ideal vehicles for the delivery of a variety of brand-new, USB-powered services that support the management and troubleshooting of mobile laptops. We provide examples of such USB services and describe a general architecture for their implementation. The services are easy to deploy, because they can be extended to remote laptops without prior installation of new software, and wellsuited for delivery through virtualization in a cloud infrastructure. While our examples target mostly the enterprise, USB services, especially virtualized ones, can easily be tailored to suit a broad set of consumer applications.

Aram V. Chobanian, MD George L. Bakris, MD Henry R. Black, MD William C. Cushman, MD Lee A. Green, MD, MPH Joseph L. Izzo, Jr, MD Daniel W. Jones, MD Barry J. Materson, MD, MBA Suzanne Oparil, MD Jackson T. Wright, Jr, MD, PhD Edward J. Roccella, PhD, [2] MPHF or more than 3 decades, the National Heart, Lung, and Blood Institute (NHLBI) has administered the National High Blood Pressure Education Program (NHBPEP) Coordinating Committee, a coalition of 39 major professional, public, and voluntary organizations and 7 federal agencies. One important function is to issue guidelines and advisories designed to increase awareness, prevention, treatment, and control of hypertension (high blood pressure [BP]). Since the publication of "The Sixth Report of the Joint National Committee on the Prevention, Detection, Evaluation, and Treatment of High Blood Pressure"

Chang Liua, Qing Zhua, Kenneth A. Holroydb, Elizabeth K. Seng b [3] Modern smart mobile devices offer media-rich and context-aware features that are highly useful for electronic-health (e-health) applications. It is therefore not surprising that these devices have gained acceptance as target devices for e-health applications, turning them into m-health (mobile-health) apps. In particular, many e-health application developers have chosen Apple's iOS mobile devices such as iPad, iPhone, or iPod Touch as the target device to provide more convenient and richer user experience, as evidenced by the rapidly increasing number of m-health apps in Apple's App Store. In this paper, the top two hundred of such apps from the App Store were examined from a developer's perspective to provide a focused overview of the status and trends of iOS m-health apps and an analysis of related technology, architecture, and user interface design issues. The top 200 apps were classified into different groups according to their purposes, functions, and user satisfaction. It was shown that although the biggest group of apps was medical information reference apps that were delivered from or related to medical articles, websites, or journals, mobile users disproportionally favoured tracking tools. It was clear that m-health apps still

had plenty of room to grow to take full advantage of unique mobile platform features and truly fulfil their potential. In particular, introduction of two- or three-dimensional visualization and context-awareness could further enhance m-health app's usability and utility. This paper aims to serve as a reference point and guide for developers and practitioners interested in using iOS as a platform for m-health applications, particular from the technical point of view.

Ali Kemal Yetisen,, a J. L. Martinez-Hurtado, a Fernando da Cruz Vasconcellos, a M. C. Emre Simsekler,b Muhammad Safwan Akrama and Christopher R. Lowea [4] The rapidly expanding number of mobile medical applications have the potential to transform the patient–healthcare provider relationship by improving the turnaround time and reducing costs. In September 2013, the U.S. Food and Drug Administration (FDA) issued guidance to regulate these applications and protect consumers by minimising the risks associated with their unintended use. This guidance distinguishes between the subset of mobile medical apps which may be subject to regulation and those that are not. The marketing claims of the application determine the intent. Areas of concern include compliance with regular updates of the operating systems and of the mobile medical apps themselves. In this article, we explain the essence of this FDA guidance by providing examples and evaluating the impact on academia, industry and other key stakeholders, such as patients and clinicians. Our assessment indicates that awareness and incorporation of the guidelines into product development can hasten the commercialization and market entry process. Furthermore, potential obstacles have been discussed and directions for future development suggested.

IV. PROPOSED SYSTEM

We propose a mobile user controlled blockchain-based system for personal health data sharing and collaboration. In the implementation, we build the system that data compere with dataset sample. System generate user pattern according user behaviour, which is a permissioned blockchain requiring the network nodes to validate, and realizes a privacy preserving personal healthcare system with a broader coverage of the healthcare ecosystem from the end device to the cloud, as well as the emphasis of the user ownership for health data. A mobile application is deployed to collect health data from personal wearable devices, manual input, and medical devices, and synchronize data to the cloud for data sharing with healthcare providers and health insurance companies. To preserve the integrate of health data, within each record, a proof of integrity and validation is permanently retrievable from cloud database and is anchored to the blockchain network.

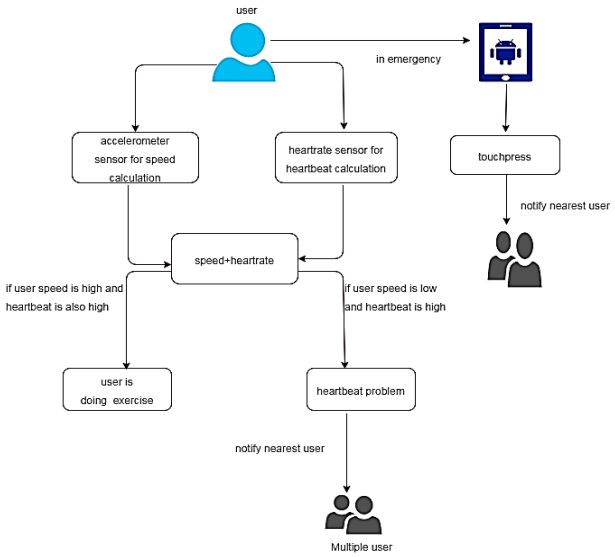


Fig 1 : System Architecture

V. RESULT AND DISSECTION

An innovative user-centric health data sharing solution by utilizing a decentralized and

permissioned block chain to protect privacy using channel formation scheme and enhance the identity management using the membership service supported by the blockchain. A mobile application is deployed to collect health data from personal wearable devices, manual input, and medical devices, and synchronize data for data sharing with healthcare providers and health insurance companies.

To preserve the integrate of health data, within each record, a proof of integrity and validation is permanently retrievable from cloud database and is anchored to the blockchain network. Moreover, for scalable and performance considerations, we adopt a tree-based data processing and batching method to handle large data sets of personal health data collected and uploaded by the mobile platform.

VI. Circuit Diagram

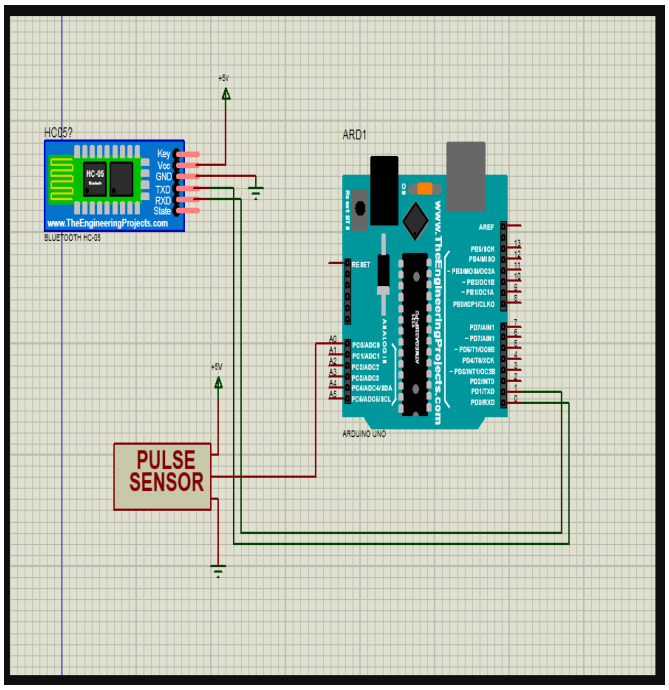


Fig 2. Circuit Diagram

VII. CONCLUSION

Blockchain technology addresses interoperability challenges, is based on open standards, provides a shared distributed view of health data and will achieve widespread acceptance and deployment throughout all industries. In this paper, we design and implement a mobile healthcare system for personal health data collection, sharing and collaboration between individuals and healthcare providers, as well as insurance companies. The system can also be extended to accommodate the usage of health data for research purposes. By adopting blockchain technology, the system is implemented in a distributed and thrustless way. The algorithm to handle data records can preserve both integrity and privacy at the same time.

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In Silico Analysis and Molecular Modelling of NS2B-NS3 Protein in Dengue

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ABSTRACT

Dengue fever is frequently born viral infection caused by female mosquito *Aedes egypti*. Transmission of dengue infection is transfer from one host to another by infected mosquito bite. Dengue virus is categorized into various serotypes on the basis of their genetic material variable. Dengue fever and dengue haemorrhagic fever is serious risk factor to Mankind Nowdays there is no specific vaccine to treat the dengue infection. There is need to design potent antiviral vaccine against dengue fever. NS2B-NS3 act as potent drug target in dengue fever. Hence our present work to achieve to understand detail molecular properties of NS2B-NS3 protein by retrieving its amino acid sequence from protein database like PDB. Analysis of physicochemical parameters, secondary and tertiary structure prediction. structure visualization is done by using Rasmol structure visualization tool. Predicted model is validated using procheck analysis. This all information gives primary information for future work to perform computer aided drug design against dengue fever.

Keywords : Dengue, Serotypes, NS2B-NS3 Protein, CADD (Computer Aided Drug Design)

I. INTRODUCTION

Dengue is fast emerging pandemic prone viral disease In many parts of the world.Dengue fever virus (DENV) is an RNA virus of the family Flaviviridae and genus Flavivirus [Shasank Sekhar Swain, 2013]. The dengue virus is most significant arthropod born human pathogen, and increasing number of case have been reported over the last few decades.Dengue is caused via mosquito bite. They transfer the germs through saliva in the human body which binds to the human receptors thus causing dengue. The dengue virus genome contains about 11, 000 nucleotide bases [Muhamad awais amin et.al, 2015].

The NS5 protein from dengue virus is bifunctional and contains 900 amino acids. The S-adenosyl transferase activity resides within its N-terminal domain and residue 270-900 from the RNA dependent RNA polymerase catalytic domain [Iranjan, Manoj, et.al, 2017]. Dengue virus contains four antigenically distinct viral serotypes named as DEN-1, DEN-2, DEN-3 and DEN-4 all the serotypes usually transmitted from one human host to the other by mosquitos of the Aedes genus, primarily *Aedes egypti* and *Aedes albopictus*, dengue virus possess a unique serological investigations in mammals recommended that the circulation of dengue follows epidemiological patterns, without any noticeable clinical signs in host. while there is no licensed dengue drug and vaccine currently exists. Several candidates are currently undergoing either clinical evaluation or preclinical development. As a result there is need to design a dengue Vaccine,

one of the antiviral agents approaches involves the blocking and inhibiting enzyme activity.[Sehrish Ruba, Mahira Arooj et.al, 2014].

The entry of dengue virus in the host cell is mediated by E protein, envelope protein present at the surface of virus enhances the fusion of viral cell membrane and host cell membrane. Initially a protein is arranged as heterodiamer in the immature state of dengue virus. The presence of premembrane protein which covers the protein peptide, will generate a spiky surface on E protein. The E protein monomer is composed of Barrales and organized into 3 structural domains domainI domainII, domain III. [Sajin.A.k.et.al, 2015]. The first reported case of dengue like illness in india was in madras in 1780, the first viriologically proved epidemic of DF in india occurred in Calcutta and Eastern Coast of india in 1963-1964. DF is a severe flu like infection that involves individuals of all age groups (infants, children, Adolescents, and adults). In this report we describe the molecular features of NS2B-NS3 protein in dengue infection in dengue by using bioinformatics approach like primary sequence analysis of protein by sequence retrieving from protein database. secondary structure prediction and understanding the basic secondary structure element study of tertiary structure by modelling 3D strcture using online tool like SWISS-MODEL. predicted 3D structure was validated by using PROCHECK analysis.

II. METHODS AND MATERIAL

A) Retrieval of protein sequence information of NS2B-NS3

For the study of NS2B-NS3 molecule its amino acid sequence retrieved from the major protein sequence database like UniprotKB and NCBI protein database. The uniprotknowledgebase (UniprotKB) is the central hub for the collection of functional information on proteins, with accurate, consistent and rich annotation. The sequence obtained was stored in FASTA fromat with its accession number.

B) Analysis of physicochemical parameters

The analysis of physicochemical parameters of NS2B-NS3 was done using online tool for protein prediction is protparam.It gives detailed information of protein like isoelectric point, theoretical PI, extinction coefficient, half life, instability index, aliphatic index, Grand average, hydropathecity.

C) Secondary structure prediction of NS2B-NS3

The secondary structure prediction of NS2B-NS3 is carried out using online protein prediction tool SOPMA. Self optimized prediction method (SOPMA). It gives the information of Alpha helix, beta sheets, extended strands, random coils.

D) Prediction of tertiary structure of NS2B-NS3

The tertiary structure of NS2B-NS3 was obtained by using SWISS MODEL tool by selecting the template with high homology and with optimized parameters. The obtained structure was stored in PDB format for visualization.

E) Visualization of tertiary structure of NS2B_NS3

The predicted structure of NS2B-NS3 is visualized by using structure visualization tool Rasmol. visualization was done using different formats to understand structural features of NS2B-NS3.

F) Model validation of tertiary structure of NS2B-NS3

3D structure of NS2B-NS3 was validated by using PROCHECK statistics and Ramchandran plot analysis.

III. RESULTS AND DISCUSSION

3.1 Retrieval of protein sequence information of NS2B-NS3

For the study of NS2B-NS3 protein sequence was retrieved from major protein sequence database like uniprotKB. accession number of sequence is stored and sequence length is found to be 3396 amino acid.
Uniprot Id : P29990

3.2 Analysis of physicochochemical parameters

TABLE 1. Showing physicochemical parameters

Parameters	Values
Aliphatic index	86.32
GRAVY	-0.229
Instability index	37.32
Molecular weight	379546.53
Theoretical PI	8.75
Extinction coefficient	607270
Total number of negatively charged residues (Asp+ Glu)	373
Total number of positively charged residues (Arg+ Lys)	410

The analysis of physicochemical properties of protein is carried out by using online protein prediction tool is protparam analysis. It gives therotical PI on the basis of nature and unstable on the basis of instability index. According to positive score indicates that higher hydrophobicity. on the basis of GRAVY score it denotes the hydrophilicity. calculated parameters are shown in below table 1

3.3 Secondary structure information of NS2B-NS3

Secondary structure prediction of NS2B-NS3 was carried out using SOPMA and all other secondary element like alpha helix, beta sheets, random coils, and extended strands were predicted as shown in table below

TABLE 2. Showing secondary structure element

Secondary structure element	Amino acid	Percentage	Residue
Alpha helix (Hh)	1324	39.04%	73
Extended strands(Ee)	639	18.84%	14
Beta turn(Tt)	232	6.84%	5
Random coil (Cc)	1196	35.27%	65

3.4 Tertiary structure prediction of NS2B-NS3

Tertiary structure prediction was carried out using SWISS-MODEL online tool for building a 3D model of protein by selecting template with high homology and optimized characteristics.The obtained structure was stored in PDB format for visualization.The details of template selected for structure prediction was shown below Table

TABLE 3. Showing template details for NS2B-NS3

Name	Title	Identity	Oligostate
2bmf.2A	RNA HELICASE	98.44%	Monomer
3j27.1.A	Envelope protein E	97.98%	Hetero Hexamer
5k5m.1.A	RNA dependent RNA polymerase	98.43%	Monomer

3.5 Visualization of tertiary structure of NS2B-NS3

Tertiary structure of NS2B-NS3 is visualized using structure visualization tool Rasmol. Visualization was done using different formats to understand structural features of NS2B-NS3.The model were represented in figure 1.

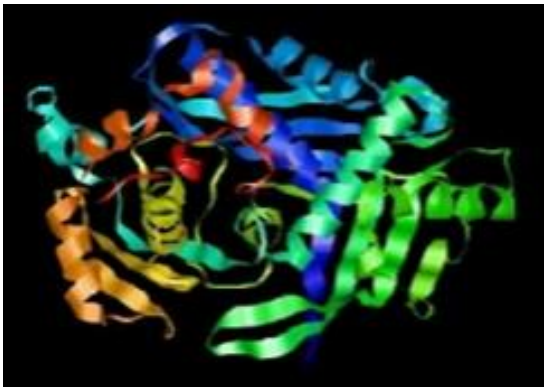


Figure1. showing 3D structure of NS2B-NS3

3.6 Model validation using PROCHECK

Using the procheck overall stereochemical quality of protein is evaluated by analysing the overall residue by residue geometry psi and phi torsion angles of Ramchandran plot analysis. It show residue with most favoured region, generously allowed region additionally allowed region and disallowed region. Ramchandran map of 2FOM showing in figure 2 below and table 4 shows procheck details given below.

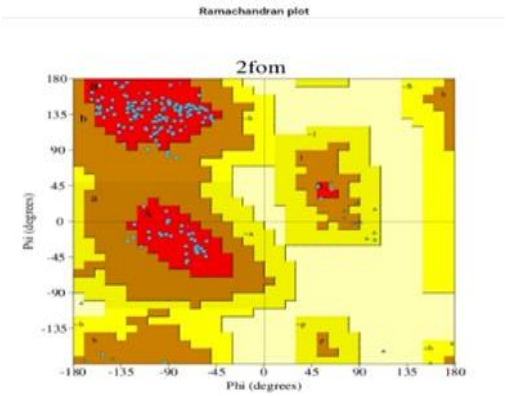


Figure 2. Showing Ramchandran plot analysis

TABLE 4. Showing Procheck Details

Procheck statistics	No.of residues	Percentage%
Most favoured regions	344	89.04%
Generously allowed regions	2	0.5%
Additional allowed regions	39	10.1%
Non-glycine and non-proline residue	385	100%
End-residue (Gly and Pro)	2	
Glycine residue	27	
Proline residue	441	
Disallowed regions	0	

IV. CONCLUSION

Dengue fever is frequently born viral infection caused by female mosquito *Aedes egypti.* Transmission of dengue infection is transfer from one host to another by infected mosquito bite. Dengue virus is categorized into various serotypes on the basis of their genetic material variable. Dengue fever and dengue haemorrhagic fever is serious risk factor to Mankind. Nowdays there is no specific vaccine to treat the dengue infection. There is need to design potent antiviral vaccine against dengue fever. NS2B-NS3 act as potent drug target in dengue fever.

We conclude that NS2B-NS3 is potent drug target in dengue disease. This protein found in DENV 2

infection.here we study all the molecular feature of protein like physicochemical properties, secondary structure prediction, tertiary structure prediction, and model validation using PROCHECK analysis.This all study gives preliminary information for designing a new drug with the help of computer based method like computer aided drug design (CADD).

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Assessing Independent Mobility of Children Indicators in Military Barrack Community of Nigeria

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ABSTRACT

Independent mobility of children assessment lacks a defined standard and measurement process. It is largely due to ways in which environmental context dictate relevant indicators. In a developing country like Nigeria, there is inadequate data and research in this area to inform a holistic assessment. Hence, this study employed multi-method data collection involving field survey, semi-structured interview, and survey questionnaire to assess independent mobility of children's indicators. Barrack spatial data was analysed using Landsat imagery and ArcGIS for objective measurement of indicators. Subsequently, 60 children from 3 NAF primary schools and 390 parents living in Sam Ethnan Air Force Barrack (SEAB) at Lagos participated. Consequently, their perception on destinations accessibility, road network connectivity, population density, land use, home geographical range, and average travel time validated objectively measured same variables. It was found that SEAB has 0.941 km^2 land area, high percentage (80%) of built up area, and population density of 42,480.315 per / km^2. Home geographical range indicated a catchment of school and playground within 100-700m and average travel time for walking to 3 primary schools are 5m.82s, 8m. 56s, 16m. 20s, and 8m.26s for children's park. Destination accessibility, population density, home geographical range, and travel time met the threshold of factor loading >0.7. The Land use and road connectivity are secondary factors excluded for failure to meet the threshold. Poor level of independent mobility, mobility restriction, closed destination accessibility associated with land use mix and short distances were found in barrack community. These findings contributed to the spatial dynamics of mobility nexus, and the perceived shift in the degree of children's independent mobility depends on these indicators.

Keywords : Mapping, Independent Mobility of Children's Indicators, Military Barracks

I. INTRODUCTION

Independent mobility of children has been defined as the ability of children to travel around their neighbourhood freely without adult's company (Carver et al., 2010b; Tranter and Whitelegg, 1994). Attempts has been made to identify and measure indicators of children's independent mobility in relation to various context in past studies. These include home range referring to how far a child can travel from their home, independent time outside explaining how many minutes a child can stay outside of home independently. It also defined independent journey to destinations as child's independent movement to specific destinations and parental license for children to know whether a child is allowed to travel independently by parents (Kyttä, 2004; Loebach and Gilliland, 2014; Villanueva et al., 2012a; Villanueva et al., 2012b). However, parental license cannot be measured like other indicators in this study as its rather perceived as intervening factor

to be further examined. This is largely due to the uniqueness of barrack environment, military regimental culture, and parental influences on barrack children. Similarly, in four previous studies, a systematic review on independent mobility of children was conducted (Bates and Stone, 2015; Malone and Rudner, 2017; Moghtaderi et al., 2012; Schoeppe et al., 2013). These studies focused on the link between independent mobility of children and health benefits. This means that children's independent mobility has been used as an explanatory factor of health outcomes. However, Malone and Rudner (2017) have provided a descriptive summary of children's independent mobility in relation to different socio-cultural and ecological contexts. On the other hand, this study draws on the relationship between barrack environment characteristics and independent mobility of children. Systematic assessment of relevant indicators in the military barrack towards promoting child-friendly environment in the unique cultural and geographic milieu was conducted.

Child-friendly barrack environment is vital for children's physical, mental, spiritual and social growth (UNICEF, United Nations International Children's Emergency Fund, 1989). However, some criteria for a child-friendly built environment was discussed in past studies (Kyttä, 2004; Nordström, 2010). Within this context, Broberg et al. (2013a) have offered an acceptable operational definition of child-friendly built environment using children's possibilities for independent mobility, and their opportunities to actualize environmental affordances. This study focused on assessing the children's independent mobility indicators in the military barrack environment in Nigeria. The findings from this research, therefore, contribute to the spatial dynamics mobility nexus in the literature. It explains relevant indicators of how children independent mobility changes with respect to changes in the barrack built environment (Priemus et al., 2001).

Military barrack refers to housing facility built to support military training and operations. Thus, it provides shelter for military equipment and personnel. Basically, a military barrack provides accommodations for one or more units. However, some complex barracks are built to sustain itself for long period. They are able to provide food, water and other life support necessities for residents while under siege. Barracks are usually extra-legal jurisdictions because they are not completely subject to civil law. Nevertheless, they can range from small outposts for military duties to complex military cities containing up to 100,000 people in a large expanse of land. The name adopted in any case depict the type of military activity that takes place at the barracks. In another way, barracks may refer solely to an establishment which is used by an army. It also applies to other sister forces such as marines, not including base used by either an Air Force or Navy. Barracks size is usually determined by its establishment status, function and population of personnel to be quartered. The roles of the military in national defence, internal operations, peace keeping and humanitarian intervention necessitated the establishment of many military barracks in the developing countries including Nigeria. Typically, the operation area is often restricted, only authorized persons are permitted access irrespective of whether is a military personnel or not. Military barracks community usually provide apartment housing estate with shared facilities for military personnel, offices and dining facilities. They also provide support facilities such as fast food restaurants, snack bar, gas station, religious centre (churches and mosque), schools, hospital or clinic, shopping and convenience retail stores, and beauty salon. Sporting facilities such as fitness centres, libraries, athletic fields, basketball hoops, child development centres automotive workshops, hobby or arts and crafts centres, bowling centres, and community activity centres.

In the barrack, it is difficult to select the most significant indicators that are measurable and achievable at the same time. Independent mobility of

children indicators lacks a defined standard and measurement process. Past studies used indicator selection frameworks such as criteria based, causal chains, and causal networks. These three frameworks have certain limitations and strengths. In a nutshell, indicators are pointers to evaluate progress, projects, and policies toward set goals and objectives. It has been defined by the Organization for Economic Cooperation and Development Countries (OECD) as statistical measures of social, environmental and economic policy sustainability (Haghshenas and Vaziri, 2012). As such, it helps in evaluating, simplifying, study trends, communicate issues and compare across places and situations (Boyko et al., 2012; DETR, 2000; Toth-Szabo and Várhelyi, 2012). Based on this, a set of appropriate indicators allow decision makers to monitor status, predict, and understand implications of the actions and inactions (Boyko et al., 2012; Gudmundsson and Sørensen, 2012; Henning et al., 2011; Rametsteiner et al., 2011). Consequently, there is a need to identify indicators to assess and ensure that independent mobility of children policy options is realized in various settings including barracks (Litman, 2007; Moussiopoulos et al., 2010; Zachariadis, 2005). This requires independent mobility of children's planning policy that ensures safe accessibility, home geographical range, travel time, and population density. Land use land cover change affecting children irrespective of their parent's socio-economic background and travel mode choice considered in the environment are same with barrack (UNEP, 2014).

Measuring independent mobility indicators of children therefore depends on ways in which environmental context is defined and contextual indicators are obtained (Kwan,2012; Marco *et al.*, 2015; and Bhosale, 2017). Similarly, place-based research is not achievable without a specific methodology and relevant indicators. Children represent a population of group that is much neglected in the city planning process especially the barrack planning. Their perceptions, which are different from those of adults, are usually not incorporated in the design of cities or barracks. The aim of this paper is to assess independent mobility indicators of children using GIS objective measurement and subjective approach to capture parent's perceptions of independent mobility in the barracks. Various indicators of sustainable independent mobility of children were identified for assessment in this study. Attempt was made to select the most relevant indicators that measurable and achievable at the same time in the military barrack context. Except for parental license that required negotiation between parent and children or to be examined as a mediating effect in predicting independent mobility of children.

II. METHODS AND MATERIAL

This study employed spatial data from the field survey method to generate barrack spatial map analysed in ArcGIS. Semi-structured interview for children's perception to rate children's independent mobility indicators and generate route map. Identified indicators were also subjected to parent perception and analysed using SPSS and SEM-PLS. Identified indicators from past studies and those peculiar to military barrack were factorised using component factor analysis and used to predict independent mobility of children in the military barrack.

2.1 Field Survey Method

In the first part, data collection was primarily by field survey method. The Geographical Positioning System(GPS) was used to obtain coordinates of destinations on ground (Kerr et al., 2011) and Landsat imagery remotely sensed for high resolution. The use of Landsat imagery remotely sensed for the barrack built up area, open spaces vegetation to determine land use land cover changes covered a period of 12 years between 2006-2018. The imagery was imported in ArcGIS, geo-referenced, and digitised for mapping of boundaries, locations, buildings, road connectivity, home geographical range, and destinations of barrack environment features. Classification of built up area, vegetation, and open spaces was carried out separately in ERDA 14. This was in line with

previous studies that found mapping to be useful for collecting data on home geographical range, time, and destinations of middle childhood aged 5-12 years. This involved objective measure of spatial data for analysis. Children are capable of completing activities involving home-school journey and visits to their local neighborhood play areas as opined by Risstto and Tonucci, (2002) and Veitch et al., (2008).

2.2 Semi-structured Interview

In the semi-structured interview, children living in the barrack were given 16 questions in the interview to assess their perception on independent mobility indicators in the barrack. The question included demographic profile, and children's understanding independent mobility. Moreover, the mapping portion dwelled on marking of local destinations, and preference route to school and destinations important for play. Children home address obtained from the participant and geo-coded using GIS. Layers of map for street network, residential, schools, and play area destinations were obtained. Children used coloured marker to locate their home, route they usually walk or cycle to and from school and play area. In addition, children wrote the names of their visited destinations in the demonstration map provided for them.

A total of 60 children involving 20 from each of the 3 NAF primary schools in the study area marked their home and preference routes to school and playground. Parents assisted the children in answering the questions and mapping. The mapping exercise was actually to test the children's ability and experience of barrack environment where they reside. Destination accessibility including road connectivity, home geographical range and average travel time were assessed objectively.

2.3 Survey Questionnaire

The third data collection method involved the use of survey questionnaire to elicit responses from parents' participant. A total of 390 questionnaires were retrieved (Krejcie & Morgan,1970) from 500 distributed. Parents living in the barrack assessed independent mobility indicators that were identified and objectively measured earlier. Secondary data from past literature therefore formed the basis for the questionnaire on independent mobility indicators. It covers the home geographical range, time and destinations where children relate in the military barracks. Permission was sought from the barrack commander for the administration of questionnaire. Furthermore, parental consent was sought with the assistance of head teachers on the parent and children participation in filling questionnaires. The data used were collected from primary and secondary sources. Quantifiable information from concerned population with adequate knowledge and experience relevant to the subject area (Knabe, 2012). These enables data on the opinion, experience and level of understanding of parent on independent mobility of children's indicators.

III.ANALYSIS AND RESULTS

3.1 Barrack Spatial Analysis and Objective Measures of independent mobility of children's indicators

Landsat imagery was imported into ArcMap 10.3 (ESRI) for mapping boundaries of the study areas, children's homes, primary schools, and play areas. Home geographical ranges from 100-700m in SEAB Lagos was considered. Pedestrian network (including bike paths and shared walking/cycling paths) around each child's home zones were confirmed to be non-existent. The travel time for walk were compiled (Mavoa et al., 2012). Distance between home and school along the most direct and walkable, cycle, and driving routes were measured. Satellite Images was acquired on March 2018 covering the total land extent of the barracks (see fig 2). Subsequently, the satellite image was geo-referenced to ensure points,

paths, lines distances and areas on the satellite image are as exact as they are on ground. The data utilized for this research was remotely sensed data and population data of the barracks. Landsat series imageries of two years (2006 & 2018) in 12-year interval acquired from the USGS Earth Explorer portal were used (see fig.9). The imageries were carefully checked to ensure that the same season was selected for the two different periods. Data analysis was carried out in two parts. First is the analysis of Landsat imagery and secondly the GIS mapping. The Landsat imagery was basically for classification to obtain land use land cover changes. On the other hand, the GIS mapping involved spatial analytical procedure and statistical analysis including buffering, overlay, and simple distance calculation. It also includes time for average walking, cycling, and driving to destinations in focus. Spatial statistics and ArcGIS software incorporated spatial statistics tools. Spatial data were displayed in study area maps. Independent mobility of children's indicators objectively measured include, the destination accessibility of children, home geographical range, and average time taken. The forth indicator identified through literature review is parental license. However, this indicator cannot be measured objectively. However, due to the uniqueness of the study area, the population density using the total built up area per persons, streetscape, and road connectivity were considered under destination accessibility. In addition to indicators from literature review, land use land cover changes over a period of 12-years was considered. It was discovered that changes in land use across both study areas have significant effect on the green areas which formed open space for children's play. This is therefore considered as an important indicator of independent mobility to play areas in the military barracks milieu of Nigeria. It also showed the rate of development in the built up area that have affected open space for children play in the barracks. Consequently, the changes hinder independent mobility of children in the residential area of the military barracks. Furthermore, objective measure of these indicators and evaluation using software formed the basis for the quantitative analysis of survey questionnaire and semi-structured interview in this study. This equally validated the results seeking parental and children's perception. These sequential methods of data analysis make the research adequately reliable, and validate the result. The data analysis was further classified into the destination accessibility of children, population density, home geographical range, and average time calculated.

Independent mobility indicators of children using GIS measurable spatial variables in ArcGIS software is essential in developing a policy framework of independent mobility that fits to military barracks. Indicators considered in this research include destinations accessibility, road connectivity, population density, home geographical range, travel time, and land use diversity. The acquired satellite image was Geo-referenced with the aid of coordinates taken from various points that are sparsely separated within the base. Thereafter, the image was digitized in various layers comprising of boundary, roads, buildings, locations amongst other relevant data. Digital boundaries were based on barracks fencing and delineation with average population size considered per persons.

Destination accessibility provides a measure of child specific neighbourhood destinations opportunities (Badland et al., 2015; Oliver et al., 2017). This becomes a driven index for a number of destinations in the barracks that reflect destinations that children regularly access. Fig. 3 showed the digitized maps and destinations in SEAB Lagos. It includes locations, road connectivity, and buildings designs. The

population density was also calculated in the study areas. Population density is the total population divided by the total land area of a place. It has a unit of persons per square kilometres (per/km^2). According to Daodu, (2004), the average number of people living in buildings within SEAB Lagos was found to be 9 persons in MOQ (bedroom bungalow), 5 persons in officers' duplexes and block of flats, 7 persons in airmen blocks (See Table 1). To calculate the average amount of people living in each of the houses, the average number of people in the buildings is multiplied by the total number of houses on the barrack. The total land area of SEAB Lagos is 0.941 km^2. Hence, the population density is 32,370 divided by 0.941 amounting to 34,399.573 per / km^2. The built-up area is 81% of the total land area of SEAB Lagos, which is 0.762 km^2. Therefore, the population density is 42,480.315 per / km^2.

Concerning the land use analysis, the data processing was in two parts. first, the stacked and composite map is clipped to the specific extent of interest. Thereafter, atmospheric correction was applied. This enabled easy processing of data. Haze correction was used to clear the cloud cover under the radiometric menu in ERDAS Imagery. In classification, acquaintance with the area of interest enabled easy sample selection and accuracy in output image. A ground-truth process was used (the process of verifying the integrity of the features on the imagery compared to its true representation on ground) in other words field-checking the mapping accuracy was necessary (Ghilani & Wolf, 2012). The second part involved the ArcGIS interface, the reference system was set to WGS 1984. Units set to meters and the coordinate system set to Universal Traverse Mercator (UTM) system. Using ArcGIS 10.3 software, the satellite images were imported and geo-referenced using the coordinates of points obtained (See Table 2). A layer (shape file) was added, set to polygon and renamed SEAB and NAF Base Kaduna to denote the boundary of the base. The added shape file was digitized (traced) along the boundaries of the barrack. Consequently, layers were added for the polygon (location of places and buildings) and line features (access roads). For each layer, the feature was digitized accurately to produce a copy of the feature to be worked on. For the locations, places like officer quarters, airmen quarters, mammy market, and schools within the base were digitized. For the buildings, each and every building within visible range from the barrack map was digitized. The Access roads, other roads and Airstrip were also digitized.

The main locations in view are NAF Primary School 1,2, 3, and 4 in SAEB Lagos. Layers with point features were created for these three locations respectively. Another point feature layer was created and labelled 'End Points', which was digitized at every point of access to the location features and it was also linked to either the access roads. Buffer zones were created from the Arc Tool box option for NAF Primary Schools 1,2, 2, and 3(see fig. 5, 6, and 7) as well as children's park (fig. 8). Intervals of 100, 400, and 700 meters obtained due to its small size or land mass. Four layers labelled 'Road Distances 1', 'Road Distances 2', 'Road Distances 3' and 'Road Distances 4' were created having line features (see fig.4), these layers were used in calculating the distances from the end points of all locations to NAF primary schools one, two, and three in SAEB Lagos. It was also used to calculate distances from the end points of all locations to Children's Parks. The attribute tables of the layers created above were accessed. Using the calculate geometry option, the distances between all the locations to all the NAF primary schools and children's park was assessed. Average Travel Time (ATT) obtained in ArcGIS using the average walking speed of children (5.43 km/hr or

1.5 m/s). The average cycling speed of children is (12.64 km/hr or 3.511 m/s) and the average driving speed within the base of (30 km/hr or 8.333 m/s). The time taken to reach all the Primary Schools and Children's Parks in SEAB was calculated and tabulated (see Appendix1). Results showed primary school 1 (ATT for walking is 5m.82s, cycling is 2m.84s, driving is 1m.33s), school 2 ATT for walking is 8m.56s, cycling is 3m.25s, driving is 1m.59s), school 3 (ATT for walking is 16m.20s, cycling is 7m.12s, driving is 2m.70s), children's park (ATT for walking is 8m.26s, cycling is 3m.91s, driving is 1m.43s). See fig 2 for the workflow for independent mobility of children in the barrack.

Table 1 : Estimated Population Density of Sam Ethnan Air Force Barrack in Lagos

Building Type (No. Persons)	**Av. Number of people**	**No. of Houses**	**Total**
MOQ Semi-Detached Flats and Duplexes	5	645 houses	3,225
MOQ (5 bedroom bungalow)	9	1,552 houses	7,760
SOQ (3 bedroom flat)	5		
Storied Building Apartment (One bedroom flat)	7	1,944 houses	13,608
Storied Building Apartment (2-Bedroom Apartment	7	1,111 houses	7,777
Estimated Number of People			**32,370**

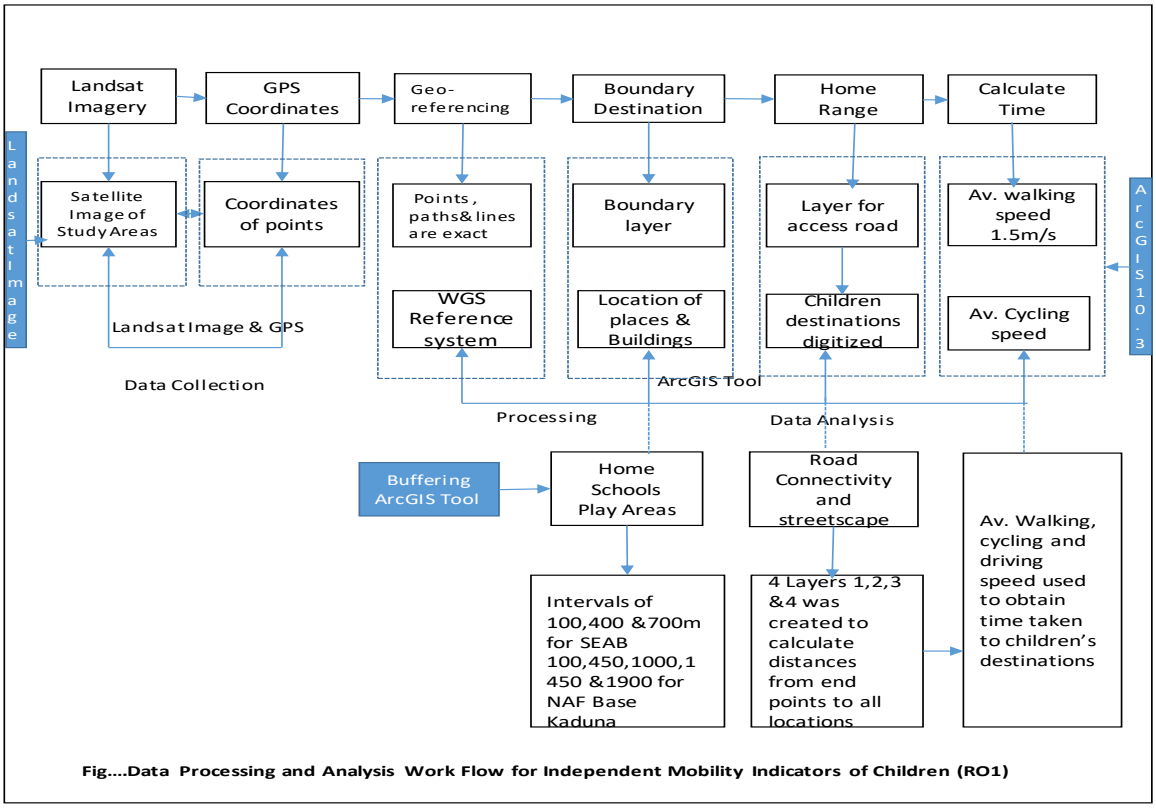


Fig....Data Processing and Analysis Work Flow for Independent Mobility Indicators of Children (RO1)

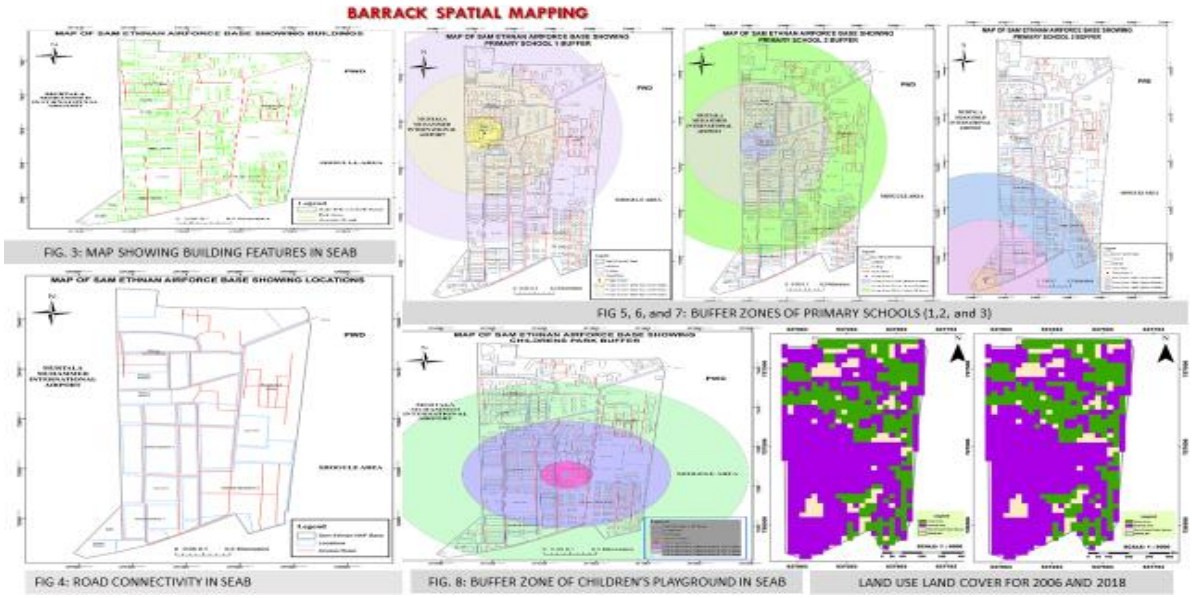
Fig 1 : Field Survey and Analysis Workflow for Independent Mobility Indicators of Children in Sam Ethnan Air Force Barrack

Table 2 : Summary of software and analysis performed

SOFTWARE/VERSION	ANALYSIS	DESCRIPTION
ARCGIS 10.4	Vectorization process of all land features for Sam Ethnan Air Force Barrack, database creation, buffer analysis and map embellishment.	The vectorization process converts all raster features of interest to an editable vector format. Database containing attributes of each digitized feature (area, perimeter distances amongst others), the buffer analysis was done on each road feature to show the width extent for streetscape features. These include walkway, bicycle lane, planting strip and street light areas and the availability of the features was verified based on this. The encroachment of buildings and structures into areas meant for streetscape features were also be checked
ERDAS 14	This software was used for all image processing.	Layer stacking, composite bands formation, classification, index analysis and change detection analysis conducted
MICROSOFT EXCEL 2018	Statistical representation of classified features	Representational charts for statistical output of some image analysis were carried out in this software for better comprehension.



Fig 2 : Satellite Image of SEAB in Lagos



3.2 Children Perception of Independent Mobility of Children's Indicators and Route Map

The perception of children relating to independent mobility indicators was carried out in a semi-structured interview. This was done in two sections. Section A covers the demographic profile of children while section B dwelled on mapping experience of children's route. The maps of the study areas produced were given to children during semi-structured interview to mark their home, school, play areas, and preference route to the school and play areas in the barracks. The preference routes marked were further entered into ArcGIS and measured with average time for walking calculated. However, it was to bridge the gap in parent's perception of issues on built environment and travel mode choice behavior that directly affect their independent mobility in the military barracks. The map provided for children enabled them to mark their home, school and play area location including preference route to school and play areas. These routes were imputed in ArcGIS for further analysis to obtain average distances and possible time it takes to walk, cycle or drive to those destinations.

3.2.1 Demographic Profile of Children

Section A contains demographic profile of children and section B dwelled on the assessment of children's ability to mark destinations accessible to them as well as preference route from their home to school and play area in the barracks. The children's demographic characteristics considered include children's sex, age, older sibling and level of education. On the other hand, assessment of independent mobility of children's indicators and environmental knowledge was carried out in section B. in section C, the mapping experience and abilities of children in the barracks was examined by allowing them to mark their homes, schools and playground as well as preference routes for further analysis.

3.2.2 Children Perception of Independent Mobility of Children Indicators in Barrack

The statistical analysis of the semi-structured interview conducted for children was to assess the independent mobility of children's indicators in the military barracks. This is contained in section B of the semi-structured interview. Using descriptive statistics to present results, 96.7% of children were of

the opinion that playground is not available for their use. Moreover, 41.7% play inside house, 35% use house yard, 20% play in football field, and 3.3% play in friend's house within the barrack. The travel mode to school and play area indicates 40% use of private car, 35% walks, 21.7% public transport, and 3.3% manage to ride bicycle after school. On parental license for independent mobility, 86.7% complaint of parental restriction, only 6.7% said they are occasionally allowed to work around without adult while 3.3% did not respond. Examining the level of freedom in barrack, 66.7 walk with adult, 28.3 walk with peers, only 5% walk alone. Rating the barrack environment, 57% filled that green along walkways to school is available but not attractive while 5% were of the opinion that traffic light is available. 100% representing all the 60 children agreed that destinations in barracks are accessible in the residential area mainly with road connectivity.56.7% believed that the barrack population is high while 43.3 were of the opinion that the population is low. 55% of children opined that distances from home to school and play areas are close while 45% felt that distances are far apart to destinations. 55% sees average travel time as short while 45% were of the view that average travel time is longer than what they can walk to school. In term of safety and security in the barrack, 80% felt that barrack is safe enough for them to walk to school and to play areas while 20% of children were of the view that barrack is not safe considering many factors. The house location, school, and play area after school, preference route walk, cycle, and driven to play area were marked by children in the semi-structured interview at SEAB. These are contained in section C. Participatory mapping attempts to engage children in the generation of personalized map. It is a way to both harness the value of children's knowledge about geographic space, and to concurrently empower the research participants. This is achieved by inviting them to engage actively in the representation and explication of their spatial environment. Engagement in the mapping exercise is a nuanced process substituting difficult to achieve textual methods. Findings from this participatory mapping in the context of 5-12 years old primary student demonstrate the potential of this research strategy. It is highly recommended for its effective implementation in barrack community and other settings in Nigeria.



Fig 9 : Children's route map

3.3 Parent's Perception on Independent Mobility of Children's Indicators.

This section answered the question how parents perceive independent mobility of children's indicators in military barracks. These indicators include destination accessibility, home geographical range, average travel time, population density, and land use. These indicators, were selected from past studies and new ones unique to barrack obtained from objective measurements. Exploratory Factor Analysis (EFA) was employed to prune down a huge number of variables into sizable and manageable factors for univariate or multivariate analysis (Pallant, 2013). It brings together items to form relevant structure for measurement model (Kline, 2015, Coubergs et al., 2017). The association and independency among items and data loading from other variables are further ascertained (Paschke et al., 2009, Wan, 2016). It calculates eigenvalues of matrices drawn from data in orthogonal paths, decreasing the dimensionality of the input dataset by examining the best structures. In EFA, the correlation between items not initially visualised from theoretical viewpoint is explored (Williams and Brown, 2010, Yong and Pearce, 2013). New relationship between observed and latent variables are discovered (Hair et al., 2012). The number of factors that describe underlying relationship among variables is a factor extraction procedure (Pallant, 2013). It was measured by Principal Component Analysis (PCA). The PCA was used to effectively summarise items into sizable elements for prediction (Huber,2009, Tabachnick and Fidell,2014). The EFA carried out in this study grouped variable into factors in which their validity was tested and analysed. Factor extraction was computed on principal component extraction, Varimax rotation, threshold for factor extraction of Eigen value >1. 0.4 value was recommended suppressed factor, meaning that any item having factor loading less than 0.4 was dropped (Paschke et al., 2009, Hair et al., 2012). Factors with loadings more than 0.7 were retained in this research as recommended by Joliffe (!972 and 2002).

Generally, results obtained in ArcGIS, children, and parent perception of independent mobility of children indicators are summarised based on indicators considered in this study. Concerning children's destination accessibility, all destinations digitised in terms of location and building features with focus on destinations where children relates (Home, School, and Play areas). Children in the barracks have little environmental knowledge of their homes, school, and play areas. They were able to mark destinations on the map provided with parent assistance. This showed level of parental restriction and control on children aged 5-12 years. The children's playground was abandoned which shifted their attention to football field and home yard. On the road connectivity, roads are well connected but pathways are not attractive and connected as revealed in the ArcGIS. Children marked shorter routes as their preference road to school but little confusion on play areas due to non-availability of structured playground and open spaces in SEAB. No attractive features on routes to school, the streetscape is bereaved of good walkways, traffic control facilities, parks, and bicycle lanes. Next is the home geographical range, closer children destinations, shorter distances, and route to destinations were digitised in SEAB. Considering average travel time, shorter distances correlates with less time to walk, cycle, and drive to destination. It encourages children's walking to school and play areas, driving speed in barracks is 30km/hour. The entrance and exit gates to barracks are closed at 12 midnights and opened 6am daily to ensure security. SEAB is densely

Populated with smaller land area. Finally, land use land cover changes clearly showed land use mix. Children are restricted to the barracks where they live, attend school, religious activities, market, shops, socio-economic facilities and often play. Using 2006 to 2018 Imagery, three classes identified include, the Built up area, Green/bare ground area, and vegetation. Change over 12-years was evaluated. Reduction in green/bare ground and vegetation is pronounced. Expansion of built up area increased population density while high residential and population densities can aggravate traffic volume and hinders independent mobility of children in the barracks

IV. FINDINGS AND DISCUSSION

The built environment subsuming barracks morphology explained by land use land cover changes, and road connectivity is often influenced by other variables. These includes of population density, land diversity, and destination accessibility, It is consistent with studies by Saelens and Handy, (2008); Ewing and Carvero (2010) and Helbich et al., (2016). The challenge of natural and barracks environmental determinants like open spaces for play areas, built up areas of home and schools are also significant variables as pointed out in Pont et al., (2009); Panter et al., (2010); Wong., (2011); Sallis et al., (2015) and Helbich et al., (2016). A mixed land-use neighbourhood such as barracks urban milieu with high population density in SEAB Lagos shows closer destination accessibility. This expression comes to play especially when destinations like mammy market, shops, schools, and play areas are considered. The trip distances are shortened by close destinations in SEAB as found in Van Loon and Frank, (2011). The buffer of the schools and playground in SEAB indicates in a distance of between 0-700m which connotes short distance trips from children's home. It summarily means that decreased destination accessibility promotes or hinders walking and cycling in a built environment. This is also consistent with findings in Saelens and Handy, (2008) and Helbich et al., (2016). A peculiar neighbourhood with pronounced land-use diversity makes trip connection by active travel (walking and cycling) more convenient. This home geographical range have impact on independent mobility of children in the barrack.

Concerning road network connectivity, more intersection yields a higher street connectivity which increases route opportunities for children. It was showed in the mapping exercise of children in the semi-structured interview where children marked their preference routes to school and play areas. It is in consistent with Giles-corti et al., (2011) and Helbich et al., (2016) studies. Children do not often aim to reduce travel distances, and their preference route decisions are influenced by other issues like safety, route attractiveness, and sometimes opportunity to meet friends as found in Harrison et al., (2014). The population density of the airmen quarters has influence on the traffic volume and independent mobility of children in the barrack. Interpreting the road connectivity digitised in SEAB, the population density also attracts more traffic with risk of pedestrian injury as found in Sirard and Slater, (2008). This clearly revealed that the ways in which barracks environmental context is defined and contextual variables derived influences independent mobility of children (Kwan,2012).

Poor level of independent mobility of children established in the military barrack as identified by various indicators considered. Mobility restriction was mainly that of parental license within the barracks. Parents decision is highly influential as clearly stated in the semi-structured interview with children and responses by parents in the survey

questionnaire. Consistent with prior work, we find that average travelled time (ATT) for driving, walking, and cycling is most strongly related to measures of accessibility to destinations. It also affected by variables such as home geographical range, land use land cover, and road connectivity in the barrack. Walking is most strongly related to measures of land use diversity, and the number of destinations within walking distance. In contrast to these previous studies, driving and cycling use are not related to proximity to transit and road network variables. Land use land cover change seems to be weak and regarded as a secondary factor. Surprisingly, it was found that population densities met the factor loading to be significant in measuring independent mobility of children in barrack. To reduce the number independent mobility of children indicators, a principle component analysis was performed with Varimax rotation and Kaiser normalisation in SPSS statistical package. It was in line with method used to factorise urban structural variables in Cervero & Duncan, (2003); Miles & Song, (2009); Song & Knaap, (2007); Yan et al., (2010). The principal component scores for every indicator was obtained as if principal components had been observed themselves. Thus, independent mobility of children had new measurable variables representing the loadings for each principal component. These measurable variables were to be used as dependent variables in predicting independent mobility of children in barrack. Simple descriptive analysis was used to explain children view of independent mobility and exploratory factor analysis for parent perception (Bromberg, Salminen & Kyttä ,2013).

V. CONCLUSION

In this study, significant relationships were found between objective measurement derived from ArcGIS, children, and parent subjective measures of independent mobility. Thus, findings showed that the perceived degree of children's independent mobility depends on the context, multi-methods, and assessment of indicators. These findings contributed to the spatial dynamics of mobility nexus, and the perceived shift in the degree of children's independent mobility depends on these indicators. Consequently, this contributed to the reliability and validity of findings on the measurement of independent mobility of children in the military barrack. The findings can be generalised in all barracks including the Nigerian Army, Nigerian Navy, Nigerian Air Force, Police, Immigration, custom, road safety corps, prison service and other housing estates that make up cities in Nigeria. Hence, independent mobility of children can be predicted by examining direct and indirect effects of barrack environment characteristics, travel behaviour factors and parental license in further studies. It is necessary especially when there is need to formulate policies and strategies for implementation of transit and child-friendly barracks in Nigeria.

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Searchable Attribute-Based Encryption Scheme over Cloud Data

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ABSTRACT

From the time in memorial, Information Security has remained a primary concern and today when most of the sensitive data is stored on Cloud with client organization having lesser control over the stored data, the fundamental way to fix this issue is to encrypt such data. So, a secure user-imposed data access control system must be given, before the users outsource any data to the cloud for storage. Attribute Based Encryption (ABE) system is one such asymmetric key based cryptosystem that has received much attention that provides fine-grained access control to data stored on the cloud. In this paper, we propose a more proficient and richer type of Attribute Based Encryption technique that not only considers the Outsourced ABE construction but also address the issue of revocation in case of user leaving the group or organization; once a user is removed from the group, the keys are updated and these new keys are distributed among the existing users also our system supports the Keyword search over encrypted data in the mobile cloud storage. In multi keyword search; data owners and users can generate the keywords index and search trapdoor, respectively, without relying on always online trusted authority. Experimental results prove that the performance of the proposed system is greater than existing system in terms of security, time consumption and memory utilization.

Keywords: Attribute-Based Encryption, Attributes Revocation, Fine-Grained Access Control, Keywords Search, Mobile Cloud Storage.

I. INTRODUCTION

Cloud Computing is seen as another choice to customary information advancement as a result of its inborn asset sharing and low-upkeep attributes. In cloud registering, the cloud specialist co-ops (CSPs, for instance, Amazon, can send diverse administrations to cloud customers with the help of extreme datacenters. By consolidating the neighborhood information the board structures into cloud servers, customers can value first class administrations and recuperation gigantic theories on their adjacent frameworks. Information storage is a fundamental administration given by cloud framework. By utilizing the cloud, the clients can be totally discharged from the troublesome nearby information storage and support. Additionally, it likewise has a huge hazard to the secrecy of those putaway documents. In particular, the cloud servers overseen by cloud suppliers are not trusted absolutely by clients while the information records put away in the cloud might be touchy and secret, for example,

marketable strategies. To give information security, as a fundamental arrangement is to scramble information records, and after that transfer the encoded information into the cloud. Sadly, structuring proficient and secure information sharing a philosophy for gatherings in the cloud isn't a simple assignment because of the accompanying testing issues.

To begin with, personality security is a significant defeat for the improvement of cloud processing. With no security of personality protection, clients might be reluctant to participate in cloud registering frameworks on the grounds that their genuine characters could be effectively revealed to cloud suppliers and aggressors. Second, it is exceedingly suggested that any part in a gathering can almost certainly utilize the information putting away and sharing administrations given by the cloud, which is defined as the various proprietor way. Contrasted and the single-proprietor way, in which just the gathering director can store and adjust information in the cloud, the numerous proprietor way is increasingly adaptable progressively applications. To wrap things up, bunches are dynamic practically speaking. The alterations of participation make secure information sharing extremely troublesome. Toward one side, the mysterious framework provokes new conceded clients to get familiar with the substance of information records put away before their cooperation, because of its unrealistic for new allowed clients to contact with obscure information proprietors and get the relating unscrambling keys. At the opposite end, an effective enrollment revocation system without refreshing the mystery keys of different clients is additionally wanted to limit the unpredictability of key administration.

To settle this issue, data which is to be put away is encoded in mixed structure. Anyway, such encoded information must be pleasing to the sharing and access control. Different private and open key cryptographic procedures are not receptive to versatile access control. So as to settle this issue Revocable and Searchable Attribute-Based Encryption method was proposed. Attribute-Based Encryption (ABE) has increased much consideration in the research network. Attribute-Based Encryption is a lopsided key based cryptographic method which improves the skillfulness of access control systems.

In a Revocable and Searchable ABE system, a client's keys just as ciphertext are marked with sets of engaging attributes and a specific key can decode a specific ciphertext just if there is a match in the attributes of the ciphertext and the client's critical. Be that as it may, a defect in the standard ABE framework is the immense size of the ciphertext and the computational complexities in the decoding stage are very saddling. In this way, there is a need to upgrade the capability of ABE. To unravel this issue, a proficiently revocable and searchable ABE (RSABE) conspire for the mobile cloud storage is proposed. Watchword search is additionally upheld, in which information proprietors and clients can produce the keywords list and search trapdoor, separately, without depending on constantly online confided in power. Our proposed framework likewise thinks about the revocation of clients in the framework to accomplish legitimacy and security.

II. LITERATURE REVIEW

In this paper [1], the capacity of attribute revocation is productively accomplished by assigning the update of mystery key and ciphertext to the ground-breaking cloud server. Catchphrase search is additionally bolstered, in which information proprietors and clients can create the keywords list and search trapdoor, individually, without depending

on constantly online confided in power. Moreover, a redistributed decoding innovation is utilized to diminish the computational heap of unscrambling on the client side.

In [2] a Secure Encryption is such a cryptographic crude, that empowers clients to search keywords over the scrambled information without spilling keywords data. In this paper, the catchphrase search is upheld and afterward the access structure is in part covered up to ensure protection data in ciphertexts is proposed.

In this paper [3], the creator proposed a dynamic searchable encryption plot. In their development, recently included tuples are put away in another database in the cloud, and erased tuples are recorded in a revocation list. The last search result is accomplished through barring tuples in the revocation list from the ones recovered from unique and recently included tuples. However, Cash et al. dynamic search plot do not understand the multi-watchword positioned search usefulness.

In this paper [4] the creators considered another need of ABE with redistributed unscrambling that is the certainty of changes. Casually, it ensures that a client can effectively check if the change is done precisely or not. Their framework exhibit that the new plan is both secure and certain, without relying upon arbitrary forecasts. In their work, they propose an alternate view for ABE that, everything considered, clears out the overhead for customers. Anyway, their development does not consider overhead calculation at the attribute specialist associated with the key-issuing process.

Here in [5], Green et al. proposed an ABE framework with re-appropriated unscrambling that, all things considered, take out the decoding overhead for customers. In such a framework, a client gives an untrusted server, state a cloud specialist organization, with a change key that allows the cloud to interpret any ABE ciphertext satisfied by that client's attributes or access arrangement into a basic ciphertext, and it just achieves somewhat computational overhead for the client to recuperate the plaintext from the changed ciphertext. Security of an ABE framework with redistributed unscrambling guarantees that a foe (Including a vindictive cloud) won't have the ability to get the hang of anything about the encoded message; regardless, it doesn't guarantee the rightness of the change performed by the cloud.

In this paper [6], Yu et al. consider the issue of client revocation which includes re-scrambling the information that is accessible to the client leaving the framework and refreshing the private keys of clients staying in the framework. They have proposed a plan that empowers the proprietor of the information to re-appropriate the errand of re-encryption and private key updates to an outsider without uncovering the substance and the client data. They have great accomplished the finely grained and versatile access in cloud processing. Anyway, the unpredictability in client revocation increments with the expansion in the number of clients which makes the framework complex. What's more, their plan does not bolster client responsibility.

Cheung et al. in [7] have proposed yet each other kind of Attribute-Based Encryption plot known as ciphertext approach attribute-based encryption (CP-ABE) where each mystery key is named with attributes, and each ciphertext is set with an access strategy. Unscrambling is done if and just if the customers characteristic set fulfills the ciphertext access structure. This gives fine-grained access control on shared information in different commonsense settings, including secure databases

and secure multicast. In this paper, they consider CP-ABE designs in which access structures are AND doors on positive and negative attributes. Their essential arrangement has been ended up being picked plaintext assault (CPA) secure under the decisional bilinear Diffie-Hellman presumption however the utilization of autonomous occurrences of CP-ABE encryption, and furthermore, the security of this proposition stays as an open issue.

In this paper [8], the creators proposed a cryptosystem that gives fine-grained access control to scrambled data that they called Key-Policy Attribute-Based Encryption (KP-ABE). In their cryptosystem, ciphertext is marked with sets of attributes and private keys are set with access structures that control which ciphertext a client can translate. They have connected their development in the measurable examination and communicate encryption. Anyway, their frameworks neglect to conceal the attributes that do the encryption. Thus the issue of attribute stowing away is left open.

Here Curtmola et al. [9] proposed two plans (SSE-1 and SSE-2) which accomplish the ideal search time. Their SSE-1 plot is secure against picked catchphrase assaults (CKA1) and SSE-2 is secure against versatile picked watchword assaults (CKA2). These early works are single watchword boolean search plans, which are exceptionally straightforward as far as usefulness. A short time later, plenteous works have been proposed under various risk models to accomplish different search usefulness, for example, single watchword search, similitude search, multi-catchphrase Boolean search, positioned search, and multi-watchword positioned search, and so forth.

The thought of ABE was proposed in this paper [10] as a fluffy form of Identity-Based Encryption (IBE). In Fuzzy IBE, Sahai et al. see the way of life as a lot of sensible characteristics. A Fuzzy IBE course of action thinks about a private key for a personality, to interpret a ciphertext blended with a character w, if and just if the personalities w and w' are near one another made a decision by some measurement. A Fuzzy IBE course of action can be united with secure encryption utilizing biometric contributions as characters; the break opposition property of a Fuzzy IBE plan is exactly what considers the utilization of biometric personalities, which ordinarily will have some confusion each time they are explored. Furthermore, they demonstrate that Fuzzy-IBE can be utilized for a kind of use that the term" attribute-based encryption". In this paper, they show two progressions of Fuzzy IBE orchestrates. Their progressions can be viewed as an Identity-Based Encryption of a message under two or three attributes that make a (delicate) character. Their IBE plans are both oversights tolerant and secure against plot assaults. Plus, the key progression does not utilize self-assertive prophets. Maker displays the security of their game plans under the Selective-ID security demonstrate.

Searchable encryption plans empower the customers to store the encoded information to the cloud and execute a catchphrase search over the ciphertext area. Because of various cryptography natives, searchable encryption plans can be developed utilizing open key based cryptography or symmetric key based cryptography [11].

III. Proposed Work

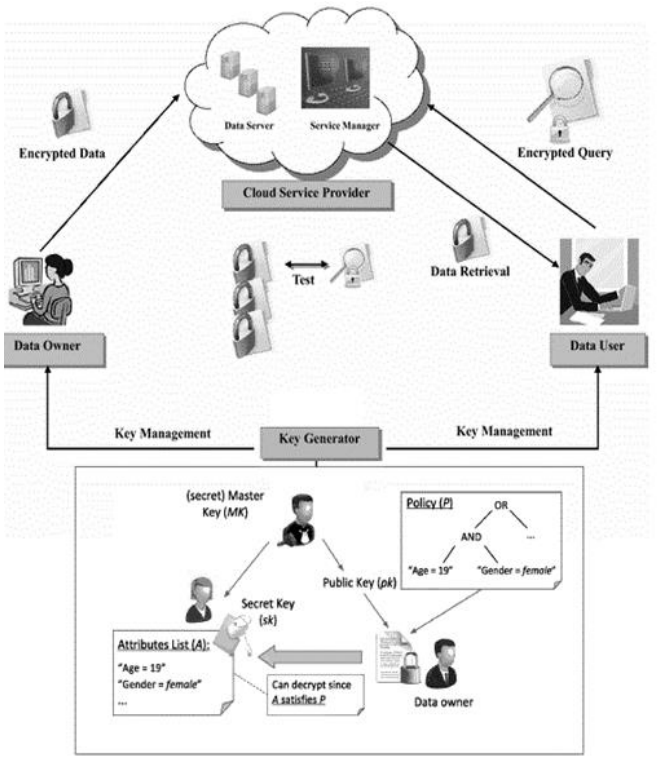


Figure 1. System Architecture

1. Attribute Based Key Generation

Initially user needs a key for file encryption or decryption before storing or downloading from cloud server. To minimize the key management overhead a separate outsourcing Key Generation Service Provider (KGSP) is used. And for data security purpose, Attribute Authority (AA) is introduced in the system. In this, upon receiving the key request from user, AA verifies the attributes of users, if they are valid then and only then KGSP generate and distribute the key for that user.

2. File Encryption and upload

For data confidentiality purpose, each and every data files are stored on server in encrypted format. After verification of attributes, user get key. Upon receiving this key, user encrypt their files and upload on cloud server.

3. File Download and Decryption

As user does not have capability to decrypt whole downloaded file, Decryption Service Provider (DSP) is introduced in proposed system. Initially, user requesting to DSP with partial key to download the file from cloud server. Then cloud server identify that file and calculate its size. If the size of file is greater than threshold size then cloud server send that file to DSP. At DSP, that file is partially decrypted and send to requested user. Otherwise Cloud server directly send that file to user and at user side this file is decrypted using key obtained from KGSP.

IV. CONCLUSION

The most important aspect that is to be considered in storing data is the security mechanisms associated with it. The proposed system presents a revocable and searchable Attribute Based Encryption scheme that is much more efficient than the previous systems. It provides security for appropriate users by using the user based access control attributes. In order to reduce the computation overhead of the user, the system provides modified outsourced ABE scheme which supports the outsourced key-issuing and decryption by utilizing Key Generation Service Provider. One of the advantage of system is that is supports secure searching over encrypted data. Results show that our system is proficient as well as practical.

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A Study of 9th Grade Students' Perception Regarding School Climate

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ABSTRACT

The Present Study was focused on study of perception of school climate among students of 9th grade. This study helped to understand the feelings of students' regarding the school environment where they spend five to six hours per day. School climate is the quality and attributes of a school. It includes school's rules and regulation, norms, behavior, support system, expectations etc. Everything that is a part of school environment, which eventually plays an important role in shaping the overall personality of children, falls under the category of school climate. The subject of the research concerns the perception of school climate among 9th grade students of North – West zone in Delhi. This study was conducted on 120 students (60 each from both schools). Students' perception regarding school climate was studied using 'The School Climate Scale' developed by Dr. Shivender Pratap Singh & Dr. Ali Imam. This climate scale consists of 18 statements of on five point scale namely strongly agree, agree, undecided, disagree and strongly disagree ranging from 5 points to 1 point respectively. The responded respond on the various aspects of climate in school such as freedom, cooperation, motivation, enjoyment of schooling, discipline, health and hygiene, fee structure, equal opportunities, support of faculty and administration. The findings of the study indicates that majority of students have fairly good and satisfactory level of perception regarding the climate of school. In addition it was found that teacher's and faculty support, discipline, opportunities provide a positive impact on students. In addition to this it was found that 9th grade Government and Private school students have different perceptions about the school climate. On the other hand, on the basis of mean values, it was observed that private school students have significantly better perception towards school climate in comparison to their government school counterparts.

Keywords : Students' Perception, School Climate

I. INTRODUCTION

Many educational researches concluded that the perception of students' about the school influenced their self-perception and self-esteem and their behavior in school. Students may have positive or negative perception about school. This becomes more evident problem when students have negative perception regarding school and school climate. Generally those students who have negative perception about school climate dislike the school and more likely to have low attendance in school which leads to the low academic achievement.

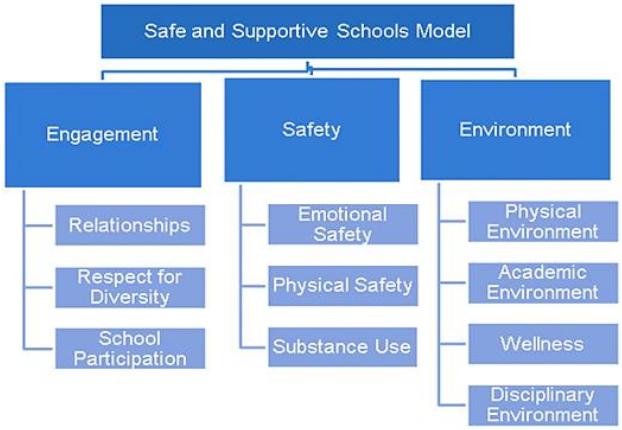
School, thus, plays an important role in the life of learners. School is the instrument for creating an environment for building positive self-concept and self-identity among students. Researchers have suggested that school climate affects the behavior of students and helps in shaping their personality. School climate may have positive or adverse effect on students' behavior. Various characteristics of school climate such as rewarding and punishing students for

their behavior, taking students' needs into consideration while making school norms, good classroom management for group[activity, positive leadership style etc gave positive outcome like good and regular attendance and high academic achievement among students.

"**School climate** refers to the quality and consistency of interpersonal interactions within the school community that influence children's cognitive, social, and psychological School Climate development. These interactions include those among staff, between staff and students, among students, and between home and school" (Haynes, Emmons, & Ben-Avie, 1997). Thus, school climate include the interactions between different stakeholders of the educational field such among both staff and students, between staff and students, and between home and school. A school's climate can define the quality of a school that creates healthy learning places; nurtures children's and parents' dreams and aspirations, stimulates teachers' creativity and enthusiasm, and elevates all of its members (Freiberg, 1999). Thus school climate is the part of School culture which is a broader term that indicates the underground stream of norms, values, beliefs, traditions, and rituals that have built up over time as people work together, solve problems, and confronts challenges. School culture is a set of informal expectations and values that shapes how people think, feel, and act in schools (Peterson & Deal, 1998).

- **Components of school climate**

According to the Safe and Supportive Schools Model developed by National Center on Safe Supportive Learning Environments, the school Climate involves three components namely safety, engagement and environment.



(Source: https://safesupportivelearning.ed.gov/safe-and-healthy-students/school-climate)

- **Engagement:** There should be strong and healthy relationship among every individual who in any form a part of school such as students, teachers, administration, parents, guardians or community. Feeling of oneness among all the participants of school climate should be there. Respect for each other's opinion irrespective of their caste, class, religion and gender and everyone should be involved and participate in school activities.
- **Safety**: School environment as well as school activities should be safe physically and emotionally for each and every child in the school. There should be no harassment, bullying including cyber bullying and victimization etc. as these create non healthy environment in the school.
- **Environment**: The environment of school includes a variety of factors such as the physical environment, instructional environment, student wellness, and discipline practices. Positive school climate leads to higher academic and behavioral outcomes of students.

- **TYPES OF SCHOOL CLIMATE**

Dr. Shivender Pratap Singh & Dr. Ali Imam divided School climate in 6 types namely open, autonomous,

controlled, paternal, familiar and closed. They described school climate is being given below:

1. Open climate

An open climate is that climate which depicts openness and supportive environment and promote healthy interaction among the principal, teachers, pupils and parents. Hoy and Sabo (1998) described that an open climate reflects the principal and teachers cooperative, supportive and receptive attitudes to each other's ideas and their commitment to work. The principal, according to these researchers, shows genuine concerns for teachers; he/she motivates and encourages staff members. He/she gives the staff freedom to carry out their duties in the best way they know. Also in a school characterized with open climate, teachers are portrayed as tolerant, helpful and respectful professionals. They are caring and willing to assist students when need to be. Teachers work hard so that pupils succeed. They care, respect and help another as colleagues and even at personal level. As a team they work for the success of pupils. Both the principal and teachers are accessible and approachable. They maintain close relationship with pupils and parents. Hoy and Tarter's (1997) findings reveal that high supportive principal behavior, low directive principal behavior, high engaged teacher behavior, and very low frustrated teacher behavior are attributes of an open/healthy organizational climate.

2. Autonomous climate

This type of climate portrays an atmosphere where teachers are given a good measure of freedom to operate in the school. The principal models enthusiasm and diligence. Both teachers and pupils are happy. There is no external threat or influence. Teachers have great desire to work and pupils are highly motivated to learn. There is a close relationship among the principal, teachers, pupils and parents (Halpin 1966)

3. Controlled climate

Hard work is the major characteristics of controlled climate. Even through the principal does not commitment; hard work is over emphasis to the extent that little or no time is given to social life. Nonetheless, teachers are committed to their work and spend considerable time on paper work. Thus in the most cases, there is little time to interact with one another. Pupils are also hard working, but are given little time to participate in extracurricular activities. The principals often employs a direct approach keeps his/her distance from teachers, pupils and parents in order to avoid familiarity. Parents are not encouraged to visit school with their children problems as the time on such matters could be used on something worthwhile (Silver 1983, Halpin 1966)

4. Familiar climate

Familiar climate depicts a laissez-faire atmosphere. The principal is concerned about maintaining friendly atmosphere at the expense of tasks accomplishment. Thus, a considerable percentage of teachers are not committed to their primary assignment. Some who are committed resent the way the principal runs the school; they do not share some views with the principal and their colleagues. As a result, those who are not committed form a clique because they are of the same attitude, they become friends. Most pupils do not take their studies seriously and some of them give flimsy excuses to be out of the class or absent from school. Most parents are not involved in their children's education, they are not keen o find out what their children do or not do in school. They do not think it is important to attend parents' teachers meetings. The familiarity between the principal and teachers is so much that the school work suffers (Silver 1983. Halpin 1966)

5. Paternal climate

This type of climate depicts an atmosphere where the principal is very hardworking, but has no effect on staff; to them hard work is not a popular term. There is a degree of closeness between the principal and teachers, but the principal's expectations from teachers in rather impractical. All the same, he/she is considerate and energetic, but his/her leadership approach is benevolently autocratic. As a result, most teachers, pupils and parents prefer to maintain distance from the principal. Often, pupils cannot express their difficulties or problems with boldness and parents visits the school only when it is absolutely necessary (Costley & Todd 1987).

6. Closed climate

Hoy and Sabo (1998:129) assert that closed climate represents the antithesis of the open climate. The main characteristics of this climate identified by Halpin (1966) is lack of commitment and or unproductive. There is no commitment, especially on the part principal and teachers. There is no emphasis on task accomplishment; rather the principal stresses routine, trivial and unnecessary paper work to which teachers minimally respond. The principal is rigid and controlling. He/ she is inconsiderate, unsupportive and unresponsive. Consequently, most teachers are frustrated and in effective. Hoy and Sabo (1998:129) add that there is lack of respect for the principal. Not only that, the teachers lack respects for and are suspicious of each other, the school authority and even the pupils. Teachers are intolerant and divided, thus there is social tension in the school.

II. REVIEW OF RELATED LITERATURE

- **UrszulaDernowska (2017)** studied the school culture and climate at two selected warsaw high junior school, to determined teacher and student perception of school climate, the inventory 'climate in my school' (woynarowska-soldon 2006) was used. This questionnaire consisted nine Dimensions of school climate. In this study two versions of the questionnaire were used; one for teachers and other one for students (school A: teachers=31, students=445; school B: teachers=34, Students =402) based on five point scale. According to his research workplace provides good Conditions for teaching and learning. Teachers showed student friendly and safety, where teachers cooperate with students to achieve common goals. The study has empirically examined the differences in school climate perception between teachers and students. The content contains a few conclusions from a multi-faceted investigation of school culture and atmosphere at these schools. In this content chosen categories of school atmosphere are broke down: (1) school fulfillment, (2) instructor – Understudy and companion connections, (3) educators' help for understudies, (4) rousing Understudies to succeed, (5) complying with the understudies' rights at school, (6) aggressive Conduct among understudies.
- **Muhammed Turhan&, TülinAkgül (2017)** investigates the relationship between students' perception of school climate and their adherence to humanitarian values. To this end, the study group consisted of 1094 students in 21 secondary schools in Elazığ province of Turkey. The "School Climate Scale," developed by Çalık and Kurt, and the "Humanitarian Values Scale," developed by Dilmaç, were used to collect data. The findings of the study indicated that female students have a higher level of adherence to humanitarian values. In addition, it was found that school activities towards values education have a significant effect on adherence to humanitarian values. It was concluded that teacher support, success orientation and safe learning environment-

positive peer interactions, which are important components of positive school climate, positively affect adolescents' adherence to humanitarian values.

- **Gulnaz Zahid (2017)** aimed at investigating and comparing the direct and indirect impact of children's perceptions of school climate upon their academic performance and socio emotional adjustment. A model was developed in which children's perception of school climate was considered as the independent variable and student academic performance and socio emotional adjustment as the dependent variables. Within this model, three mediating variables were selected which were children's perceptions of parental involvement, academic motivation and student academic engagement. The mediators indicate three broad categories, i.e., school, home and student-specific variables, which facilitate comparing the significance of their role in the model. Data was collected from 324 students from Grades 7 and 9 and only the complete data from 268 cases (girls=126, boys=142) was analyzed. Two independent models were tested through path analysis. Findings revealed differential roles of the selected mediators for the student outcomes. This study presents a significantly useful model to understand the impact of school climate and provides baseline information for the implementation of the National Education Policy (2009), which focuses upon the improvement of learning environment of the schools.
- **Anurupa Kundu & Debdulal Dutta Roy (2016)** worked on Teacher's Innovative behavior towards School Climate. The sample for the study consisted of 400 school teachers from 28 schools of Kolkata and adjoining areas (West Bengal, India). They were administered the following measures: a) Innovative Work behavior Scale (Jansen, 2000), b) School Climate Perception Scale (Johnson, Stevens and Zvoch, 2007). Correlation and Regression Analysis were used to examine the dynamics of relationship between school climate perception and innovative work behavior. Results of regression analysis revealed that instructional innovation, student relation and collaboration were the significant predictors of innovative work behavior. This study is a noteworthy contribution towards understanding the school climate factors that are important for innovative work behavior of school teachers.
- **Swaha Bhattacharya & Monimala Mukherjee (2011)** worked on the 'Study on school teachers of CBSE and ICSE board regarding School Climate and their involvement in job. The point of the examination is to ponder the school atmosphere and employment association as saw by the teachers of CBSE and ICSE board crosswise over Kolkata. As needs be, a gathering of 80 teachers (40 from CBSE and 40 from ICSE board) were chosen as test in this examination. General Information Schedule, Perceived School Climate Poll and Perceived Job Involvement Questionnaire were regulated to them by giving legitimate direction. The discoveries uncovered that school atmosphere as seen by the educators of ICSE Board is nearly superior to that of the CBSE Board. The same is valid for work contribution too. At the point when correlation was made between the instructors of CBSE and ICSE Board in terms of apparent employment contribution, noteworthy distinction was watched.

III. RESEARCH METHODOLOGY

For conducting this research, the researcher selected descriptive research method. Through descriptive research the researcher tried to describe the

perception of selected sample regarding school climate. This is an attempt to analyze and interpret the perception of students about the various aspects of school climate.

- **Population and Sample**

Population is the totality of all the subjects or members of the same category which is subjected to observe or study. Sampling is the small portion of population which is selected for the observation and analysis. Thus, keeping this in view a total sample of 120 students of 9th grade of two schools of North West Delhi was selected through random sampling technique.

- **Title**

"A Study of 9th Grade Students' Perception regarding School Climate"

- **Objectives**
  i. To assess 9th grade students' perception on school climate
  ii. To study relationship between Government and private school 9th grade students' perception on school climate

- **Research Hypothesis**

There is no significant relationship between Government and private school 9th grade students' on school perception

- **Tool used**

School Climate scale (SCS) by Dr. Shivendra Pratap Singh and Dr. Ali Imam

IV. METHODS AND MATERIAL

School Climate scale (SCS) developed by Dr. Shivendra Pratap Singh and Dr. Ali Imam consists of 18 test item statements and all the items are positive type. This scale is 5- point likert type representing various aspects of climate in school viz. freedom, cooperation, motivation, enjoyment of schooling, discipline, health and hygiene, fee structure, equal opportunities, support of faculty and administration.

School Climate Dimension	Item Number
Freedom & cooperation	2,4
Motivation & enjoyment in School	1, 3, 8, 12, 14, 17
Discipline	7, 11
Health & hygiene	9, 15
Fee structure	10
Equal opportunity	6,13,16
Support of Faculty & administration	5, 18

Reliability: It is the most fundamental quality which any measuring instrument should possess. Split half method was employed. A split half reliability coefficient was found by correlating scores of the subjects on odd items of the form with their scores on even items. The reliability was calculated by using the scores of 200 students on the 18 items of the final SCS test. The correlation coefficient thus, obtained was 0.89 which when correlated by spearman- brown prophecy formula increased to 0.92.

Validity: Content validity of items was ensured through rational analysis of the administrators and experts in the questionnaire construction. Correlation between total scores and item scores were also used for validity. This approach assumes that the total score was valid; thus the extent to which the item correlation with the total score was indicative of construct validity for the scale.

V. INTERPRETATION AND ANALYSIS

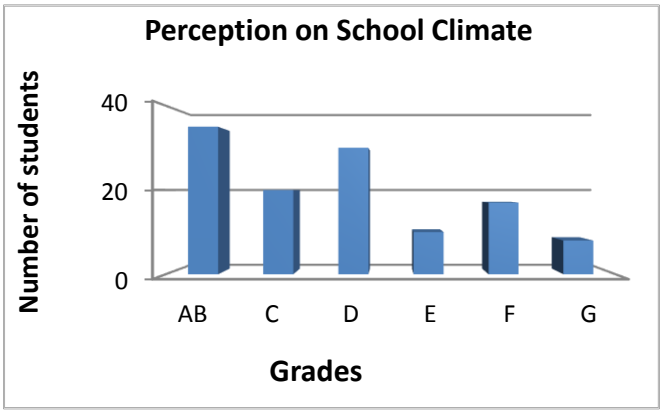
Objective 1 : To assess 9th grade students' perception on school climate

Table 1.

Raw Score	Number of Students	Grade
78-90	35	A,B
66-78	20	C
54-66	30	D
42-54	10	E
30-42	17	F
18-30	08	G

Following grades represents the student perception about school climate.

- Grade A= Extremely favorable(EF)
- Grade B = Highly favorable(HF)
- Grade C = Above Average Favorable (AAF)
- Grade D= Average Favorable(AF)
- Grade E = Below Average Favorable (BAF)
- Grade F = Highly Unfavorable(HU)
- Grade G = Extremely Unfavorable(EU)



Interpretation: The above table revealed that maximum students have above average favorable perception about school climate. 35 students lie in A, B grade that means they have extremely and highly favorable perception about school climate. Few students (8) lie in G grade i.e. they have extremely unfavorable perception about school climate. Thus, we can conclude that majority of students have fairly good and satisfactory level of perception regarding the climate of school.

- **Objective 2 :** To study relationship between Government and private school 9th grade students' perception on school climate

Table 2

Variables	N	Mean	r- value	Level of significance	Remarks
Govt. School Students	60	64.266	-0.142	0.279 at 0.05	Negative correlation
Private School Students	60	74.666			

The above table revealed that the relationship between the perception of 9th grade students in government and private school is negatively correlated. The calculated 'r' is -0.1418 which is less than the critical value of correlation i.e. 0.279 at 0.05 level of significance. So, the hypothesis "There is no significant relationship between Government and private school 9th grade students' perception on school climate" is rejected. This result shows that there is a negative correlation between the perception of students of Government and private schools. It can be concluded that 9th grade Government and Private school students have different perceptions about the school climate. On the other hand, on the basis of mean values (Government: 64.66 and Private: 74.66), it can be said that private school students have significantly better perception towards school climate in comparison to their government school counterparts.

VI. FINDINGS OF THE STUDY

School climate especially positive school climate enhance the quality of school. When the school climate is positive, students become energetic to learn and participate in various activities of the school with the full zeal. The study reveals the perception of 9th grade students towards their school climate. The result shows that maximum number of students has above Average Favorable (AF) level of perception about the school climate. Less number of students lies in Extremely Unfavorable (EU) category of perception of School Climate.

The results also indicate that Private school students have better perception about their school climate in comparison to Government school students. It may be so because students studying in Private schools may have better facilities of learning than the students studying in Government Schools.

A positive school climate helps in building the positive personality of the student. Perception of school climate also influences student's behavior and emotional status. Developing positive attitude towards school climate is valuable for overall development of personality. The present education system is student centered. The quality of instruction being plays a great role in the development of a positive school climate. The curriculum framed must be useful from the practical point of view. The behavior and the attitude of the teacher towards students play a significant role in framing attitude towards school climate. The way in which a teacher encourages the students for the active participation in classroom activities and in making decisions for life also affects attitude towards school climate. The role of the teacher is not limited to as an instructor rather he/she is a guide, friend or a philosopher. Teacher represents the natural complexity of the real world. Teacher must have a caring attitude towards the class. He/she must possess a quality that not only makes him a good instructor but also a mentor and an asset for the society.

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An Enhanced Approach for XSS Attack Detection on Web Applications

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ABSTRACT

Programming security vulnerabilities have prompted numerous effective assaults on applications, particularly web applications, once a day. These assaults, including cross-site scripting, have caused harms for both web site proprietors and clients. Cross-site scripting vulnerabilities are anything but difficult to misuse however hard to alleviate. Numerous arrangements have been proposed for their recognition. In any case, the issue of cross-site scripting vulnerabilities present in web applications still perseveres. In this paper, we propose to investigate a methodology dependent on hereditary calculations that will most likely distinguish cross-site scripting vulnerabilities in the source code before an application is sent. The proposed methodology is, up until this point, just actualized and approved on web applications, in spite of the fact that it tends to be executed in other programming dialects with slight adjustments. Introductory assessments have shown promising outcomes.

Keywords: Cross-Site Scripting, Genetic Algorithm, Software Security, Vulnerability Detection

I. INTRODUCTION

Security testing is turning into a vital piece of programming improvement because of the various assaults that product applications experience once a day. Because of their dynamic nature, i.e., the changing of their substance progressively because of client input or of being reloaded, web applications are the most presented to security assaults, for example, Cross-Site Scripting (XSS). Many research exercises have been led to deliver issues identified with XSS vulnerabilities since their revelation. As per this deliberate survey, the greater part of the methodologies concentrated on averting XSS attacks2– 5 and a less number spotlight on distinguishing XSS vulnerabilities6– 9 in web applications amid programming security testing.

Cross-site scripting vulnerabilities are a security issue that happens in web applications. They are among the most widely recognized and most genuine security issues influencing web applications. They are a sort of infusion issues that empower malignant contents to be infused into believed web sites. This is a consequence of an inability to approve contribution from the web site clients. What happens is either the web site neglects to kill the client info or it does it mistakenly, hence, opening a road for a large group of assaults.

Fruitful XSS can result in genuine security infringement for both the web site and the client. An assailant can infuse pernicious code into where a web application acknowledges client input, and if the info

isn't approved, the code can take treats, exchange private data, capture a client's record, control the web content, cause the forswearing of administration, and numerous different malignant exercises.

Cross-site scripting assaults are of three sorts in particular reflected, put away and Document Object Model (DOM)- based. Reflected XSS is executed by the person in question's program and happens when the injured individual gives the contribution to the web site. Put away XSS assaults store the noxious content in databases, message gatherings, remarks fields, and so on of the assaulted server. The malevolent content is executed by visiting clients in this manner passing their benefits to the assailant.

Both reflected and put away XSS vulnerabilities can be found on either the customer side or server side codes. Then again, DOM-put together XSS vulnerabilities are found with respect to the customer side. Aggressors can gather delicate or imperative data from the client's PC. In this paper, we propose a hereditary calculation based methodology for the recognition of XSS vulnerabilities in web applications.

The remainder of the paper is sorted out as pursues: Section 2 gives a short survey of related research led to the issues of XSS. Segment 3 portrays the proposed methodology and in Section 4 we give the fundamental aftereffects of the methodology assessment. Segment 5 finishes up the paper.

II. LITERATURE REVIEW

Thought it been long time that XSS assaults are in presence. Still it is a standout amongst the most genuine dangers to web application security [6]. The sevierity of the thing can be comprehended by the way that OWASP [3], which is a celebrated file of web application vulnerabilities, has recorded the XSS assaults in top 10 basic assaults on Web Application Security. As per the Report Statistics of White Hat security 2016 on Web Application Security, almost 50% of all web-based adventures are done through XSS assaults. Tragically we can not dispose of such assault as it is exceptionally simple to send by the aggressors. It is executed by the client's web program and numerous websites are as yet defenseless against such assaults. As per the exploration directed by Acunetix [12], over 33% web applications are as yet powerless against XSS and are obvious objective to assault. According to the report of Synk [3], which is a supplier of helplessness filtering items, the number is significantly higher. They report that around half of the current Web Application are inclined to XSS.

An answer was planned that utilizes a hereditary calculation way to deal with distinguish and expel the XSS vulnerabilities from the web application [7]. The primary segment includes in this arrangement was to change over the source code entered by assailant in the application, to the control stream chart. The second segment centers around recognizing the XSS from the client's program. The third part focuses on expelling the XSS from the URL. This methodology consolidates client experience displaying and client conduct reenactment as discovery testing [6,8,9,10]. The methodology was unfit to give moment web application insurance, and they can't ensure the discovery of all defects too.

In another paper [2], SQL and XSS models were proposed. They built up a SQL infusion and XSS location method[3] that searches for assault signature by utilizing a channel for the HTTP demand sent by the client. In paper[6] fluffy rationale was utilized for location of web security and phishing website identification utilizing a standard based security confirmation framework. It depends on removing the misuse ways of the XSS vulnerabilities of the web

application. The works was done to get to dangers because of various kinds of code infusions vulnerabilities.

In a paper displayed in [2], arrangement of the learning calculation that can choose a lot of traits from a given informational index dependent on weight by the SVM strategy and order into fluffy standard dependent on the handling of the Apriori calculation was proposed.

Avancini and Ceccato [12] examined the coordination of spoil investigation with hereditary calculations as a methodology in programming security testing of web applications. Their technique demonstrated some improvement in catching XSS vulnerabilities and utilizing them as an experiment in security testing. They likewise actualized the coordination of static pollute examination, hereditary calculation and limitation explaining to naturally produce experiments that recognize cross-site

scripting vulnerabilities [13]. Their execution concentrated just on reflected XSS in PHP code. The outcomes appear to be encouraging. Be that as it may, the wellness capacity of the hereditary calculation should be reinforced and the model tried in a more extensive scope of programming frameworks.

Duchene et al.[9] proposed a methodology that joined model deduction and transformative fluffing to identify XSS vulnerabilities. Their methodology utilized model derivation to acquire a state model of the framework under test and after that utilized hereditary calculation to create test input groupings, which empowered the discovery of vulnerabilities. A clarification of their procedure showed it would demonstrate fruitful when executed on true applications.

Lwin and Hee [14] proposed an answer that can expel XSS defencelessness from web applications before programmers can misuse them. The methodology works in two stages. To begin with, it utilizes static examination to distinguish potential XSS vulnerabilities in application source codes. Furthermore, it utilizes design-coordinating methods to accompany suitable getting away systems to anticipate input esteems from causing content execution. Specialists have additionally proposed apparatuses that address the issue of XSS.

BIXSAN15 and L-WMxD [16] are two instances of such apparatuses created to handle the XSS issue. BIXSAN sift through destructive HTML substance and evacuates the non-static labels in the HTML page. It has been tried on many web programs and appeared to effectively counteract XSS assaults. L-WMxD, then again, takes a shot at webmail administrations to identify the nearness of XSS vulnerabilities. The device has been tried on genuine world webmail applications with certain confinements and the outcomes appear to be encouraging.

III. IMPLEMENTATION

Identifying XSS Vulnerability is the way toward tending to and dispensing the nullified data sources or contents that enable the aggressor to infuse the vindictive content in the source code. The most famous way to deal with identify helplessness can be arranged into static, dynamic, and crossover examinations [18]. The static examination is a strategy that discovers mistakes in early improvement that is previously the program is started. Dynamic investigation recognizes vulnerabilities by dissecting the data got amid program execution [24]. The mix of static and dynamic examinations is a mixture approach; dynamic investigation procedures improve

the bogus cautions of static investigation approaches and give exact outcomes. In any case, test results demonstrate that a direct cross breed approach is probably not going to be better than a completely static or a completely unique location.

A) Detection of XSS

Here we use Xenotix framework for detecting the XSS attack or redirection vulnerabilities that utilizes a noxiously created URL connect to bring evil information into Web Pages (both statically and powerfully produced). At the point when the information (or a controlled type of them) go to one of the ensuing application-programming interface (API), the application might be defenceless against the XSS attack. We recognize all employments of the APIs, which might be utilized to get to DOM-based XSS information, can be controlled through uniform asset locators (URLs).

The Algorithm engaged with the location procedure is as per the following:

Algorithm 1: XSS Attack Generation and Detection

Step 1: Create the Web application for organization

Step 2: write the JavaScript on search box

Step 3: To generate the XSS attack on the web browser

Step 4: Configure the server 127.0.0.1 in Xenotix Framework

Step 5: Running the DOM XSS Analyzer

Step 6: Detection of DOM-based XSS attack

B) Prevention of the XSS Attack

For Prevention of the XSS attack, we propose a technique called Dynamic Hash Generation Technique, whose principle objective is to make the treats pointless for the attackers. This methodology is effectively actualized on the web server with no progressions required on the web program. With this system, the web server will produce a hash of estimation of name property in the treat and send this hash an incentive to the program, so the program will keep the hash estimation of treat in its database instead of the first esteem.

Presently each time, if the program needs to reconnect as a piece of dynamic association, the program needs to incorporate the hash treat an incentive into its comparing demand with the goal that the web server will likewise rework this hash treat an incentive to the first esteem, which is produced by the web server. Revising of hash an incentive to unique esteem is important to be done at the server side, with the goal that the web server will confirm the client at the program side. As the program stores the hash estimation of treats, so even the XSS attack can take the treats from program's database, the treats can't be utilized later to commandeer or remove the client's session.

In this paper, we have utilized the Dynamic Hashing Generation Technique on the server side, which is utilized to create the hash of estimation of name characteristic in the treat. The various characteristics will stay the same. Following are a portion of the means, which are utilized to clarify the Dynamic Hashing Generation Technique:-

- The client on the web program side presents the client id and secret word to the web server of the web application.
- The web server presents comparing data from the program and produces a treat.
- Now the web server will dynamically create the hash of estimation of the name characteristic in the treat and store both these qualities (unique

just as hash esteem) as a table on the server side. In this manner, the web server will send the hash estimation of the name credit in the treatment to the web program.

- The web program will store this hash an incentive into its vault.

Since the treats (hash form) at the program's database presently are not legitimate for the web applications. Thusly XSS attack will not most likely imitate the client utilizing stolen treats, which are changed over into its hash structure. Presently if the program needs to reconnect to the web server as a piece of the dynamic association, it needs to incorporate treat (hash esteem) with its comparing solicitation to the web server. The web server will utilize the data in the table to rework back the estimations of name trait in the treat (sent by the web program) to the first esteem created by the web server as appeared in the Figure 1.

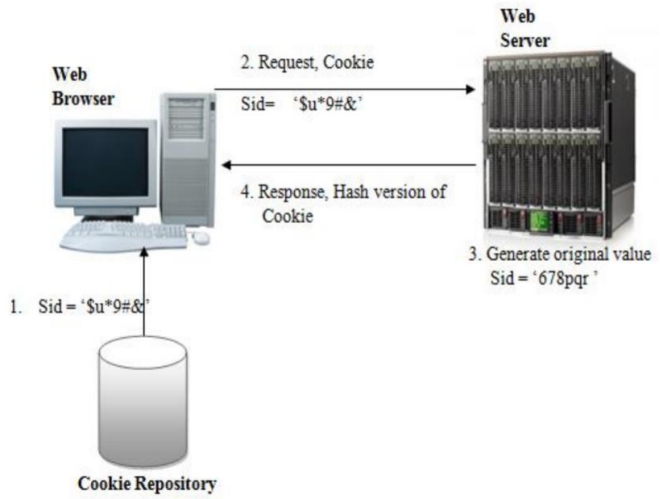


Figure 1. Dynamic Hash Generation Technique

IV. DISCUSSION AND ANALYSIS

The above approach was implemented in a prototype and evaluated for its effectiveness and performance. The data used for the experiments is web applications develop for college. The website is developed in PHP, deployed on Xampp Server.

The XSS vulnerabilities detector module then uses the Xenotic framework in the proposed approach to identify the vulnerable paths in the CFGs of the files under test.

The Prevention module uses the Dynamic Hashing method. We have seen in our experiments that the web server successfully generate the hash of the value of name attribute in cookie and browser stores and returns this value to the web server on every subsequent request. The proposed technique described above does not affect the performance of client side web browser resulting in superior web surfing experience.

V. CONCLUSION

In this paper, we presented a Xenotic Framework-based approach for XSS detection in web applications. Cross-site scripting is a huge security threat for web applications. It can lead to account or web site hijacking, loss of private information, and denial of service, all of which victimize the site users. Our proposed approach is an improvement based on previously proposed approaches. It uses the Dynamic Hash Generation technique, whose main purpose is to make the cookies worthless for the attackers even if the attacker successfully exploits the vulnerabilities of XSS attacks on the victim‘s web browser. This technique has been implemented on the web server and the results showed that our technique works well and doesn’t affect the browsing speed of the website.

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Relation Between Sensitivity and Gender-A Case Study

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ABSTRACT

Humans are sensitive to certain parameters, for ex., light, sound, smell and criticism. In the present study these aspects are studied with reference to gender on High school students of Guntur District, Andhra Pradesh, India. A total of 2743 are responded to the questions (male:1589 and female:1154). The study found that the sensitivity is more in male students in relation to light, sound and smell, however, in the case of criticism, it is more in female students. Exposure therapy is useful to face light sensitivity and counseling for criticism. Regarding the sound and smell, they have no much impact on the student's life/Career.

Keywords : Sensitivity, Gender, High School Students, Light, Sound, Smell, Criticism

I. INTRODUCTION

Human mind responds differently to different environments. It takes serious about some and not bother about other matters. For ex., some people can't take sleep under the light, others may not, if light is glowing. Number of people feels a lot about criticism, even some committed suicide. In some cases, they are sensitive to sound and smell. They can hear from a longer distance or they can't bear small sounds. Some people can experience the smell from a distance. Earlier, researchers studied on Specific phobias, Career goal (Sankara Pitchaiah and Nazia Sultana, 2018), Academic success (Sankara Pitchaiah, 2019a), Onychophagia (SankaraPitchaiah, 2019), Anger (Sankara Pitchaiah, 2019b), Hemophobia (Sankara Pitchaiah, 2019c), Oneirophobia (Sankara Pitchaiah, (2019d), Hodophobia (Sankara Pitchaiah, (2019e) and Acrophobia (Sankara Pitchaiah, 2019f).
The present study aimed at studying the sensitivity of High school students towards light, sound, smell and criticism.

II. METHODOLOGY

A total of 2743, 8th to 10th class Government High school students was participated, out of them 1589 are male and 1154 are female (Table 1). The selected students were assembled in a classroom of the respective schools and asked them to give their response to a question-"Do you feel sensitivity to light/sound/smell/ criticism?The purpose of the study and the details regarding sensitivity were explained in their mother tongue. Percent variation was observed and explained in the next section.

Table 1. Student's Strength-Class and Gender

Gender→	Male	Female
Class		
8th	546	420
9th	525	352
10th	518	382
Total	**1589**	**1154**

III. RESULTS AND DISCUSSION

The relation between Sensitivity and gender are presented below. Students experiencing sensitivity and the percent variation were included in tables 2 and 3.

Table 2. Student's sensitivity – class wise and gender wise

Sensitivity→	Light		Sound		Smell		Criticism	
Gender→	Male	Female	Male	Female	Male	Female	Male	Female
Class								
8th	141	82	194	110	151	83	144	164
9th	150	78	178	110	114	81	154	124
10th	91	64	173	84	117	70	178	183
Total	**382**	**224**	**545**	**304**	**382**	**234**	**476**	**471**

Table 3. Sensitivity (%)- Class wise and gender wise

Sensitivity→	Light		Sound		Smell		Criticism	
Gender →	Male	Female	Male	Female	Male	Female	Male	Female
Class								
8th	25.82	19.52	35.53	26.19	27.66	19.76	26.37	39.05
9th	28.57	22.16	33.90	31.25	21.71	23.01	29.33	35.23
10th	17.57	16.75	33.40	21.99	22.59	18.32	34.36	47.91

Male

8th Class:
Highest percent of 8th standard students expressed sensitivity to sound (35.53) compared to others (Table 3 and Figure 1), light (25.82), smell (27.66) and criticism (26.37).

9th Class:
33.90% of 9th students pointed sound sensitivity compared to criticism (29.33%), light (28.57%) and smell (21.71%) (Table 3 and Figure 2).

10th Class:
The high percent of 10th students marked sensitivity to criticism (34.36) and sound (33.40) compared to others, light (17.57%) and smell (22.59%) (Table 3 and Figure 3).

Female

8th Class:
Highest percent of 8th standard students marked sensitivity to criticism (39.05) compared to others (Table 3 and Figure 1),light (19.52), sound (26.19) and smell (19.76)

9th Class:
35.23% of 9th students expressed criticism sensitivity compared to (Table 3 and Figure 2) sound (31.25%), smell (23.01%) and light (22.16%).

10th Class:
The high percent of 10th students marked sensitivity to criticism (47.91) compared to others, sound (21.99), smell (18.32) and light(16.75) (Table 3 and Figure 3).

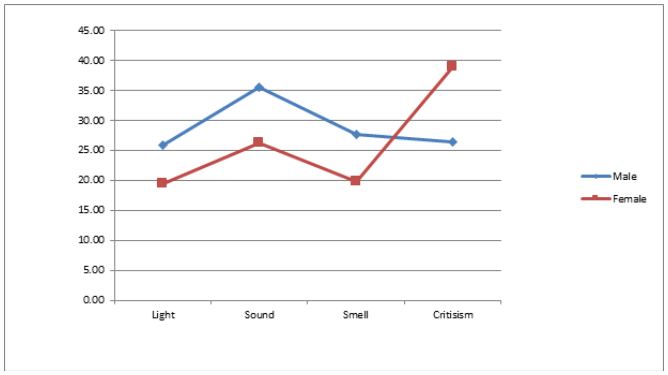


Figure 1. Gender and Sensitivity-8th class

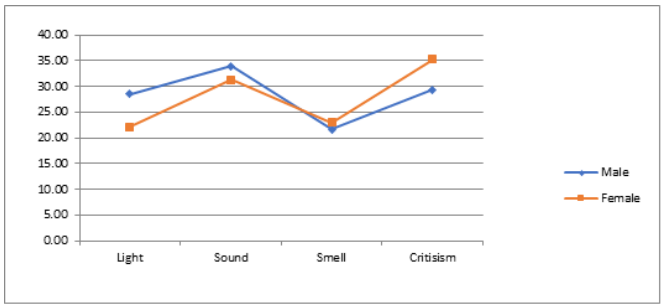


Figure 2. Gender and Sensitivity-9th class

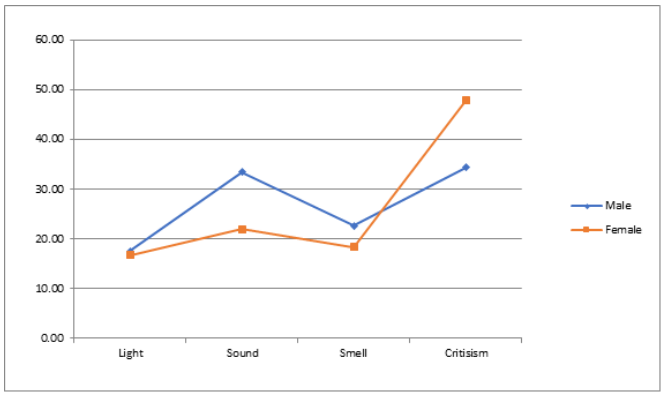


Figure 3. Gender and Sensitivity-10th class

Comparative Study

Sensitivity and Classes

Male

Sensitivity to light

28.57% of 9th class students show the sensitivity to light, compared to 25.82% of 8th class (Table 4 and Figure 4). The lowest percent is observed in 10th class students.

Table 4 Sensitivity and gender (%)

Gender→	Male			Female		
Class	8th	9th	10th	8th	9th	10th
Sensitivity						
Light	25.82	28.57	17.57	19.52	22.16	16.75
Sound	35.53	33.90	33.40	26.19	31.25	21.99
Smell	27.66	21.71	22.59	19.76	23.01	18.32
Criticism	26.37	29.33	34.36	39.05	35.23	47.91

Sensitivity to Sound

The highest percent of 8th class students expressed the sensitivity to sound (35.53)(Table 4 and Figure 4) compared to 9th class (33.90) and 10th (33.40).

Sensitivity to Smell

The highest percent of 8th class students marked (Table 4 and Figure 4) the sensitivity to smell (37.66) compared to 10th class (22.59) and 9th (21.71).

Sensitivity to Criticism

The highest percent of 10th class students (Table 4 and Figure 4) pointed the sensitivity to criticism (34.36) compared to 9th class (29.33) and 8th (26.37).

Female

Sensitivity to light

22.16% of 9th class students show the sensitivity to light, compared to 19.52% of 8th class (Table 4 and Figure 5). The lowest percent is observed in 10th class students (16.75).

Sensitivity to Sound

The highest percent of 9th class students expressed the sensitivity to sound (31.25) compared to 8th class (26.19) and 10th (21.99) (Table 4 and Figure 5).

Sensitivity to Smell

The highest percent of 9th class students marked (Table 4 and Figure 5) the sensitivity to smell (23.01) compared to 8th class (19.76) and 10th (18.32).

Sensitivity to Criticism

The highest percent of 10th class students pointed the sensitivity to criticism (47.91) compared to 8th class (39.05) and 9th (35.23). Light, Sound and Smell sensitivities are more in 9th class students compared to others (Table 4 and Figure 5). However, sensitivity to criticism is more for 10th class.

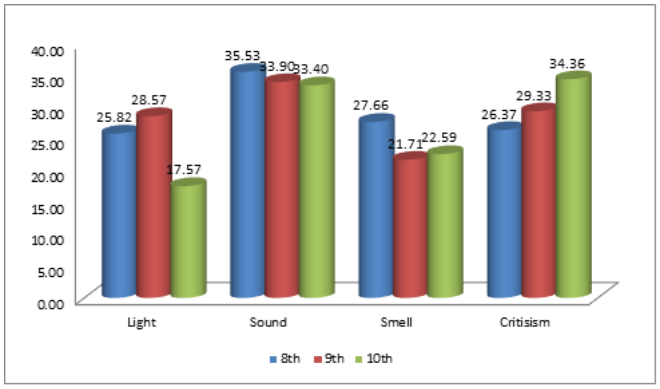


Figure 4. Comparison of Sensitivity and class-Male

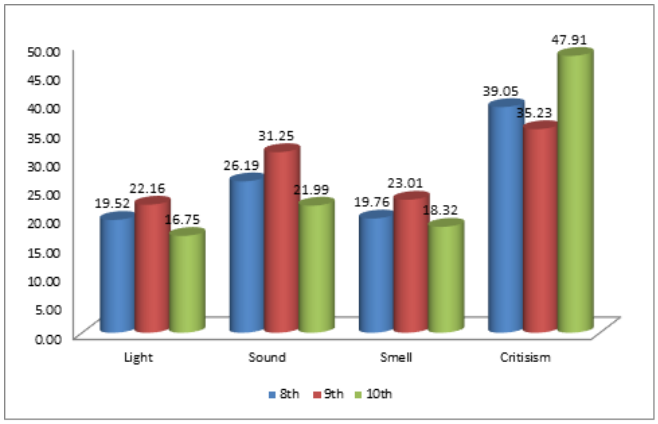


Figure 5. Comparison of Sensitivity and class-Female

Sensitivity and Gender

From the Table 5 and Figure 6, it is observed that sensitivity to light, sound and smell are more for male students, i.e., 23.99%, 34.28% and 23.99 respectively. In the case of criticism sensitivity is high for female students (40.73).

Table 5. Comparison of Sensitivity and Gender (%)

Sensitivity	Male	Female
Light	23.99	19.48
Sound	34.28	26.48
Smell	23.99	20.37
Criticism	30.02	40.73

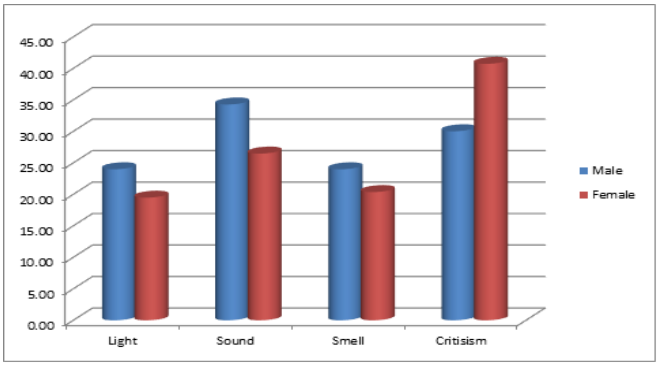


Figure 6. Comparison of Sensitivity and Gender

IV. CONCLUSION

Sensitivity in relation light, sound, smell and criticism are observed with class and gender. The study concluded that sensitivity to light is slightly high in 9th, sound and smell in 8th and criticism in 10th class male students. The percentages are more for 9th in relation to light, sound and smell in female students. In the case of criticism, 10th class students show more sensitivity. The study further concluded that the sensitivity to light, sound, and smell are more in male and criticism in female high school students.

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A Review on Ground Water Quality Assessment of Akkalkuwa Region, Nandurbar (Maharashtra)

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ABSTRACT

Due to increase population, advanced agricultural practices, industrialization, man-made activity, water is being highly polluted with different contaminants. Water is a vital resource for human survival. This research paper examines the quality of municipal corporation supplied water, bore-well, jamia filter plant and hand pump of akkalkuwa taluka of nandurbar maharshtra, India. Sample from five different places were collected in the month of march,2019. The physio-chemical and biological parameters was analyzed with reference to I.S/B.I. S and W.H.O. recommendation. During the study period various water quality parameters were analyzed pH, Hardness, Conductivity, turbidity, Dissolved oxygen, Chemical oxygen demand, Alum dose, Total solids, Biological oxygen demand, Alkalinity, Residual chlorine. The present study concluded that the total solids and residual chlorine and BOD in water sample is above the permissible limit but total solids is above the acceptable limit and below the permissible limit, and remaining those parameters under the limits.

Keywords : Water Quality Assessment, Water Quality Index, Geographic Information System, W.H.O., BOD, pH, Hardness, Conductivity, Turbidity, Dissolved Oxygen, Chemical Oxygen

I. INTRODUCTION

Water is one of the most important and abundant compounds of the ecosystem. All living organisms on the earth need water for their survival and growth. As of now only earth is the planet having about 70 % of water. But due to increased human population, industrialization, the use of fertilizers in the agriculture and man-made activity, it is highly polluted with different harmful contaminants. In Akkalkuwa and Nandurbar district Maharashtra state municipal supplied drinking water plays an important role as these district abundant increasing population growth. The main sources of ground water in akkalkuwa are tube-well, well, reservoir, bore well. Municipal supply water from the major source of water supply for drinking purposes in most part of India. In Akkalkuwa more than 90% of the population of Akkalkuwa region depend upon the natural ground water for their daily water demand. The safe portable water is absolutely essential for healthy living. According to WHO/IS above 80% of the diseases of the world population and more than

one-third of the deaths in the developing countries are due to pollution of water.

An effort has been made to comprehend the groundwater quality of Akkalkuwa region for drinking purpose utilizing Water Quality Index (WQI) and Geographic Information System (GIS) techniques. In this study four groundwater samples were collected during March, 2019. Standard methods have been adopted in groundwater sampling which are prescribed by the American Public Health Association (APHA, 1995), and World Health Organisation (W.H.O). Eleven water quality parameters have been considered to ascertained water quality index. pH, residual chlorine, turbidity, total solids, conductivity, alkalinity, hardness, biological oxygen demand, chemical oxygen demand, dissolved oxygen and alum dose. The World Health Organisation has been considered to assess the suitability of groundwater for drinking purposes. This study reveals that 66% area is falling under excellent and 14% very good and good category and 20% area is falling under poor, very poor and unfit category as per the W.H.O classification. The predicted accuracy of the obtained result is around 97.05% reflecting capability of adopted techniques. The present study is helpful in proper planning and management of available water resource for drinking purpose.

II. LITERATURE REVIEW

The various technical on the assessment of water quality for bore-well, municipal corporation, hand-pump and jamia filter plant and different areas have been standard research level for the study. The various physio-chemical para meter was studied and analysed in march, 2019 different parameters which is conducted or analysed like D.O, B.O.D, C.O.D, pH, Turbidity, Residual chlorine, Alkalinity etc. Where studied. The result revealed that there was significant seasonal variation in some physical-chemical property of water but hand-pump was moderately polluted in akkalkuwa region on the basis of study its was clarify that this water is not for potable and due to some pollutants organism it is harmful for skin and aquatic life.

We are referred various technical research papers on assessment of ground water quality for bore-wells, hand-pump, reservoir and different places, which are presented in phase one reported work on assessment of ground water quality which is summarized below.

Physio-chemical parameters for testing of waters which is studied by SS Sager, RP Chavan, CL Patil, DN Shinde, SS Kekane, 8th Oct 2015 and which is accepted in 10th Nov 2015.

Another review which is presented by dr. Seema Tiwari at Sagar institute of research and technology, Bhopal, India. 10th march 2015

Another review which Is published by Divya Bhardwaj and Neetu Verma which is M. TECH scholar and assistant professor of Deenbandhu Chooturam university, sonepat, Haryana.

We are also follow the procedure or safety and accuracy of municipal corporation of Nandurbar P.W.D division and we also follow the NRDWS Guidelines 2013, and national accreditation board for testing and calibration laboratory.

2.1 Site Study: -

The water of Reservoir, hand pump, and Filter water of akkalkuwa nandurbar Maharashtra is used by 90% of people which is survive in akkalkuwa region. The present study was conducted in akkalkuwa rural area the geographical coordinates of akkalkuwa nandurbar, India is latitude 21.55˚N longitude 74.02˚ E.

Elevation above sea level: 686 ft. (209meter) the state of Maharashtra is primarily a mountainous or hilly area.

2.2 Collection of Sample and Their Analysis

The total one municipal supplied water sampling sites two samples from different two sampling site of akkalkuwa during the last February to half of the march in the year 2019. The water samples for analysis were collected in plastic bottles and all the sample were stored in sampling kits and brought to the Environment laboratory for detailed chemical and bacteriological analysis. The physio-chemical analysis was performed following standard method (I.S &B.I. S).



Fig-1. Hand pump Akkalkuwa



Fig-2. Reservoir Akkalkuwa



Fig-3. Jamia filter water

III. METHODOLOGY

3.1 pH: - pH is one of the most common analyses in water testing, is the standard measure of how acidic or alkaline a solution is. It is measure a scale from 0-14. pH is of 7 is neutral, pH is less than 7 is acidic and pH is more than 7 is basic.

3.2 Conductivity: - conductivity is measured by electric conductivity meter which is carried our solution electric conductivity used to quickly estimate the ionic or soluble salt concentration in water sample. The instrument is standardized with known values of conductance observed with KCL solution.

3.3 Turbidity: - Turbidity may be due to organic and inorganic constituents. Organic particulates may harbor micro-organism. Thus, turbid conditions may increase the possibility for bone disease.

3.4 Dissolved Oxygen: -: The amount of oxygen which is dissolved in water, such as river and lake. All living organisms depend upon oxygen to maintain the metabolic process that produce energy for growth and water quality index increase till dissolved oxygen value reaches to 100 mg/lit. Above 100 mg/lit, the water quality index decrease and the water quality becomes very poor. D.O is the most important indicator of the health of water bodies and its

capacity to support balanced aquatic ecosystem of plants and animals

3.5 Chemical Oxygen Demand: - The standard method for indirect measurement of the amount of pollution in a sample of water. The chemical oxygen demand test produce is based on the of the chemical decomposition of organic and inorganic contaminants, dissolve in water. If excess organic is introducing to the system, there is potential for complete depletion of dissolved oxygen. Without oxygen the entire aquatic community is threatened. The only organism present will be air- breathing insects and anaerobic bacteria.

3.6 Biological Oxygen Demand: - B.O.D is a measure of organic pollution to both waste and surface water. High B.O.D is an indication of poor water quality.

BOD is a measure of organic material contamination in water, expressed in mg/l. BOD is the amount of dissolved oxygen required for the bio chemical decomposition of organic compounds and the oxidation of certain inorganic materials. Typically, the test for BOD is conducted over a five days' period.

3.7 Hardness: - Hardness is defined as the sum of calcium and magnesium hardness in mg/l as CaCO3. As per IS: 10500-2012 desirable limit and permissible limit for hardness lies between 200-600 mg/l respectively. The effect of hardness is scale in utensils and hot water system in boilers. High concentration of hardness may Couse the problem of heart disease and kidney stones.

3.8 Alkalinity: - Alkalinity is a chemical measurement of waters ability to neutralize acid. Alkalinity is also a measure of a water buffering capacity or its ability to resist changes in pH upon the addition of acids or bases. Alkalinity of natural water is due to primarily to the presents of weak acids salts, although strong bases may also contribute in the extreme environment. Other salts of week acids such as borate, silicates, ammonia, phosphate and organic bases from natural organic matter may be present in small amount. It is measured by titrations with standardized acid to a pH value of 4.5 and is express commonly as milligrams per liter as calcium carbonate. Commonly occurring materials in water that increase alkalinity are carbonates bicarbonates, hydroxides. Lime stone bad rock and thick deposits of glacial till are good sources of carbonate buffering, lakes within such areas are usually well buffered.

3.9 Alum dose or Co-agulants: - Co-agulants are used in water treatments plants to remove natural suspended and colloidal mater and it is also remove that material which do not settle in plan sedimentation. Alum is the most widely used co-agulant. When alum solution added to water the molecules dissociate to yield SO_4^{2-} and Al^{3+}. The positive species combine with negatively charged colloidal to neutralize part of the charge on the colloidal particle thus, agglomeration takes place. Co-agulants is a quite complex phenomenon and the co-agulents should be distributed uniformly throughout the solution.

Jar test is simple device used to determine this optimum co-agulant thus required. It is also expressed in mg/lit.

3.10 Residual chorine: - All type of natural and raw water contains chlorides. Its comes from activities carried out in agricultural area. The chlorine demand is satisfied upon initial dosing, chlorine reacts with any organic matter in water the amount of chlorine used in this reactions is known as the chlorine demand of the water. When the chlorine demand of the water is satisfied, some portion of the remaining chlorine reacts with nitrogen in the water to from compounds known as chloramines. Nitrogen-containing compounds may result from decaying organic matter in raw water secured for drinking water treatment. In swimming pool, swimmers add nitrogen-containing compound to the water in the form of substance such as urine and perspiration.

Chloramines may impart a chemical odor to water, which is sometimes in accurately described as a "chlorine" odor. The chlorine that combines chemically with nitrogen-containing compounds is known as "combined chlorine".

3.11 Total Solids: - Total dissolved solids is a measure of the suspended and dissolved solids in water. Total solids are directly related to the purity if water and the quality of water purification system and effects everything that consumes, lives in, or uses water, whether organic or inorganic, whether for better or worse. Common inorganic salts that can be found in water include calcium, magnesium, potassium and sodium which are cations and carbonates, nitrates bicarbonates, chlorides and sulphates which are anions. The settling of suspended solid from turbid waters threatens benthic aquatic communities. Deposited particles may obscure sources of food, habitat, hiding places and nesting sites. Most aquatic insects will simply draft with the current out of the affected area. Increase sediment may impact plant communities. Primary production will decline because of a deduction in light penetration. Sediment may damage plants by burial, scouring and abrasion.



Fig-4. To conducted different titration methods



Fig-5. To find out the different parameters

IV. DISCUSSION

During the study period various physio-chemical municipal supplied water quality parameters like pH, turbidity, conductivity, TDS, alkalinity, total hardness, residual chlorine, D.O, B.O.D, COD, colour, odour, taste are conducted.

According to above conducted parameters we clarify that some parameters are under the acceptable limit and some are not, due to which many problems are faces by the consumers like kidney stones, cholera, diabetes, blood pressure, cancer, diarrhea, malaria, dengue etc. These are the major factors which are directly harmful affected to the aquatic life or human body.

As per the study the average pH of different sampling site was 7.51 which are within acceptable limit. Highest value (8.31) of pH was found at the Sample-2.

Turbidity is essential for measure because if turbidity is high then it is block filters and stop them working effectively. As per our study we see that turbidity of all samples are under the acceptable limit.

TDS refers to matter suspended or dissolved in water or waste water with high content inferior and may be polluted. In study it was found that the TDS of akkalkuwa region average TDS is 327mg/lit. But

according to our study TDS of sample 1&2 is high from desirable limit.

Similarly, we see that the value of hardness and residual chlorine are excess in 1&2 as per WHO limit.

Also saw that Dissolved oxygen is under the desirable limit or under the WHO limit, but we see that after 5 days' incubation at 20˚c biological oxygen demand is very high (2.8mg/lit) for sample-2 (municipal corporation) while WHO limit say that it is not exceed 1.2mg/lit.

Alkalinity range of water in different samples in around Akkalkuwa municipal supply water where found average 32.34mg/lit which is under the permissible limit.

V. CONCLUSION

The effects of water pollution are not only devastating to people, but also to animals, fish, and birds also destroy aquatic life and reduces its reproductive ability.

Polluted water is unsuitable for drinking, recreation, agriculture, and industry. It diminishes the aesthetic quality of lakes and rivers. Eventually, it is a hazard to human health.

The present review paper undertaken to account to bring an acute awareness among the people about the quality of water.

The individual and the community can help minimize water pollution by simple housekeeping and management practices the amount of waste generated can be minimized.

The problem associated with waste water reuse arise from its lack for treatment.

The challenge thus it to find such low-cost, low-teach, users friendly methods, which on one hand avoid treating us sustains waste water depend living hoods and on the other hand protect degradation of our valuable natural resources.

The use of constructed wetlands is now being recognized as an efficient technology for waste water treatment. Compare to the conventional treatment system, constructed wetlands need lesser material and energy, are easily obtained have no sludge disposal problems and can be maintain by untrained personnel.

Further these systems have lower construction, maintenance and operating costs as this are driven by natural energy of sun, wind, soil, micro-organisms, lands and animals.

Hence, for planned, strategic, safe and sustainable use for waste water there seems to be a need for policy discussion and coherent programs encompassing low-cost decentralized waste water treatment technologies.

So in this project, various taste will be conducted on water and compare it with I.S & B.I.S standard. Until now no one has compare the ground water quality on the basis of various zones. Therefore, there is the potential for this project.

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Review on Antidepressant Medication

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ABSTRACT

Depression is a life-threatening, debilitating, and common disease affecting different segments of community. Chemical and synthetic drugs available to treat this disease cause many adverse effects and may lead to complete recovery in only 50% of patients. Antidepressants are effective and accessible treatment options that can reduce suffering and prevent relapse of symptoms. They are recommended as first line treatment options in moderate and severe depression or mild or sub threshold depression that has persisted despite other interventions All current antidepressants, with the exception of agomelatine, increase the transmission of the monoamines, particularly serotonin, nor adrenaline and dopamine. The antidepressants are crucial for the treatment of depressive episodes in the acute phase when untreated symptoms are at their worst. With long-term use, however, the brain sets to work compensating for the drug-induced changes with a process he calls oppositional tolerance. Antidepressant drugs are the mainstay for the treatment of depression. Usually, antidepressants are given in combination with some form of limited supportive psychotherapy.

Keywords: Antidepressant medication, Noradrenaline reuptake inhibitors, Depression, Neurotransmitter.

I. INTRODUCTION

Antidepressants are drugs used for the treatment of major depressive disorder and of other conditions, including some anxiety disorders, some chronic pain conditions (off-label use), and to help manage some addictions.[1] Depression is a common and recurrent disorder accounting for significant morbidity and mortality worldwide. Depression affects approximately 8-12 per cent of the global population and is currently the leading cause of disability worldwide (in terms of total years lost due to disability). [2] Following a first episode of depression, 22 per cent of sufferers will continue to have symptoms after a year and up to 85 per cent will have two or more episodes despite active treatment. Having longer and more frequent episodes, being single, having a low income and old age all worsen the prognosis. [3, 4] Antidepressants are effective and accessible treatment options that can reduce suffering and prevent relapse of symptoms. They are recommended as first line treatment options in moderate and severe depression or mild or sub threshold depression that has persisted despite other interventions. Anti - depressants are not first-line treatment for short duration mild or sub threshold depression or for depression in children and adolescents.[5, 6]

II. Pharmacology

All current antidepressants, with the exception of agomelatine, increase the transmission of the monoamines, particularly serotonin, noradrenaline and dopamine. The majority of antidepressants: selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants (TCAs), serotonin and

noradrenaline reuptake inhibitors (SNRIs), noradrenaline reuptake inhibitors (NRIs) and noradrenaline and dopamine reuptake inhibitors (NDRIs) achieve this by inhibiting the transporter responsible for the re-uptake of one or more monoamines, see Figure 1. Monoamine-oxidase inhibitors (MAOIs) block the mitochondrial enzyme monoamine oxidase, which in turn reduces the breakdown of serotonin, noradrenaline and dopamine. Mirtazapine is an alpha2-adrenoreceptor antagonist that increases noradrenaline and serotonin transmission by reducing the action of the alpha2-adrenoreceptor negative feedback pathway.[7] Agomelatine, which is due to be launched in 2009, has a novel mechanism of action namely 5-HT2c and 5-HT2b antagonism and is a direct agonist at melatonin 1 and 2 receptors. Agomelatine's place in antidepressant therapy is yet to be fully established but it is likely to improve sleep and appears not to cause weight gain or sexual dysfunction, which are often adverse effects of other antidepressants. [8]

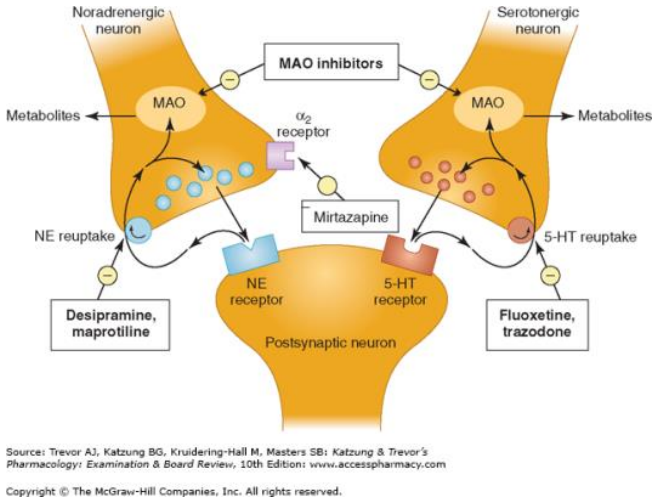


Figure 1. The mechanism behind serotonin and nor adrenaline reuptake inhibition. SNRI: serotonin and noradrenaline reuptake inhibitor; MAO: monoamine oxidase, COMT: catechol-o-methyltransferase

Causes of disease – Environmental factors and Gene component

Genetic Causes of Depression

Most of the published genetic association studies of mood disorders have focused on functional polymorphisms (DNA sequence variations that alter the expression and/or functioning of the gene product) in the loci encoding the serotonin transporter (SLC6A4), serotonin 2A receptor (5HTR2A), tyrosine hydroxylase (TH) (the limiting enzyme for dopamine synthesis), tryptophan hydroxylase 1 (TPH1) (serotonin synthesis), and catechol-o-methyltransferase (COMT) (dopamine catabolism.[9] It has long been known that depressive illnesses can run in families, but until fairly recently it was not fully known whether people inherited a susceptibility to these illnesses or if something else such as the environment was the true culprit. Those who research depression have been able to determine that to some extent depressive illnesses can be inherited. What appears to be inherited is a vulnerability to depression. This means that if we have close relatives who have clinical depression, we may inherit a tendency to develop the illness. It does not mean that we are destined to become depressed.[10,11] bipolar disorder is between 50% and 75%. Brothers and sisters of those with bipolar disorder may be 8 to 18 times more likely to develop bipolar disorder, and 2 to 10 times more likely to develop major depressive disorder than others with no such siblings .[12]

Twin Studies: Much of what we know about the genetic influence of clinical depression is based upon research that has been done with identical twins. Identical twins are very helpful to researchers since they both have the exact same genetic code. It has been found that when one identical twin becomes depressed the other will also develop clinical depression approximately 76% of the time. When

identical twins are raised apart from each other, they will both become depressed about 67% of the time. Because both twins become depressed at such a high rate, the implication is that there is a strong genetic influence. If it happened that when one twin becomes clinically depressed the other always develops depression, then clinical depression would likely be entirely genetic. However because the rate of both identical twins developing depression is not closer to 100% this tells us that there are other things that influence a person's vulnerability to depression. These may include environmental factors such as childhood experiences, current stressors, traumatic events, exposure to substances, medical illnesses, etc.[13] Research has also been done with fraternal twins. Unlike identical twins that have the same genetic code, these siblings share only about 50% of their genetic makeup and do not necessarily look alike. Studies have shown that when one fraternal twin becomes depressed, the other also develops depression about 19% of the time. This is still a higher rate of depression when compared to overall rates for the general public, again pointing towards a genetic influence in the development of clinical depression.[14,15]

Environmental Causes of Depression

Environmental causes of depression include events such as stress, traumatic events and childhood difficulties. These are events that can happen to anyone and they happen during our everyday lives. They are considered factors that are outside of us. Some researchers refer to these events as sociological or psychosocial factors because they are a "meeting" or "combination" of events that happen in society and the function and workings of the human mind. Researchers have known for some time that the experiences (events) we have in our lives can and do affect our mental health. Thoughts, emotions and behaviours of people are influenced by the prior experiences in their lives. These experiences can include past relationships, childhood development and past crises. The key to development of clinical depression in some people seems to be how they react to the various environmental causes or factors in their everyday lives. [16]

Stress: There appears to be a very complex relationship between stressful situations, the reaction of the individual's mind and body to stress, and the development of clinical depression. Most researchers believe that for some people there is a direct relationship between a stressful event and the development of depression. What is interesting to note is that this stress can be negative or positive. Examples of negative stress are loss of a loved one, loss of a job, loss of a relationship and divorce. Examples of positive stress are planning for a wedding, preparing for a new job, and moving to a new city. Both negative and positive stress from environmental events can precede the development of depression. [17]

Traumatic Events: It is a fact that many people have experienced a traumatic event prior to developing depression. Traumatic events in the lives of people include loss of a loved one, a serious medical illness, the end of a marriage or significant financial loss. These types of events can destroy the sense of control and stability in a person's life, often leading to emotional distress.[18]

Childhood Difficulties: It has long been known that people with severe difficulties in childhood have higher rates of clinical depression. The most common childhood difficulties include sexual, emotional, or physical abuse, disfunctional upbringing, parental separation, and mental illness in one or both of the parents. One of the most difficult emotional events for a child to endure is the separation or death of a parent before the age of eleven.[19,20] Children that have experienced this event also demonstrate a higher probability of developing depression.

Synthetic Chemicals: Every day we take in synthetic chemicals from all over. From preservatives, additives and hormones that are found and added to so many of our foods, pesticides that are sprayed and air and water pollution as well. Studies have shown that air and water pollution alone can cause cancer and other diseases. Synthetic chemicals and pollutants are now being more closely looked at as a link to depression and Major Depressive episodes. [21]

Noise Pollution: Noise pollution has been linked to aggression, hypertension, increased stress levels, tinnitus, hearing loss and disruptions in sleep. Specifically, tinnitus is linked to severe depression, panic attacks and forgetfulness. Continual exposure to noise pollution has also been linked to cardiovascular disease and increased blood pressure. A person with possible depressive tendencies will become even more susceptible to depression with continual, prolonged exposure to noise pollution. [22]

Electrical Pollution: We are constantly surrounded by radio waves everywhere we go. Much of the electrical equipment we use works off of radio waves and these radio waves have been found to induce depression and rage. The exact causes as to why are not yet known and unlike other types of environmental causes of depression, electrical pollution cannot be seen, heard, tasted, or felt. But, it does have a negative effect on our mind and body. [23]

Natural and Catastrophic Disasters: Natural and catastrophic disasters, such as hurricanes, earthquakes, or fires, and even manmade disasters such as bombings and war can push an already susceptible person into a severe Major Depression. [24] The National Centre for Environmental Health has found that people, who normally would not be a candidate for depression, can become depressed after major life altering episodes, such as their house being destroyed in a natural disaster .[25]

Adverse effects

Difficulty tolerating adverse effects is the most common reason for antidepressant Adverse effects discontinuation. [26]

General: Almost any medication involved with serotonin regulation has the potential to cause serotonin toxicity (also known as serotonin syndrome) – an excess of serotonin that can induce mania, restlessness, agitation, emotional lability, insomnia and confusion as its primary symptoms.[27,28]Although the condition is serious, it is not particularly common, generally only appearing at high doses or while on other medications. Assuming proper medical intervention has been taken (within about 24 hours) it is rarely fatal. [29, 30]

Side effects for Prolong Treatment

The antidepressants are crucial for the treatment of depressive episodes in the acute phase when untreated symptoms are at their worst. With long-term use, however, the brain sets to work compensating for the drug-induced changes with a process he calls oppositional tolerance. The brain tries to re-establish its usual balance of production, release and reuptake of neurotransmitters – as every system of the body does when its normal functioning has been disturbed. The idea is that if the medication artificially jacks up the brain's level of serotonin or norepinephrine, the neurobiology of the system reacts by reducing its own production of the neurotransmitter. For some people, however, stopping the medication has no effect. They continue to have recurring depression. If antidepressant treatment is restored as a response, these patients can develop a permanently recurring illness. This is tardive dysphoria.[31,32]

Pharmacotherapy for Depression

Antidepressant drugs are the mainstay for the treatment of depression. Usually, antidepressants are given in combination with some form of limited supportive psychotherapy. For mild depression, psychotherapy alone may be of use. However,

evidence is accumulating that the combination of antidepressant treatment and some form of psychotherapy may be superior to either treatment alone, especially for more severe and recurrent depression.[33,34,35]Over the past decade, the so-called tricyclic antidepressants (eg, imipramine or desipramine) have been supplanted by the so-called serotonin selective reuptake inhibitor (SSRI) antidepressants as first-line medications, primarily because of the tolerability and safety of the newer compounds.[36] However, whether the newer antidepressants are more or less efficacious than the older generation compounds, especially for severe depression, is controversial.[37]

III. Classification of Available Antidepressants

Table 1. Functional Classification of Antidepressants

Function	Antidepressant
Monoamine oxidase inhibitor	Isocarboxazid, Phenelzine , Tranylcypromine
Norepinephrine transport blocker	Amoxapine, Desipramine, Doxepin, Maprotiline , Nortriptyline, Protriptyline
Serotonin transport blocker	Amitriptyline, Citalopram, Clomipramine, Fluoxetine, Fluvoxamin, Imipramine, Paroxetine
Dopamine transport blocker	Bupropion
Serotonin 5-HT2A receptor blocker	Mirtazapine, Nefazodone, Trazodone

When fewer antidepressant compounds were available, the drugs were classified either as tricyclic antidepressants or as monoamine oxidase inhibitors (MAOIs), a classification that mixes a structural criterion with a functional one. At present, a broad range of structures make up the antidepressant pharmacopoeia, but there are only a few known functional (possibly therapeutic) effects of these compounds. Therefore, a functional classification of antidepressants is more useful than a structural one. Although not a completely satisfactory strategy, all currently available antidepressants can be classified into 1 of 3 classes: (1) MAOIs, (2) biogenic amine neurotransmitters (serotonin, nor epinephrine, and dopamine) reuptake blockers, or (3) serotonin type 2A (5-HT2A) receptor blockers (Table 1). This review focuses on reuptake blockers and 5-HT2A receptor blockers.

IV. CONCLUSION

Effective treatment and management of depression is a challenge for all healthcare professionals. Antidepressants remain an appropriate treatment for moderate and severe depression, or for mild depression or sub therapeutic depression that has persisted. The SSRIs are recommended first-line because of their superior safety profile and better tolerability. Further antidepressant choices depend in part on adverse reaction profile, interaction potential, the evidence base, pharmacological properties and patient preference. In treatment-resistant cases, a variety of augmentation and combination strategies have been tried with some success. Problems that can occur with antidepressant treatment include an increased risk of bleeding, hyponatraemia, serotonin syndrome and discontinuation symptoms, Antidepressant drugs are the mainstay for the treatment of depression. Usually, antidepressants are given in combination with some form of limited supportive psychotherapy. For mild depression, psychotherapy alone may be of use.

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Forest Fire Detection Utilizing ACO in Wireless Sensor Network

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ABSTRACT

Natural disasters have expanded due to man recently being senseless and with the impacts or effects of the damages they caused on the nature. These factors which adversely influence the ecosystem in the world have been noticed and the hitches are needed to be forestalled. As known, fires are the leading of these disasters. The majority of the fires are triggered by the environmental causes despite the fact that minority of them are self-triggered. To prevent fires many different safety systems have been developed. Among these systems, Wireless Sensor Networks stand out with their ease of use and low cost. In this study implementation of systems for keeping track of fires in a certain area with Wireless Sensor Networks has been discussed. The system utilizes data identified with the residual battery energy of sensor nodes to increase or decrease the range of transmission of sensor nodes and relocation scheme for the sink node in network. Some numerical and theoretical calculations are given to demonstrate that our proposed system is utilized to reduce the energy consumption in network of the remote framework essentially.

Keywords : Wireless Sensor Networks, Forest Fire Detection, Ant Colony Optimization, Cluster Head Selection.

I. INTRODUCTION

There are numerous issues in automatic fire discovery, of which the most critical ones are about various sensor mixes and suitable systems for speedy and commotion tolerant fire identification. Analysts have been examining fires occurring in different places, for example residential area, timberland and mines to discover a few answers for fire observing. A vital issue in automatic fire detection is division of flame sources from noise sources. For the residential fires, being flaring or non- flaming, the general pattern is to concentrate either on the sensor and sensor mixes or location methods. In another word, scientists have concentrated either on distinguishing the best arrangement of sensors which cooperatively can recognize fire utilizing basic strategies or on structuring complex identification systems that utilization single or, best case scenario exceptionally little arrangement of basic sensors. A very long while of forestry research investigate have brought about numerous advances in field of timberland fire checking. The Fire Weather Index (FWI) system being created by the Canadian Forest Service and the National Fire Danger Rating System (NFDRS) presented by the National Oceanic and Atmospheric Administration are two instances of such advances. Contemplating the best in class strategies uncovers two fundamental patterns in flame identification, i.e., existing systems have either considered flame

location as an utilization of a specific field or the principle worry for which methods have been explicitly structured.

Numerous commercial items can just recognize airborne smoke by utilizing either ionization sensors or photoelectric sensors. An alert is produced endless supply of the airborne smoke. The issue with such detection is aggravation sources, for example, a cigarette or a toasting bread. Along these lines, numerous specialists concur on the reality decreasing false caution rates in fire detection requires utilizing more than one sensor alongside a proper recognizing algorithm.

Forest fires are among the disasters making dangers mankind and biological communities all through the world. The likelihood of forest fires is consistently expanding because of environmental change and human activities. A great part of the forest areas are under the risk of out of control fires as a result of its climatic and topographical qualities and forest fires cause loss of human and animal lives, hurt ecosystems and national riches consistently, particularly in the late spring months. Forest fires affect individuals negatively, animals, forests and soil separated from economic harm. The pessimistic impact of wild fires on individuals is the air contamination, which cause health issues, for example, respiratory and cardiovascular issues because of smoke. So as to limit harm, early identification of woods fires is a urgent issue. Without an unmistakable and right comprehension of the circulation and elements of forest fires, it is difficult to adequately oversee them. Sensor network technology is considered as one of the vital technologies for the current Century. A wireless sensor network (WSN) contains of a huge number of sensor nodes, which are remotely deployed either inside the phenomenon or near to it. Random deployment, self-organizing, cooperative effort and data fusion are some features of sensor nodes. Since sensor nodes may be strategically, randomly, and densely deployed in a forest, sensor nodes can depend the exact origin of the fire to the end users before the fire is spread and goes uncontrollable.

The section I explains the Introduction of forest fire detection techniques. Section II presents the literature review of existing systems and Section III present proposed system implementation details Section IV presents experimental analysis, results and discussion of proposed system. Section V concludes our proposed system. While at the end list of references paper are presented.

II. LITERATURE REVIEW

Majid Bahrepour, Nirvana Meratnia, Paul Havinga [1] survey previous studies from three perspectives: (1) fire detection techniques for residential areas, (2) fire detection techniques for forests, and (3) contributions of sensor networks to early fire detection.

In [2], the author used FWI index and his novel k-coverage algorithm to recognize forest fires. K-coverage algorithm monitors each point by using k or more sensor nodes to enhance fault tolerance. Therefore, some sensors can be put in standby mode to extend network lifetime. Although there are many algorithms to find the minimum number of sensors to be utilized, they are usually NP complete problems. The proposed k-coverage solution proved to prolong the network life time. Forest fire detection was not the focus of this work and was considered as an application for the novel k-coverage problem.

Lim et al. [3] proposed an innovative framework for residential fire detection. They introduced metric of interval-message-ration (IMR) and evaluated their

framework utilizing the IMR metric. They concluded that the framework is not only applicable for fire-detection but can also be applied for other disaster recoveries. Here they consider residential area for detection of fire. That would be beneficial in other areas also.

Lu Zhiping et al [4] proposed a forest fire detection solution using WSN. Their system is made of sensor nodes, gateway(s), and task manager(s). Each sensor node is equipped with temperature and humidity sensors. After obtaining sensory information at sensor nodes, data are fused at gateways and data-analysis and decision making are done by task manager nodes.

Sr	Title	Authors	Description	Limitations
1	Automatic Fire Detection: A Survey from Wireless Sensor Network Perspective	M. Bahrepour, N. Meratnia, P.Havinga	Author did study of previous methodology from three perspectives	Here author only consider three perspectives
2	Efficient K-Coverage Algorithms for Wireless Sensor Networks and Their Applications to Early Detection of Forest Fires	Bagheri, M	utilized FWI index and his novel k-coverage algorithm to recognize forest fires	Author did not focused on fire detection. He focused on enhancing network lifetime.
3	A Fire Detection and Rescue Support Framework with Wireless Sensor Networks	Lim, Y.-s., S. Lim	Author proposed an innovative framework for residential fire detection. They present metric of interval-message-ration (IMR) and evaluated their framework using the IMR	Here residential fire detection is main focus of author
4	The Design of Wireless Sensor Networks for Forest Fire Monitoring System	Zhiping, L., Q. Huibin	Utilized wireless sensor network to detect fire in forest	If deployed node fail then there is issue to detect.
5	Forest Fire Modeling	M. Hefeeda,	Author focus on detecting the	Sensors are deployed in forest

	and Early Detection u Adhoc & Sensor Wireless Networks	M. Bagheri	fire earlier before it occurs also they moderate the aspect that generate fire. Analyzed forest weather for that	for earlier detection if fails.
6	On connected multiple point coverage in wireless sensor networks	Yang, S., Dai, F., Cardei, M., And Wu, J	Present techniques to prolong network lifetime.	Main focus is prolonging network lifetime

Author [5] present the design and evaluation of a WSN for early detection of forest fires. They present the key aspects in modeling forest fires. We do this by analyzing the Fire Weather Index (FWI) System, and show how its different components can be utilized in designing efficient fire detection systems. The FWI System is one of the most comprehensive forest fire danger rating systems in North America, and it is backed by several years of forestry research. The analysis of the FWI System could be of interest in its own right to researchers working in the sensor network area and to sensor manufacturers who can optimize the communication and sensing modules of their products to better fit forest fire detection systems. Then, model the forest fire detection problem as a coverage problem in WSN, and they present a distributed algorithm to solve it. In addition, we show how our algorithm can achieve various coverage degrees at different subareas of the forest, which can be used to provide unequal monitoring quality of forest zones. Unequal monitoring is important to protect residential and industrial neighborhoods close to forests. Finally, they present a simple data aggregation scheme based on the FWI System. This data aggregation scheme significantly prolongs the network lifetime, because it only delivers the data that is of interest to the application. They validate several aspects of their design using simulation.

Sensors are assumed to self-organize into clusters by utilizing a distributed protocol. After the termination of the clustering protocol, sensors know their cluster heads and the whole network is connected. Any of the protocols described in the recent survey in can be employed. Author proposed system does not restrict the cluster size, and it allows single- and multi-hop intra-cluster communications. The sensor clustering and data routing problems are outside the scope of this paper. Author consider four problems [6] here. First, modeling the forest fire detection application as a coverage problem in wireless sensor networks. Second, designing a distributed coverage protocol. Third, developing a data aggregation scheme that is suitable for the forest fire detection application. The last issue is achieving unequal fire protection in different zones in the forest, e.g., forest zones near industrial plants and residential areas, or forest zones with drier conditions and higher temperatures.

Selecting the minimum subset for activation is desired because it reduces total energy consumption and thus prolongs the network lifetime. Computing the minimum subset, however, is NP-hard as per Yang et al. [7]. In [5] Hefeeda et al, author designed a logarithmic factor approximation algorithm to solve the k-coverage problem. Author's previous work

focused on the theoretical analysis of the algorithm without paying much attention to the specific application. In the current work, we customize this algorithm to the forest fire detection application, and they consider several issues that were not addressed before.

Forest fires have multidimensional negative effects in social, economic and ecological matters. Unfortunately, Turkey is one of the countries subjected to wildfires every year. It is difficult to say that firefighting can be successful without enough data about fire such as spread direction and speed etc. The more data about wildfire means the more effective fire management. Economically, firefighting is well called to be a costly task. It is wise to invest in early warning systems which are definitely much less costly on the whole.

Algorithm

1) Proposed Algorithm

Let S be a system such that, S= Input, Process, Output

Input:
Sensing Information

IP = {IP1; IP2…, IPn}

IP is a set of input represents sensing information.

Process:
1) Set of sensor nodes.
SN = {SN1; SN2; …., SNn}
SN is a set of sensor nodes in a network.

2) Cluster Formation
CF = {CF1; CF2…., CFn}
CF is set of clusters created in set up phase. Each cluster having number of sensor nodes.

3) Calculate residual energy of each node The energy spent of a node that transmits. l-bits packet over distance d is:

$$E_{Tx}(l,\hat{d}) = E_{Tx-elec}(l) + E_{Tx-amp}(l,d) = E_{elec} * l + \varepsilon_{fs} d(2) * l$$

Where, with amplifying index $\varepsilon_{fs}, \varepsilon_{ms}$ respectively,

$$\hat{d_0} = \sqrt{\frac{\varepsilon_{f8}}{\varepsilon_{mp}}}$$

the energy consumption of receiving this message is:

$$E_{Rx}(l) = E_{exel} * l$$

4) Cluster Head selection using T2FLCA
CHead = {CHead1; CHead2…. CHeadn}
CHead is set of cluster heads, which are useful for communication among clusters.
Kopt is the optimal cluster number for each round:

$$K_{opt} = \lfloor n * p * (\frac{n-dead}{n}) + 0.5 \rfloor$$

Where n = the number of nodes
Dead = the number of energy-exhausted nodes
P = CH probability.

5) Multi hop routing using ACO algorithm Once we found the clusters, the intra cluster data transmission will have started. For this Chain of CH is formed. Calculate transmission probability Pijof CH:

$$P_{i,j}{}' = \frac{[T_{ij}(t)]^{\alpha}[\eta_{ij}^{\beta}]}{\Sigma_8[T_{ij}(t)]\alpha[\eta_{ij}^{\beta}]}$$

Output:
Data routing to base station.

System Architecture

System Architecture

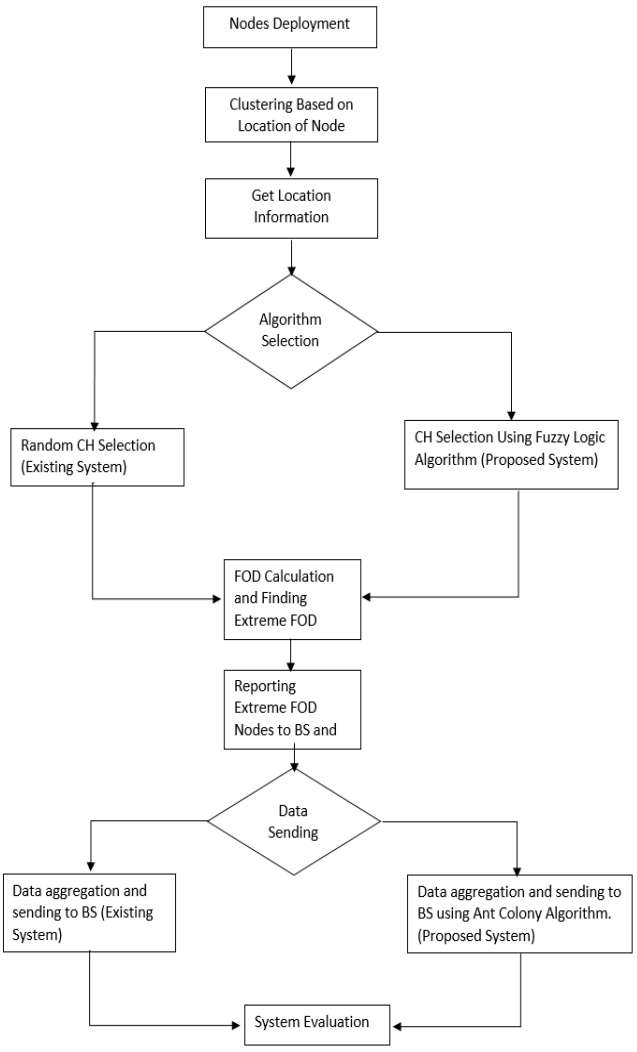


Fig 1. System Architecture

Here in Fig.1 show the system architecture.

III. RESULT AND DISCUSSIONS

Experimental Setup

All the experimental cases are implemented in NetBeans IDE in congestion with algorithms and strategies, and run in environment with System having configuration of Intel Core i5-6200U, 2.30 GHz Windows 10 (64 bit) machine with 8GB of RAM.

Result

Following figure 2 shows the time comparison between proposed system and existing system. The time required for implementing the proposed system is less than the time required for the existing system.

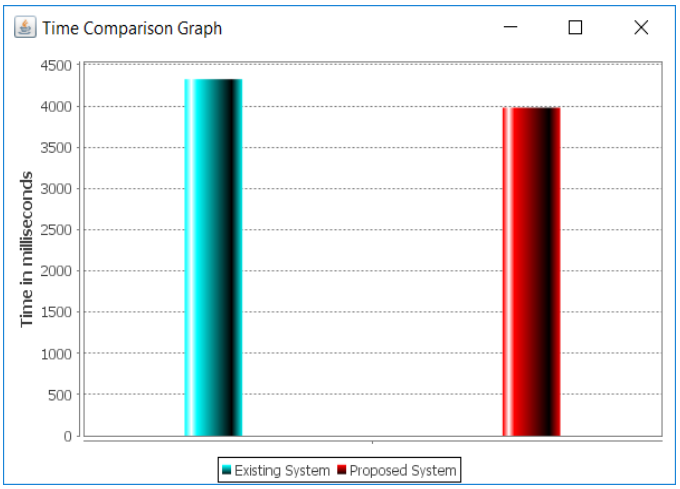


Figure 2. Time Comparison Graph

Figure 3 shows the comparison graph between energy consumption ratio of existing and proposed system. In the proposed system energy consumption ratio is less compared to
the energy consumption ratio in the existing system.

Energy Consumption Formula:

Remaining Energy=Energy Available – Energy Consumed;

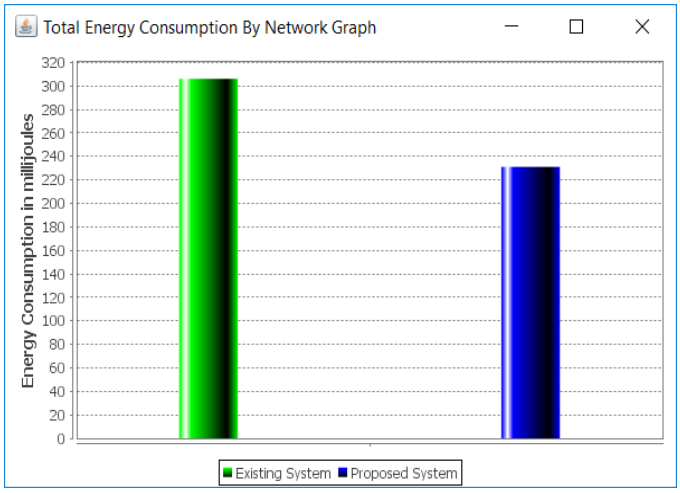


Figure 3. Energy Consumption Graph

IV. CONCLUSION

This examination initially uncovers that WSN technology is an exceptionally encouraging green innovation for the future in identifying proficiently the forest fires in our nation. Besides, and through the experiments consider, we finish up the adequacy of the proposed methodology as far as energy efficiency and algorithmic complex nature compare with the existing methodology is better and its reasonableness to the setting of our nation predominantly amid summer seasons. The more data recovered by WSN about forest fires means the more effective fire management by forest authorities. Hence, introducing the paradigm of multi-modal detection of Forest fires seems to be a good solution for the future in which scalar data and multi-media data can be collected by heterogonous.

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Effect of Yoga on Balance in Geriatric Population

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ABSTRACT

Background : The geriatric population is defined as population aged 60 years and above. [(1)]During this age many of the systems undergo deterioration. Balance problems in elderly are most commonly due to multi factorial condition which may include age related or disease-related declines in the balance system. Research shows that altered balance is the greatest collaborator towards falls in the elderly with a high correlation between balance deficit and the incidence of falls. Iyengar yoga, one of the active, or Hatha, yoga techniques, is a system for developing physical and mental well-being through stretching of all muscle groups for strength, flexibility, and physical balance. Yoga as a complementary therapy is thought to be more therapeutic than traditional exercise because it involves active engagement between mind and body. Its practice has been associated with increased muscle strength, endurance, flexibility, range of motion and cardiopulmonary endurance. It mainly works on increasing body awareness and proprioception, which will lead to improvement of balance in older adults.

Objectives:

1. To compare pre and post score of Modified Clinical Test of Sensory Interaction in Balance (CTSIB-M).
2. To compare pre and post score of Time up and go test.

Materials and Methodology:

This was an experimental study that included 40 participants, healthy older adults between the age group 60-75 years, both male and female. The subjects were randomly divided in to 2 groups; Group A was the experimental group whereas group B was the control group.

The experimental group was made to perform yogasanas for the duration of four weeks for 5 times a week whereas the control group was not given any intervention.

Result and Conclusion:

The study conducted concludes that yogasanas are effective in improving balance in elderly individuals at the end of four weeks compared to control group. Thus, it can be used clinically to improve balance in geriatric population.

Keywords : Balance, Yoga, Old Age.

I. INTRODUCTION

The geriatric population is defined as population aged 60 years and above. [(1)]During this age many of the systems undergo deterioration. This has the potential to affect balance, restrict safe mobility, increase the likelihood of a fall and adversely affect quality of life. [(2)] Balance problems in elderly are

most commonly due to multi factorial condition which may include age related or disease-related declines in the balance system. Causes of reduced balance in elderly could be weakness in the core stabilizing muscles, altered muscle activation patterns, loss of proprioception, and an inability to control normal postural sway.[3]

Balance problems and falls are leading cause of institutionalization in this group. There are numerous risk factors for falling in this population, such as muscle weakness, past history of falls, gait, balance, visual and cognitive impairment, osteoarthritis, depression and so on. [4]Falls among the elderly are associated with high morbidity and mortality and can involve high-cost medical intervention.[5]Research shows that altered balance is the greatest collaborator towards falls in the elderly with a high correlation between balance deficit and the incidence of falls.[6]

Age-related changes in the sensorimotor and neuromuscular system negatively affect performance in static and dynamic postural control even in healthy older adults which leads to increased risk of falls. [7]Normal ageing is characterised by a decrease in bone and muscle mass and an increase in adiposity.[8] A decline in muscle mass and a reduction in muscle strength lead to risk of fractures, frailty, reduction in the quality of life and loss of independence. These changes in musculoskeletal system reflect the ageing process as well as consequences of a reduced physical activity. The muscle wasting in frail older persons is termed 'sarcopaenia'. This disorder leads to a higher incidence of falls and fractures and a functional decline. [9]

Skeletal muscle strength (force-generating capacity) also gets reduced with ageing. [9] This reduction in muscle strength causes problems in physical mobility and activity of daily living. The total amount of muscle fibres is decreased due to a depressed productive capacity of cells to produce protein. There is a decrease in the size of muscle cells, fibres and tissues along with the total loss of muscle power, muscle bulk and muscle strength of all major muscle groups like deltoids, biceps, triceps, hamstrings, gastrocnemius (calf muscle), and so on.[10]

With ageing, toxins and chemicals build up within the body and tissues. As a whole, this damages the integrity of muscle cells. Physical activity also decreases with age, due to a change in lifestyle. Somehow, the physiological changes of the muscles are aggravated by age-related neurological changes. Most of the muscular activities become less efficient and less responsive with ageing as a result of a decrease in the nervous activity and nerve conduction. [11] Also with ageing, the total water content of the tissue decreases and loss of hydration also adds to the inelasticity and stiffness.[12]

Iyengar yoga, one of the active, or Hatha, yoga techniques, is a system for developing physical and mental well-being through stretching of all muscle groups for strength, flexibility, and physical balance. [13]A person assumes a series of stationary positions that use isometric contraction and relaxation of different muscle groups to create specific body alignments. There is also a deep relaxation component. Yoga as a complementary therapy is thought to be more therapeutic than traditional exercise because it involves active engagement between mind and body. Its practice has been associated with increased muscle strength, endurance, flexibility, range of motion and cardiopulmonary endurance. It mainly works on increasing body awareness and proprioception, which will lead to improvement of balance in older adults. [14, 15]

The geriatric population is defined as population aged 60 years and above. [1]During this age many of the systems undergo deterioration. This has the potential to affect balance, restrict safe mobility, increase the likelihood of a fall and adversely affect quality of life. [2] Balance problems in elderly are most commonly due to multi factorial condition which may include age related or disease-related declines in the balance system. Causes of reduced balance in elderly could be weakness in the core stabilizing muscles, altered muscle activation patterns, loss of proprioception, and an inability to control normal postural sway.[3]

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endurance, flexibility, range of motion and cardiopulmonary endurance. It mainly works on increasing body awareness and proprioception, which will lead to improvement of balance in older adults. [14, 15]

II. MATERIALS AND METHODOLOGY

Study location: Study was conducted at Rock Garden, Pimpri, Pune.

Sampling method: Simple random sampling method was used. 40 healthy older adults between the age group 60-75 years, both male and female, Subjects who are willing to participate in the study, Subjects who are ready to sign written informed consent form, and Subjects who are functionally independent that is, score of 100 point on barthel index. Subjects having history of any recent musculoskeletal problems, serious cardiac and pulmonary condition which may required hospitalization, neurological conditions, psychiatric illness, serious visual impairments (i.e. cataracts), self-report of uncontrollable diabetes & hypertension, vertigo, who are already in another active research study were excluded.

Procedure and Data collection:

After approval from the ethical committee the project was conducted. All subjects were explained about the aim and nature of the study and those willing to participate were requested to sign the consent form. Pre participation evaluation form consisting of general assessment and outcome measures that include Modified Clinical Test of Sensory Interaction in Balance (CTSIB-M), Timed Up and GO test (TUG) were documented. All the subjects were then equally divided into two groups by randomisation method. Group A was the experimental group whereas group B was the control group. The experimental group was made to perform yogasanas for the duration of four weeks for 5 times a week whereas the control group was not given any intervention.Each therapy session started with 5-10 minutes of warm up focused on slow dynamic muscle movements with shoulder/arm circling, wrist circling and neck rolling.This was followed by 25 – 30 minutes of asanas consisting of following poses: Week 1 – Modified Sun salutations on chair,Core strengthener and leg lifts on chair, Knee to chest pose on chair

Week 2 – Tadasana (mountain pose) with chair support, Adho mukho svanasana (downward dog pose) with chair support, Virabhadrasana (warrior pose) with chair support, Utkatasana (chair pose) with chair support

Week 3 – Tadasana (mountain pose) , Adho mukho svanasana (downward dog pose), Virabhadrasana (warrior pose) , Utkatasana (chair pose) , Vrikshasana (tree pose) with chair support, Trikonasana (triangle pose) with chair support

Week 4 –Vrikshasana (tree pose),Trikonasana (triangle pose)

Each asana was performed for 5 times for duration of 10 seconds.

Each therapy session ended with eye yoga and pranayama. Entire session of yoga was under supervision of physiotherapist.

The outcome measures were taken before and after four weeks in both the groups.

For the equally distributed data, inter-group significance was calculated by using Unpaired t- test and intra-group significance was calculated using paired t-test.

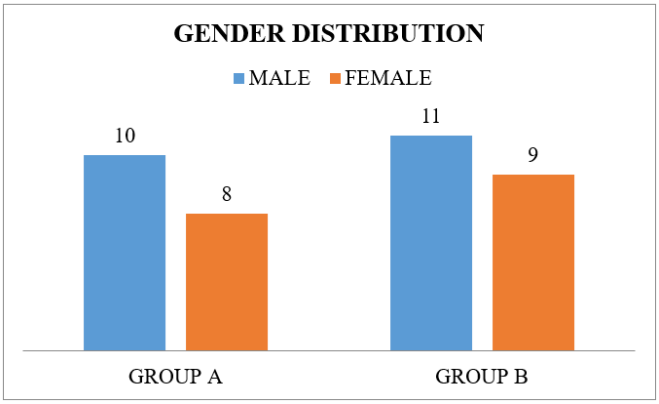
III. RESULTS AND DISCUSSION

In this study 40 subjects were included and divided into group A and group B randomly and Modified Clinical Test of Sensory Interaction in Balance (CTSIB-M), Timed Up and GO test (TUG) was recorded before and after the intervention and then were compared and graphically represented

Table 1: Gender Distribution Among Group A And B

GENDER	GROUP A	GROUP B
MALE	10	11
FEMALE	8	9

Graph 1 : Graphical Representation of Gender Distribution Among Group A And B



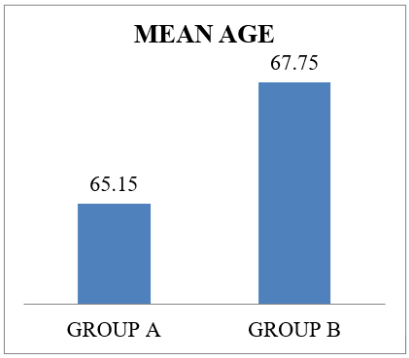
INTERPRETATION:

It can be inferred from the above data that there were 10 male and 8 female subjects in Group A and 11 male and 9 female subjects in Group B

Table 2 : Age Distribution Among Group A and B

	MEAN AGE (years)	SD
GROUP A	65.15	±4.2
GROUP B	67.75	±5.7

Table 2 : Graphical Representation of Age Distribution Among Group A And B



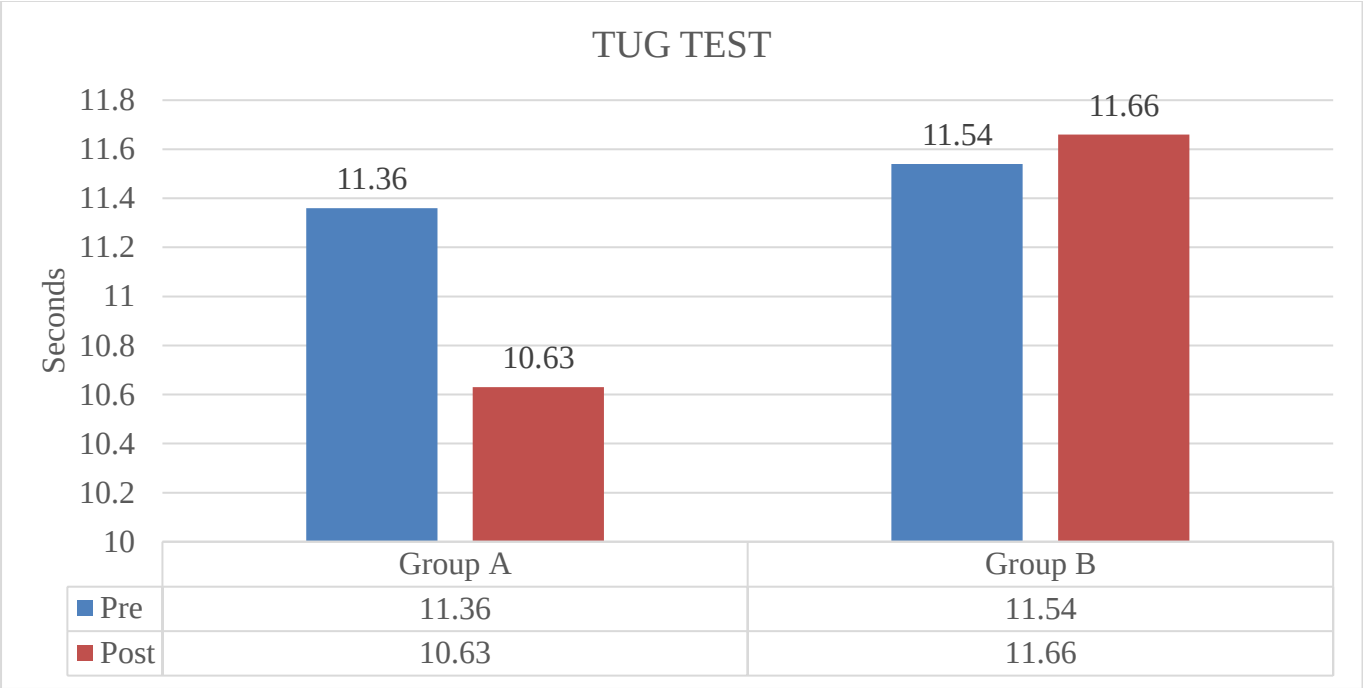
INTERPRETATION:

It can be inferred from the above data the that the mean age of subjects in Group A is 65.15± 4.2 years whereas the mean age of subjects in Group B is 67.75± 5.7 years.

Table 3: Comparison of Pre And Post Values of Time Up and go Test Among Group A and Group B

TUG TEST (seconds)	PRE		POST		SIGNIFICANCE	INFERENCE
	MEAN	SD	MEAN	SD	P VALUE	
GROUP A	11.36	1.92	10.63	1.85	0.003	HIGHLY SIGNIFICANT
GROUP B	11.55	2.03	11.66	2.03	0.029	HIGHLY SIGNIFICANT

GRAPH 3 : Group A V/S Group B Pre And Post Tug Test Scores



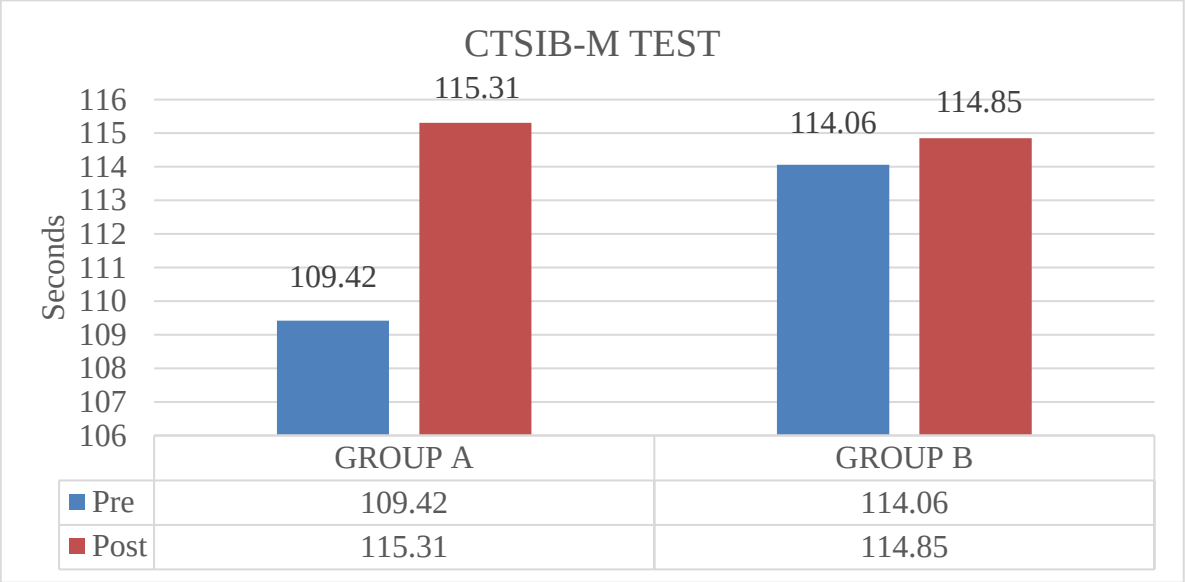
INTERPRETATION:

According to the above data there was a highly significant **decrease** (p value < 0.05) in TUG Test scores among Group A whereas there was a significant **increase** (p value < 0.05) in TUG Test scores among Group B.

Table 4: Comparison of Pre And Post Values of CTSIB-M Among Group A and Group B

CTSIB-M TEST (seconds)	PRE		POST		SIGNIFICANCE	INFERENCE
	MEAN	SD	MEAN	SD	P VALUE	
GROUP A	109.4	12.88	115.3	7.6	0.009	HIGHLY SIGNIFICANT
GROUP B	115.31	6.22	114.85	5.84	0.191	NOT SIGNIFICANT

Graph 4 : Group A V/S Group B Pre and Post CTSIB-M Test Scores



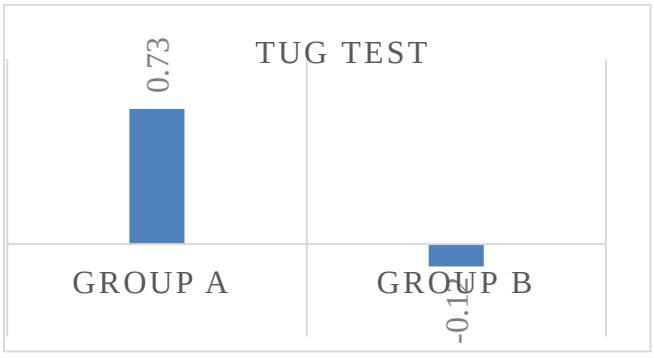
INTERPRETATION:

According to the above data there was a highly significant change (p value < 0.05) in CTSIB-M scores among Group A whereas there was a no significant change (p value > 0.05) in CTSIB-M scores among Group B.

Table 5: Mean Difference of Tug Test Scores Among Group A And Group B

TUG TEST					
GROUP A		GROUP B		SIGNIFICANCE	INFERENCE
MEAN DIFFERENCE	SD	MEAN DIFFERENCE	SD	P VALUE	
0.73	0.89	-0.12	0.22	0.000	HIGHLY SIGNIFICANT

Graph 5: Group A V/S Group B Mean Difference of Tug Test Scores



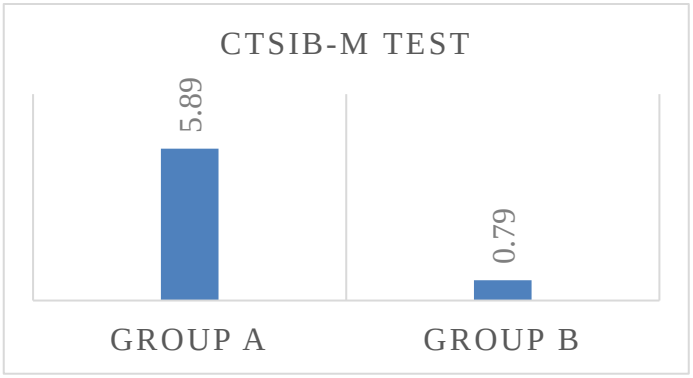
INTERPRETATION:

The analysis of above data concludes that among Group A and B there was a positive change in pre and post values of TUG test in Group A. A positive difference is an indicator of improvement in TUG score whereas negative difference implies decline in the TUG scores.

Table 6: Mean Difference of CTSIB-M Scores Among Group A And Group B

CTSIB-M TEST					
GROUP A		GROUP B		SIGNIFICANCE	INFERENCE
MEAN DIFFERENCE	SD	MEAN DIFFERENCE	SD	P VALUE	
5.89	8.49	0.79	2.6	0.015	HIGHLY SIGNIFICANT

Graph 6: Group A V/S Group B Mean Difference of CTSIB-M Scores



INTERPRETATION:

The analysis of above data concludes that among Group A and B there was a significant increase in the CTSIB-M scores in Group A as opposed to Group B.

IV. DISCUSSION

The primary goal of the study was to evaluate the effect of 4 week yoga therapy program on balance in geriatric population with mean age of 65.15 ±4.2 in group A (yoga therapy group) and 67.75 ± 5.7 years in group B (control group).

The outcome measures analyzed were TUG test and CTSIB-M test.

Statistically significant results were obtained in balance measured by TUG (p value < 0.05) and CTSIB-M (p value < 0.05) among the subjects in

yoga therapy group to those who weren't given any intervention.

The decrease in TUG score among Group A is supported by Mary L et al., 2012 [17] who evaluated the effects of modified chair-yoga in 16 elderly and found improvement in functional mobility by reduction in TUG score.

The improvements in physical measures like balance, directly related to the yoga intervention are not surprising. [18, 19] Yoga poses are very similar to conventional balancing exercises given in routine clinical practice. Asanas or poses in the present study are given in different position like sitting and standing in a sequential order and progression was done according to improvement in balance. It ranges from low COM and wide BOS in sitting position to high COM and narrow BOS in standing position.

According to Jayasinghe S R, 2004, [20] yoga practice will lead to improvement in flexibility, balance, strength and overall fitness. Pranayam component of yoga (slow breathing) is able to improve heart rate variability by improving cardiovascular rhythms.

The increase in TUG score among Group B is supported by Camila Tomicki et al., 2016 [21] who assessed the effect of physical exercise program on the balance and risk of falls of institutionalized elderly persons and found negative results with a reduction in body balance and an increased risk of falls after the three months of the study among G1 (control) group of the study.

In addition to the above research article, exposure to cold weather may also result in clinically relevant differences in balance as it leads to reduced muscle power and is related to mobility limitation and decreased functional performance. Indeed, poor explosive power performance may be more indicative of falls risk than traditional strength measurements in older people.

A study by Ulrich Lindemann et al. (2014) concludes the physical performance in older women is reduced in a cold environment. Furthermore, walk-ratio, which was also negatively affected by the cold environment, has also been shown to be associated with risk of falling. [22]

Another positive result of the present study was the improvement in the CTSIB-M scores among Group A. Carter et al.,2003 [23] obtained an improvement in static balance using muscular strength training rather than balance training, though only in 6.3% of the patients. Thus, the present findings suggest that yogasanas leads to more evident positive results in static balance than does muscular strength training.

In his study Mangesh A. Bankar et al.2013 [24] stated yoga exercises involve stretching and relaxing of muscles causing significant physical and mental exertion resulting in benefits like improved muscular strength and muscle mass which results in increased exercise capacity. Yoga exercises improve joint flexibility, prevent decline in the physical function, and improve the QOL of elderly people.

Similar results have been obtained in a study by Goncalves *et al.*, in which data were collected from 83 elderly Yoga practitioners aged 60 years and above. Researchers found that joint flexibility measured using goniometry was significantly more than the control group, also significant reductions in activity execution timings were noted in Latin-American development to the maturity Group (LADEG) autonomy protocol.[25]

V. CONCLUSION

The study conducted concludes that yogasanas are effective in improving balance in elderly individuals at the end of four weeks compared to control group. Thus it can be used clinically to improve balance in geriatric population.

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A Comparative Study of Attitude towards Grading System of Teachers of Senior Secondary Schools in Rural and Urban areas of North-East Delhi

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ABSTRACT

Evaluation of students about the success and failure of education shows, therefore, the better the evaluation system, the better the education and the shortcomings of education are found. The grading system is an evaluation system in which students do not score, But to know about its effectiveness, it is important to know the views of teachers, because one The evaluation system is not the same for all the students. The teachers know more about the best of the students.

Keywords : Evaluation and Grading System

I. INTRODUCTION

Education is a natural process that runs from birth to death. Education is the basis of man's physical, mental, social and secondary powers. By this he becomes a responsible citizen of the society and contributes to the development of society.

Generally, the word education is used in the English language for Education, its origins are composed by the Latin word 'education' which means - Teaching. This word is made up of E + DOO. E means - from inside, the word duko means - to develop from within. It means that by education, the person is educated and internal powers are developed.

Education has two dimensions -
1- Compressed
2- Comprehensive

According to Frobel, "Education is a process by which the internal forces of the child are brought out."

According to Gandhiji, "I mean by education that is the process of development of all forms of the body, mind and soul of the child and man."
According to Socrates, "The meaning of education is to bring the universal views of the present world into the invisible form of the human brain."
According to John Lock, "Plants are grown by agriculture and by human education."According to John DV, "Education is the development of all the qualifications of a person by which he develops the ability to control the atmosphere and fulfill its potential."

Whenever we start doing any work, there is no purpose hidden behind it. After working for some time we need to know that what we are trying to do is going on in the right direction and in what kind of support we are getting in achieving our objectives. In this way, evaluating the meaning of efforts in achieving objectives is evaluated. Thus evaluation gives us the opportunity to evaluate the value of our efforts and efforts to fulfill our power.
The field of evaluation is quite extensive as it seeks to evaluate this value of all the parties and traders involved in the learning process, in which all aspects

emerge from power. Inherent vulnerabilities have emerged so that their right solutions make teaching learning so effective. It is possible that for the welfare of the students, the achievement of the specified learning objectives is simple, sustainable and effective areas to be done.

Different educationist has defined evaluation as following :

Evaluation is the assignment of symbol to phenomenon in order to characterize the worth or value of a Phenomenon, usually with reference to some cultural or scientific standards. **- James M. Bradfield**

The term evaluation is closely related to measurement. It is in some respect, inclusive including informal and intuitive judgment of pupil's progress. Evaluation is describing something in of selected attributes and judging the degree of acceptability or suitability of that which has been described.

-Thorndike and Hegan

Evaluation is a systematic process of collecting analyzing and interpreting information to determine the extent to which pupil's are achievement instructional objectives.

-Norman E.Gronlund and Robert L.Linn

The process of ascertaining or judging the value or amount of something by use of a standard of appraisal includes judgment of pupil's progress. Evaluation is describing something in term of internal evidence and external criteria.

-CV GOOD

By the above definition we can know that the area of assessment is very broad. The process of continuity and continuity is found in this process. The two characteristics of evaluation are continuity and continuity as follows.

(A) Prevalence of Evaluation. The generality of the evaluation is expressed as follows: -

- The area of assessment is wide.
- evaluation in teaching

- The method used in evaluation is comprehensive: -

(A) - The resultant technique

- Functional and experimental tests and examinations-
- Written tests and exams

(B) Qualitative techniques-

Inspection and observation method-

Question and Check list

A brief history of grading system for evaluation: -

First of all, keith Huskin talked about its grading system. The first grading system came in Cambridge University of England, 1792. Come on the basis of technology. Evaluation on the basis of technology, this basic sector of education is effective for both academic theory and experimentation. All grades in England are assessed by the grading system.

Grading System: -

The most emphasis has been given on the evaluation of students in improving the examination system of India but recently the grading system has been added to the evaluation system for the prevailing higher secondary students. It has been taken care of for evaluation of the examination system that can evaluate the development of the student with the valid and credible wealth and empower the learning process i.e. it should be resolved of the coincidence and the work should be emphasized on the continuous and detailed Evaluation should improve the conduct of the examination, changes in teaching methods, and grading should be used instead of inference.

Many times the actual score is different from the original score. It is very difficult to differentiate between 59 and 60 marks and 32 and 33 marks. Thus there is an impact on the achievement of the student in one or two numbers in the number. Many times the teacher's attitude is different for checking examination copy, so the grading system has proven successful.

The Higher Education Ratio Commission (1996-77) gave the representation of the grade-grade system.

General Level	Points	Marks Obtained in Percentage
O	6	75% and Above
A	5	65-74
B	4	55-64
C	3	45-54
D	2	35-44
E	1	25-34
F	0	0-24

Although different types of grading have been proposed, but are generally as broad as 5 points, 9 points and many measurements. The more diffusion power required in examining the examiner's answer sheets and providing more reliable points. Although two candidates get one point in any examination or both get zero marks, the scores earned by the two students will be similar in accordance with the marks, but they will not be equal in the psychological terms. A student who has never studied, zero marks can be real, but if the person studied for the whole year but could not pass the exam due to some reason, the number of such students can not be counted according to his achievement.

Thus, the level of achievement of the two students can be different even if the number of two students is equal.

Need of the Study

Each teacher has its own opinion about the evaluation under the examination system, that is, there is a different perspective on evaluation of rural and urban teachers, because it is not necessary that the same assessment system is effective for urban students and that is for rural students, it is also as effective.

Comparative votes according to the areas of the teachers about the grading system can be understood from how important this grading system is for evaluation and how efficient the grading system is based on the areas. Teachers of different areas get different views for any exam system, through which this study can easily be used to find out that the grading system is positive and positive for students of rural and urban areas. ?

It is most important to know the opinion of teachers about any new education system as it is a teacher who can properly understand the mindset, thoughts and momentum of the students whose direct impact falls on the students' academic achievement.

Today, the students studying in the urban areas are competing for one another ahead of the competition. If one student receives two marks more than the other student, the second student is motivated to complete the two marks. In the same village students, such a trend is seen. It is easy to know from the opinion of the teachers that how the impact of grading system on students is being applied to their motivation and educational achievement.

Grading system for students from 2010 to 10th standard under higher secondary education was introduced in which students were given grades instead of numbers, so it is not necessary that

teachers in all areas in Delhi are fully agreed with this system, hence the rural and it is necessary to know comparative approaches to urban areas grading system. It is very important for students to evaluate not just the knowledge but to evaluate the overall development of the lawful and credible.

Statement of the Problem

A Comparative Study of Attitude towards Grading System of Teachers of Senior Secondary schools in rural and urban areas of North-East Delhi.

Purpose of study

- TO study the attitude of teachers towards the grading system
- To study Compare of the approach of male teachers and Female teachers.
- To study Understanding the attitude of urban teachers and rural teachers about grading system
- To study suggestions for improvement of the evaluation system.

Hypothesis of the study

- There will be no difference in the approach towards grading system of rural and urban women teachers
- There will be no difference in attitude towards rural and urban male teachers' grading system.
- There will be no difference in approach towards grading system of rural male teachers and urban teachers.
- There will be no difference in approach towards grading system of rural male teachers and urban teachers.

II. METHOD AND PROCEDURE OF STUDY

Population: -

In this study, the urban and rural high schools of East Delhi area have been included.

Sample : -

The researcher has taken only the high schools of East Delhi for her research. Only 8 schools in entire schools have been taken in which 4 schools have been included in rural area and 4 schools from urban areas.

Method

The researcher has adopted the survey method and factual method in this research to solve its problem.

Process :-

In this research, self-made questionnaire attempts have been made by the researcher.

Delimitations

In the research work, 100 teachers of the upper secondary schools of East Delhi have been included.

-50 teachers have been taken from the rural area and 50 to the urban area school.

- 25 female teachers have been included in the urban area and 25 women's teachers from rural areas.

-25 male teachers are included in urban areas and 25 male teachers from rural areas.

III. Result Analysis

Category	total	mean	S.D	Value of t	Table value
Rural Female Teachers	25	15.52	1.60	3.494	2.02
Urban female Teachers	25	17.04	1.48		

There was no difference in attitude towards rural and urban teachers' grading system.

Category	total	mean	S.D	Value of t	Table value
Rural Male Teachers	25	16	1.64	0.037	2.02
Urban Male Teachers	25	17.48	1.17		

There was no difference in attitude towards rural and urban male teachers' grading system.

Category	total	mean	S.D	Value of t	Table value
Rural Male Teachers	25	16	1.64	4.94	2.02
Urban Female Teachers	25	17.04	1.48		

There was no special difference in the approach towards grading system of rural male teachers and urban female teachers.

Category	total	mean	S.D	Value of t	Table value
Rural Female Teachers	25	15.52	1.60	3.494	2.02
Urban Male Teachers	25	17.04	1.48		

There was no special difference in the approach towards grading system of rural female teachers and urban male teachers.

Findings

Teachers were not fully convinced to implement grading system for secondary education. In rural areas teachers and teachers of urban areas have found a difference in the approach for grading system.

IV. CONCLUSION

According to most teachers, the grading system will not have a competitive spirit in the students but all the teachers are unable to agree to the grading system. In this way it can be said that the Education Committee should focus both its positive and negative effects before deciding the evaluation system. There is an important role of evaluation in the teaching learning process, which also affects students' academic achievement and motivation. The teacher's views must be taken for a good evaluation system.

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Action Research: A Project for Improving School Management

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ABSTRACT

This article presents the facts related to school management Problems in the modern era. Action Research is a research that is done to find solutions to educational problems, a process in which a teacher can find out the reasons and solutions for problems soon. There are many such problems in the school, which are not resolved on time, it takes a bigger form, so for the diagnosis of problems in the school, Action Research plays a very effective role and helps maintain the school management. School management includes offices, teachers, students, curriculum, teaching staff, non-teaching staff etc. There is no problem every day, Action Research can be tackled by the above problems, and in this the researcher does not need special degrees of research. The teacher can easily do this.

Keywords : Action Research, School Management, Teaching Learning

I. INTRODUCTION

Principal and teacher in the school have an important role as the Principal guides their school teachers like a leader who is done for students and school management. All the teachers in the school work by building team. It is the responsibility of the principal and teachers to remove the problems related to the school. If the teacher works on the basis of the guidance of his leader, then a positive environment is created and this is possible only when minor problems are not ignored. School Management is an important part of any education system, which includes teachers, students, parents, curriculum, assessment, co-curricular activities, teaching processes, school building, school fee, transport facilities. Problems related to these can be easily overcome with the help of Action Research. Any person associated with the school can study problems, the principal and teachers play the most roles in it.

"Action Research is a process in which participants examine their own educational practice systematically and carefully using the techniques of research."

(Watts, 1985)

"Comparative research on the conditions and effects of various forms of social action and research leading to social action"; this type research uses " a spiral step," each of which is " composed of a circle of Planning, action and fact finding about the result of the action'.

(Kurt Lewin)

"Action Research is a process for studying problem by practitioners scientifically to take decision for improving their current practice."

(S.M. Corey)

"Research concerned with school problems carried on by school personal to improve school practice is action research."

(Sara Blackwell)

Action Research

Areas	Action Research
Aim	Look for solution of education problems
Problem	Related to school
Nature of problem	Practical and Narrow
Sample	Limited
Time	Short time
Investigators	Teacher belongs to the same school
Collection of Data	Self Made Test or Teacher made Test
Analysis of data	General Statistics are used

Action research is really suitable for any individual or any group or organization who wants to improve their performance; In fact, action research is widely used in education, especially by teachers who use it to improve their learning. Obviously, action research matches well with education and gives teachers and students the benefit of both their teaching and learning as it caters to the need of education and enables continuity in research.It helps in making school and classroom teaching effective.

Educational Action Research- "Educational Action Research has been established after the American educational philosopher John Dewey, who said that professional educators should be involved in community problem-solving". Naturally, it is focused on developing curriculum, professional improvement and learning in social context.

II. CHARACTERISTICS OF ACTION RESEARCH

- **Informal and lack rigor**: Action research can be done by any person related to the institution, it does not have much formality.
- **Flexible**: Flexibility is found in the process of action research.
- **Deals with Situational Problem**: This process is done to prevent sudden problems so that it does not take the form of a big problem in the future.
- **Improvement**: This process is done to improve the organization.
- **Suggestions and solutions**: Its goal is not to generalize the result but to find out the problem, to give the right suggestions and to solve the problem.

III. AREAS OF ACTION RESEARCH IN EDUCATION

The problem of action research in education is only related with following field:-

- Teaching Practice: In this, problems related to classroom problems are resolved such as teaching materials, teaching equipment, management etc.
- Problems with Students: The purpose of education is to seek the desired results in the students 'behavior, sometimes the teacher has the problems of achieving these goals, that is, the students' behavior in the classroom and outside of the classroom is abnormal.
- Co-Curricular Activities: Co-curricular Activities is an important part of the curriculum but there are problems in school to organize co-operative actions many times.
- Administration: To maintain good environment in school, it is important to address problems related to administration.

Evaluation: This is an important part of the learning process, the more valid and reliable the assessment system will be, the more effective it will be, the problems related to this can be overcome by this research on time.

IV. OBJECTIVES OF ACTION RESEARCH

- **To improve the working condition of School plant:** Action research is used to make school planning well.
- **To develop scientific attitude among teachers and principal for studying their problems:** Through the Action Research, teachers and principals can easily solve problems related to school, classroom, student and learning processes by themselves.
- **To bring good in school :**
- **To develop the ability among administrators to improve and modify the School**
- **To make the school system attractive and effective.**

V. PROCEDURE OF ACTION RESEARCH

The process of action research is not too long; results in four to five steps are achieved. The main steps of the action research are as follows.



Figure1 : Procedure Cycle of Action Research

- **Identify the Problem**: The problem is defined and the reasons are analyzed. Before doing this research, it should be fully aware of the problem. Only after knowing any problem can the problem be checked correctly, correct can be detected as students may be uninterested or more enthusiastic to make noise in the classroom improperly, therefore it is important to identify the problem.
- **Formulation of Hypothesis:** Based on the reasons, the list of tentative solutions is prepared and the hypotheses are made.
- **Design of Research**: The first hypotheses are confirmed and after that the framework of research is prepared and its techniques and equipment are selected. Self-made test and standardized tests can be done.
- **Collection of Data:** After gathering the collected data correctly, the scores of the data are calculated.
- **Analysis of Data:** By tabulating the collected data, the hypothesis is selected by the method of calculation.
- **Formulation of Conclusion:** The results are discussed and the findings of research related suggestions are prepared by the findings of the research.
- **Implementations of Result:** The suggestions and recommendations given are executed.

Advantages of Action Research

Improvement in school Environment:

- Through this research, all the branches related to the school, such as administration, infrastructure and class management, make appropriate improvements over time. The teacher can also use this research to select the right teaching material which is helpful for classroom management.
- Teacher investigate their own Practice in new way : Teachers can know the problems in teaching process in the classroom through action research and can use new techniques and

methods for their teaching, in which it helps the teacher to bring freshness and innovation in his teaching.

- Teacher develop understanding with students : The better understanding between the students and the teacher in the classroom, there is a good interaction between students and teachers during classroom teaching process, which is a good class management symbol, teachers can easily learn the interest of the students through action research. It strengthens the confidence of teachers and students.
- Professional Development and School Improvement: The teacher is required to take the assistance of Action Research for his professional development. Professional development of a teacher is possible only if he has a vision of positive and well-being for the school and his education, because these two are only two aspects of a coin. The development will be done by the teachers and the teacher will improve in the school only when it develops itself professionally.
- Encourages changes in school: Action Research School Principal encourages teachers and teachers to make appropriate changes over time, correct changes can be made to find out the shortcomings at the right time. The teacher has important responsibility for his school because the teacher is considered ideal in society.
- Democratic Approach to Education: If action research is done repeatedly in the school, then there is equally brightness in the activities of the schools. The effect is on the environment of the school. The spirit of removing the problems can create democratic atmosphere in the school.
- Encourage to educators to reflect on their practice: The teacher can reflect on his own through research, he can know about his teaching, discipline etc., so that the teacher can understand the weakness and strength of his teaching.
- Teachers to acquire new knowledge: Through this research the teacher grows new knowledge through its results and findings. This teacher is helpful in providing essential knowledge related to classroom management and school management.

VI. LIMITATIONS OF ACTION RESEARCH

- This research is limited, only local problems can be solved. Cannot be used for big problems, it does not involve more people, but people associated with the organization can participate.
- Action research is not counted in experimental research; it is based on a theoretical. There is a lack of experimental in it.
- On the basis of its received data and receipts, the results cannot be generalized.
- Internal and external validity is found in this research.
- This research lacks internal and external validity.
- In this research standardized tests are of little use.
- It cannot be done in every field, so the area of action research is considered to be less narrow than any other research.
- It cannot be done in every field, so the area of action research is considered to be less narrow than any other research.

VII. CONCLUSION

In this way we can say that when the school management is discussed, it refers to every branch affiliated to the school such as principal, teachers,

students, parents, administration, school infrastructure, examinations, school facilities and school policies etc. Whatever changes take place over time, its impact falls on the school and the learning process as it is the responsibility of the school to give new knowledge. Today's generation cannot learn old time or cannot be ready to learn from traditional education. In today's era, Information Technology is showing interest of students, which have been used in education but information about students' interest, can be obtained only if action research is conducted from time to time. Action Research School is a boon for improvement.

Action research can be done by any person connected to the institute, it can be used for improvement in the teaching process, classroom management etc.

In this, the researcher does not require the ability to differentiate the research. .The teacher creates a positive environment in the school by research. The research process is not of very long duration, so it can easily be done for the improvement of the teacher and principal school, as we have mentioned about its advantages in this article. We can take advantage of this in every branch related to the school and can improve.

As per every research, if any research has some benefits, then there are certain limitations, such as, a person ca not do any action research, and its results cannot be generalized. The lack of validity of its data is found. But the research is appropriate and effective for school improvement; it helps teachers to run the education process smoothly.

According to the above conclusions, teachers can bring in effectiveness in teaching while reflecting their teaching with the help of Action Research. This research gives full support to the new teachers in understanding the learning process.

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Antimicrobial Activity of *Ipomoea pes-caprae* L. against Selected Microbial Species

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ABSTRACT

In the present investigation, petroleum ether, chloroform, ethyl acetate and methanol extracts of leaves of Ipomea pes-caprae were studied for the antibacterial and antifungal activities against Gram-positive bacteria such as Bacillus pumilus, B. subtilis, Micrococcus luteus and Staphylococcus aureus, Gram-negative bacteria, Escherichia coli, Pseudomonas aeruginosa and Klebsiella pneumonia fungal strains such as Aspergillus niger, A. fumigates and A. flavus and the results are presented. The mean zone of inhibition for bacteria ranged from 8.5 to 25.6 mm. The minimum inhibitory concentration and minimum bactericidal concentrations were from 15.62 to 500 µg/mL and 31.25 to 1000 µg/mL respectively. The standard drug, Ciprofloxacin (10 µg/disc) was used for standard bacterial strains and recorded mean zone of inhibition ranged from 23.5 to 29.5 mm. The mean zone of inhibition for Aspergillus species ranged from 9.6 to 21.5 mm. The minimum inhibitory concentration and minimum fungicidal concentrations were from 31.25 to 500 µg /mL and 62.5 to 1000 µg/mL respectively. The standard drug, Ketoconazole (5 µg/disc) was used for Aspergillus species and recorded mean zone of inhibition ranged from 23.5 mm to 26.5 mm.

Keywords : Ipomoea Pes-Caprae, Minimum Inhibitory Concentration, Minimum Bactericidal Concentrations.

I. INTRODUCTION

Medicinal plants represent a rich source of antimicrobial agents. Plants are used medicinally in different countries and they are source of many potent and powerful drugs. A wide range of medicinal plant parts is used for extract as raw drugs. They possess varied medicinal properties, while some of these raw drugs are collected in small quantities by the local communities and traditional healers for local use [1]. The plants represent a rich source of antimicrobial agents [2, 3]. Many of the plant materials used in traditional medicine are readily available in rural areas at relatively cheaper than modern medicine [4-6]. Medicinal plants not only provide health benefits as traditional medicines. In the last decade, there has been a nine fold increase in the export value of Indian herbal raw materials [7]. The aim of the present study was made to find out the biological properties of the medicinal plant, *Ipomoea pes-caprae* for antimicrobial activity against Gram-positive bacteria such as *Bacillus subtilis, B. pumilus , Micrococcus luteus* and *Staphylococcus aureus,* Gram-negative bacteria, *Escherichia coli ,Pseudomonas aeruginosa* and *Klebsiella pneumonia* , fungal strains such as *Aspergillus niger, A. fumigates* and *A. flavus.*

II. METHODS AND MATERIAL

A. DETERMINATION OF *In Vitro* ANTIMICROBIAL ACTIVITY

1) Microorganisms used

The clinical isolates of Gram-positive bacteria such as *Bacillus subtilis, B. pumilus, Micrococcus luteus* and *Staphylococcus aureus,* Gram-negative bacteria, *Escherichia coli, Pseudomonas aeruginosa* and *Klebsiella pneumonia* fungal strains such as *Aspergillus niger, A. fumigates* and *A. flavus* were obtained from the Department of Clinical Microbiology, Rajah Muthiah Medical College and Hospital, Annamalai University, Annamalainagar. The stock cultures were maintained on Muller Hinton Agar for bacteria and Sabouraud dextrose agar for fungus at 4ºC. *In vitro* antibacterial activity were determined by using Muller Hinton Agar (MHA) and Muller Hinton Broth (MHB) and antifungal activity were determined by using Sabouraud Dextrose Agar (SDA) and Sabouraud Dextrose Broth (SDB) obtained from Himedia Ltd., Mumbai.

2) Preparation of inocula

Twenty-four hours old culture of selected bacteria/fungi were mixed with physiological saline and the turbidity was corrected by adding sterile physiological saline until a Mac Farland turbidity standard of 0.5 (CFU) per mL was obtained. The mould fungi were sub cultured on SDA and incubated (at 30°C for 72-96 h for *Aspergillus* sps.). The growth was scraped aseptically, crushed and macerated thoroughly in sterile distilled water and the fungal suspension was standardized spectro-photometrically to an absorbance of 0.600 at 530 nm [8].

3) Preparation of test solution and disc

The test solution was prepared with 100 mg of crude extracts was dissolved in 5 per cent dimethyl sulphoxide (DMSO). Sterile susceptibility test discs obtained from Himedia, Pvt. Ltd, Mumbai were impregnated with 20 µL of the extract (corresponding to 50, 25 and 12.5 mg/mL of crude extracts) and allowed to dry at room temperature. All the extracts were streaked on the MHA and SDA plates to check their purity. After the incubation period (24 h for bacteria and 24 to 48 h for fungi), the plates were observed.

B. Antimicrobial assay

1) Disc diffusion method

The antimicrobial activities of crude extracts of *Ipomoea pes-caprae* was determined by disc diffusion method according to [9]. 20 mL of MHA/SDA was poured into petridishes and allowed to solidify. Plates were dried and 0.1 mL of standardized inoculum suspension (bacteria/fungi) was inoculated on the entire agar surface. The disc with different concentrations of crude extracts were prepared and aseptically applied on the surface of the petriplates with sterile forceps and gently pressed to ensure contact with the inoculated agar surface. Ciprofloxacin (5 µg/disc) for bacteria and Ketoconazole (5 µg/dics) for *Aspergillus* were used as positive controls. 10 per cent DMSO was used as blind control in these assays. Finally, the inoculated plates were incubated at 37°C for 24 h for bacteria and at 30°C for 72-96 h for *Aspergillus* sp. The zones of inhibition was observed and measured in millimeters. Each assay in these experiments was repeated three times.

2) Minimum inhibitory concentration (MIC)

The minimum inhibitory concentration was determined in MHB for bacteria and SDA for fungi described by broth macro dilution method [10]. The plant extracts were dissolved in 10 per cent DMSO obtained 2 mg/mL. 0.5 mL of stock solution was incorporated into 0.5 ml of MHB to get a concentration of 1000 to 15.62 µg/mL. 50 µL of standardized suspension of the test organism was transferred into each tube. The control tube contained only organism and devoid of plant extracts. The culture tubes were incubated at 37°C for 24 h for bacteria and 30°C for 72-96 h for *Aspergillus* sp. The lowest concentrations, which did not show any growth

of tested organism after macroscopic evaluation were determined as MIC.

3) Minimum bactericidal concentration (MBC) and Minimum fungicidal concentration (MFC)

The MBC and MFC of the extracts were determined [11] by plating 100 µL of sample from each MIC assay tube with growth inhibition into freshly prepared MHB and SDA and the plates were incubated at 37°C for 24 h and 28°C for 48-72 h (fungi). The MBC and MFC values were recorded at the lowest concentration of the extracts that did not permit any visible bacterial/fungal colony growth on the agar plate during the period of incubation.

III. RESULTS AND DISCUSSION

RESULTS

The results of different extracts of antimicrobial activity of leaves of *Ipomoea pes-caprae* are presented in Table 1. For bacteria, the mean zone of inhibition for petroleum ether extracts ranged between 8.5 ± 0.50 mm and 20.5 ± 0.50 mm, the values of chloroform extracts were from 9.5 ± 0.50 mm to 22.5 ± 0.50 mm. On the other hand, mean zone of inhibition for ethyl acetate extracts, the values were from 10.1 ± 0.76 mm to 22.8 ± 0.76 mm and for methanol extracts were from 11.0 ± 0.50 mm to 25.6 ± 0.76 mm. The methanol extract produced the highest mean zone of inhibition of 25.6 ± 0.78 mm (at 1000 µg/disc concentration), lowest MIC (15.62 µg/ml) and the lowest MBC (31.25 µg/ml) against *Staphylococcus aureus*. The highest values of MIC (500 µg/mL) and MFC (1000 µg/mL) were recorded in petroleum ether extracts against *E. coli,* and *P. aeruginosa*. With regard to *Aspergillus* strains tested, the mean zone of inhibition for petroleum ether extracts ranged between 9.6 ± 0.26 mm and 16.5 ± 0.50 mm, for chloroform extracts these values were from 10.5 ± 0.50 mm to 17.1 ± 0.26 mm. On the other hand, the values of ethyl acetate extracts were from 11.0 ± 0.50 mm to 18.8 ± 0.28 mm and for methanol extracts were from 11.8 ± 0.76 mm to 21.5 ± 0.50 mm. Among all the extracts tested, the methanol extract recorded the highest mean zone of inhibition of 21.5 ± 0.50 mm (at 1000 µg/disc concentration), the lowest MIC (31.25 µg/mL) and MFC (62.5 µg/mL) values were recorded with methanol extracts against *Aspergillus niger.* The highest MIC and MFC of 500 and MFC of 1000 µg/mL were recorded in petroleum ether extract against *A. flavus.*

In the present study, petroleum ether, chloroform, ethyl acetate and methanol extracts leaves of *Ipomoea pes-caprae* were screened for antibacterial and antifungal activities. The highest mean zone of inhibition for bacteria (25.6 ± 0.78 mm at 1000 µg/disc concentration) was observed with methanol extracts of leaves of *Ipomoea pes-caprae* against strain of *Staphylococcus aureus* when compared to all the extracts among tested strains.

Table 1. Antibacterial and antifungal activity of leaves of *Ipomoea pes-caprae*

Sl. No	Bacterial/Fungal Strains 1) Solvents/Extracts	Mean zone of inhibition[a] (mm)[b]				MIC (µg/ml)	MBC/ MFC (µg/ml)
		Concentration of the disc (µg/disc)					
		1000	500	250	Ciprofloxacin (10 µg/disc)/ Ketoconazole (5 µg /disc)		
1	*Bacillus subtilis*						
	Petroleum ether	14.0 ± 0.50	12.5 ± 0.50	11.6 ± 0.78	26.0 ± 0.50	250	500

	Chloroform	15.5 ± 0.50	13.8 ± 0.76	12.8 ±0.26	23.5 ± 0.50	250	500
	Ethyl acetate	17.2 ± 0.28	14.5± 0.50	13.0 ± 0.50	25.0 ± 0.50	250	500
	Methanol	18.5 ± 0.50	16.8 ± 0.76	14.5 ± 0.50	26.0 ± 0.50	125	250
2	*Bacillus pumilus*						
	Petroleum Ether	15.5 ± 0.50	13.6 ± 0.28	11.8 ± 0.76	28.0 ± 0.50	250	500
	Chloroform	17.6 ± 0.28	15.5 ± 0.50	13.5 ±0.50	26.5 ± 0.50	250	500
	Ethyl acetate	18.8± 0.76	16.2 ± 0.26	15.0 ± 0.50	28.5 ± 0.50	125	250
	Methanol	19.7 ± 0.75	17.5 ± 0.50	15.6 ± 0.28	25.8 ± 0.78	125	250
3	*Micrococcus luteus*						
	Petroleum Ether	19.5 ± 0.50	17.8 ± 0.76	16.2 ± 0.26	26.0 ± 0.50	125	250
	Chloroform	21.5 ± 0.50	19.8 ± 0.78	17.5 ± 0.50	26.5 ± 0.50	62.5	125
	Ethyl acetate	22.8 ± 0.76	20.0 ± 0.50	18.5 ± 0.50	28.1 ± 0.50	31.25	62.5
	Methanol	24.0 ± 0.50	22.5 ± 0.50	19.5 ± 0.50	27.5 ± 0.50	31.25	62.5
4	*Staphylococcus aureus*						
	Petroleum Ether	20.5 ± 0.50	18.6 ± 0.76	17.1± 0.26	29.5 ± 0.50	62.5	125
	Chloroform	22.5 ± 0.50	20.3 ± 0.78	18.8 ±0.76	28.5 ± 0.50	31.25	62.5
	Ethyl acetate	22.8 ± 0.76	20.6 ± 0.57	19.5 ± 0.50	28.5 ± 0.50	31.25	62.5
	Methanol	25.6 ± 0.78	23.5 ± 0.50	21.8 ± 0.76	29.5 ± 0.76	15.62	31.25
5	*Escherichia coli*						
	Petroleum Ether	12.5 ± 0.50	10.5 ± 0.50	9.5 ± 0.50	26.0 ± 0.50	500	1000
	Chloroform	13.8 ± 0.76	11.5 ± 0.50	10.1 ± 0.28	25.0 ± 0.50	250	500
	Ethyl acetate	15.0 ± 0.50	13.8 ± 0.26	11.5 ± 0.50	25.5 ± 0.50	250	500
	Methanol	16.8 ± 0.26	14.5 ± 0.50	13.1 ± 0.76	26.8 ± 0.76	250	500

Sl. No	**Bacterial/Fungal Strains Solvents/Extracts**	**Mean zone of inhibition[a] (mm)[b]**				**MIC (µg/ml)**	**MBC/ MFC (µg/ml)**
		Concentration of the disc (µg/disc)					
		1000	**500**	**250**	**Ciprofloxacn (10 µg/disc)/ Ketoconazoe (5 µg /disc)**		
6	*Pseudomonas aeruginosa*						
	Petroleum Ether	11.6 ± 0.78	9.5 ± 0.50	8.5±0.50	26.5 ± 0.50	500	1000
	Chloroform	12.0 ± 0.50	10.8 ±0.76	9.5±0.50	26.0 ± 0.50	250	500
	Ethyl acetate	12.5 ± 0.50	11.5 ±0.50	10.1±0.76	26.5 ± 0.50	250	500
	Methanol	14.0 ± 0.50	12.6 ±0.78	11.0±0.50	24.5 ± 0.50	250	500
7	*Klebsiella pneumoniae*						

	Petroleum Ether	13.0 ± 0.28	11.6 ± 0.28	10.5± 0.50	25.6 ± 0.28	250	500
	Chloroform	14.1 ± 0.21	12.5 ± 0.50	11.2 ± 0.28	24.0 ± 0.50	250	500
	Ethyl acetate	15.5 ± 0.50	13.8± 0.76	12.5 ± 0.50	24.0 ± 0.50	250	500
	Methanol	17.0 ± 0.50	14.5 ± 0.50	12.5 ± 0.50	25.5 ± 0.50	250	500
8	*Aspergillus niger*						
	Petroleum Ether	16.5 ± 0.50	14.8 ± 0.76	12.5 ± 0.50	25.5 ± 0.50	250	500
	Chloroform	17.1 ± 0.26	15.5 ± 0.50	13.5 ±0.50	26.0 ± 0.57	250	500
	Ethyl acetate	18.8 ± 0.78	16.5 ± 0.50	14.8 ± 0.76	26.5 ± 0.50	125	250
	Methanol	21.5 ± 0.50	18.5 ± 0.50	16.8 ± 0.76	26.5 ± 0.50	31.25	62.5
9	*Aspergillus fumigates*						
	Petroleum Ether	14.1 ± 0.26	12.5 ± 0.50	10.6 ± 0.28	26.5 ± 0.50	250	500
	Chloroform	15.5 ± 0.50	13.5 ± 0.50	12.0 ±0.50	25.0 ± 0.50	250	500
	Ethyl acetate	16.0 ± 0.50	14.3 ± 0.28	12.5 ± 0.50	24.5 ± 0.50	125	250
	Methanol	18.2 ± 0.78	15.8 ± 0.76	13.5 ± 0.50	25.5 ± 0.50	62.5	125
10	*Aspergillus flavus*						
	Petroleum Ether	12.5 ± 0.50	10.8 ± 0.76	9.6 ± 0.26	24.6 ± 0.26	500	1000
	Chloroform	13.0 ± 0.50	11.5 ± 0.50	10.5 ±0.50	25.5 ± 0.50	250	500
	Ethyl acetate	13.5 ± 0.50	12.0 ± 0.50	11.0 ± 0.50	24.8 ± 0.26	250	500
	Methanol	14.8 ± 0.76	13.0 ± 0.50	11.8 ± 0.76	23.5 ± 0.50	250	500

DISCUSSION

In the present investigation, petroleum ether, chloroform, ethyl acetate and methanol extracts of *Ipomoea pes-caprae* leaves were screened for antibacterial and antifungal activities against gram positive bacteria, such as *Bacillus subtilis, B. pumilus, Micrococcus luteus* and *Staphylococcus aureus,* Gram-negative bacteria, *Escherichia coli, Pseudomonas aeruginosa* and *Klebsilla pneumonia* fungal strains such as *Aspergillus niger, A. fumigates* and *A. flavus* and results exhibited varied level of antimicrobial activity. The mean zone of inhibition for bacteria ranged from 7.0 to 25.6 mm and for *Candida* species ranged from 7.1 to 21.5 mm. The differences in the antimicrobial activity of crude extracts may be due to the amount of antimicrobial agent present in the extract and their mode of action

on different test microorganisms [12]. However differences were observed between antibacterial activities of the extracts. These differences could be due to the differences in the chemical composition of these extracts as the secondary metabolites of plants have many effects including antibacterial properties [13, 14]. We observed in this study the variation of antimicrobial activity. This may be attributed to the nature of the plant material or its origin [15].

Among the extracts tested, the methanol extract of *I. pes-caprae* leaves was exhibited the highest mean zones of inhibition of 25.6 ± 0.78 mm (at 1000 µg/disc concentration) against *Staphylococcus aureus*. This may suggest that the antimicrobial activity of individual plants or their extracts may involve distinct active principles with distinctive mechanisms of action [16]. The same plant was exhibit antimicrobial properties but the results are differed. [17] Recorded the methanol extracts of *I. pes-caprae* leaves exhibited highest inhibition zone of 17, 18 and 21 mm against *Klebsiella pneumoniae, Escherichia coli* and *Bacillus subtilis* respectively. The methanolic crude extract as well as its aqueous soluble fractions of stem bark of *Ipomoea pes-caprae* exhibited moderate antimicrobial activity with average zone of inhibition ranging from 8-12 mm each as compared to standard (40-42 mm) [18]. The results presented here were accordance to some previous studies. The same methanol/other solvents extracts of many plants produced different zone of inhibition. [19] Recorded the similar trend in the chloroform and the methanol extracts of *Boesenbergia rotunda* and the chloroform extracts of *Alpinia galanga, Piper betle, Spilanthes acmella*, and *Zingiber zerumbet* with the inhibition zones ranged from 8.6 to 29.1 mm. The maximum zone (29.1 mm) of antibacterial effect against *Staphylococcus aureus* was produced from the chloroform extract of *Alpinia galanga*. [20] Recorded the similar observation in *Ocimum gratissimum* and *O. sanctum* showed maximum zone of inhibition with that of 30 and 25.5 mm respectively against *Salmonella typhi*.

In the present study, the minimum inhibitory concentration and minimum bactericidal/fungicidal concentrations were from 15.62 to 500 µg/mL and 31.25 to 1000 µg/mL respectively. The lowest minimum inhibitory concentration (15.62 µg/mL) and minimum bactericidal concentrations (31.25 µg/mL) were observed with methanol extracts of leaves of *Ipomoea pes-caprae* against strain of *S. aureus*. With regard to *Aspergillus* strains tested, the methanol extract of leaves showed the lowest MIC (31.25 µg/mL) and MFC (62.5 µg/mL) respectively against *Aspergillus niger*. In the present study, lowest MIC values were recorded in Gram-positive bacteria only but in results of [21] showed a few exceptions *i.e.,* the MIC values of all extracts of *Ipomoea pes-caprae* were found to be less for gram-positive bacteria.

IV. CONCLUSION

The results indicated that methanol solvent extracts exhibit highest antimicrobial activities as compared with the other extracts. So, use of natural products, especially of *I. pes-caprae* may be considered as a new source of antibacterial and antifungal agents. The findings of this work are useful for further research to identify, isolate and characterize the specific compound which is responsible for higher antimicrobial properties.

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An Experimental Investigation on The Properties of Concrete by Partial Replacement of Fine Aggregate with Demolition Waste

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ABSTRACT

Concrete is the most widely used as construction materials in the world. In fact, concrete is used in virtually everything and there are still no substitutes are available for many of its application. Without concrete, the community and society today could not exist. Therefore, lots of researchers and engineers are doing the research of the aggregate sources. All these research as alternative sources for the replacement of the natural aggregates in producing concrete in the various future construction works. In that concept we had made the research on the fine aggregate replacement in concrete with the construction and demolition waste. The project explains about the properties of materials used in concrete, mechanical and transport properties of the concrete.

Keywords: Demolition, Aggregate, Virtually.

I. INTRODUCTION

In Asia, the construction activities are extremely emerging. Parallel to that, one of the main problems in urban areas is the vast amount of construction and demolition waste produced everyday. In many population growth and developing countries, construction and demolition waste often had been disposed incorrectly. Since an obligation of searching the solutions, recycling of the waste is the profitable and appropriate alternative that will improve the construction method. The utilization waste materials will help to avoid several environmental or health damages, reduce the exploration of natural resources, and increase the lifetime of the landfill. The abandoned concrete waste products are generated in a significant amount during the production process or the demolition of the buildings. It has causes a large land required storing it and consequence in land pollution. These problems will spend a lot of money. In order to make sure the continuously of crushed aggregates supply, the recycling or reuse the concrete waste as an alternate source as an aggregate replacement.

1.2 Objective

The main objectives of this project are described as follows:

a) To determine the characteristics of the recycled fine aggregate.

b) To determine hardened concrete properties containing in recycled fine aggregate concrete.

c) To determine transportation properties of recycled fine aggregate concrete.

d) To identify the optimum proportion for replacement the natural fine aggregate with recycled fine aggregate in the concrete.

1.3 Scope of Study

The concrete waste was crushed to fine aggregate with the maximum aggregate size of 4.75mm. Then, the concrete design mix proportion was prepared where the batching of the concrete material was done by weight. Mix proportioning was based on the water cement ratio (water/cement) and the density of the concrete is 2400kg/m^3. The scope of this study is the replacement of natural fine aggregate (sand) with recycled fine aggregate. The ratio of sand replaced to recycled fine aggregate are 100:0% as control, 80:20%, 50:50%, 20:80% and 0:100%.

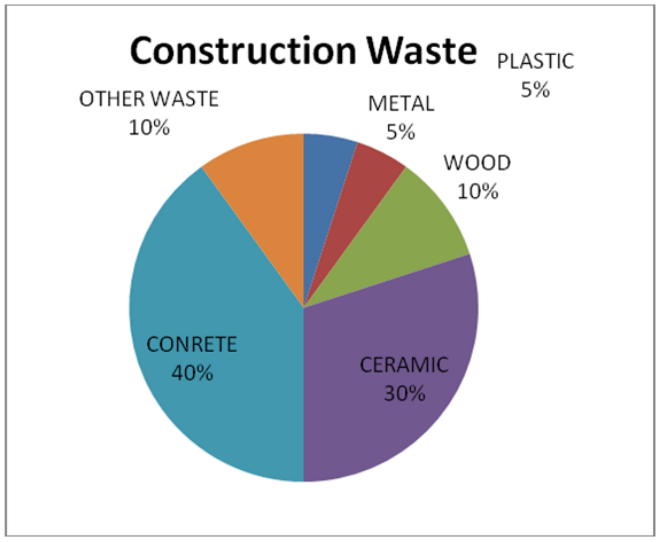
II. LITERATURE REVIEW

Cement concrete is environmentally clean construction material, produced from the local raw materials: aggregates (sand and gravel), cement and water. This is universal construction material used for the construction of various buildings and constructions, as well as for the production of construction parts. The choice of construction materials is always determined by quality and price. Both, concrete's quality, as well as price, largely depends on the raw materials used in the production. In concrete's production process it is important to reduce costs in any technological stage as much as possible. However, the quality parameters of the final product have to fulfill the defined limits. One of the ways to reduce the production costs is to replace the natural aggregates with the ones, produced from buildings' demolition waste. Moreover, from ecological point of view, concrete is an ideal material, where it is possible to integrate construction and demolition waste during then manufacturing process.

Demolition and construction waste consists of the following waste materials: reinforced concrete, concrete, bricks, tiles, glass, wood and other materials, obtained during the demolition of the buildings. Larger amount of buildings' demolition waste consists of concrete and ceramics. Main composition of this waste is shown in Fig. 1.

There are several reasons why the amount of construction and demolition waste is increasing worldwide:

- ✓ There are a lot of buildings that are not suitable for exploitation, therefore they have to be rehabilitated or demolished;
- ✓ Buildings, even if they are suitable for the exploitation (for instance old factories, farm buildings etc.), lose their functionality, their purpose changes and finally they are demolished (Fig. 1).



III. MATERIALS AND MIX PROPORTIONING

3.1 Materials used:

3.1.1 Cement:

Cement as it commonly known, is a mixture of compounds made by burning limestone and clay together at very high temperature ranging from 1400 to 1600 c. although there are other cements for special purposes, this project will focus solely on Portland cement and its properties.

3.1.2 Water:

Water is the key ingredient, which when mixed with cement, forms a paste that binds the aggregates together. The water causes the hardening of concrete through a process called hydration. Hydration is a chemical reaction in which the major compounds in cement form chemical bonds with water molecules and become hydrates or hydration products. The water needs to be pure in order to prevent side reactions from occurring, which may weaken the concrete or otherwise interfere with the hydration process. The role of water is important because the water to cement ration is the most critical factor in the production of "perfect" concrete. Too much water reduces concrete strength, while too little will make the concrete unworkable. Concrete needs to be workable so that it may be consolidated and shaped in to different forms (I.e. walls, domes, etc). Because concrete must be both strong and workable, a careful balance of the cement to water ratio is required when making concrete. Portable water is considered satisfactory for mixing concrete. The water should be colourless and free from any smell. The presence of chlorides and sulphates are injurious to reinforcing bars as they may be corroded.

3.2. Aggregates:

Aggregates are chemically inert, solid bodies held together by the cement. Aggregates come in various shapes, sizes and materials ranging from fine particles of sand to large course rocks. Because cement is the most expensive ingredient in making concrete, it is desirable to minimize the amount of cement used. 70 to 80% of the volume of concrete is aggregate keeping the cost of the concrete low. The selection of aggregate is determined, impart by the desired characteristics of the concrete. For example, the density of the aggregate determines the density of concrete. Soft, porous aggregates can result in weak concrete with low wear resistance, while using hard aggregates can make strong concrete with a high resistance to abrasion.

Aggregates should be clean, hard and strong. The aggregate is usually washed to remove any dust, silt, clay, organic matter or other impurities that would interfere with the bonding reaction with the cement paste. It is then separated in to various sizes by passing the materials through a series of screens with different size openings.

3.2.1 Fine Aggregates:

The fine aggregate locally was used in this investigation. The aggregate was sieved through IS sieve. The fine aggregate or sand may be natural or crushed. It may be available in a riverbed or in a quarry. The sizes of sand particles vary from a maximum of 4.75mm down to 150micron i.e. 0.150mm. Good sand must contain all the particles with in the above range that is and it should be graded sand. The sand may be sieved through the Indian standards sieves: 4.75 mm, 2.36 mm, 1.18 mm, 600-micron, 300 micron and 150 microns. The sand may be classified as VERY COURSE (ZONE 1), MEDIUM COURSE (ZONE 2), COURSE (ZONE 3) and FINE (ZONE 4) depending upon its grain size distribution.

3.2.2 Coarse Aggregate:

The course aggregate may be natural or crushed gravel. It may have a maximum size of 20 mm down to 4.75 mm and should be graded. It should be clean, and free from dust and other impurities. It should be stored separately from sand or lime etc. on a hard surface. If necessary, the aggregate may be washed and dried for 72 hours before use. Moist or wet aggregate should be used in construction. The aggregate consists of over 75% of concrete mix.

Therefore save cement by using clean and graded aggregate having proper shape and size



3.3 Recycled Aggregate :

The building and demolition waste are taken and crushed to separate fine and coarse materials. Then the aggregates are sent to the batching plant and washed to remove the fines, and then they are separated by sieving. In our project we had been using the recycled fine aggregate. The aggregates passing through 4.75mm sieve and retained on 90 micron are taken.

Properties of Recycled Fine aggregates

A. ***S.no***	B. ***Particulars***	C. ***Results***
D. *1*	E. *Type*	F. *Building Waste*
G. *2*	H. *Specific Gravity*	I. *2.72*
J. *3*	K. *Water absorption*	L. *4%*
M. *4*	N. *Fineness modulus*	O. *3.06*
P. *5*	Q. *Grading*	R. *Zone II*
S. *6*	T. *Density*	U.

In the properties of the recycled aggregates when they are compared with the natural fine aggregates the Specific gravity has been increased, water absorption is also increased due to the large amount of fines present in the recycled fine aggregate. So the grading had been changed from the zone –III to the zone-II. The fineness modulus is also been changed and the density of the recycled fine aggregate has been increased.

So we must make into the consideration most probably the water absorption of the R F A and add the amount of water in more percentage into the concrete

levels of water reduction possible allow major increases in strength to be obtained.

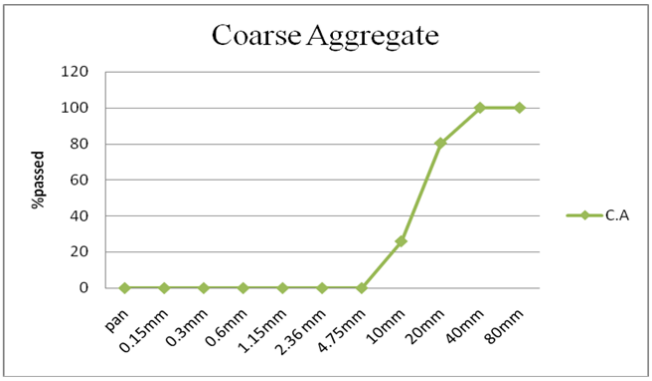


Recycled Aggregate

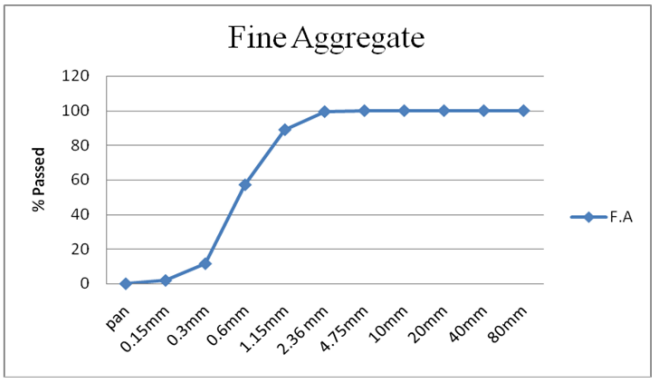
Uses

- To provide excellent acceleration of strength gain at early ages and major increases in strength at all ages by significantly reducing water demand in a concrete mix.
- Particularly suitable for precast concrete and other high early strength requirements.
- To significantly improve the workability of site mixed and precast concrete without increasing water demand.

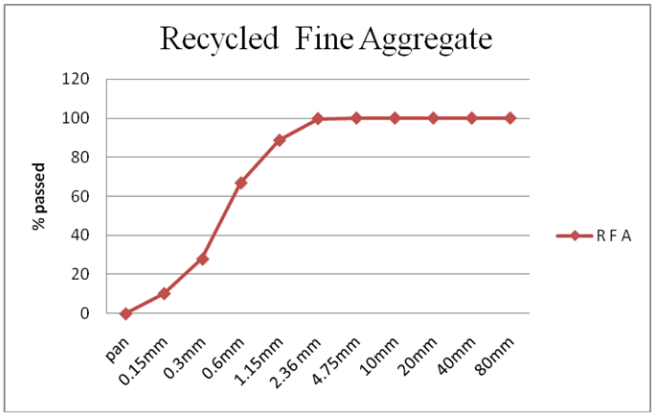
- To provide improved durability by increasing ultimate strengths and reducing concrete permeability.
- In screeds it reduces the water content required to give suitable workability for placing and compaction.



Graph 3.1



Graph 3.2



Graph 3.3

When we come across the graph that showing the comparison between sieve analysis of river sand and recycled fine aggregate, we can notice some important things. They are:

A. As it indicates that the river sand is lower than the RFA curve.
B. The presence of the percentage of fines is more in the RFA
C. When the fines are more in the aggregate that we use commonly the water absorption also increases
D. So, more water is to be used, as in this study we had got the water absorption percentage as 4%.
E. Similarly, we can notice the increase in the density and specific gravity of the RFA than the normal sand.

3.5 Mix proportioning

There are various methods of mix proportioning. Mix proportioning was based on the water cement ratio (water/cement) and the density of the concrete is 2400kg/m^3. Quantity of water is taken according to slump of concrete 0.5 for economical purpose. The quantity of cement i.e; 350 kg/m^3 used. Therefore, quantity of water should be 175kg/m^3. For fine and coarse aggregate absorption of water in additional 1 % and 0.8% of water was used. The quantity of aggregates is taken based on the aggregate grading curve is selected. The quantity of fine aggregates used is 646kg/m^3, coarse aggregates is 1229kg/m^3, the quantity of 20mm and 12mm are 502kg/m^3 and 727kg/m^3.

For the investigation purpose the fine aggregates replaced with recycled fine aggregates in percentage relatively 0, 20, 50, 80 and 100 percent for the mixes M_1, M2, M3, M4 and M_5 respectively.

3.6 Specimen Details

The specimens like cubes, cylinders and beams that are used to conduct the strength tests are taken according *to IS10086-1982*.

Compression strength = cube moulds of 150mmX150mmX150mm are used.

Split tensile strength = cylindrical moulds of 100dia@200mm height are used.

3.7 Curing procedure

After casting the cubes and cylinders the specimens were left for 24 hours then they remoulded and kept in normal water curing. The specimens were kept for normal water curing until testing age

STRENGTH PROPERTIES

This chapter explains about the strength properties like compressive strength and split tensile strength.

4.1 Testing of Compressive Strength:

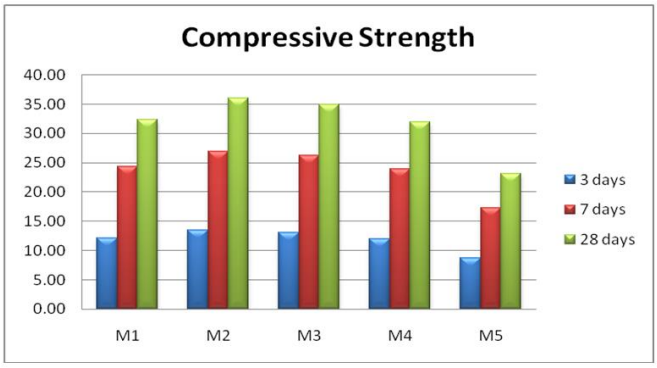
Compression test is done confirming to *IS: 516-1953*. All the concrete specimens that are tested in a 2000KN capacity Compressive-testing machine. Concrete cubes of size 150mm x 150mm x150mm and cylinders of size 100mm dia & 200mm height were tested for crushing strength, crushing strength of concrete was determined by applying load at the rate of 1400 N/cm²/min till the specimens fail. The maximum load applied to the specimens was recorded and divided the failure load with cross-sectional area of the specimens for compressive strength has been calculated.

Compressive strength test was conducted on cubes of 150mmX150mmX150mm cubes for the various mixes M1,M2,M3,M4 and M5 of the Recycled fine aggregate concrete are given in the below table



4.1.3 Compressive Strength of different mixes

Compressive strength N/mm²			
Mix	3days	7 days	28 days
M1	12.15	24.30	32.40
M2	13.48	26.96	35.95
M3	13.10	26.22	34.96
M4	12.00	24.00	32.00
M5	8.67	17.33	23.11



- The cube compressive strength results at 3, 7 and days with various percentage replacement of the fine aggregate by recycled fine aggregate at 0, 20, 50, 80 and 100 percentages are shown in the table 4.3.
- Compressive strength of the cubes at the 3 days is varied from one mix to the other, from 0% to 20 % replacement of the fine aggregate the strength has been increased from 12.15 mpa to 13.48mpa. The strength had been decreased when the

percentage of the aggregate replacement is increased. When it has increased from 20% to 50% then strength decreased from13.48 to 13.10. Similarly for the next proportions the strength reduced as 12 and 8.67 for 80% and 100% replacement respectively.

- Compressive strength of 7 days is varied from one mix to the other, from 0% to 20 % replacement of the fine aggregate the strength has been increased from 24.30 mpa to 26.96 mpa. The strength had been decreased when the percentage of the aggregate replacement is increased. When it has increased from 20% to 50% then strength decreased from26.96 to 26.22. Similarly for the next proportions the strength reduced as 24 and 17.33 for 80% and 100% replacement respectively.
- The same has been repeated in the 28 days strength results, but the results that are shown in the 28 days are more than the target strength of the M20 grade. As the results shown in the table 4.1 the strengths of 28 days for the mixes M1, M2, M3, M4 and M5 are 32.4, 35.95, 34.96, 32 and 23.11 N/mm2 respectively.
- So we can make the replacement of the fine aggregate with the construction waste and the demolition waste. The replacement can not be done 100% as the strength parameters may have a large difference in comparison with natural aggregates.

4.2 Split Tensile Strength

This test is conducted in a 2000 KN capacity Compression-testing machine by placing the cylindrical specimen, so that its axis is horizontal to the plates of the testing machine. Narrow strips of packing material i.e., plywood is placed between the plates and the cylinder to receive compressive stress. The load was applied uniformly at a constant rate until failure by splitting along the vertical axis takes place. Load at which the specimens failed is recorded and the split tensile stress is obtained using the formula based on *IS: 5816-1970.*

$$F_t = 2P/\pi DL$$

Where P = Compressive load on the cylinder

L = Length of the cylinder D = Diameter of the cylinder

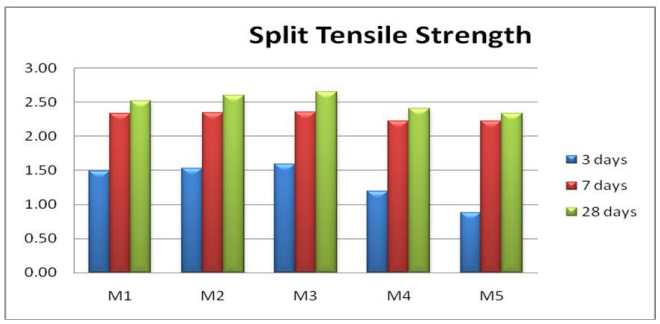
Split tensile strength has done for the mixes M1, M2, M3, M4 and M5 of the recycled fine aggregate concrete the test has conducted on the cylinder of 100mmX200mm. The values of the split tensile strength test at the age of 1 day, 7 days, 28 days has shown in the table below



4.2.3 Split Tensile Strength for different mixes

Split Tensile Strength N/mm²			
Mix	3 days	7 days	28 days
M1	1.49	2.33	2.52
M2	1.53	2.34	2.60
M3	1.59	2.36	2.65
M4	1.19	2.22	2.41
M5	0.88	2.22	2.33

Table 4.6



Graph 4.2 Age vs split tensile strength

Split Tensile test is conducted on the cylinders of the sizes in ratio 1:2 to the diameter and length of the specimen. In this investigation totally 36 cylindrical moulds of size 100mm*200 mm were tested for knowing Split tensile strength of different mixes at 3 days , 7days, and 28 days.

Split Tensile strength of the cubes at the 3 days is varied from one mix to the other, from 0% to 20 % replacement of the fine aggregate the strength has been increased from 1.49 mpa to 1.53 mpa. The strength had been decreased when the percentage of the aggregate replacement is increased. When it has increased from 50% to 80% then strength decreased from1.59 to 1.19. Similarly for the next proportion the strength reduced to 0.88N/mm^2.

Split Tensile strength of 7 days is varied from one mix to the other, from 0% to 20 % replacement of the fine aggregate the strength has been increased from 2.33 mpa to 2.34 mpa. The strength had been decreased when the percentage of the aggregate replacement is increased. When it has increased from 50% to 80% then strength decreased from2.36 to 2.22. Similarly for the next proportion the strength reduced to 2.22

The same has been repeated in the 28 days strength results, but the results that are shown in the 28 days are more than the target strength of the M20 grade. As the results shown in the table 4.1 the strengths of 28 days for the mixes M1, M2, M3, M4 and M5 are 2.52, 2.60, 2.65, 2.41 and 2.33 N/mm^2 respectively.

The targeted strength is not fixed for the split tensile strength but the tensile strength should reach 10% of the compressive strength and in our investigation we could not achieve the tensile property.

So we can make an note that the tensile property of the concrete is decreased with usage of the recycled fine aggregate in large proportions.

IV. TRANSPORT PROPERTIES

Various spermous properties of recycled fine aggregate concrete has tested for the different mixes. The properties that tested for the recycled fine aggregate concrete are mentioned below.

1. Evaporation test.
2. Absorption test.
3. Moisture migration test.

5.1 Evaporation test

Evaporation test has done on the cubes of 150mmx150mmx150mm for the mixes of recycled fine aggregate concrete. It has done after curing of 28 days. After curing of 28 days cube specimens were allowed to normal temperature to normal dry, after normal drying cube specimens were kept in oven at the temperature of 95^{0}C cube specimens were taken from the oven at ages of 15mins, 30mins, 1hour, 2hours, 3hours, 4hours, 24hours, 48hours, 72hours. The values of percentages of evaporation at the ages of 15mins, 30mins, 1hour, 2hours, 3hours, 4hours, 24hours, 48hours, and 72hours.

The values of percentages of evaporation at the ages of 15mins, 30mins, 1hour, 2hours, 3hours, 4hours, 24hours, 48hours, and 72hours are given below in the table 5.2 and this are obtained from the observations that are made from the investigation by taking the changes in the weights of the specimens in periodical ages.

As we had conducted some physical test on the materials and found that the water absorption of RFA as 4% for the different mix proportions of the fine aggregate replacement there will be change in the water/cement ratio.

Graph 5.1 represents the variations of the percentage evaporation occurred in different ages for the different mixes. The evaporation in the early stages is very high and later it decreases. At the age of 24 hours the evaporation has been continuously decreased from the mix M1 to M4 as 4.69 to 3.2 and in M5 mix it has increased to 4.56percent. The evaporation is majorly depended on the properties of the ingredients that are used in the concrete as the fines present in the aggregates are more then the absorption is more and that will affect the evaporation property.

Generally the water absorption of the recycled materials will be 4% to 8%. In our investigation we got water absorption as 4%. So the absorption we got is optimum and that may not affect the properties of the concrete.

By this we can notice that there is no much variation in the water evaporation in the different mix proportions of the recycled aggregate as a replacement. As there is no large variation between the percentages evaporation that had been made in the results, so we can make a statement that recycled fine aggregate does not make any abnormal change in the transport properties.

The results that are observed in the evaporation test are constant and we can make a statement that replacement of the fine aggregates with the construction and demolition waste does make any changes in the durability properties

5.2 Water Absorption test

Water Absorption test has done on the cubes of 150mmx150mmx150mm for the mixes of recycled fine aggregate concrete. It has done after 72 hours evaporation cube specimen. After 72hours evaporation cube specimens were allowed to normal temperature, cube specimens were kept in curing tank and the weight of the specimen are taken at the ages of 15mins ,30mins, 1hour, 2hours, 3hours, 4hours, 24hours, 48hours, 72hours and percentage absorption is calculated. The values of percentages of absorption at the ages of 15mins, 30mins, 1 hour, 2hours, 3hours, 4hours, 24hours, 48hours and 72hours are given in table

5.3 Moisture migration test

Moisture migration test has done on the cubes of 150mmx150mmx150mm for the mixes of recycled fine aggregate concrete. It has done after 72 hours evaporation, cube specimens were allowed dry to normal temperature. Cube specimens were kept on the layer of water for the absorption of moisture, cube specimens were taken from the moisture migration test at the ages of 15mins, 30mins, 1hour, 2hours, 3hours, 4hours, 24hours, 48hours and 72hours. The values of moisture migration in mm are noted and the percentages of moisture migration at the ages of 15mins, 30mins, 1 hour, 2hours, 3hours,

4hours, 24hours, 48hours and 72hours are calculated. The values are given below in the table.

V. CONCLUSION

Results of experiments on compressive strength, split tensile strength, water absorption and evaporation for different recycled fine aggregate concrete have been presented with those of control concrete. For the mixes of the replaced aggregate with the construction waste the investigation had been made on different strength and transport properties and the following conclusions are made

- In the recycled aggregate the percentage of fines present is more than that of the natural sand.
- As the fines are more then the water absorption also increases. The absorption of RFA is 4%.
- The RFA does affect the fresh properties of the concrete.
- The compressive strength is increased up to some percentage of the replacement.
- The properties of the recycled fine aggregate are very similar to the natural aggregates.
- The recycled fine aggregates gives a dense concrete as the fines help in making.
- Tensile strength of the concrete also increases in the replacement of the fine aggregate only up to some percentage.
- This recycling has lots of advantages to the environment and human kind.
- So the replacement of the fine aggregate in the concrete can be done by the construction and demonization waste.

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An Experimental Investigation on the Strength Properties of Self Curing Concrete by Using Super Absorbrnt Polymer

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ABSTRACT

The super absorbent polymer (SAP) has the nature of absorbing large amount of water and converts into gel and at the same time it swells or a large amount of volume change occurs when SAP reacted with water. Main SAP agent is sodium polyacrylate . These properties are very useful and effective in plain concrete. It is proved that it has many positive effects on the properties of concrete in both stages; 1.fresh concrete, 2. hardened concrete. Super absorbent polymer is mainly having the water tightness properties of plain concrete with time. The study includes short term and long term effect of the super absorbent polymer on the water sealing properties. Many advantages exist in the use of super absorbent polymer in plain concrete with internal water. This internal water source acts as internal curing agent after the final setting of concrete. At the same time the SAP releases water at relatively slower rate at the fresh concrete stage. The SAP also provides additional voids in the concrete. These voids affect the concrete strength negatively at the same time improve the concrete performance by improving the concrete workability and consistency, reducing the concrete susceptibility to freezing thawing cycle, and improving concrete stability. In this project we tried to study the behavior of super absorbent polymer in mechanical properties of compression, split tensile and flexural strength with internally cured concrete. An experiment has been carried out for M50 concrete using Super absorbent polymer of 0%,0.2%,0.3%,0.4% and 0.5% respectively. concrete cubes, cylinders and beams are casted and tested for 7 days and 28 days. The results are discussed in detailed and the compressive strength and split tensile strength greater for 0.2% of sap when compared with the remaining percentages of sap concrete. 0.2% of sap is optimum for the Beam of size 700X150X150 mm and shows the high flexural strength.

Keywords : Super Absorbent Polymer, Polyethylene Glycol, Hydration, Internal Curing, LWA

I. INTRODUCTION

1.1 GENERAL

The process of curing involves maintaining satisfactory moisture content and temperature after concrete is placed in order to hydrate the cement particles and produce the desired hardened concrete properties. Internal curing can be divided into two categories. The first category is internal water curing in which an internal curing agent stores water during mixing which is gradually released as hydration processes. The second category is internal sealing which is very similar to external sealed curing, in the goal of which is to prevent the loss of moisture from the concrete.

The super absorbent polymer agent absorbs water and converts it into gel, then releases it slowly with time, at the same time the gel volume increases proportionally. The expansion in volume has the tendency to clog the water pathways in the concrete mass, and consequently improving its water tightness properties. The use of SAP is proven to be very effective as a sealant in plain concrete if sufficient amount is used. This paper focuses on the long-term effect as well as the short-term effect of the use of the SAP in plain concrete. Several samples such as sodium polyacrylate and polyethylene glycol were prepared with different SAP content. Generally, the content of SAP is measured as a percentage of the Portland cement used by weight. The amount of water added to the fresh concrete is one of the most important key factors that affect the concrete properties, including water tightness durability and strength. The water is an essential ingredient needed for the hydration process in the fresh concrete and for the curing process in the hardened concrete at its early stages. Excessive amount of water added in the fresh concrete improves the concrete workability in general, reduces the concrete strength, and increases the drying shrinkage of the hardened concrete. The most common admixture used nowadays is the superplastisizer which is water reducer and at the same time retarder. The water gel created in the fresh concrete by the use of SAP provides cushioning and lubrication in the concrete mass which in turn improves the concrete workability as well as the concrete stability.

The use of internal-curing admixtures is very important from the point of view that water resources are getting valuable every day (i.e., each 1 m^3 of concrete requires about 3 m^3 of water for constructio4n mostly for curing). The benefit of Internal-curing admixtures is more significant in desert areas where water is not readily available.

1.2 NEED FOR SELF–CURING

When the mineral admixtures react completely in a blended cement system, their demand for curing water (external or internal) can be much greater than that in a conventional ordinary Portland cement concrete. When this water is not readily available, due to de-percolation of the capillary porosity. For example, significant auto-genius deformation and cracking may result.

Due to the chemical shrinkage occurring during cement hydration, empty pores are created within the cement paste, leading to a reduction in its internal relative humidity and also to shrinkage which may cause early-age cracking. This situation is intensified in HPC (compared to conventional concrete) due to its generally higher cement content, reduced water/cement (w/ c) ratio and the pozzolanic mineral admixtures (fly ash, silica fume). The empty pores created during self-desiccation induce shrinkage stresses and also influence the kinetics of cement hydration process, limiting the final degree of hydration . The strength achieved by internal curing could be more than that possible under saturated curing conditions.

Often specially in HPC, it is not easily possible to provide curing water from the top surface at the rate required to satisfy the ongoing chemical shrinkage, due to the extremely low permeability's often achieved.

II. LITERATURE SURVEY

2.1 INTRODUCTION:

Some of the early research works had done using different mineral admixtures for internal curing

concrete. The literature pertaining to self curing concrete are reviewed and presented in this chapter.

2.2 REVIEW OF LITERATURE ON SELF CURING CONCRETE

Marianne Tange Hasholt, et al. [1] studied the effect of superabsorbent polymer on the mechanical strength of concrete by optimizing the dosage and internal water added. The authors arrived at the conclusion that "Addition of SAP does not lead to decrease in mechanical strength and while one has to be very patient and careful, it is possible to not only retain the same strength but also to increase it while preventing self-dessication.

M. Manoj Kumar, et al. [2] studied the effects of addition of using different ratios of superabsorbent polymer on the various mechanical properties of concrete, like Compressive Strength, Splitting Tensile Strength and Flexural Strength and compared them to conventional concrete.

Vivek Hareendran, et al.[3] created five different mixes of self- curing concrete and testd them with conventional self cured concrete for mechanical properties of concrete like Compressive Strength, Splitting Tensile Strength and Flexural Strength.

Moayyad Al-Nasra, et al. [4] studied the effect on superabsorbent polymer on fresh and hardened concrete using sodium polyacrylate and conducted some tests on the strength and stability of internally cured concrete.

M. KhodadadSaryazdi et al. [5] Self-desiccation is the major source of autogenous shrinkage and crack formation in low water-binder ratio (w/b) concreteswhich can be reduced by internal curing. In this paper performance of high strength self consolidating concrete (HS-SCC) withw/b of 0.28 and 0.33 including autogenous shrinkage, drying shrinkage, compressive strength, and resistance to freezing-thawingwas investigated. Then, for the purpose of internal curing, 25% of normal weight coarse aggregate volume was replaced withsaturated lightweight aggregate (LWA) of the same size; and its effects on the material properties was studied. Two modes ofexternal curing, moist and sealed, were applied to test specimens after demoulding. Autogenous shrinkage from 30 minutes to 24hours after mixing was monitored continuously by a laser system. The initial and final setting time were manifested as a changeof the slope of the obtained deformation curves. Shrinkage after initial setting was 860 and 685 microstrain (με) for 0.28 and 0.33w/b mixtures, respectively. The saturated LWA reduced these values to 80 and 295 με, respectively. By LWA Substitution the 28-day compressive strength of 0.28 w/b mixture was reduced from 108 to 89 and 98 to 87 MPa for moist and sealed cured specimen,respectively. The corresponding values for 0.33 w/b mixture was 84 to 80 and 82 to 70 MPa. Shrinkage of 0.28 w/b mixture without LWA after moist and sealed cured specimen dried for 3 weeks was about 400 με. Shrinkage of moist and sealed cured specimen containing LWA was reduced 9% and 25%, respectively. On the contrary for 0.33 w/b mixture an increase was noticed. Freezing-thawing resistance was improved by sealed curing, decreasing w/b and substituting LWA.

III. METERIAL PROPERTIES

The materials used for this experimental study were deeply analysed and quality measures were taken in proper execution .The project consumes materials which are inert and available easily in abundance thus making it cost efficient with the calibre to withstand the constructional challenges faced in curing process.

3.1.1 Materials Used

Cement

Cement used in the investigation was 53 grade ordinary Portland cement confirming IS: 12269: 1987.

Fine aggregate

River sand passing through 4.75mm sieve is used.

Coarse aggregate

Coarse aggregate is naturally found rock particles which can be taken by crushing them. Various sizes of aggregates are available such as 20mm, 40mm.

Silica fume

The silica fume used in this project is densified.

Chemical admixtures

The chemical admixture used is superplasticising admixture.

ADMIXTURES FOR IC

Sodium poly acrylate as a Super absorbent polymer is used as admixture for internal curing.

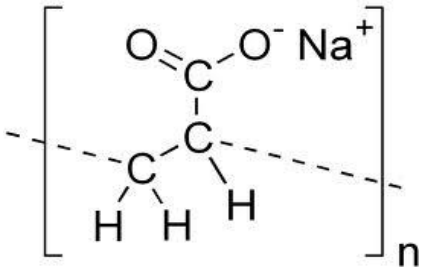
Water

A tap water available in the concrete laboratory was used in casting process.

Super absorbent polymer Properties

3.2 SUPER ABSORBENT POLYMER

Superabsorbent polymer (SAP) is a polymeric material which is able to absorb a significant amount of water from the surroundings and to retain the liquid within its structure without dissolving it takes up water during the mixing process, so it can be used as a dry concrete admixture and the use of SAP permits free design of the shape and size of the formed inclusions. The super absorbent polymer used in this study is Sodium Polyacrylate, also known as water-lock, which is a sodium salt of polyacrylic acid with the chemical formula [-CH2-CH(COONa)-]n and broad application in consumer products. It has the ability to absorb as much as 200 to 300 times of its mass in water. The maximum water absorption is approximately 5000 times its weight. Sodium polyacrylate is anionic polyelectrolyte with negatively charged carboxylic group in the main chain. Below figure, shows the composition of the sodium polyacrylate.



Sodium polyacrylate is a chemical polymer it is made up of multiple chains of acrylate compounds that possess a positive anionic charge, which attracts water-based molecules to combine with it, making sodium polyacrylate a super-absorbent compound. Sodium polyacrylate is used extensively in the agricultural industry and is infused in the soil of many potted plants to help them retain moisture, behaving as a type of water reservoir. Florists commonly use sodium polyacrylate to help keep flowers fresh.



IV. EXPERIMENTAL WORK AND TESTING

4.1 GENERAL

Preliminary tests are done to determine the characteristics of the aggregates to be used in preparation of concrete before mixing to know about the materials and how to use it.

4.2 Tests to be done in these work are given below:

- Specific gravity test.
- Water absorption test.
- Sieve analysis.

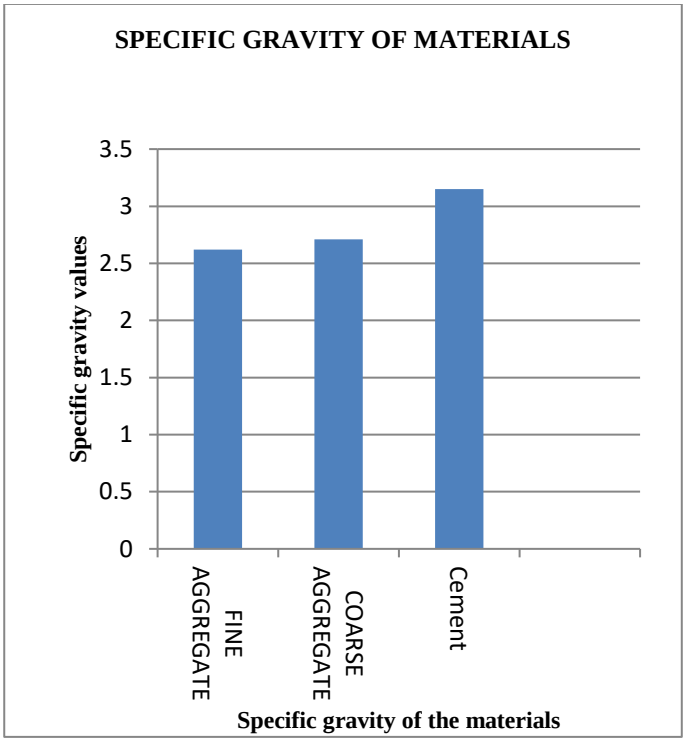
4.3 SPECIFIC GRAVITY

Specific gravity is the ratio of the density of a substance to the density of a reference substance; equivalently, it is the ratio of the mass of a substance to the mass of a reference substance for the same given volume. Specific gravity of fine aggregate and coarse aggregate is measured by pycnometer and Digital density meters.

In this process, we are using pycnometer for measuring the specific gravity of aggregates. A pycnometer is simply a bottle which can be precisely filled to a specific, but not necessarily accurately known volume. Placed upon a balance of some sort it will exert a force. A pycnometer is usually made of glass, with a close-fitting ground glass stopper with a capillary tube through it, so that air bubbles may escape from the apparatus.

The pycnometer is used in ISO standard: ISO 1183-1:2004, ISO 1014–1985 and ASTM standard: ASTM D854.





4.4 WATER ABSORPTION TEST

This test helps to determine the water absorption of coarse aggregates as per IS: 2386 (Part III) – 1963. For this test a sample not less than 2000g should be used.

Water absorption gives an idea of strength of aggregate. Aggregates having more water absorption

are more porous in nature and are generally considered unsuitable unless they are found to be acceptable based on strength, impact and hardness tests.

Water Absorption Test on Fine Aggregate

Table 1. Water Absorption Test on Fine Aggregate

Aggregate	I	II	III
Wt. Of saturated surface dry aggregate (g)	4423	4582	4776
Wt. Of oven dry aggregate (g)	4375	4534	4727

Calculation:

$$\text{Water absorption} = \frac{\text{wt.of sat.aggregate} - \text{wt.of oven dry aggregate}}{\text{wt.of oven dry aggregate}} \text{ X } 100$$

4.5 SIEVE ANALYSIS

A **sieve analysis** a practice or procedure used (commonly used in civil engineering) to assess the particle size distribution of a granular material.

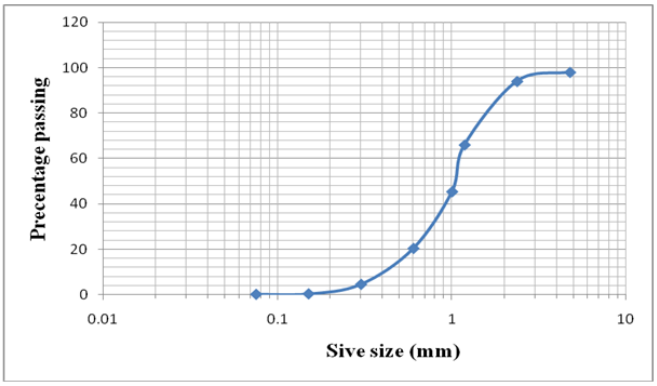
The size distribution is often of critical importance to the way the material performs in use. A sieve analysis can be performed on any type of non-organic or organic granular materials including sands, crushed rock, clays, granite, feldspars, coal, and soil, a wide range of manufactured powders, grain and seeds, down to a minimum size depending on the exact method. Being such a simple technique of particle sizing, it is probably the most common.

About 1 kg of dry sample of fine aggregate was taken and sieved on IS sieve number: 470, 240, 60, 30 and 15. This operation was continued until number particles passed through the sieves finally. Then the material retained in each sieve was collected and weighted. The results were tabulated and the percentage of fine aggregate of varying size that passes through each sieve was calculated and recorded. The values obtained were compared with grading limit chart for fine aggregate as given in IS: 383-1970 and the actual zone, to which particular fine aggregate comes under, was determined.

Uncrushed gravel or stone which is the result of natural disintegration and crushed gravel or stone are usually called the “Coarse Aggregates”. As mentioned earlier, coarse aggregates are stones that are retained on 4.75mm sieve. Nearly all natural aggregates originate from bed rocks. There are three kinds of rocks, namely, igneous, sedimentary and metamorphic. In such, many properties of aggregate depend on the properties of the parent rock itself. Coarse aggregates are classified into two main groups:

1. Single size aggregate and
2. Graded aggregate.

Single size aggregate is based on a nominal size specification. It contains about 85to 100 percent of the material which passes through that specified size of the sieve and zero to 25% of which is retained in the next lower sieve. A graded aggregate contains more than one single-size aggregate. Size of the gravel affects several aspects: mainly strength & workability. The use of largest maximum size of aggregate practicable to handle under a given set of conditions could be used. Using the largest possible maximum size will result in: reduction of the cement content, reduction in water requirement, and reduction in drying shrinkage.





4.5.1 Water Mould dimensions

For casting cubes, cylinders and beams standard moulds with smooth machined inner faces were used. The inner dimensions of the cube mould were 150X150X150mm. For casting cylinders, standard cast iron mould of 150mm diameter and 300mm height were used. For beams 750X150X150mm. The mould was completely water tight during concreting.

Mixing of materials

Concrete for all the specimens were mixed by using handling equipment.

Compaction

Compaction was done through using tamping rod. The tamping was done for one third of the portion of the concrete was filled in the mould and 30 blows are made in each time.

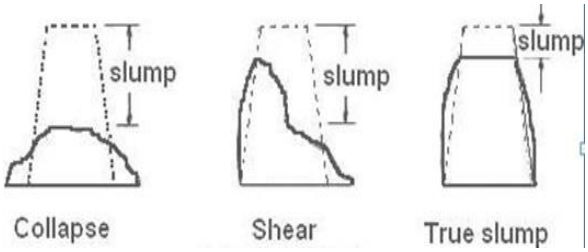
4.6 Test for fresh concrete

The slump test is a measure of the behavior of a compacted cone of concrete under the action of gravity. It measures the consistency of the wetness of the concrete

4.7 Procedure of Concrete Slump test

- The mold for the slump test is a frustum of cone300mm of height. The base is 200mm in diameter and the top is 100mm in diameter.
- The base is placed on a smooth surface and the container is filled with concrete in three layers whose workability is to be tested.
- Each layer is tamped 25 times with a standard 1mm diameter steel rod rounded at the end.
- When the mold is completely filled with concrete the top surface is struck off by means of screening and rolling motion of the tamping rod.
- The mold must be firmly held against its base during the entire operation that it could not move due to the pouring of concrete and this can be done by means of handles or foot rests brazed to the mould.
- Immediately after filling is completed and the concrete is leveled the cone is slowly and carefully lifted vertically an unsupported concrete will now slump.
- The decrease in the height of the center of the slumped concrete is called slump.
- The slump is measured by placing the cone just besides the slump concrete and the tamping rod is placed over the cone so that it should also come over the area of slumped concrete.
- The decrease in the height of concrete to the mould is measured with scale. The various types of slumps was shown in the figure 5.8.
    - Value for M50 mix

- 50-90 used for normal reinforcement concrete.



4.8 Casting procedure and curing process

In this study concrete of M50 grade was considered. The mix design of concrete was done. The mix proportion obtained was **1: 1.46 : 2.13** (cement,sand, coarse aggregate, water) the mix design gives the cement content of 475 kg/m3 of concrete.

Using the above mix proportion, a total number of 30 standard concrete specimens are 150X150X150 mm size of cubes and 30 number of cylinders specimens are having size of 150 mm diameter, 300mm height and 10 number of beam specimens are having size of 700X150X150 mm. The number of cubes and cylinders are casted 30 for dry curing or kept as dry 30 for water curing and the number of beams are casted 5 for dry curing and 5 for water curing.

Cast iron moulds are used for casting. For casting specimen, three different proportion in fraction of Super absorbent polymer are 0%, 0.2%,0 .3%, 0.4% and 0.5% . The concrete was mixed by manually and then it was poured in to the moulds in layer by layer. Compaction was done by a tamping rod. The specimens were removed after 24 hours of casting and then cured under water for 7 days and 28 days. The specimens were taken out from the curing tank and dried itself of 24 hours before the period of testing

4.9 COMPRESSIVE STRENGTH TEST

The cubes are casted according to the design, then after setting of concrete, demould the cube. Then take them to the curing pit and place the cubes in it for 7 days and 28 days. Take the cubes out and wipe them and place it under dry condition for 2-3 hours. The cubes are tested in compression testing machine.

The compressive strength is the capacity of a material or structure to withstand loads tending to reduce size. It can be measured by plotting applied force against deformation in a testing machine. Some materials fracture at their compressive strength limit; others deform irreversibly, so a given amount of deformation may be considered as the limit for compressive load. Compressive is a key value for design of structures. This test is done to determine the compressive strength of concrete as per IS 516–1959 (Methods of tests for strength of concrete).



Fig 4.9.1 Testing of Compressive Strength of Cube

Compressive strength is often measured on a universal testing machine; these range from very small table-top systems to ones with over 53 MN capacity Measurements of compressive strength are

affected by the specific test method and conditions of measurement. Compressive strengths are usually reported in relationship to a specific technical standard.

CALCULATION:

Compressive strength in $N/mm^2 = \frac{Load}{Area}$

4.10 SPLIT TENSILE STRENGTH TEST :

For the determination of splitting tensile strength of concrete, cylinder specimens of diameter to length ratio 1:2 was selected, with diameter as 150 mm and the length as 300 mm specimens were dried in open air after 7 days and 28 days of curing and subjected to splitting tensile test under universal testing machine. The rate of loading was adjusted as 0.11 to 0.023 MPa/sec as per ASTM C496-90. While testing the specimens, plywood pieces one at the top and the other at the bottom. The split tensile strength (f) was obtained using the formula

$F = 2P/3.14dl\ (N/mm^2)$

Where P= load at failure (N),

d = diameter of specimen (mm),

l= length of specimen (mm)



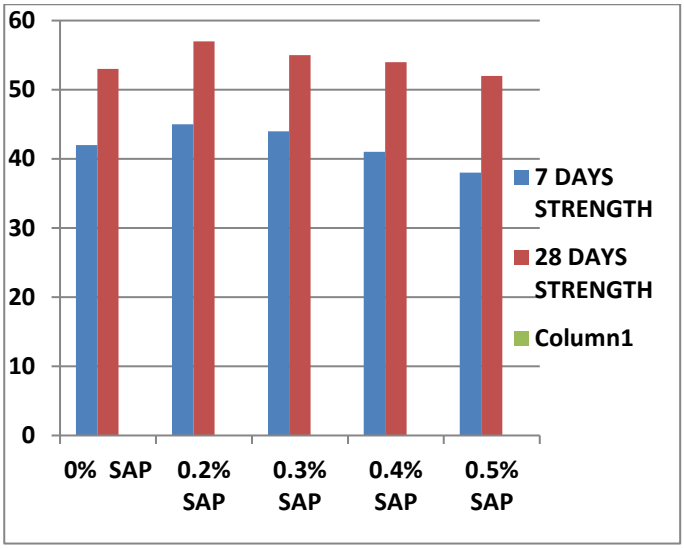


Fig. 4.10.1 Bar graph for compressive strength of cubes of 7 days and 28 days for Air dry

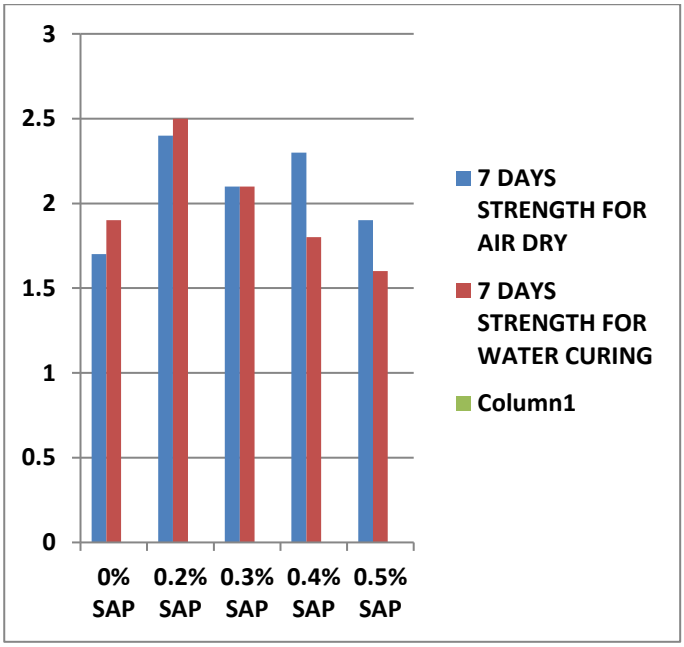


Fig.1.10.2. Bar graph for tensile strength of cylindres after 7 days for air dry and 7 days for Water curing

V. CONCLUSION

The internal curing (IC) or self curing by the addition of silica fume is an effective means of drastically reducing autogenous shrinkage. Since autogenous shrinkage is a main contributor to early-age cracking, it is expected that IC would also reduce such cracking. An additional benefit of IC beyond autogenous shrinkage reduction is increase in compressive strength. As internal curing maintains saturated conditions within the hydrating cement paste, the magnitude of internal self-desiccation stresses are reduced and long term hydration is increased. IC is particularly effective for the high performance concretes containing silica fume.

- Water retention for the concrete mixes incorporating self-curing agent is higher compared to conventional concrete mixes, as found by the weight loss with time.
- The optimum dosage is 0.2%.Addition of SAP leads to a significant increase of mechanical strength (Compressive and Splitting tensile).
- Compressive strength of self-cured concrete for dosage of 0.2% was higher than water cured concrete for 7 days testing.
- Split tensile strength of self-cured concrete for dosage of 0.2% was higher than water cured concrete for 7 days testing.
- Flexural strength of self-cured concrete for dosage of 0.2% and 0.3% was higher.
- There was a gradual increase in the strength for dosage from 0% to 0.2% and later gradually reduced.
- The Self-cured concrete using SAP was more economical than conventional cured concrete.
- In the study cubes,cylinders and beams were casted and kept for air dry and water curing in room temperature about 250-300c.practical feasibility of self cured member is need to be checked in hot regions.

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A Review Based Study on Problem-Solving Ability of School Students in Relation to their Academic Achievement

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ABSTRACT

Studies were reviewed to find out the relationship between problem–solving ability and academic achievement of school students. It was found that for the last few years, there is a significant positive relation between Problem-Solving Ability and Academic Achievement of school students. The review of various studies revealed that the problem-solving ability of boys is significantly higher than the girls. The study also concluded that there is a positive correlation between various factors like (personality, study behavior, learning style, scientific attitude, intellectual ability, examination anxiety etc.) and academic achievement.

Keywords **:** *Problem-Solving Ability, School Students and Academic Achievement.*

I. INTRODUCTION

In our society academic achievement is considered as a key point to judge one's total capabilities. Hence academic achievement attributes a very incumbent place in education as well as learning process. "Academic Achievement is the knowledge attained or skill developed in the school subjects, usually designed by test scores or by marks assigned by teachers"(Carter 1958). Achievement is influence by personality, encouragement, knowledge, education and training. There are many other factors which also influence the academic achievement of students like problem-solving ability, intelligence, study habits, socio-economic status, personality etc. Problem-solving ability is one important factor influencing academic achievement of students.

Academic achievement generally refers to the levels of proficiency attained in some academic work. It encourages the students to work hard and learn more. It is the status of students learning and refers to knowledge attained and skills develop during their academic work which is assessed by the teachers. The academic achievement of the same student differs from time to time from one class to another. Academic achievement is one of the most important aims of education. The success or failure of a student is measured in terms of academic achievement.

The term Academic Achievement is the combination of two words academic and achievement. In this the word 'Academic' is related to formal education. It is derived from the word 'Academy' means school, where special types of instructions are imparted. The term academic means institutional system of formal education in school, college and university.

Achievement is an accomplishment of success in bringing a desired end. Academic Achievement plays a very significant and pivotal role in the attainment of harmonious development of child. It refers to the

knowledge attained and skill developed in the different subjects. Academic Achievement is multi - dimensional phenomenon. It is a product of interaction between several factors and operations in the pupils such as abilities, motivation, interest and attitude and a complicated set of forces operating in functional set up of the school.

According to Jonassen (2010) "most important cognitive goal of education (formal and informal) in every educational context (public schools, universities and corporate training) is problem solving". Problem-Solving process is the careful analysis of details of a problem to reach a solution. Effective problem solving demands proper conceptual understanding.

Problem-Solving Ability may be said to be a deliberate and purposeful act on the part of an individual. It helps in the realization of the set goals or objectives by inverting some novel methods or systematically following some planned step for removal of the interferences and obstacles when usual methods like trial and error, habit formation and conditioning fail. Problem-Solving is the framework or pattern within which creative thinking and reasoning take place. It is the ability to think and reason in different complex situations. People who have learned effective problem-solving techniques are able to solve problems at higher level of complexity than more intelligent people who have not such training. Problem-Solving Ability is highly correlated with intelligence, reasoning ability and mathematical ability.

OBJECTIVES

- To review and analyze the published literature on the problem solving ability of school students.
- To analyze the academic achievement of school students.
- To study the relationship between problem-solving ability and academic achievement of school students.
- To identify the factors that correlates problem-solving ability of school students.

II. METHODS AND MATERIALS

The study included researches conducted in India and abroad, published in various journals.

III. REVIEW OF LITERATURE

Gakhar et al. (2003) studied *creativity, problem solving and personality in relation to scholastic achievement* with the objective to study the relationship between academic achievement and problem solving by taking a sample of 545 students of senior secondary school and found that problem solving ability was significant and positively correlated with mathematical achievement.

Salami, S. O. and Aremu, A. Oyesoni (2006) studied on *relationship between problem-solving ability and study behavior among school going adolescents in southwestern Nigeria.* A descriptive survey research design was employed in this study. The participants for this study were 430 final senior secondary school students selected by stratified random sampling technique. Researcher found that the problem solving ability correlated significantly with study behavior and it is significantly predictive of the secondary school students study behavior.

Sharma (2007) studied *problem solving ability and scientific attitude as determinant of academic achievement of higher secondary students* and found that high achievers had high problem solving ability

in comparison to average and low achievers; there exist positive relationship between achievement, problem solving ability and scientific attitude.

Jose, Nisha M. and Thomas, Rainal P. (2011) studied on *Problem-Solving Ability and Scholastic Achievement of Secondary School Students.* The main objectives of the study were (i) to find out whether there is any significant difference in the problem solving ability of secondary school learners with respect to gender, locale and type of school and (ii) to find out whether there is any significant difference in relationship between problem solving ability and scholastic achievement of secondary school learners with respect to gender, locate and type of school. The sample was comprised of 320 secondary school students of Kottayam district. Survey Method was adopted in the study. The major findings were, boys have higher problem solving ability compared to girls. Problem Solving Ability of students in rural school is greater than the students in urban school; private school students have significantly higher problem solving ability when compared to government school students and both government and private school students possess greater problem solving ability but the school students possess greater problem solving ability but the scholastic achievement of government school students are low.

Manjula, M.and Natraj, P.N. (2012) focuses on *problem solving ability among the matriculation school students of Cuddalore district.* Normative survey method has been used to collect data. By using random sampling technique 644, IX standard matriculation school students have been chosen and involved in this study. In the present investigation descriptive analysis and differential analysis statistical techniques were used. The results revealed that (i) the problem solving ability of students are low in matriculation schools at Cuddalore district. (ii) investigation also reveals that there is no significant difference in respect of the sub samples, type of family, mothers' education, fathers' occupation and mothers' occupation, while in respect of gender, locality, fathers' education and parental monthly income there is significant difference on their problem solving ability.

James, A.O.and Adewale, O.A.(2012) studied on *relationship between Senior Secondary Schools Students' Achievement in Mathematical-Problem Solving and Intellectual Abilities Tests*. The study was aimed at establishing the relationship between the achievement of secondary school students in mathematical problem solving and their achievement in intellectual ability test using factor analysis. The study population consisted of all the students in Senior Secondary Schools (SSS) in Ondo State. Out of this population, a sample of 206 students was purposively selected from three senatorial districts of the State. Seven instruments (six on intellectual abilities and one on mathematical problem solving) were administered on the respondents. The finding of the study showed that a significant relationship existed between mathematical problem solving and intellectual abilities (verbal, induction and numerical abilities) of the students. Thus, teachers should provide avenue for students to improve their intellectual abilities of verbal, induction, numerical, retention and other abilities.

Anboucarassy .B. (2015) studied on *Problem solving ability of higher secondary students in relation to their learning styles.* The samples selected for the study were higher secondary school students from different schools in Pondicherry. The sample size 300 was drawn from various schools. The tool used to collect data is Problem solving ability test standardized by L.N. Dubey and Styles of learning

and thinking tool standardized by D. Venkatraman. The study showed that problem solving ability of higher secondary students is average in nature. It was found that problem-solving ability had a positive relationship with learning.

Chauhan, Poonam and Shrma, Neha (2015) the main aim of this study was to analyze the problem solving ability among intellectually gifted students and investigated whether gender and location influenced problem solving ability of intellectually gifted students or not. The sample for the present study comprised of 30 intellectually gifted (16 female and 14 male) students from 10 different rural and urban senior secondary schools of Aligarh District. Raven's Advanced Progressive Matrices developed by Raven, J.C., Court, J.H. and Raven,J.(1977) and Problem Solving Ability Test developed by Dubey, L.N.tools employed for data collection. Correlation and Two way ANOVA techniques are used for data analysis. The result of this study revealed that there is low problem solving ability among intellectually gifted students. Intellectually gifted boys showed higher problem solving ability than girls and there is no significant difference between rural and urban intellectually gifted students with respect to their problem solving ability. Further, the finding showed the significant interaction effect of gender and location on problem solving ability of the intellectually gifted students.

Panju, N.and Kaur, Bhupinder (2015) studied and compared the *problem solving ability among senior secondary school students.* Problem Solving Ability Test (Dubey,2005) was used to collect data. The findings of the study revealed that school students possessed problem solving ability ranging from average to low. The results of the study also highlighted insignificant difference in problem solving ability among adolescent boys and girls. Mean, S.D. and t-test were used for statistical analysis.

Agnihotri,A.K.(2015) conducted a study on *Problem-Solving Ability among Senior Secondary School Students of Govt. Senior Secondary Schools of Hamirpur district of Himachal Pradesh.* Objectives of the study were to compare the senior secondary school boys and girls' students of science, commerce and arts with respect to their Problem-Solving Ability In the present study, Problem Solving Ability test constructed by L.N. Dubey has been used to collect data. There are 20 items in Problem solving ability test. It is found in the present study that the students of Science and Commerce streams have the higher level of problem solving ability as compare to the students of Arts stream. On the other hand there was no significant difference in the level of problem-solving ability on the gender basis.

Kumari, Jyoti (2016) studied on *Problem-Solving Ability of Senior Secondary School Students.* The main objectives of the study were- to study the difference in the level of problem-solving ability among senior secondary school students in relation to type of school, their stream and gender. A sample of 320 students of government and private schools was taken from Tehsil Nurpur and Indora of Kangra District of Himachal Pradesh. Problem-solving ability test developed by L.N. Dubey was used for this study.

Bala, Preeti, and Shaafiu,K.Q. (2016) studied on *academic achievement of secondary school students in relation to their problem solving ability and examination anxiety.* Descriptive survey method was used. The difference of male and female students' academic achievement, problem-solving ability and examination anxiety was also evaluated.200 secondary students of Maldives (100 males and 100 females) were randomly selected as sample.

Examination Anxiety Scale and Problem solving ability scale were administered on 10 different secondary schools of Maldives. The study concluded that there exists no significant difference between male and female students in academic achievement, problem solving ability and examination anxiety. The study also revealed that there exists a positive correlation between academic achievement and problem solving ability and also showed that there exists a negative correlation between examination anxiety and academic achievement.

Dhadhich Anita (2016) conducted study on the *problem-solving ability of 11th standard students*. The main objectives of the study were to observe the problem-solving ability of students of 11th standard of government and private schools to observe the difference between the problem solving ability of girls and boys. For the present study, a sample of 60 students has been taken and standardized test of problem solving ability developed by Dr. Rooprekha Garg has been used. By using the various statistical techniques the result was drawn that there is significant difference between problem solving ability of boys and girls of 11th standard students

Ahuja,J., Nagpal, P. and Kakkar, N. (2017) carried on *A comparative study of problem solving ability of science and arts senior secondary school.* The main objectives of the study were- to study the problem solving ability of male and female science students of senior Secondary schools, to study the problem solving ability of male and female arts students of senior Secondary schools and to study the difference if any in the problem solving ability of science and arts senior secondary school. The hypotheses made were there is no significant relationship in the problem solving ability of science and arts senior secondary schools students. Descriptive Survey Method was used for the present study. A sample of 100 students was randomly selected from the government and private schools. Problem-Solving Ability Test by L.N.Dubey was used. For the analysis of data Mean, S.D. and 't'-test was used.

Lizzie, J.(2017) carried out the study *Problem Solving Ability in Mathematics in relation to their academic achievement among higher secondary students.* The sample for the study consists of 300 higher secondary students selected random from government, government aided and private higher secondary students of Tiruvallur city. Descriptive Survey method was used. Descriptive analysis and inferential analysis had been utilized for this study. Null hypothesis were framed and tested. To assess the problem solving ability in mathematics, the questionnaire was constructed by the investigator. To assess the academic achievement quarterly and half yearly marks were calculated. The main finding was found a positive relationship between problem solving ability in mathematics and academic achievement.

IV. CONCLUSION

It was found that Problem-Solving Ability is significantly and positively correlated with academic achievement. Various factors like personality, study behaviour, learning style, scientific attitude, intellectual ability, exam anxiety have greater influence on Problem-Solving ability and academic achievement of school students.

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An Experimental Investigation on the Properties of High Volume Flyash Glass Fibre Reinforced Self Compacting Concrete

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ABSTRACT

Civil engineering is a professional engineering discipline that deals with the designing and construction. In construction one of the main resource is concrete in the world. The concrete is day-to-day have many changes like strength, durability, shrinkage. This project deals with the self-compaction concrete with use of fibre reinforcement. The self-compacting in concrete is achieved by adding super plasticizers and glass fibres are used as reinforcement. The influence of including fly ash on the properties of self-compacting concrete is investigated. Fly ash is introduced by 50% in the total weight of cement. The water to binder ratio was maintained at 0.38%. Properties included workability, compressive strength, split tensile test, modulus of elasticity and shrinkage. The results indicate the high volume FA can be used in SCC to produce the high strength and low shrinkage. Increasing the admixture content beyond the certain level leads to a reduction in strength and increasing in absorption. Making concrete structure without compaction has been done in the past. Like placement of concrete under water by the use of term without compaction. Inaccessible areas were concrete using such a techniques. The production of such mixes use expensive admixtures ad large amount of cement but such type of concrete is low strength. To eliminate such issues lead to the development of self-compacting concrete (SCC). Usage of fibres makes the mixing of concrete complex. Self-compacting concrete (SCC) is an innovative concrete that does not require vibration for placing and compaction.

Keywords : Compression, Durability, Flyash, Workability, GFRP, Plasticizers, Torsion

I. INTRODUCTION

Cement is the main ingredient in concrete production. Concrete is predominant construction material. Infrastructure development around the world created demand for construction material. It was estimated that global production of cement is about 1.3 billion tons in 1996. Production of every point of cement emits carbon dioxide to the tune about 0.87 tons. Expressive it is another way. It can be said that 7% of the world's carbon dioxide emission is attributable to Portland cement industry. Because of the sufficient contribution to the environmental pollution and to the high consumption of natural resources like limestone etc., we cannot go on producing more and more cement. There is a need to economize the use of cement. One of the practical solutions to optimize cement use is

replacing pozzolanic industrial waste materials like fly ash.

Fly ash:

Fly ash is finely divided residue resulting from the combustion of powdered coal and transported by the flue gases and collected by electrostatic precipitator. In U.K. it is referred as pulverized fuel ash (PFA). Fly ash is the most widely used pozzolanic material all over the world. The uses of fly ash as concrete admixture not only expense technical advantages to the properties of concrete but also contributes to the environment pollution control. In India alone, we produced about 75 million tons of fly ash per year, the disposal of which has become a serious environmental problem. The effective utilization of fly ash in concrete making is, therefore, attracting serious consideration of concrete technologists and government departments. In India, the total production of fly ash is nearly as such as that of cement (75 million tonnes). But our utilization of fly ash is only about 50% of the production. Therefore, the uses of fly ash must be popularized for more than one reason. Concrete is applicable to a variety of constructions due to its flexibility. Cover the past several decades plenty of research was done on the different types of concretes, one of such being roller compacted concrete (RCC). RCC has proved itself to be the best and the economical for mass concreting applications like dams and pavements, due to its rapidity in construction and reduced cementitious material content. SCC as a method evolved both from the efforts of a few concrete dam designers and from the work of geotechnical engineers who traditionally designed earth and rock fill embankments.

II. SELF-COMPACTING CONCRETE

Self- Compacting Concrete or SCC is one of the most widely used concrete types mainly because of its self-compacting characteristics and additional strength benefits. Find out the importance and uses of Self-Compacting concrete along with its manufacturing processes inside the article. Concrete is the most basic element of for any kind of construction work. No matter what type of building structure it is, the concrete used should be study and well compacted. Ensuring the above points not only provide additional strength to the structure but also good finish and appearance to the final product. The compacting of any conventional concrete is done through external force using mechanical devices.

Application of self compacting concrete:

The development of SCC marks an important milestone in improving the product quality and efficiency of the building industry. SCC can also be used in situations where it is difficult or impossible to use mechanical compaction for fresh concrete, such as underwater concreting, cast in-situ pile foundations, machine bases and columns or walls with congested reinforcements. Recently, this concrete has gained wide use in many countries for different applications and structural configurations as stated by Bouzoubaa (2001). It can also be regarded as "the most revolutionary development in concrete construction for several decades". Originally developed to offset a growing shortage of skilled labour, it is now taken up with enthusiasm across the world for both site and precast concrete work.

FIBRES:

A glass fibre is a form **Glass fibre** also called fiberglass. It is material made from extremely fine fibres of glass Fiberglass is a lightweight, extremely strong, and robust material. Although strength properties are somewhat lower than carbon fibre and it is less stiff, the material is typically far less brittle, and the raw materials are much less expensive. Its bulk strength and weight properties are also very favourable when compared to metals, and it can be easily formed using

moulding processes. Glass is the oldest, and most familiar, performance fibre. Fibres have been manufactured from glass since the 1930s. The fibre reinforced plastic where glass fibre is the reinforced plastic. The glass fibre is usually flattened into a sheet, randomly arranged or woven into a fabric. According to the use of the glass fibre can be made of different types of glass. Fibre glass is light weight, strong and less brittle. The best part of fibre glass is its ability to mould into various complex shapes. This is why fibre glass is widely used in boats, aircrafts, roofing and other applications.

Glass-reinforced plastic:

Glass-reinforced plastic (GRP) is a composite material or fibre-reinforced plastic made of a plastic reinforced by fine glass fibres. Like graphite-reinforced plastic, the composite material is commonly referred to as fiberglass. The glass can be in the form of a chopped strand mat (CSM) or a woven fabric. As with many other composite materials (such as reinforced concrete), the two materials act together, each overcoming the deficits of the other. Whereas the plastic resins are strong in compressive loading and relatively weak in tensile strength, the glass fibresare very strong in tension but tend not to resist compression. By combining the two materials, GRP becomes a material that resists both compressive and tensile forces well.

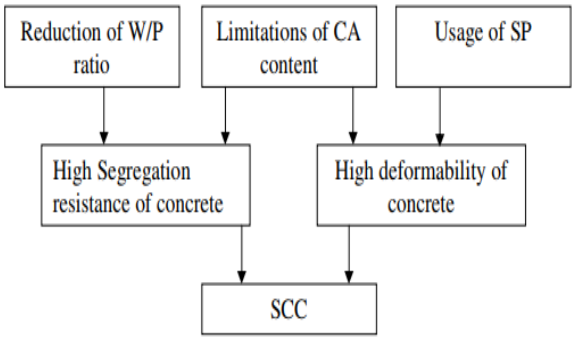


Fig. 1 : Basic principles on SCC

III. METHODS FOR ACHIEVING SELF COMPACTION

SCC consists of powder (Cement + filler) in high volume rather than normal concrete; this can be normally achieved with replacement of CA from conventional concrete. This involves high deformability of paste or mortar and resistance to segregation of CA from mortar because concrete has to flow during confined zones and around obstacles like rebars.This in turn is achieved by limiting the aggregate content, using a low water-powder (W/P) ratio and use of a SP. The methodology is shown schematically given by Okamura and Ozawa (1995) as below in Figure.

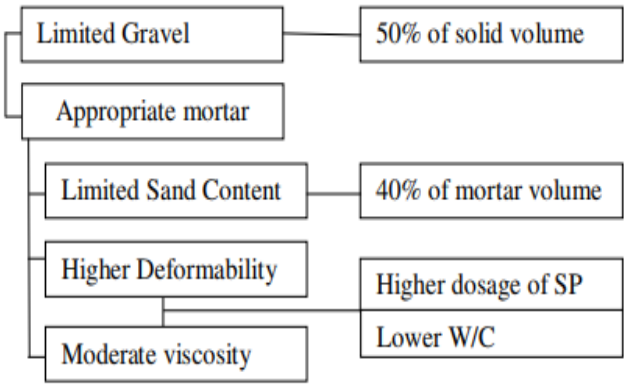


Fig 2 : Methods of achieving SCC

Passing Ability:

Passing ability is the ability of the concrete to flow though restricted spaces without jamming. This property is related to the maximum aggregate size and aggregate volume, and the L-Box test is the most common method used to evaluate this property. A visualization experiment conducted by Okamura (1997) showed that obstruction occurred from the contact among CA. As the distance between particles decreases, the potential for blocking increases due to particle collisions and the build-up in internal stresses. Decreasing the CA volume can reduce inter-

particle interaction, and it has been shown that the energy required to initiate flow is often consumed by the increased internal stresses and CA. Hence, Okamura (1997) recommended that the aggregate content should be reduced in order to avoid blockage. The 12 relative displacement from the change in aggregate location causes shear stress in addition to compressive stresses, and in order to flow easily through the narrow spaces the shear stress should be minimized as proposed by Okamura et al (1999).

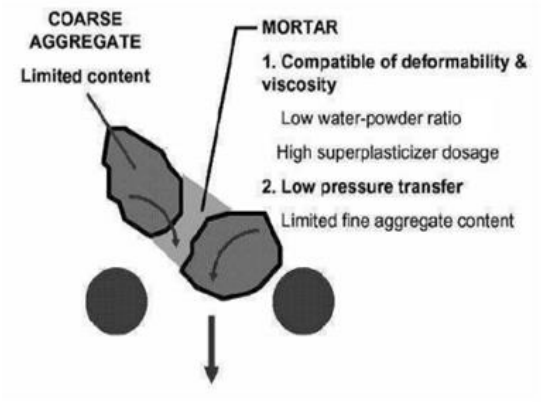


Fig. 3 : Mechanism for achieving Self-Compactability (Okamura et -1999)

IV. DEVELOPMENT OF SELF COMPACTING CONCRETE

Kuroiwa [1993], Developed a new type of concrete with materials normally used in conventional concrete, that is, cement, aggregates, water and admixtures. The chemical admixtures were used to improve the deformability and viscosity properties of the concrete. The newly developed concrete was named super-workable concrete. This has shown considerable resistance to segregation and deformability. It also filled heavily reinforced formworks completely without the use of any vibrators. The laboratory tests showed that the super-workable concrete has superior fresh and hardened state properties with improved durability. Because of this, this concrete was considered to be suitable for structures having heavy reinforcement areas and used in the construction of twenty-storied buildings.

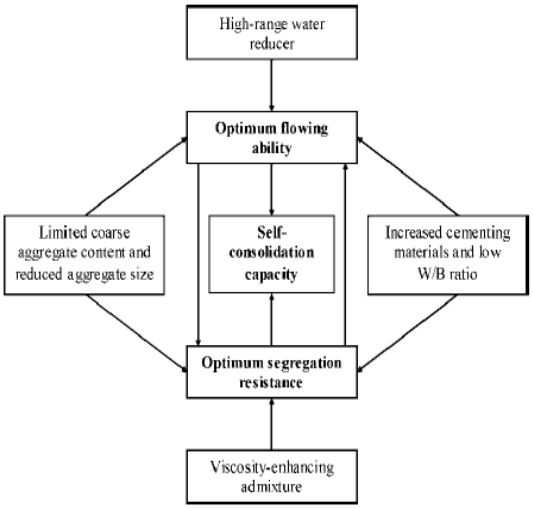


Fig. 4 : Development of SCC

Mix proportioning:

There are various methods of SCC mix proportioning Mix proportioning was based on the water cement ratio(water/cement +fly ash ratio) and the density of the concrete is 2400kg/m3.for roller compacted concrete i.e. zero slump concrete. Quantity of water required is very less it should be taken as 0.38% and cement is taken as 450 kg/m. But in these 50%of cements is replaced with fly ash. Coarse aggregate is 900 kg/m3 and fine aggregate is 900 kg/m3.

V. EXPERIMENTAL PROCEDURE:

We have assumed a new mix proportions which are by satisfying the workability properties of EFNARC guidelines. First we have done the trial and error method to fix the ratio of water cement and admixture. By using different ratios we got the slump cone flow as 590mm at water cement ratio 0.46. We assumed that the ratio is suitable for mix design.



Fig 5 : before adding of super plasticizer



Fig 6 : After adding of super plasticizer

COMPRESSIVE STRENGTH

Compression test is done confirming to IS:516-1953. All the concrete specimens that are tested in a 2000 KN capacity compression testing machine. Concrete cubes of size 150mm x 150mm x 150mm and cylinders of size 150mm diameter and 300mm height and prisms of size 100mm x 100mm x 500mm were tested for crushing strength, crushing strength of concrete was determined by applying load at the rate of 1400 N/Cm2/min till the specimens fail. The maximum load apply to the specimens was recorded and divided the failure load with cross sectional area of the specimens for compressive strength of the concrete.

Compressive strength test was conducted on cubes of 150mm x150mm x 150mm cubes and 150mm x 300mm cylinders and 100mm x 100mm x 500mm prisms for the various mixes of the high volume fly ash role compacted concrete.

SPLIT TENSILE STRENGTH

This test is conducted in a 2000 KN capacity compression testing machine by placing the cylindrical specimen, so that its axis is horizontal to the plates of the testing machine. Narrow strips of packing material i.e., plywood is placed between the plates and the cylinder to receive compressive stress. The load was applied uniformly at a constant rate until failure by splitting along the vertical axis takes place. Load at which the specimens failed recorded and the split tensile stress is obtained using the formula based on IS: 5816-1970.

FLEXURAL STRENGTH TEST

Reference standards

IS: 516-1959 – Methods of tests for strength of concrete.

The bed of the testing machine shall be provided with two steel rollers, 38 mm in diameter, on which the specimen is to be supported, and these rollers shall be so mounted that the distance from centre to centre is 50 cm for 15.0 cm specimens or 40 cm for 10.0 cm specimens. The load shall be applied through two similar rollers mounted at the third points of the supporting span that is, spaced at 16.67 cm centre to centre. The load shall be divided equally between the two loading rollers, and all rollers shall be mounted in such a manner that the load is applied axially and without subjecting the specimen to any torsional stresses or restraints.

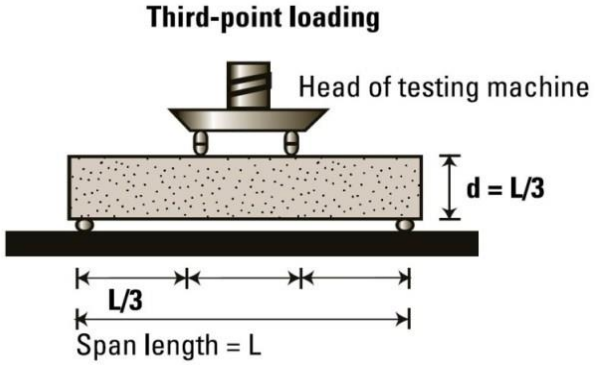


Fig. 7

$$\text{Flexural Strength} = \frac{Pl}{bd^2}\ (MPa)$$

REBOUND HAMMER TEST:

Schmidt' rebound hammer developed in 1948 is one of the common the adopted equipment's for measuring the surface hardness. External view of the hammer as show in fig.

It consist of spring control hammer that slides on a plunger with in a tubular housing. When the plunger is pressed against the surface of the concrete, the mass rebound from the plunger. It retracts against the force of the spring. The hammer against the concrete and the spring control rebound, taking the rider with it along the guide scale. By pushing a button, the rider can be held in position to allow the reading to be taken. The distance travel by the mass, it is rebound number. It is indicated by the rider moving along a graduated scale.



Fig 8 : Rebound hammer

VI. EXPERIMENTAL RESULTS:

Results and experiments on compressive strength, Split tensile strength, water absorption and evaporation for different fly ash replaced roller compacted concrete have been presented with those of control concrete. For the range of fly ash replaced roller compacted concretes and control mixes studied, the following conclusions can be drawn.

1. The compressive strength was nearly equal to control SCC for 5%fly ash replacement for 1, 7 and 28 days curing ages. Fly ash replacements greater than 20% have lower strength than conventional concrete.
2. The split tensile strength of fly ash concrete were comparable with conventional concrete up to 5% fly ash replacement. However, 50% fly ash replaced concrete had lower split tensile strength than conventional concrete.
3. The results demonstrated that, irrespective of fly ash percentage replacement there was good relationship between compressive strength and split tensile strength.
4. The absorption characteristics shows that the initial 30 min absorption values for all the concretes were lower than limits commonly associated with good quality concrete. The maximum absorption observed was 3.75% for 20% fly ash.

Evaporation of the SCC was comparable with conventional concrete up to 60% fly ash replacement. However evaporation of 60% fly ash replaced concrete and 15% ESP higher than conventional concrete.

Table 1 : Compressive strength for various mixes at 7,14,28 days

MIXES	FIBRE (%)	Compressive strength (MPa)		
		7 days	14 days	28 days
M1	0	13.26	21.5	27.8
M2	0.2	15.32	23.7	29.2
M3	0.4	16.7	24.1	30.5
M4	0.6	17.2	25.8	32
M5	0.8	16.8	25.2	31.3
M6	1	15.9	23.6	30.5

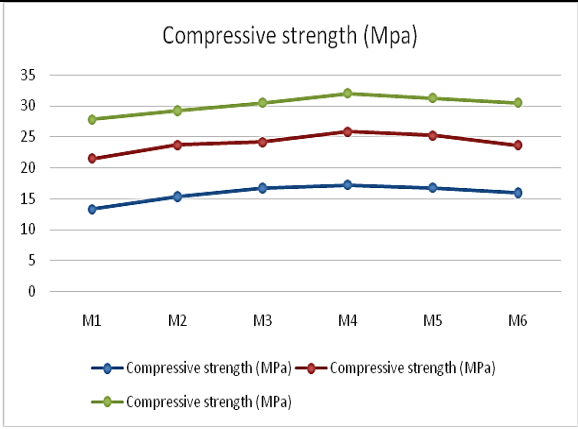


Table 2 : Split Tensile strength for various mixes at 7,14,28 days

MIXES	FIBRE (%)	Split tensile strength (MPa)		
		7 days	14 days	28 days
M1	0	2.5	4.6	6.8
M2	0.2	2.8	5.3	7.2
M3	0.4	3.4	5.7	7.6
M4	0.6	4.2	6.1	8.2
M5	0.8	4.1	5.8	8
M6	1	3.9	5.1	7.5

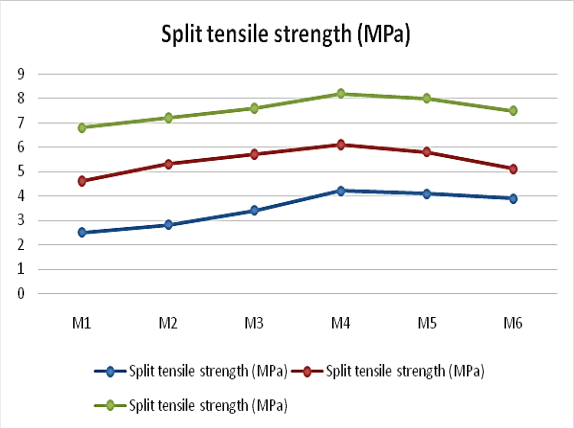
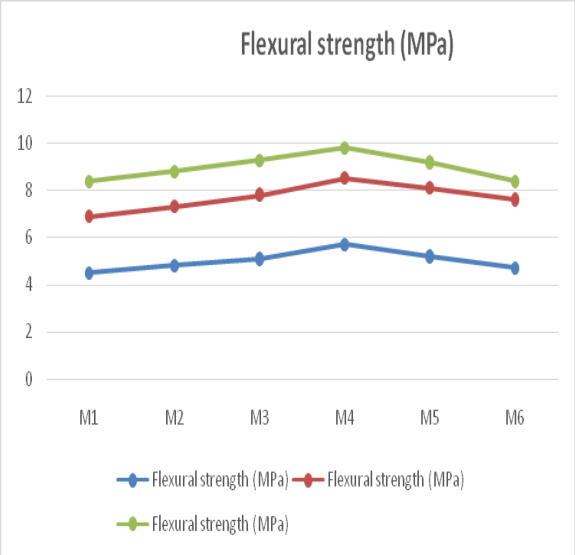


Table 3 : Flexural strength for various mixes at 7,14,28 days

MIXES	FIBRE (%)	Flexural strength (MPa)		
		7 days	14 days	28 days
M1	0	4.5	6.9	8.4
M2	0.2	4.8	7.3	8.8
M3	0.4	5.1	7.8	9.3
M4	0.6	5.7	8.5	9.8
M5	0.8	5.2	8.1	9.2
M6	1	4.7	7.6	8.4



VII. CONCLUSIONS

1. The workability of fibre reinforced self-compactingconcrete decreases with increase in the percentage of fibre added.
2. The maximum value of compressive strength was observed at 0.6% of fibre content at all ages. The compressive strength of concrete decreases with increase in fibre content beyond 0.6%.
3. The maximum value of compressive strength based on rebound hammer test was observed at 0.6% of fibre content at all ages. The compressive strengthof concrete based on rebound hammer test decreases with increase in fibre content beyond 0.6%.
4. The maximum value of split tensile strength was observed at 0.6% of fibre content at all ages. The split tensile strength of concrete decreases with increase in fibre content beyond 0.6%.
5. The maximum value of flexural strength was observed at 0.6% of fibre content at all ages. The flexural strength of concrete decreases with increase in fibre content beyond 0.6%.

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Comparison of Scapular Muscles Activation with Shoulder Retraction and Shoulder Elevations in Individuals with Scapular Dyskinesia

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ABSTRACT

Background : Scapular dyskinesis is a condition that is commonly associated with shoulder pathology but is also present in asymptomatic individuals, and it is believed to be a risk factor for further injury. Evidence suggests that patients with rotator cuff–related shoulder pain present scapular kinematic abnormalities such as decreased scapular upward rotation, decreased scapular posterior tipping, and external rotation. It has been proposed that abnormal scapular kinematics may be linked to weakness of scapular muscle.

Muscle Activation is a very specific, non-medical, mechanically based process of evaluating and treating muscular imbalance and dysfunction. Its main goal is to increase the contractile capability of your muscles, resulting in increased strength, stability, range of motion, and reduced muscle and joint pain.

The study was conducted to determine whether shoulder elevations and retractions showed any difference in the interscapular distance in indivudals with scapular dyskinesia.

Objectives:

1. To assess Interscapular distance post shoulder retraction exercise.
2. To assess Interscapular distance post shoulder shrugging exercise.
3. To assess Interscapular distance post shoulder retraction + shrugging exercise.
4. To compare the effectiveness of these exercises on scapular dyskinesia.

Materials and Methodology : An intervention based study comprising of 30 female individuals. The subjects were randomly divided into 3 groups, Group A was given combined exercises of shoulder retraction and elevations. Group B was given shoulder retraction and Group C was given shoulder elevations.The samples were assessed pre and post with the help of Interscapular distance.

Results : Shoulder retractions when given along with shoulder elevations was clinically significant pre and post . Likewise, Shoulder retractions and elevations when given separately were also clinically significant pre and post. The comparison of all the three groups showed that all were equally effective in treating scapular dyskinesia.

Conclusion : The study concludes that all three forms of exercise showed similar results in reducing the Inter scapular distance in individuals with scapular dyskinesia.

Keywords : Inter Scapular Distance, Shoulder Retraction, Shoulder Elevation, Scapular Dyskinesia.

I. INTRODUCTION

Scapular dyskinesia is an alteration in normal scapular position and motion. It is characterized by prominence of the scapular medial border and/or inferior angle relative to the thoracic cage in the static position or in dynamic motion; early scapula elevation or shrugging during arm elevation; or inadequate upward and downward rotation of the scapula during arm elevation or lowering .

Muscle Activation is a very specific, non-medical, mechanically based process of evaluating and treating muscular imbalance and dysfunction. Its main goal is to increase the contractile capability of your muscles, resulting in increased strength, stability, range of motion, and reduced muscle and joint pain. Muscle Activation Technique is known to be an effective treatment for injury recovery and rehabilitation, as well as chronic pain management for a variety of neuromuscular disorders.

The shoulder complex is made up of several joints. The glenohumeral joint (GHJ) and the scapulothoracic joint (STJ) are thought to be important in the shoulder complex and make up a large portion of shoulder movement. There are numerous studies on scapulo-humeral rhythm and muscle activity, especially during shoulder elevation. Therefore, although there is a lot of information on shoulder elevation, there is less information on horizontal abduction and adduction and internal and external rotation of the shoulder joint. Shoulder movement during activities of daily living and sport is diverse and does not just comprise shoulder elevation. Therefore, an investigation of shoulder movements other than elevation will further the understanding of shoulder performance in activities of daily living.[1]

The scapula supports the humerus, and scapular stability is important for shoulder movement. Scapular muscle activity and scapular movement are different in patients with shoulder disease compared to healthy subjects. For example, scapular kinematic alterations associated with shoulder impingement, rotator cuff tendinopathy, rotator cuff tears, adhesive capsulitis, and so on, and these patients often reduced serratus anterior and increased upper trapezius activation. And it was reported that the combination of standard rehabilitation interventions and scapulothoracic joint control training exercises were an effective treatment of the shoulder joint dysfunction. Therefore, research on exercises to change scapular muscle activity has led to the recognition of the importance of scapular stability for shoulder movement in normal scapular muscle activity. However, apart from shoulder elevation, the mechanism of scapular stability, especially in isometric contraction and movement of the shoulder joint, remains unknown. Ijiri et al. previously investigated scapular muscle activity during isometric contraction of the shoulder joint during internal and external rotation, and revealed differences in activity among the scapular muscles. This difference is based on the constant rule that muscles with same movement as the scapular movement have higher activity. In addition, the reaction time against external force is also different for each scapular muscle . In the previous study, the muscles with higher activity reacted earlier compared to the other scapular muscles, with similar results for the agonist muscles of GHJ. We considered that the scapular muscles are divided into agonist and the antagonist muscles and that the agonist muscles of STJ have the

same function against external force as the agonist muscles of GHJ and contribute to scapular stability.[1]

The scapular muscles work synergistically to control the scapular movement, and patterned scap-ular muscle activations are necessary for optimal scapular stabilization. The upper trapezius (UT), lower trapezius (LT) and serratus anterior (SA) are working together to move the scapula into the upward rotation. The middle trapezius (MT) and rhomboid muscles retract the scapula and Lower trapezius cause upward rotation and depression of the scapula. In addition, during arm elevation, LT contributes to posterior tilt and external rotation of the scapula[2]

The scapular retraction exercises are widely used by clinicians in an aim to balance the activity of the scapular muscles as well as the rotator cuff muscles in different upper-limb positions to improve the scapular kinematics .

The general movement pattern of the scapula observed during scapular retraction exercises was the upward rotation, external rotation and posterior tilt, and in theory, this pattern results in increasing the acromio–humeral distance. However, there is limited information that shows how trapezius muscle activity changes during scapula retraction exercise with different shoulder abduction angles. Understanding changes in the trapezius muscle activity among retraction exercises may help guide the clinicians to select activities that are most appropriate for the rehabilitation program.[2]

II. METHODS AND MATERIAL

Study Location: Study was conducted in Dr D Y Patil College of Physiotherapy, Pune.

Sampling Method: A random selection was done among 60 samples. 30 subjects meeting the inclusion and exlusion criteria were recruited. They were selected based on a postural analysis done which included if the individuals presented with protracted shoulders or any neck pain

Procedure and data collection: Subjects were randomly divided into 3 groups; **Group A**, **Group B**, **Group C**. Group A subjects (n=10) were taught combined movements of shoulder retraction and elevation, subjects in Group B (n=10) were taught Shoulder retraction, subjects in Group C (n=10) were taught shoulder elevations.

Group A: On day 1 Therapist demonstrated shoulder shrugging with retraction together to the subjects and asked them to repeat the exercises for 3 repititons after the therapist said “Elevate your shoulders towards your ears and along with that squeeze your shoulder blades back”, they were asked to hold the position for 20 seconds and take rest for 15 s before starting the next exercise. Subjects were guided to breathe normally throughout the exercise. Followed by this trial, 5 minutes of break was given , Individuals then performed 20 repetitions of the shoulder shrugs with 10 s hold. This was continued for days 2, 3, 4, 5,6.

Group B: On day 1 Therapist demonstrated the Shoulder retraction isometric exercises to the subjects and asked them to repeat the exercises for 3 repetitions after the therapist says “squeeze your shoulder blades back”, they were asked to hold the position for 20 seconds and take rest for 15 s before starting the next exercise. Subjects were guided to breathe normally throughout the exercise (not to hold their breath to avoid Valsalva maneuver) Followed by this trial, 5 minutes of break was given, individuals were then asked to perform 20 repetitions

of the Shoulder Retraction exercises with 10 s hold. This was then continued for days 2,3,4,5,6.

Group C : On day 1 Therapist demonstrated shoulder shrugging exercise to the subjects and asked them to repeat the exercise for 3 repetitions after the therapist said " Elevate your shoulder and bring them towards your ears", they were asked to hold the position for 20 seconds and then take rest for 15 s before starting the next exercise. Subjects were guided to breathe normally throughout the exercise. Followed by this trial, 5 minutes of break was be given, Individuals were asked to perform 20 repetitions of the shoulder shrugs with 10 s hold. This will be continued for days 2, 3, 4, 5, 6.

Outcome measure i.e Interscapular distance was recorded in the data collection form (Appendix 3, 4) on 1st day of treatment and was recorded again on day 7 post treatment.

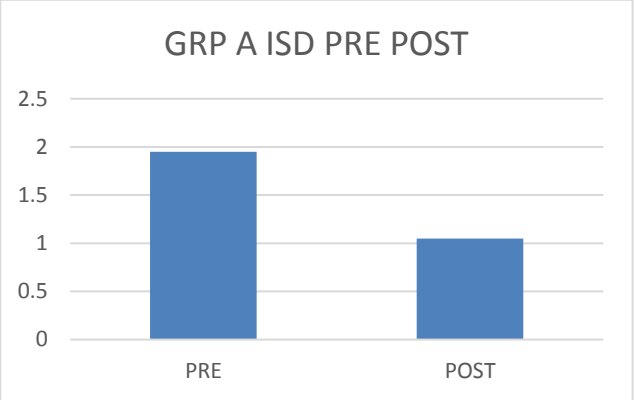
III. RESULTS AND DISCUSSION

In this study, 30 individuals having scapular dyskinesia were selected and divided into group A(n=10), Group B(n=10) and group C(n=10) randomly and Interscapular Distance was compared before and after the intervention and graphically represented.

TABLE 1. GROUP A ISD PRE POST

GROUP	MEAN	P VALUE	INFERENCE
PRE	1.95±0.4378	0.000	SIGNIFICANT
POST	1.05±0.4378		

GRAPH NO.1



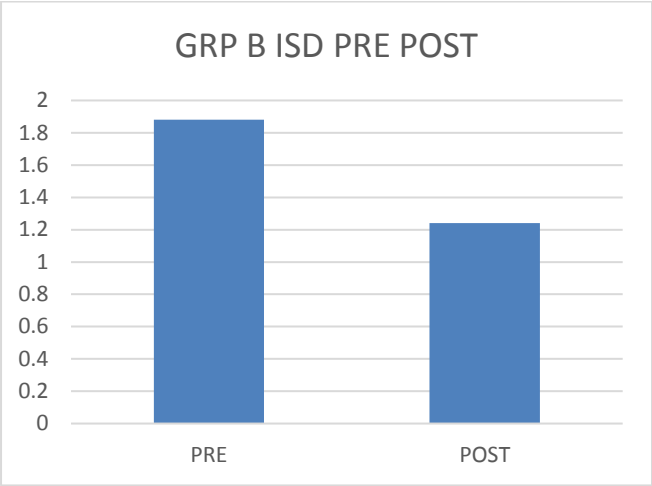
INTERPRETATION

Table 1 and Graph 1 shows within group analysis of group A ISD ups pre and post which includes how many push ups the individual was able to do pre and post . Paired t-test was applied and the result shows statistically significant change pre and post intervention as p<0.005. This shows that group A treatment was effective in strengthening in mild degrees in individuals with scapular dyskinesia

TABLE 2. GROUP B ISD PRE POST

GROUP	MEAN	P VALUE	INFERENCE
PRE	1.88±0.4264	0.000	SIGNIFACANT
POST	1.24±0.4926		

GRAPH NO.2



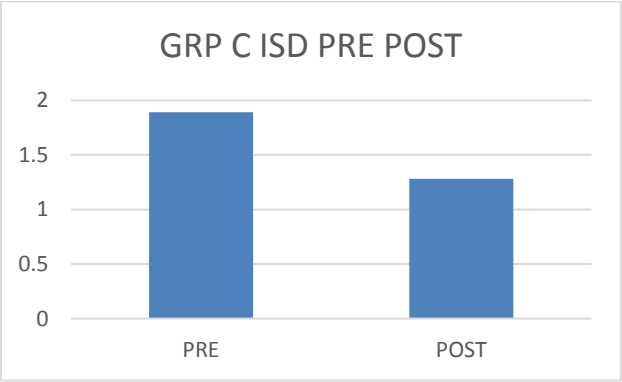
INTERPRETATION:

Table 2 and Graph 2 shows within group analysis of group B ISD ups pre and post which includes how many push ups the individual was able to do pre and post . Paired t-test was applied and the result shows statistically significant change pre and post intervention as p<0.005. This shows that group B treatment was effective in strengthening in mild degrees in individuals with scapular dyskinesia.

TABLE 3. GROUP C ISD PRE POST

GROUP	MEAN	P VALUE	INFERENCE
PRE	1.89±0.3814	0.000	SIGNIFICANT
POST	1.28±0.4367		

GRAPH NO.3



INTERPRETATION:

Table 3 and Graph 3 shows within group analysis of group C ISD ups pre and post which includes how many push ups the individual was able to do pre and post . Paired t-test was applied and the result shows statistically significant change pre and post intervention as p<0.000. This shows that group C treatment was effective in strengthening in mild degrees in individuals with scapular dyskinesia

IV. DISCUSSION

The present study on "Comparison of scapular muscles activation with shoulder retraction and shoulder elevations in individuals with scapular dyskinesia" was conducted to determine whether scapular retractions and elevations intervention had any effects on individuals with scapular dyskinesia residing in Pimpri, Pune city.The study was conducted with 60 samples by simple random sampling , out of which 30 were selected having scapular dyskinesia.

The objective of this study was to determine whether performing shoulder retraction and elevations had any effects in reducing the interscapular distance in individuals with scapular dyskinesia.
Our study says that dyskinesia was also seen in individuals between the age group of 18-30 because this age group comes under the working and college going population , wherein they tend to adapt a single posture for a prolonged period of time.

In Group A, the results showed that the interscapular distance had reduced significantly (p<0.000) before and after treatment.

In Group B, the results showed that the interscapular distance had reduced significantly (p<0.000) before and after treatment.

In Group C, the results showed that the interscapular distance had reduced significantly ($p<0.000$) before and after treatment.

When the comparison of all the groups were performed, all three groups showed similar amount of difference in the interscapular distance. They showed no significant difference in the data recorded. ($p<0.005$).

Russ Paine studied that an effective exercise program for rehabilitation should include improving the strength and function of the muscles that control the position of the scapula. He also mentioned that implementation of the scapular program can begin early in the rehabilitation protocol and progress to more aggressive strengthening approaches. Scapular strengthening should be included as a part of all rehabilitation programs relating to the shoulder complex. Advancement in the knowledge of shoulder complex biomechanics and related EMG patterns has allowed for the development of strengthening exercises that maximally address these "anchor" muscles. As there are techniques evolving to objectively measure scapular position and dynamic function, the interaction between the scapula and glenohumeral joint can be further clarified.

It can be further concluded that these interventions could be given individually or in combination with each other as it may suit the person.

V. CONCLUSION

The study concludes that both shoulder retraction and shoulder elevation helped in reduction of interscapular distance in individuals with scapular dyskinesia.

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Gender-Based Violence as A Driver of HIV Infections Among Adolescent Girls and Young Women in Kisumu, Kenya

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ABSTRACT

Gender Based Violence is a universal catastrophe affecting global health, and thus development and is a major human rights concern. This study's major objective was to establish what extent gender-based violence prevention influence performance of HIV prevention projects for young women and teenagers in Kisumu County. The study population constituted of teenage girls, and young women enrolled in HIV prevention projects implemented in Kisumu County for at least two years. Interviews were also conducted with key project implementers including project managers and monitoring and evaluation managers. Data collection for the study was done by utilizing data collection tools which included focused group discussion, structured questionnaires and an interview guide. 364 respondents were taken from 89,611 adolescents enrolled in HIV prevention projects using stratified random sampling technique. For descriptive data the study employed percentages, frequencies Arithmetic Mean as analytical tools of analysis. The Pearson's value and Linear Regression were manipulated as statistical tools for inferential statistics. To test the hypotheses, the Fisher (F) test utilized. Descriptive statistics showed that gender-based violence prevention has a noteworthy effect on the production of HIV prevention projects for young women and adolescent girls in Kisumu County. The value of r2 was 0.452, indicating that gender-based violence prevention explained 45.2% of the change in the effectiveness of HIV prevention projects in Kisumu. The beta coefficient was 0.623, implying that gender-based violence had a noteworthy statistical impact on the performance of HIV prevention projects (β=0.623, t=10.928, p=0.000<0.05).

Keywords : Gender-Based Violence, Adolescents Girls, Young Women, Project Performance

I. INTRODUCTION

Data from various countries show major discrepancies in efforts to step down the spread of new HIV transmissions. Over the last ten years some nations have succeeded in reducing HIV prevalence by more than 50% which is not the case for many African nations. According to a 2016 report of UNAIDS there has actually been a disheartening rise of new HIV infections in some African countries, UNAIDS (2016). The biggest burden in this is occurring in sub-Saharan Africa. China has achieved admirable results in addressing its HIV epidemic. The country's HIV history has been steady, with national negligence being the major facet in the metastasizing of the virus in the early 1990s. However, an important development in the past ten years and the national sensitization and response has reduced the epidemic through the country as well as better, standards of living for the victims of HIV|AIDS. China's HIV epidemic is characterized by a diminishing prevalence 0.037 percentage rate, while some areas have higher and more intensely unpleasant HIV prevalence rates. China is also

challenged in offering increased targeted prevention programmes to majorly affected populations like young people.

HIV continues to hinder long term development in Africa. Sub Saharan Africa is gravely aggrieved, with nearly 70% of the PLHIV globally. (WHO, 2015). Notwithstanding the number of new HIV infections has reduced, HIV prevalence remains worryingly high in some countries. Many counties in this region have shown considerable political and financial commitment to address the epidemic in the sub-Saharan region which has experienced a random scaling up of aversion, treatment, and comprehensive care services. However, most nations in this region still rely on grants and donations to fund their HIV response. (Bill, 2010). Most governments have shown efforts to make attempts to battle the epidemic in this region continually. Kenya HIV epidemic is ranked fourth across the globe concerning the population living with HIV that was estimated at 1.5 million victims in 2015.

On estimate, 36,000 persons died from AIDS-related sicknesses in the year 2015, although this figure is quickly declining from a 51,000 in the year 2010. To this date, more than 660,000 children have been orphaned by this plague. HIV prevalence rose to 10.5% in 1996 and had declined to 5.9% by 2015. The decline was hugely influenced by the rapid imposition of HIV treatment, management, and care. (WHO, 2016). The SDG (Sustainable development goal) aim is to completely eradicate the AIDS epidemic by the year 2030 while consolidated global strategy aims to minimize cases of incidences occurring annually by 90% and the annual death rate occurring from AIDS-related causes by 80% (compared with 2010).

Amongst the most sanctioned social evils universally is the violence against women traversing religion, race, ethnicity, and social status. Sexual and gender-based violence (SGBV) is an exceptionally unsettling global concern. It has immense negative impacts on the female gender. SGBV can be defined as injurious and damaging acts committed against an individual's will based on their gender. This harmful act causes the deprivation of freedom for the individual either publicly or privately. It is more often than not that cases of sexual gender abuse are as a result of unequal gender relations in communities or as an occurrence of abuse of power. Jewkes argues that gender inequality is the cause of violence against women. He asserts that in the case of this harmful acts there is the involvement of a male and a female in which case the latter is the victim as the former has the upper hand in the relationship as dictating the society. Violence against women can be as a result of prejudice embedded within the laws of a society or prevailing societal believes and norms or take the form of sexual violence. This form of harm can cause dislocation and worse than be an experience of dislocation. Kenya is no exception, like the rest of the world, Sexual Gender Abuse is rooted in the societal structure that is keen on power differential amongst men and women.

Women are disadvantaged in that they have to stomach violence as a means of resolving conflict, as the society generally accepts it or is ore likely than not to turn a blind on the issue. Cornwall Andrea states: that the last decade has seen women increasingly get infected and affected by HIVAIDS in sub Saharan Africa. 61% of the African population living with HIV are women. UNAIDS states that its more likely than not that victims of gender based violence have thrice higher probability to be infected with the virus than those who have not been violated. According to statistics of a research carried out by the United Nations the probability of younger women being physically or sexually violated by an intimate is higher than that of older women. KDHS

2014, indicated that 38% of females aged between fifteen to forty-nine years have reported physical violence with 14% having eperienced sexual abuse.

Statement of the problem

Individuals infected with HIV, especially women and girls, are at a higher peril for GBV as a ramification of their status, and those experiencing GBV face a greater risk of HIV infection (Ellsberg and Betron 2010)—a risk more than 50 percent greater (World Health Organization [WHO] 2013). The intersection between the two creates a dual epidemic. Gender disparities can be biologically, structurally or socially caused and they can be as a result of stigma and prejudice affecting both males and females. Programs that address both GBV and HIV have the potential to make a greater impact on these epidemics than stand-alone programs that fail to consider this intersection. (UNITAID, 2016).

A recent study undertaken in Kenya shows that 32% and 18% of women and men aged 18-24 respectively have reportedly faced sexual violence before they are of 18 years of age. According to UNICEF. Socioeconomic facets like unemployment, social class, financial ability, personal and societal values are determinants of gender-based violence. There is not one specific cause of SGBV but a combination of several societal and individual problems. Gender-Based Violence incapacitates one on the aspect of a bargaining ability for safer sex or the ability to access their rights as human beings.

Objective

This study sought to explore to what extent gender based violence prevention influence performance of HIV prevention programs for adolescents in Kisumu County,
Kenya.

Hypothesis

The researcher hypothesized that:

Ho Gender based violence prevention has no significant influence on the performance of HIV prevention projects for adolescent girls and young women in Kisumu County, Kenya.

H1 Gender based violence prevention has a significant influence on the performance of prevention projects for adolescent girls and young women in Kisumu County, Kenya.

II. LITERATURE REVIEW

Amongst the most sanctioned social evils universally is the violence against women traversing religion, race, ethnicity, and social status. Sexual and gender-based violence (SGBV) is an exceptionally unsettling global concern. It has immense negative impacts on the female gender. SGBV can be defined as injurious and damaging acts committed against an individual's will based on their gender. It is more often than not that cases of sexual gender abuse are as a result of unequal gender relations in communities or as an occurrence of abuse of power. Jewkes argues that the reason women are an easy target for sexual and physical abuse is gender inequality. He asserts that in the case of this harmful acts there is the involvement of a male and a female in which case the latter is the victim as the former has the upper hand in the relationship as dictating the society. Violence against women can be as a result of prejudice embedded within the laws of a society, or prevailing societal believes and norms or take the form of sexual violence. This form of harm can cause dislocation and worse than be an experience of dislocation. Kenya is no exception, like the rest of the world, Sexual Gender Abuse is rooted in the societal structure that is keen on power differential amongst men and

women. Women are disadvantaged in that they have to stomach violence as a means of resolving conflict, as the society generally accepts it or is are likely than not to turn a blind on the issue. HIV initiatives are largely concerned with finding ways to curb sexual violence. The institutionalizing of HIV post-exposure prophylaxis with the use of guidelines, such as WHO, PEPFAR GBV|HIV integration and the country's national standard for GBV, service delivery protocols and provider training has dominantly been used to address the issue of sexual violence in sub-Saharan Africa.

Integration of GBV and HIV prevention

GBV services through the delivery of prophylaxis, information, and linkages. The rising concern for the stigma associated with accessing facilities that offer help to survivors of GBV and SGBV has led to the development of models of sexual violence services that cater for the victims. One of the tested models includes a scheme for a microfinance model that embraces HIV and gender training. This model has gone beyond prevention of HIV to address issues that make one prone to the exposure of the virus addressing the issue of poverty reduction and increased women empowerment. These institutions seek to address issues of health, law, order, justice and deliver protection, support, and rehabilitation. The experience of abuse or the fear of it leads to detrimental effects on the prevention of HIV. For instance that the amenities for survivors of gender-based and sexual violence are limited, but even in the case of their availability a very small percentage of the affected in the community seek any form of care from the facilities. Research has shown that some factors attributed to this predicament and these include, fear of physical assault from partners and especially women from their husbands and stigmatization and fear of discrimination from the society. The sex subject is taboo in most sub-Saharan African families and is one that can cause physical punishment if ever brought up. Research shows that 60% of girls in an African family set up will not dare bring up the subject of condom usage for fear of violence.

A survey carried out by the Kenya Demographic and Health Survey in the year 2008 and 2009 showed that 39% of females aged fifteen and above had undergone a physical abuse. At least one in every four girls, as indicated by the study, had been sexually violated within a relationship. In another research in 2014, this time majoring on married, separated and divorced respondents KDHS gathered that at least 38% women, 9% men that were ever married had been physically abused by their partners. While 14% and 4% women and men aged 15-49 respectively had been sexually violated by their spouses. The matters of sexual and physical abuse are a grave issue in Kenya and one cannot be lightly handled if Kenya is to make any progress in eradicating the epidemic.

Legal framework

Gender Based Violence issue is one that is quite well covered in the constitution of Kenya. Laws, policies and regulations that aid the impediment and management of sexual and gender-based violation have been endorsed in various aspects that traverse the issue, including gender equality. These laws include the Sexual Offences Act (2006) which provides a comprehensive legal coverage of child prostitution and pornography, sexual assault, rape and attempted rape and compelled acts. Other legal frameworks covering the matter include the National Gender and Equality Commission Act (2011), to mention just but a few. Some of the legal framework majors particularly on women who have been the most affected by the phenomena. When these legal frameworks are considered gender-based violence violates about twenty-three Kenyan rights as stated in chapter four within bill of rights of the Kenyan

Constitution. Magnitude of the effects of abuse is not one that can easily be ascertained. Individuals react differently and worse than these cases go unreported owing to fear of stigmatization. An abused individual will often more than not be in an environment that is more reactive than proactive against sexual gender-based violence.

Theoretical Framework

Three Theories guided this study; Health promotion theory, Theory of performance and sociological theories.

Health promotion theory

The Health promotion theory is majorly concerned with classifying and stipulating health promotion approaches rather than the elements affecting health outcome. It is primarily concerned in stipulating factors involving the most suitable methods of conveyance. Caplan stratifies health promotion in two angles, one from the point of modifying an individual's behavior or their environment and secondly the priorities articulated in health promotion by the victims, or experts.

It is a prescriptive approach propelled by the society's health determining factors, and as such aims at directing everyday activities to a healthy lifestyle. The affected communities are exposed to such an environment that encourages behavioral change for the achievement of a standard or better health. In WHO's 2000 strategy this theory was widely put into consideration.

Practically individually focused and expert-driven interventions are adopted in endeavors that promote healthy living including those addressing HIV infection. With the involvement of some of the affected communities and very few considerations of the environmental determinants of health promotion, this theory has barely been implemented. This collaborative approach is slowly being embraced while dealing with the vulnerable groups, a detrimental concern globally.

Sociological theories

Behavioral modifications are subject to a social set up and thus the importance of sociological theories. An individual's conduct is directly or indirectly related to the societies they are part of.

This theory, however, is wanting on the aspect of empirical evidence. A good illustration is the sexual orientation at socio cultural point of view. The sociological theory states that sexual identities are predominantly formed as individuals in given peer groups interact. Thus, the formation of gender roles and predominating ideologies like sexual ideologies where girls view sex as service to men and boys relate to the subject as a form of individual success. The primary principle behind this theory is that associations determine behavior.

The Theory of Performance (ToP)

Six foundational concepts are employed in the theory of performance in the attempt of behavioral modification, and they include, context, levels of knowledge and skill, identity status, and personal and fixed factors. Keenly interested in performance, the theory adopts teamwork and addresses the aspects of a sense of belonging as a contributing factor in behavioral change. Effective performance is subject to change and thus an object for evaluation to determine levels of production with the aim of improving the contingent factor.

Conceptual Framework for the study

Three key indicators of gender-based violence prevention were identified – sexual gender-based violence (SGBV); Emotional violence and physical violence.

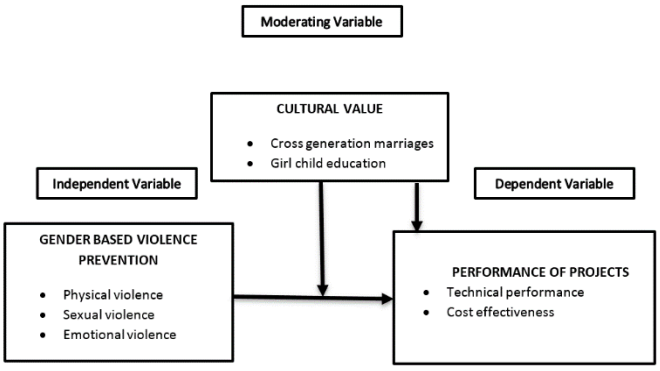


Figure 1 : Conceptual Framework of the Study

III. RESEARCH METHODOLOGY

The study adopted a pragmatic knowledge claim. According to Gakuu (2008), Pragmatic Knowledge Claim allows a researcher to seek knowledge and understanding of a situation under study, problems, and consequences using multiple approaches. A pragmatic approach is based on abduction reasoning that employs both induction and deduction reasoning to enable the use of both qualitative & quantitative techniques to conduct the same study (Gakuu, 2008). Pragmatism perceives knowledge as being created and also based on the reality of experiences recorded. It claims that knowledge is born from activities, circumstances, and repercussions; it is concerned with applicability and way forward thus putting the problem as most important instead of methods (Gakuu et al., 2008). Alan (2009) posits that a researcher is guided by the ontological, epistemological, axiological, and methodological orientations. In this study, both quantitative and qualitative aspects of the performance of the project were investigated justifying the need for pragmatism. The researcher in this case indulged in research to gathering and synthesis qualitative data.

1) Research design

Mixed method approach was used to enable data analysis to be done in a cross-sectional way.

In research methods, Sekaran (2003) indicates that a mixed mode approach can be classified into mixed models and mixed methods. Under a mixed model's approach, descriptive data analysis is undertaken independently followed by inferential data analysis. Under a mixed methods approach, both descriptive and inferential data analysis are conducted in parallel in an integrated way. Therefore descriptive, inferential and qualitative analysis could be conducted based on objective simultaneously.

2) Sampling size

In this study, respondents were drawn from the four organizations which have been in operation pursuing the stated objective in Kisumu County. Because the number of organizations is too small to be sampled, a census of the organizations is preferable rather than a sample (Mugenda & Mugenda, 1999). The sample means consisted of key respondents were drawn from all the selected organizations. According to Huber (2004) determining a sample size in robust statistics a researcher is informed by the precision rate and the desired confidence level. Adopting a formula by Krejcie and Morgan (1979), will help chose a worthwhile sample size, i.e , adequate enough to offer accuracy.

$$S = \frac{x^2 NP\,(1-P)}{d^2\,(N-1) + x^2 P\,(1-P)}$$

Where;

S = needed sample size.

x^2 = table value of chi-square for 1 degree of freedom at the desired confidence level (3.84).
N = the population size (89,611).
P = population size.
d = degree of accuracy expressed.

$$S = \frac{(3.84)\ (89611)\ (0.5)\ (1\text{-}0.5)}{0.0025\ (89611\text{-}1) + (3.84)\ (0.5)\ (1\text{-}0.5)}$$

With the sample size determined, the proportional allocation was adopted to distribute the respondents among different organizations aiming to have at least 8 percent as shown in

Thus 358/89611× 100 = 8%

3) Sampling Procedure

Determination of sampling methods and procedures helped this study focus to remain objective in choosing the sample free of biases. Different organizations were used from which respondents were picked from as strata. A sample was picked autonomously in a similar ratio to have a similar percentage of each total to ensure proportionality in representation from each strata. Random sampling ensured that every element in each strata has an equal chance of being chosen. Computer random numbers were generated for each category and respondents assigned these numbers randomly in proportion to the number of employees in each sector.

Research instruments

All the data collected was used to source for information. Secondary information was obtained mainly from desktop review and internet Search. Information Data obtained from the respondents was used to determine link between the variables in the study. Triangulation of research instruments was utilized with the aim of obtaining adequate information. Self-administered structured questionnaires and an interview guide were employed in the collection of data as instruments of research. A research instrument, in this case, is a device that the researcher used to collect data. To obtain quantitative data a structured questionnaire was utilized while a guided interview aided in gathering qualitative data. The application of multiple instruments was important for enhancing the validity of data obtained and minimizing the possibility of experiencing interviewer biases. Such biases often arise from non-verbal cues that may influence participants to give misleading responses by reporting positive aspects even where negative aspects are predominant (Jaeger, 1984).

Reliability of instruments

The study applied, test-retest technique. It involves applying a similar test twice to a similar group of respondents after a particular period has expired between the two tests (Coopers and Schindler, 2003). This gauge was chosen because the respondents being interviewed were expected to voluntarily be willing to respond to the questions in both times.

Ethical Issues

Written communication seeking permission to carry out research was done and letters dispatched to the targeted respondents in appropriate offices. The respondents were required to sign the letters of consent before the actual data collection commencement. The respondents were assured that disclosures would not be made on the identity of the respondents. As such, the respondents were requested not to indicate their names on the questionnaires and disclosure of the findings was availed on request. In the occurrence of any detrimental effects arising as a repercussion of the

research to the institution or individuals under study, the researcher committed to making compensations.

IV. FINDINGS AND DISCUSSIONS

A sample size of 358 respondents from a research population of 89,611 adolescents in Kisumu County as recorded in the most recent census was used in the study. 352 filled tools were returned which was a return rate of 96.7% which was considered adequate for this study. Richardson (2005) indicated that a response rate of 60% and above is both desirable and achievable in social sciences though in some cases it could go lower.

Categories of Respondents by Level of Education

The options that were provided in this item were: primary level, secondary level, and tertiary level. Table below shows that the highest percentage of respondents were either in secondary school or had completed secondary level of education (54.5%); 382% had acquired a primary level of education while 7.3% of those interviewed had tertiary education(Polytechnic, college or university). The responses were as shown in Table below

Distribution of respondents by level of education

Level of Education	F	%
Primary	137	38.2
Secondary	195	54.5
Tertiary	26	7.3
Total	**358**	**100**

Distribution of respondents by marital status

Options provided required them to indicate whether they were single, married, divorced or separated. This information was considered important to determine help understand the dynamics of different respondents in a peer-based setting. The results were as shown below

Distribution of respondents by marital status

Marital Status	F	%
Single Married	278	77.7
Divorced/Separated	44	12.3
Widowed	31	8.7
	5	1.3
Total	358	100.0

The results show that 77.7% of respondents interviewed were single and had never been married. Most of the respondents in this category were school going. Out of the total population questioned 12.3% indicated that they were married. This information would later be used by the researcher to establish the influence of early marriages among adolescents in the region. A small percentage (8.0%) indicated that they had earlier been married but were now divorced or separated. Others indicated that they were widowed (2.0%)

Distribution of respondents by the duration of engagement in the project

The duration an individual had been involved in the projects was considered important in appreciating the project performance. The data were clustered and categorized as shown below

Distribution of respondents by the duration of engagement in the project

Duration of engagement	Frequency	Percentage
0 months - 3 months	45	12.6
4 months - 6 months	12	3.4
7 months - 9 months	80	22.3
10 months - 12 months	150	41.9
Above 12 Months	63	17.6
Non- responsive	8	2.2
Total	358	100

Research findings showed that 45(12.6 %)had been engaged for utmost three months while 3.4 % had been involved for a period between 4 to 6 months. This result implies that 22.3 % of the respondents had been involved in the project for a period between 7 – 9 months. Although the majority (41.9 %) of the respondents had been involved for 12 months or less in the projects, this was not an indicator of the respondent's experience in the projects. Interviews conducted in this study indicated that many respondents had worked with similar projects for more than three years which was considered in this study sufficient to make objective responses on the performance of HIV prevention projects.

Tests for Statistical Assumptions and Analysis of Likert-Type Data

Pedace (2013) indicates that conflict in statistical assumptions can nullify them. Tests conducted included normality test, multicollinearity and singularity. Also Type I & II errors which occur due to the wrong interpretation of results during tests of various statistics were controlled. Also, use of Likert scale in analysis is elaborated in this section.

Normality test

This study used the Shapiro-Wilk test since the sample size n= 3 to 2000 i.e 352. In this test statistics stands for W. Following a SPSS run, the following results were obtained using the main independent variables and dependent variable as shown

Normality Test

	Shapiro-walk		
Variables	Statistic	Df	Sig.
Gender-based influence prevention	.976	182	.003
Cross-generational marriages	.972	182	.001
Performance of projects	.963	182	.000

All the statistics in the test (W) were above 0.96. The list was 0.963, and the highest was 0.997. None of the variables had W statistics =1. Therefore none was a perfectly normal distribution, but the scores were significantly closer to 1 which was acceptable since a perfectly normal distribution is rarely achievable.

Likert Scale as an Interval Measure

Likert scale types of questions were used in the study. These are differentiated as Likert item; when an item is used to measure a single variable and Likert scale; when some items are arranged as a group intended to measure a single variable (Brown, 2011). A composite score was used in analysis and decision rules after analysis of mean scores were guided by the logical equal levels of the score approximated to the first decimal point in line with equidistance arguments (Carifio and Rocco, 2007; Bertram, 2007; Lantz, 2013). This study used one verbal anchor; 1=Strongly

Disagree (SD); 2= Disagree (D); 3= Neutral (N); 4= Agree (A); 5= Strongly Agree (SA) Therefore the judgment rule followed this argument; Strongly disagree would be for values lying between 1<S.D>1.8; Disagree for values between 1.8<D>2.6; Neutral for values between 2.6<N>3.4; Agree for values between 3.4<A>4.2; Strongly Agree for values between 4.2<S.A>5.0. This creates a scale that has an equidistance of 0.8.

Correlations coefficient was used to measure relationships. Decision rule followed Cohen (1988) guiding that r ranging between .10 - .29 means weak correlation; r- ranging between .30 - .4.9 means medium correlation and r- ranging between .50 to 1.0 means strong correlation. Positive or negative sign indicates the direction of the relationship, never the strength. These guidelines were also used by Shirley, Stanley, and Daniel (2005).

Correlation Analysis

Correlation analysis results

		Performance of projects	Gender based violence prevention	Cross generational marriages
Performance of projects	Pearson Correlation	1	.	
	Sig. ailed) (2-			
	N	**352**		
Gender based violence prevention	Pearson Correlation	**0.826***	1	
	Sig. (2-tailed)	**0.033**		
	N	**352**	352	
Cross generational marriages	Pearson Correlation	**0.744***	0.710	1
	Sig. (2-tailed)	**0.038**	0.177	
	N		352	352

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Control of Type I Error and Type II Error

For statistical findings to be valid, a researcher has to control Type I & II errors which occur due to wrong interpretation of results during tests of various statistics. The former occurs when null hypothesis gets accepted in place of rejection while the vice versa is true for occurrence of the latter(Larry, 2013). In this study, to control type 1 error, a confidence level of 95% was used implying that the standard variate was 1.96 and the sample proportion (p) <= 0.05 as recommended by Larry (2013). Type II error was controled by choosing a sizeable sample as recommended by Sekaran's (2003) sample size criterion.

The table aove shows the correlation analysis results of the dependent and indepedent variables. To determine correlation between the variables, Pearson Correlation was used.

Tests of Hypothesis

Hypothesis testing was done to establish the statistical significance of gender based violence prevention on the performance of projects. Testing was based on ordinary least squares (OLS) regression results, under OLS regressions, the values, R, R2, F-ratio, "t-values" and "p-values" were acquired. The R-value shows the magnitude of the relationship, R2-(coefficient of determination) value indicates the extent to which change in independent variable explain indicators of the dependent variable (goodness of fit), F-value indicates the statistical influence of the whole model, t-values represent the influence of individual variables, Beta values show the influence of the independent on the dependent variable and "p-value" indicates the confidence level at 95% or 0.05 significant level . In determining the significance, F test was used; where the general rule is If F Calculated< F Critical null hypothesis is accepted otherwise rejected.

The decision rule adopted was; if "p-value" < α, reject the null hypothesis otherwise accept. The models in these tests focus on establishing the influence of the independent variables on the dependent variable but not choice of model.

Models for testing the hypothesis

Objective	Hypothesis	Model for Hypothesis testing
To determine the extent to which gender-based violence prevention influence the performance of HIV prevention projects for adolescent girls and young women in Kisumu County, Kenya	Hypothesis 1; **H1:** Gender-based violence prevention has no significant influence on the performance of HIV prevention projects for adolescents and girls and young women in Kisumu County, Kenya.	$y = a + þ_1X_1 + e$ y= project performance a=constant β_1= Beta coefficient X_1= Gender based violence prevention e= error term

Ho: Gender-based violence prevention has no major influence on performance of HIV prevention programs for adolescents and girls and young women in Kisumu County, Kenya.

The hypothesis aimed at establishing whether gender-based violence prevention has a major impact on the performance of HIV prevention programs in Kisumu. A composite index of performance of HIV prevention projects was used as the dependent variable. This composite was of cost-effectiveness, technical performance and beneficiaries' satisfaction of services. The independent variable was a composite index of gender-based violence prevention, in which it composes sexual violence, emotional violence, and physical violence.

To test this hypothesis a regression model of the form: $y= \beta0 + \beta1X1+ \varepsilon$ was estimated, where:

y = Performance of HIV prevention projects

β0 = Constant

β1 = Beta coefficient

X1 = Gender-based violence prevention

ε = Error term

r value of 0.826 indicates a very positive influence of gender-based violence prevention on the performance of HIV prevention projects. The coefficient of determination (adjusted R-Square) statistics of .650 implies gender-based violence prevention explains 65.0% of the performance of HIV prevention projects, while 35.0% of performance is explained by other factors other than gender-based violence prevention. The adjusted R^2 is used instead of R^2 as it takes care of the adjustments in the degrees of freedom. The Durbin-Watson Statistic of 2.590 showed the absence of autocorrelation as such indicating the model was statistically good.

Table : Regression results of the influence of behavioral interventions on the project's performance

Model	Coefficients (β)	Std. Error	Z value	P>Z
(Constant)	14.434***	4.832	3.129	0.004
Gender based violence	.468**	.147	1.22	0.012

a. Dependent Variable: Performance of HIV prevention projects.

b. Predictors: (Constant), Gender based violence prevention

F (1,352) = 10.026***, [p=0.000<0.05] r = 0.826

R^2= 0.771

Adjusted R^2 = 0.65

Durbin Watson = 2.590

The F-ratio of 10.026 is statistically significant at 5% [p=0.000<0.05] implying that Gender-based violence prevention has a consequential effect on how HIV prevention projects for teenagers in Kisumu County in Kenya. Thus, from the regression results, the null hypothesis was rejected. Based on previous studies conducted on the influence of GBV prevention on the performance of projects the researcher concludes that the findings agree with various former studies (King R, 2008: Stephenson et al., 2014; Peterman 2014 & Nicholl et al., 2006). These studies suggest that gender-based violence prevention is important in improving performance of projects. A positive correlation was established between the performance of HIV prevention projects and gender based violence prevention in this research, with [r=.826, n=352, p=.046<0.05], the Pearson correlation was very close to 1, implying gender-based violence prevention is perceived to contribute to the performance of HIV prevention projects highly.

V. CONCLUSION AND RECOMMENDATIONS

Whereas the study sought to know the relationship between gender-based violence prevention and performance of projects, it proved quite a difficult task establishing working indicators for the beneficiaries of the reserch. Owing to the obstacles faced it is of essence to conclude that for strategy concerns, executers of projects need to put to use school settings for significant information and as such achieve performance improvement for projects. Gender inequality links gender-based violence and HIV as one of two indirect pathways that have an even greater impact on HIV transmission than the direct pathways. In societies where patriarchy and unequal gender norms are deeply entrenched, the probability of men committing sexual violence or paying for sex, and are less likely using condoms is higher.

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Performance Analysis of Three Phase Two Quadrant Controlled Converter for DC Load Applications

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ABSTRACT

This paper provides the operation and analysis of three phase two quadrant controlled converter. In this paper, the converter is being checked with varying the duty cycle for two different loads R and RL. The Power factor, Total Harmonic Distortion (THD) and efficiency are better for very low duty cycle which is the same for RL load. This analysis estimates THD and power factor at various conditions. The FFT analysis is done to find the harmonic content present in the input current waveform. This analysis is done using MATLAB software.

Keywords : Total Harmonic Distortion, Power Factor and efficiency.

I. INTRODUCTION

This paper addresses the Buck-Boost AC-DC Cuk Converter using power factor correction techniques for reducing THD and improving power factor. The proposed converter is designed for low power rating and low output voltage 20W with 13.5V. The voltage follower approach an average current control technique. The proposed converter is simulated using MATLAB and it shows low THD in the supply current and improves the power factor of AC mains. [1] The PWM rectifier gate pulse is generated using FPGA based controller to drive the devices of the rectifier. In this paper PWM rectifier and Phase controller rectifier is compared on the basis of input current harmonics. The power factor can be regulated to unity by demanding a phase shift between the first harmonic of the input current and first harmonic of the supply voltage. [2]

This paper presents the single-phase AC-DC three-level converter for improving power quality at AC mains. The proposed converter is simulated with three different voltage and a current controller such as PI-Hysteresis, Fuzzy-Hysteresis and Fuzzy tuned PI Hysteresis. By comparing all the three controllers fuzzy-tuned PI voltage controller with the hysteresis current controller showed better performance, with 0.93% in simulation and 1.351% in the experiment without any filter in the source side. [3-8-20] In this paper, a single-phase positive output super-lift Luo converter is proposed converter operates in continuous conduction mode. The proposed converter is tuned using Neuro-fuzzy inference system (ANFIS) controller. For voltage control Proportional and Integral (PI) is used and for current loop Hysteresis controller. [5-19]. The simulation results show the very low THD of 0.44% and by obtaining unity power factor at the source side and load side. The ANFIS tuned PI voltage controller and the hysteresis current controller is implemented in an FPGA based hardware of the proposed LED drive with reduced input current THD of 1.24% and input power factor close to unity without any source side filter. [4-7-8-9]

The main objective of this paper is to achieve unity power factor, reduce source current total harmonic distortion (THD) and regulate output voltage using an AC-DC three-level boost converter. The Xilinx Spartan-6 XC6SLX25 FPGA board is used for

implementation of the controllers. As a result, Fuzzy logic voltage controller with Hysteresis current controller has better performance and ability to achieve input current THD less than 5%. [5-6-8] The paper discusses the different control methods implemented in AC-DC boost converter namely (Hysteresis control, Fuzzy Logic Control). The fuzzy logic is used to derive a control scheme of boost rectifier for the improvement of power quality. [6-9] This paper analysis single phase Three level AC-DC converters in MATLAB SIMULINK. The fuzzy logic controller with PI voltage controller reduces the source current THD of about 3.23% for wide load variation and attains unity power factor. The main advantage of the three-level converters are high voltage can be obtained by reduced stress on the switches. The fuzzy logic current controller produces better power quality and enhanced THD. [7-10-16]This paper dealt with a fuzzy-tuned PI voltage controller and a hysteresis current controller operating a single-phase AC-DC three-level converter is proposed for improving power quality at AC mains for LED drive applications. [8]

The main objective of this paper is to achieve unity power factor with less harmonic distortion. Battery charger and the input stage of Three-level inverter is the main application of this proposed single phase three-level rectifier. [9] A bridgeless modified Single Ended Primary Inductance Converter (SEPIC) is discussed in this paper. Using MATLAB SIMULINK open loop and closed loop simulation are done in both steady state and dynamic conditions. PI and fuzzy tuned PI controllers are used to tune the proposed converter. [10] The paper presents the theoretical analysis of the parallel-bridge rectifier which is supplying a resistive load does not introduce line-to-line short circuits during commutation. This states that the parallel-bridge rectifier is better than other conventional rectifiers by providing reduced losses and increased power output. [11] This paper proposes a large current rectifier using a fork-connected auto transformer and dc-side current injection. A single-phase full bridge inverter is used to inject the compensation currents into the dc side of two three-phase half-wave rectifiers which reduces harmonics in input current side. This proposed converter is used in the front-end rectifier application. [12]

A 24-pulse diode rectifier for low voltage and high-current applications is proposed in this paper. By the addition of ASFR, the proposed application is low cost and simple. [13]. The paper discusses the comparison of class E rectifier and conventional full-bridge rectifier in terms of power quality analysis. The Class E full-wave rectifiers are mainly used in harmonic reduction and efficiency when used in MHz WPT systems. [14]

A novel EM radiation-to-dc power conversion system is proposed realizing full-wave rectification. The power rectified and transferred to dc load between two antennas. The antenna is optimized according to the rectifier. [15] The single-phase PWM AC-DC boost converter is proposed and examined in steady-state conditions, dynamic conditions and during load variation. [16] A three-phase Boost rectifier is designed for applications like wind turbines, windmills, fuel cells, etc. the controllers like PI Controller and PR Controller are used to control the DC output voltage of three-phase Boost rectifier using Space Vector Pulse Width Modulation technique (SVPWM). The controllers are examined in various conditions and the PR controller shows very good performance when compared to other controllers. [17] This paper displays the investigation and outline of a negative output Luo converter for the enhancement of power quality as far as enriched power factor and less source current Total Harmonic Distortion (THD). The PI controller has lessened peak overshoot and THD with enhanced power factor. [18]

To overcome the problems like low order harmonics in the ac power supply, low power factor, high peak current, line voltage distortion, increased electromagnetic interference and various additional

losses in conventional technique of single-phase AC-DC conversion this paper propose single phase AC-DC Zeta converter.[19] This paper proposes the appropriate design of a closed loop controller for AC-DC super lift Luo converter to achieve unity power factor and reduced source current THD. [20]

II. OPERATING PRINCIPLE

A three-phase fully controlled converter is as shown in Fig. 1. The current flow in the converter will be seen when the top group (T_1, T_3, T_5) or the bottom group (T_2, T_4, T_6) conduct. The input cycle of the thyristors conducts 120° and they are fired between the sequences of 60°. The thyristors present in the same phase angle are fired at 180° and hence they cannot conduct simultaneously. There are only six possible conduction modes present in the continuous conduction mode they are T_1T_2, T_2T_3, T_3T_4, T_4T_5, T_5T_6, and T_6T_1.

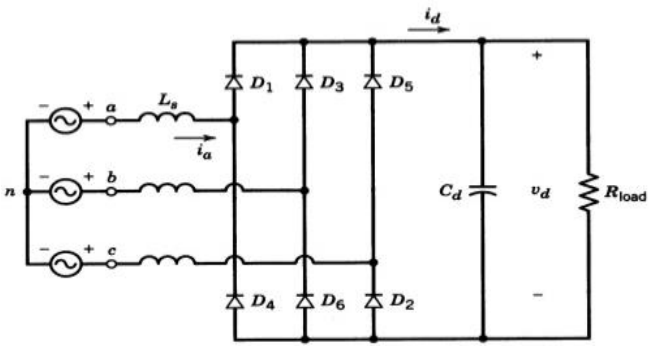


Fig.1 Circuit Diagram of Three Phase Fully Controlled Converter

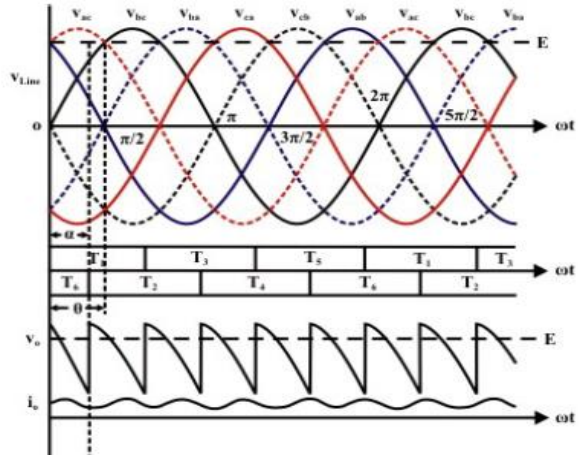


Fig.2 Waveform for Rectification Mode

III. MODES OF OPERATION

There are two modes of operation:

A. Rectification Mode

When the firing angle α < 90¬0, the converter is operating is rectification mode. In this mode, the dc output voltage obtained is positive. This implies the power is flowing from the three-phase ac supply to the dc load side. For example, when the converter is fired at an angle α(say 30¬0), then each thyristor conducting for 1200 of the input cycles and are fired in the sequence as mentioned in the operating principle. As we can see from the waveform, at α the line voltage Vac appears across the load from the R phase. Then after 600 duration, the line voltage Vbc appears across the load. This trend continues as Vba, Vca, Vcb, and Vab again. Thus, six pulse per cycle appears across the load, hence the other name six-pulse converter. The waveforms for rectification mode are shown in figure 2.

B. Inversion Mode

No, When the firing angle α > 90¬0, the converter is operating in inversion mode. In this mode, the dc output voltage obtained is negative, hence the name inversion (of voltage) mode. This implies the power is flowing from the dc load side to the three-phase ac supply side, that is power flow gets reversed. If the RLE load is connected, then the EMF is also reversed to suitable dc polarity. For example, when the converter is operating in inversion say at an angle 1200, as we can see from the waveform (fig.), Vbc appears across the load. This trend continues as V_{ba}, V_{ca}, V_{cb}, and V_{ab} again which is the same as rectification mode. But the value of α has the inherent restriction of range because for successful commutation of the thyristor it is essential that, β is larger than the turn off time of the thyristor. In practice, this upper value of α is further reduced due to commutation overlap. The waveform of the Inversion mode is shown in figure 3.

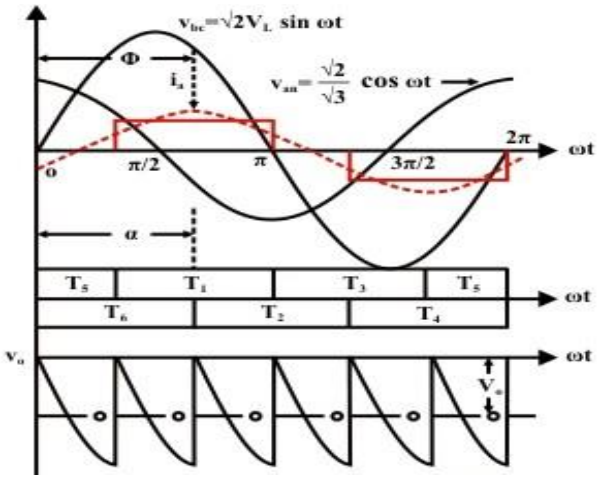


Fig.3 Waveform for Inversion Mode

Figure 2 & 3 shows the Rectification and Inversion mode waveforms of Three Phase Fully Controlled Converter

IV. CIRCUIT ANALYSIS

The output voltage waveform can be written as

$$V_o = \frac{3\sqrt{2}}{\pi} V_L \cos\alpha$$

The RMS output voltage is

$$V_{ORMS} = V_L\left[1+\frac{3\sqrt{3}}{4\pi}\cos 2\alpha\right]^{1/2}$$

The input power factor is

$$\text{Input Power Factor} = \frac{\text{Actual Power}}{\text{Apparent Power}} = \frac{2\sqrt{2}}{\pi}\cos\alpha$$

Percentage THD

$$\%THD = \frac{\sqrt{V_2^2+V_3^2+V_4^2+\cdots}}{V_1}$$

V. SIMULATION ANALYSIS

The simulation analysis of three-phase fully controlled rectifier with R and RL loads.

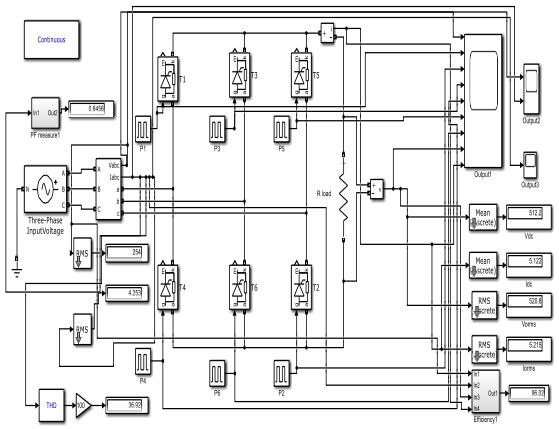


Fig.4 Simulation of Three Phase Full Controlled Rectifier with R Load

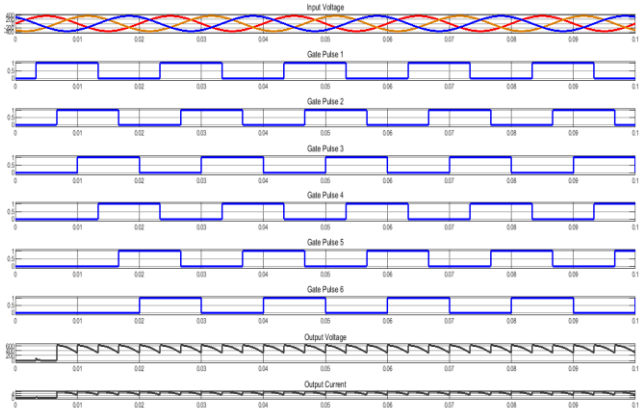


Fig.5 Switching Waveforms

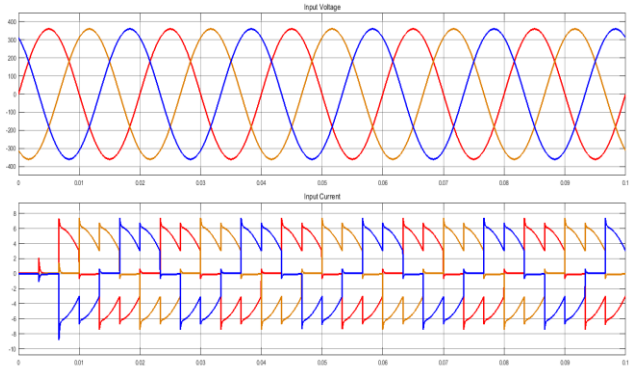


Fig.6 Input Voltage and Input Current Waveform for R load

Figure.5 shows the Input voltage, Gate pulse, and Output voltage and Output current waveforms. Figure.6 represents the Input voltage and Input current waveforms of Three Phase Fully Controlled Converter.

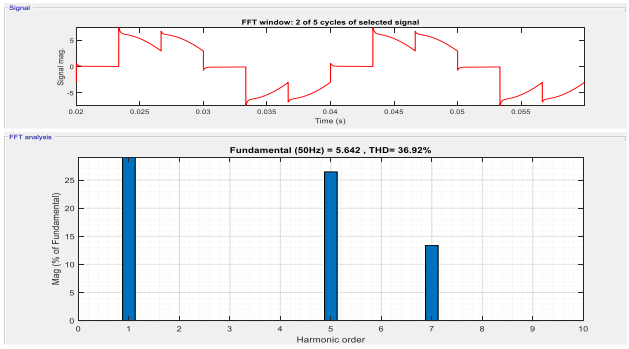


Fig.7 FFT Analysis of Source current @ $\alpha = 30^0$

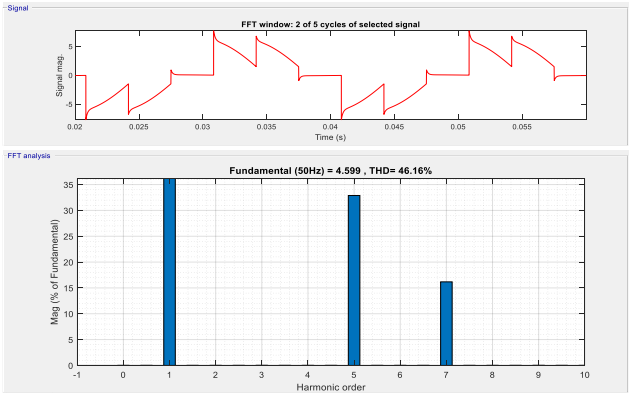


Fig.8 FFT Analysis of Source current @ $\alpha = 45^0$

The source current FFT analysis of Three Phase Fully Controlled Converter for two different firing angles 30^0 and 45^0.The THD for firing angle 30^0 is 36.92 and for 45^0 is 46.16.

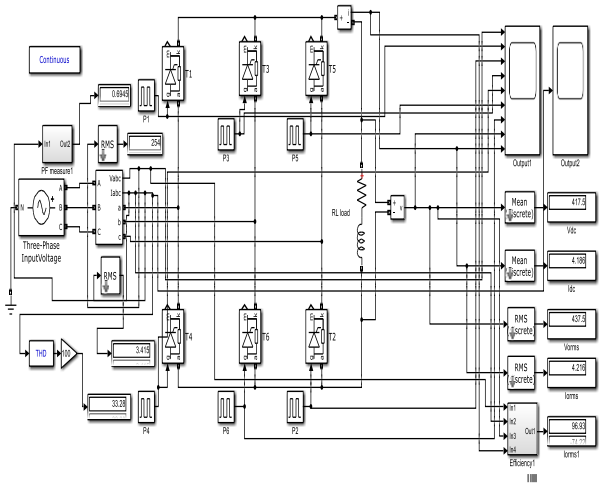


Fig.9 Simulation of Three Phase Full Controlled Rectifier with RL Load

TABLE I Shows the Firing Angle Variation of Three Phase Full Controlled Rectifier with R Load

S.No	α	I_{in}(A)	V_o(V)	I_o(A)	V_{orms}(V)	I_{orms}(A)	PF	Source Current THD(%)	η
1	30	4.253	512.2	5.122	520.8	5.215	0.8456	36.92	96.02
2	45	3.582	417.5	4.175	437.5	4.384	0.7152	46.16	89.74
3	60	2.76	294.2	2.942	334.5	3.355	0.5535	66.01	75.02
4	75	1.89	172.1	1.721	227.4	2.285	0.3879	97.86	53.65
5	90	1.075	78.35	0.7835	127.5	1.284	0.2424	147.7	31.54
6	120	0.197	5.499	0.05499	18	0.1886	0.1377	687.4	1.617

TABLE II Shows the Firing Angle Variation of Three Phase Full Controlled Rectifier with RL Load

S.No	α	I_{in}(A)	V_o(V)	I_o(A)	V_{orms}(V)	I_{orms}(A)	PF	Source Current THD(%)	η
1	30	4.181	512.2	5.13	520.8	5.143	0.8366	31.8	98.72
2	45	3.415	417.5	4.186	437.5	4.216	0.6945	33.28	96.93
3	60	2.428	294.2	2.955	334.5	3.018	0.5132	37.29	91.97
4	75	1.316	150.7	1.522	232.4	1.668	0.3213	54.37	71.89
5	90	0.665	64.77	0.6598	147.9	0.8644	0.2113	94.41	40.65
6	120	0.1668	6.46	0.07306	78.71	0.1945	0.1887	422	2.227

Table I and II show the firing angle variation of the Three Phase Full Controlled Rectifier with R Load and RL Load.

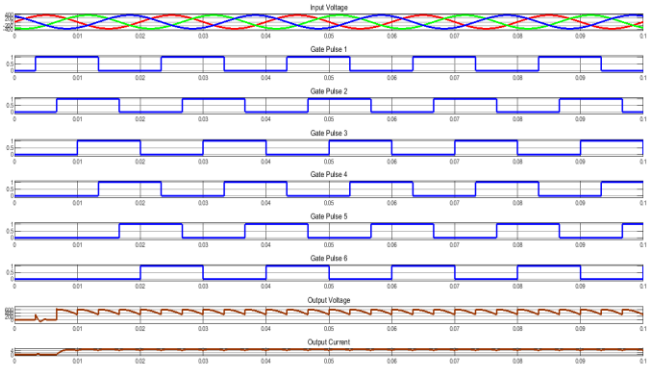


Fig.10 Switching Waveforms

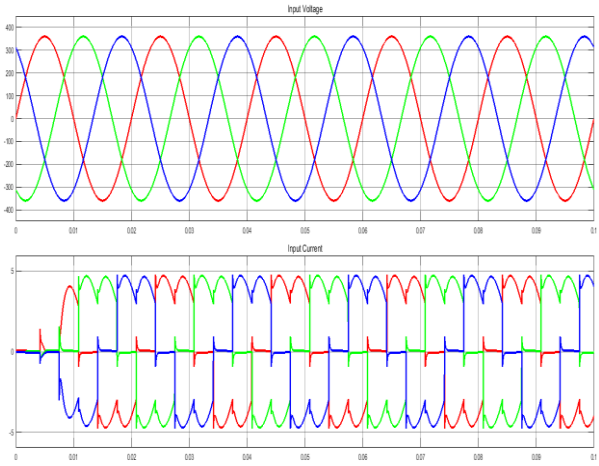


Fig.11 Input Voltage and Input Current Waveform for RL Load

Figure.10 shows the Input voltage, Gate pulse, and Output voltage and Output current waveforms. Figure.11 represents the Input voltage and Input current waveforms of Three Phase Fully Controlled Converter.

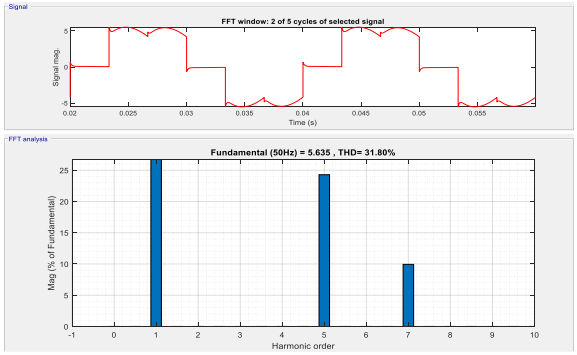


Fig.12 FFT Analysis of Source current @ $\alpha = 30^0$

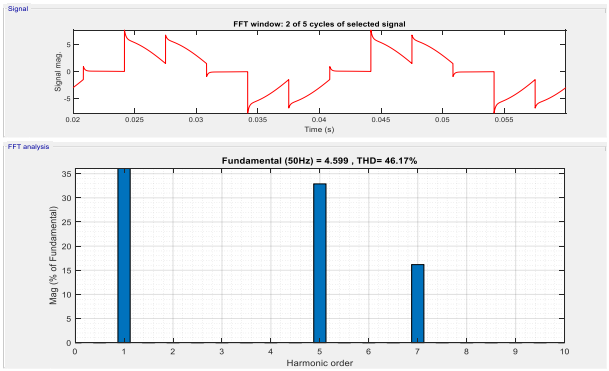


Fig.13 FFT Analysis of Source current @ $\alpha = 45^0$

The source current FFT analysis of Three Phase Fully Controlled Converter for two different firing angles 30^0 and 45^0.The THD for firing angle 30^0 is 31.8 and for 45^0 is 33.28.

VI. CONCLUSION

The analysis of three-phase Fully Controlled Converter for various firing angles has been performed. From the simulation analysis, as the firing angle is increased for both rectification and inversion modes the THD and power factor for the input current also varies. From the tables, it can be inferred that harmonic content of the input current increases because as the firing angle increases, the waveform distortions further increase the harmonic content. Since the THD rises, power factor and efficiency decrease considerably. In order to decrease THD filters can be used. This converter can be used for higher power DC applications.

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Poor and Disliking Subjects in Relation to Residence - A Case Study on High School Students

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ABSTRACT

Liking and Disliking towards a subject is a common feature among the high school students. Some students feel easy about some subjects and tough about some other. The response was taken from 2743 students, studying 8th to 10th classes (Rural: 869 and Urban: 1874) in Government High schools of Guntur District, Andhra Pradesh. The study found that High percent of rural students are Poor in almost all the subjects, except Natural Science compared to the urban students. In both cases, Telugu subject is easy for them. High percent of rural students disliking all the subjects compared to the urban.

Keywords : Poor In Subjects, Disliking, Residence, High School, Solution

I. INTRODUCTION

Students' success depends on their interest in studies. Further, brain functioning controls a student's ability to understand the subject. Some students are sharp in mathematics, some in science and some others in languages. Even among the languages, some are bright in mother tongue or Hindi or English. The present study examined the students' interest with reference to various subjects.

Causes

Some students are poor in some subjects or they may dislike some subjects. The reasons may be;

- feel tough to learn
- opinion formed at lower classes
- unable to understand
- poor teaching genes
- negative opinion about teacher
- heredity (Sankara Pitchaiah and Anjani, 2019)

II. METHODOLOGY

A total of 2743 students, studying 8th to 10th in Government high schools was participated, out of them 869 are rural and 1874 are urban school students. The details are shown in Tables 1 and 2. Students were assembled in a classroom of the respective schools and asked them to give their response about poor and disliking subjects. The purpose of the study and the details were explained in their mother tongue.

TABLE - 1 POOR IN SUBJECTS-RURAL AND URBAN STUDENTS

Poor in Subjects	Rural	Urban
Telugu	30	75
Hindi	369	397
English	254	446
Mathematics	658	806
Natural Science	95	301
Physical Science	182	270
Social Science	171	210

TABLE - 2 DISLIKING SUBJECTS-RURAL AND URBAN STUDENTS

Disliking Subjects	Rural	Urban
Telugu	132	65
Hindi	443	221
English	286	151
Mathematics	346	226
Natural Science	174	116
Physical Science	171	169
Social Science	105	116

III. RESULTS AND DISCUSSION

Variation of percentage of the Poor and Disliking subjects with reference to rural and urban students was shown in table 3.

Poor in Subjects

Rural

The highest percent of rural students expressed that they are poor in Mathematics (75.72), followed by Hindi (42.46) and English (29.23). The lowest percent of students are poor in Telugu (3.45), followed by Natural science (Table 3 and Figure 1).

TABLE -3 POOR AND DISLIKING SUBJECTS – RURAL AND URBAN (%)

Subjects	Rural		Urban	
	Poor in Subjects	Disliking Subjects	Poor in Subjects	Disliking Subjects
Telugu	3.45	15.19	4.00	3.47
Hindi	42.46	50.98	21.18	11.79
English	29.23	32.91	23.80	8.06
Mathematics	75.72	39.82	43.01	12.06
Natural Science	10.93	20.02	16.06	6.19
Physical Science	20.94	19.68	14.41	9.02
Social Science	19.68	12.08	11.21	6.19

Urban

In the urban school students, also more students are poor in Mathematics (43.01%). Next to Mathematics, problem reported with English (23.80%), followed by Hindi (21.18). Here, also less percent of students felt poor in Telugu (4.00), followed by Social Science (Table 3 and Figure 1).

High percent of rural students are Poor in almost all the subjects, except Natural Science compared to the urban students. In both cases, Telugu subject is easy for them.

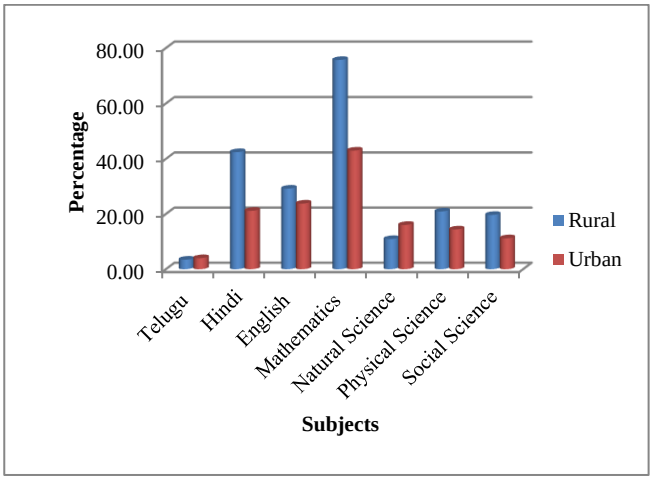


Figure 1. Poor in Subjects-Rural and Urban

Disliking subjects

Rural

The highest percent of rural school students pointed (Table 3 and Figure 2), that they dislike the Hindi subject (50.98), followed by Mathematics (39.82) and English (32.91). The lowest percent of students are disliking Social Science (12.08), followed by Telugu (15.19).

Urban

In Urban schools more students dislike Mathematics (12.06%), followed by Hindi (11.79%) and Physical science (9.02%). Less percentage of students dislike the Telugu subject (3.47).

High percent of rural students expressed disliking all subjects compared to the urban.

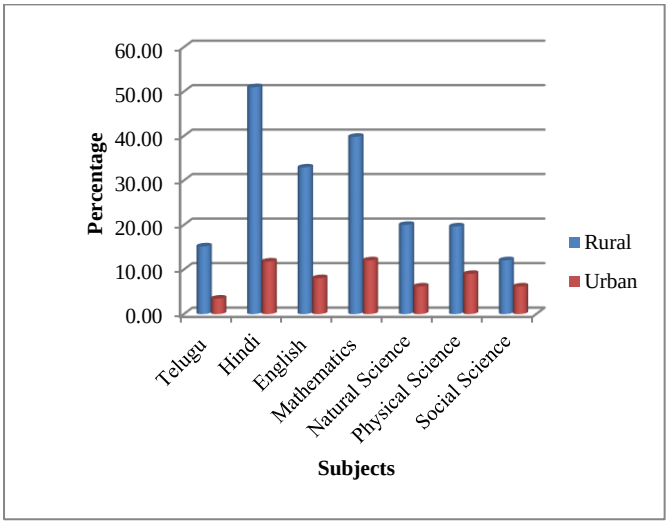


Figure 2. Disliking subjects –Rural and Urban

Poor in subjects Vs Disliking subjects

Rural students

It is observed that those students dislike the particular subject are also poor in such subjects, for ex: Hindi, English and Physical science (Table 3 and Figure 3).

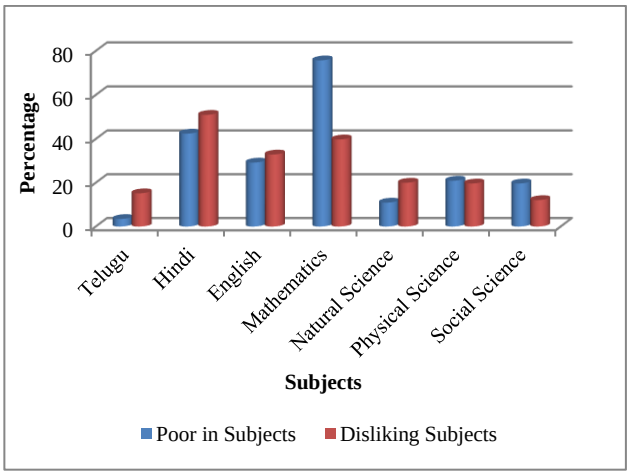


Figure 3. Poor and Disliking subjects –Rural

Urban Students

Though most of the students like the certain subjects, they are poor in almost all the subjects (Table 3 and Figure 4).

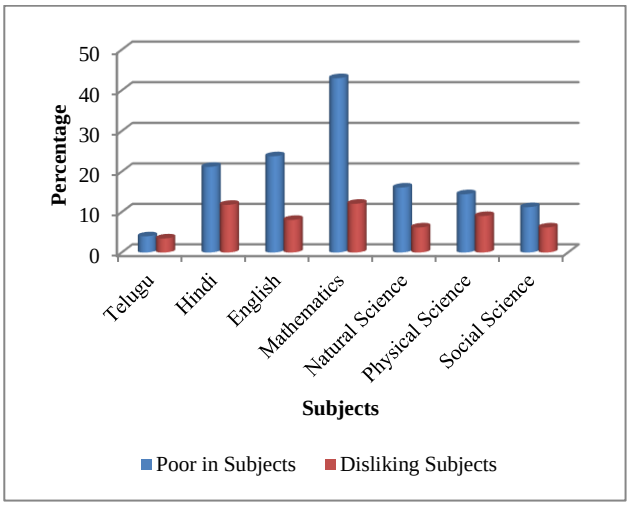


Figure 4. Poor and Disliking subjects –Urban

Takeuchi et al., (2014) studied on brain structures in the sciences and humanities. The authors examined 312 science students (225 males and 87 females) and 179 humanities students (105 males and 74 females). Whole-brain analyses of covariance revealed that after controlling for age, sex, and total intracranial volume, the science students had significantly larger rGMV in an anatomical cluster around the medial prefrontal cortex and the frontopolar area, whereas the humanities students had significantly larger rWMV in an anatomical cluster mainly concentrated around the right hippocampus. The results may support the ideas that autistic traits and characteristics of the science students compared with the humanities students share certain characteristics from neuro imaging perspectives.

One may like a subject or not, students shall remember that each subject is important to score good marks. If they spend more time for liking subjects and less time for disliking and tough subjects,

the students get less marks (Sankara Pitchaiah and Anjani, 2019).

IV. CONCLUSION

The study concentrates on the students those poor in subjects. It is also observed in the relation between poor and disliking subjects. It is observed that those students dislike the particular subjects are also poor in such subjects, for ex: Hindi, English and Physical science. Urban students, though most of the students like the subjects they are poor in almost all the subjects. It is suggested to spend more time with poor and disliking subjects.

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Pelletization Techniques. The Pharma Review

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ABSTRACT

Pellets are spherical or nearly spherical, free-flowing granules with a narrow size distribution, typically varying between 500 and 1500 μm for pharmaceutical applications. They are generally produced via a pelletization process whereby a powder blend consisting of an API and excipients particles is agglomerated into spherical granules. This review article deals with various aspects of the extrusion–spheronization technique. Pelletization is a technique to convert drugs or excipients to small free flowing, spherical or semi spherical units, which are produced by agglomerating fine powdered drugs/ excipients with a binder solution. Pellets range in size, typically, between 0.5 – 2 mm. In relation to pharmaceuticals, pellets offer high degree of flexibility in design and development of oral dosage form. Pelletization technique help in the formation of spherical beads or pellets having a diameter 0.5 -1.5 mm which can be eventually coated for preparation of modified release dosage form. The manufacturing techniques include Drug layering, Extrusion-Spheronization, Cryopelletization, Compression, Balling, Hot-Melt Extrusion Technology, Freeze pelletization, Spray-drying & Spray-congealing. Factors affecting pelletization technique and advantages, disadvantages of pellets are discussed.

Keywords : Pellets, Pelletization Technique

I. INTRODUCTION

1.1 Pellets

Small free flowing spherical unit ranging in size, prepared by agglomeration of fine powders called pellets.

- Their size and shape allow their administration as injection and also for oral drug delivery.
- Pellets range in size typical between 0.5-1.5mm,though other sizes could be prepared.[1]



Figure 1. Pharmaceutical Pellets

Pellets as a drug delivery system offer not only therapeutic advantages, such as less irritation of the gastro-intestinal tract and a lowered risk of side effects due to dose dumping but also technological advantages, for example, better flow propertiess, less friable dosage form, narrow particale size distribution, ease of coating and uniform packing.[2]. Pellets can be

prepared by a special technique called Pelletization. This technique is referred to an agglomeration process that convert fine powder or granules of bulk drug or excipient in to small , free flowing , spherical or semi spherical pellets .This technique is needed to produce pellets of uniform size with high drug loading capacity and also prevent segregation and dust [3]



Figure 2. Dosage forms-pellets

1.2.Characterization of pellets

- Characterization studies for prepared pellets.
- Optimizing the best formula for each drug, based on in vitro drug release studies.
- Formulating the optimized formula into dosage form
- Characterization studies for final dosage form.[4]

1.3. Why pellets

- Excellent stability.
- Dust free round pellets.
- Good flow behavior.
- Easy to dose.
- Compact structure.
- Very low hygroscopicity.
- High bulk density.[1]

2. Pelletization

Pelletization is often referred to as a size-enlargement process that involves the manufacture of agglomerates with a relatively narrow size rang, usually with mean size 0.5 to 2 mm named pellets. Pellets are small particles typically created by compressing an original material.[5] .Pelletization is a novel drug delivery system; a technique which converts fine powder particles into pellets. These oral multiparticulate drug-delivery systems offer biopharmaceutical advantages with respect to predictable and even distribution and transportation in the gastrointestinal tract. It has many advantages compared to single-unit dosage forms for ease of filling, better flow properties of spherical pellets, sustained, controlled or site-specific drug delivery, even distribution in the GI tract, less GI irritation, good bioavailability, ease of coating and uniform packing. Pelletization is easier and simple technique compared to granulation in order to develop a site-specific drug delivery system.[6]

Multiparticulate dosage forms are gaining much favour over single unit dosage forms because of their potential benefits like predictable gastric emptying, no risk of dose dumping, flexible release patterns, and increased bioavailability with less intra-subject variability[2]

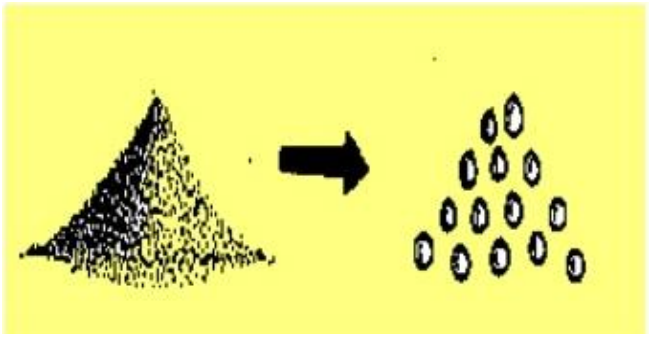


Figure 3. Pellets Formation

In recent years, there has been a growing interest in the field of pelletization to produce spherical pellets which can be changed into several dosages forms like tablet and capsule or can be administered as such. Pelletization involves size enlargement process and if the final agglomerates are spherical in shape in the size range of 0.5-2.0 mm, they are called pellets.[7]

Pelletization is a novel drug delivery system; a technique which converts fine powder particles into pellets. These oral multiparticulate drug-delivery systems offer biopharmaceutical advantages with respect to predictable and even distribution and transportation in the gastro-intestinal tract. Pelletization can be referred as the conversion of fine powder, granules of drug and excipient by the means of agglomeration to small, free flowing spherical subunit referred as pellets. Which are smaller in size (0.5-1.5mm) and intended mostly for oral administration.[8]

3. Historical development

The term pellet has been used by a number of industries to describe a variety of agglomerates produce from diverse raw materials, using different pieces of manufacturing equipment. These agglomerates include fertilizers, animal feeds, iron ores, and pharmaceutical dosage units and thus do not only differ in composition but also different sizes and shapes. as a meant pellets meant different things for different industries.[9]. In industries utilized pelletization processes since the turn of the 20th century in order to manufacture particles with defined sizes and shapes, it was only in the early 1950's, in response to a desire to sustain the release of drugs over an extended period of time, that the pharmaceutical industry developed a keen interest in the technology. In 1949, pharmaceutical scientists at **Smith Kline & French (SKF)** realised the potential of candy seeds in developing sustained-release preparations and began the development of tiny drug pellets that could be loaded into capsules.

Also, pelletization is used in various industries, such as agriculture (fertilizers and herbicides), mineral processing (iron ore pelletization), food and detergent industry. [10]

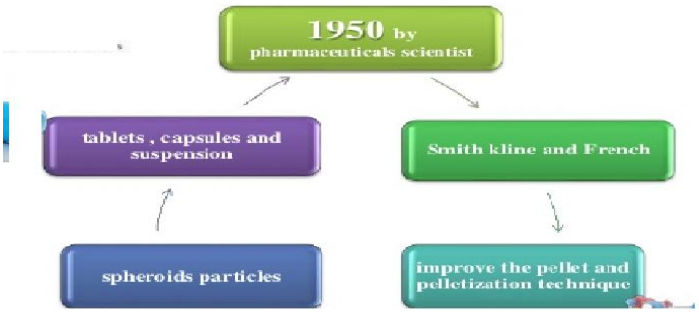


Figure 4. History of pelletization

4. Advantages

- They can be divided in to desired dosage strength without process or formulation changes.
- Improve appearance of product.
- Pellets are of small size and have good flow ability compare to powder form.
- Ease of handling, such as filling into capsules
- Incorporation of incompatible ingredients in a single dosage form
- Different release profiles at different sites in the Gastrointestinal tract
- Protection against degradation of active ingredients by oxidation or moisture by providing film coating
- High degree of patient acceptance when filled in capsules due to their elegance as compared to tablets
- Ideal shape for application of film coatings due to low surface to volume ratio
- High drug loading capacity without producing large particles
- Pellets are less susceptible to dose dumping effect and decrease the side effect
- Due to their small size reduction in gastrointestinal irritation compare to tablet
- Pellets reduce variation in gastric emptying rate and intestinal transit time thus reduce inter and intra patient variability
- They can be formulated as sustained, controlled, or site specific delivery of the drug from coated

pellets.
- Density increase can be achieved as bulk density of powder is increased by spheronization process. This can improve the process and packaging.

5. Disadvantages

- Pellets filling involve capsule filling which can increase the costs
- Tableting of pellets destroy film coating on the pellets.
- The size of the pellets may vary formulation to formulation but usually is in range of 0.05 mm and 2 mm.[11]

6. Requirements of pellets

- Pellets should be of spherical shape and the surface should be smooth so that desired uniform film coating can be done.
- Particle size of pellets should be in range 0.5-1.5 mm.
- The quantity of excipients should be maximum so as to maintain the particle size.

7. Reason for pelletization

- The pharmaceutical industry has developed a great interest in Pelletization due to a variety of reasons:
- Prevention of segregation of co-agglomerated components, resulting in an improvement of the uniformity of the content.
- Prevention of dust formation, resulting in an improvement of the process safety, as fine powders can cause dust explosions and the respiration of fines can cause health problems.
- Increasing bulk density and decreasing bulk volume.
- The defined shape and weight improves the appearance of the product.
- Improvement of the handling properties, due to the free flowing properties
- Improvement of the hardness and friability of pellets.

Controlled release application of pellets due to the ideal low surface area to volume ratio that provides an ideal shape for the application of film coatings.

8. Pellets formation and growth

In order to select and optimize any pelletization/granulation process, it is important to understand the fundamental mechanisms of granule formation and growth. However, based on the experiments on the mechanism of pellet formation and growth, the following steps were proposed: nucleation, coalescence, layering and abrasion transfer. Nucleation is followed by a transition phase, and the growth mechanisms affecting the transition region are coalescence and layering.

Coalescence is defined as the formation of large-sized particles by random collision of well formed nuclei, and the mechanism requires slight excess moisture on the nuclear surface. Although the number of nuclei is progressively reduced, the total mass of the system remains unchanged during this step. The particles, however, undergo a continuous change in size as long as the conditions that lead to the transfer of material exist.[12]

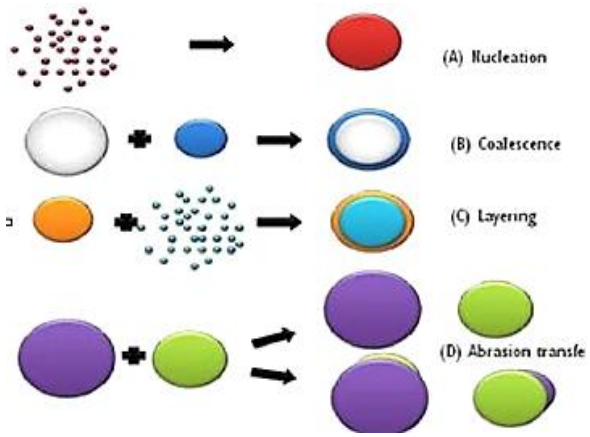


Figure 5. Pellet growth mechanism.

A] Nucleation B] Coaescence C]Layering D] Abrasion transfer.

9. Pelletization V/S Granulation:

- Pelletization produces spheroids with high loading API than granules as it require excipients.
- Pelletization is simple, requires less equipments and fast processing than granulation.
- Coating of pellets is easier than coating granules due to their spherical shape and low surface area to volume ratio.
- Pelletization gives better results in formulation of sustained release and controlled release delivery system than granulation.
- Pelletization gives high through put with low wastage unlike in granulation.
- Pellets are easier to produce of uniform shape, size, good flow properties, reproducibility in packing, high strength, low friability and smooth surface with high drug loading capacity which is not possible with granulation.[6]

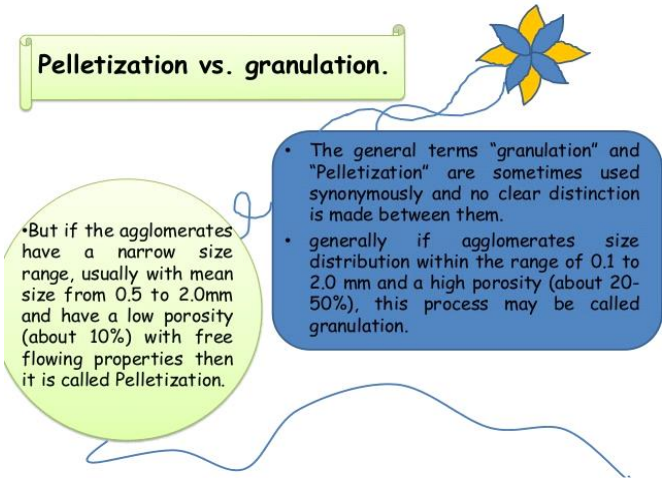


Figure 6. Pelletization vs granulation

10. Method of pelletization

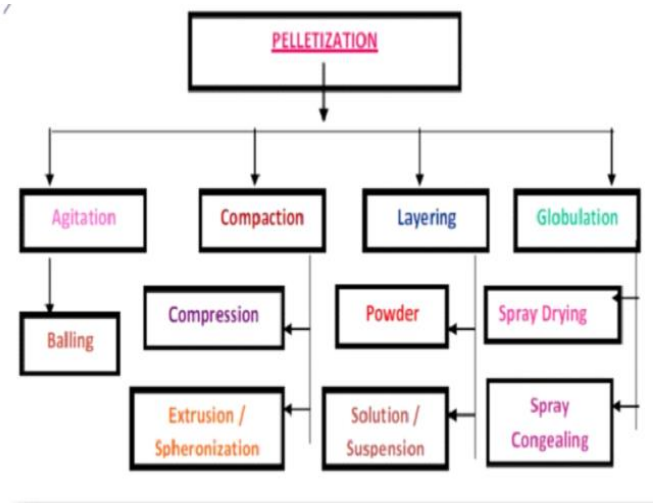


Figure 7. Method of pelletization

10.1 Agitation

In finely divided particles are converted to spherical particles, upon the addition of appropriate quantity of liquid, by a contineus rolling or thombing motion.
The liquid may be added to or during the agitation stage. Pans, discs, drums, or mixtures may be used to produce pellets by the balling process.[7]

10.1.1 Balling

Also known as spherical agglomeration is a pelletisation technique in which finely divided particle or powder upon addition of an appropriate quantity of liquid are converted to spherical particle by continuous rolling or tumbling action.

They can be done either by adding an appropriate amount of liquid into powder called liquid induced agglomeration or subjecting it to high temperature called melt induced agglomeration. Round curvature pans, horizontal drum mixer, and rotatory fluid bed granulator can be used for the production of spherical pellets by balling.

10.2. Compaction

A compaction is a form of pressure agglomeration in which drug particles or granules are forced together with or without formulation aids by a mechanical force to generate pellets of well defined shape and sizes. In compression, particles that are pretreated through dry blending or wet granulation followed by drying rearrange themselves to form a closely packed mass. At higher pressure, the particles are forced against each other and undergo elastic and plastic deformation. In extrusion spheronization, first the dry powder mix is agglomerated with the help of a binding liquid. Then it is processed in the extruder to produce high-density extrudates. These extrudates are finally converted to pellets on spheronizer.[8]

10.2.1. Compression

Compression is a pelletization process in which a mixture or blend of active ingredient and excipients are compacted under pressure to generate pellets of define shape and size. The pellets are small enough to be filled into capsule.[13]

10.2.2. Extrusion / Spheronisation

Extrusion / spheronisation is a multistage process for obtaining pellets with uniform size from wet granulates (extrudates).

The method involves the following main steps:

- The dry mixing of the ingredients, in order to achieve homogenous powder dispersions
- Wet massing, in which the powders are wet mixed to form a sufficiently plastic mass.
- An extrusion stage, in which the wet mass is shaped into cylindrical segments with a uniform diameter;
- The spheronisation stage, in which the small cylinders are rolled into solid spheres (spheroids);
- The drying of the spheroids, in order to achieve the desired final moisture content;
- Screening (optional), to achieve the desired narrow size distribution.

10.2.3.Extrusion

Extrusion consists in applying pressure to a wet mass until it passes through the calibrated openings of a screen or die plate of the extruder and further shaped into small extrudate segments.

As the mass passes through the extruder screen, the resulting extrudates eventually break under their own weight. Usually the extrudates have the same length. The extrudates must have enough plasticity in order to deform, but an excessive plasticity may lead to extrudates which stick to each other as they are collected and further processed in the spheroniser. The diameter of the segments and the final size of the spheroids depend on the diameter of the openings in the extruder screen. In order to obtain reproductible results, it is recommended to monitor extrusion parameters such as: feed rate, powder consumption, die temperature and compression chamber pressure.

10.2.4 Spheronisation

Spheronisation reffer to the formation of spherical particles from the small rods produced by extrusion. The essential part of the spheronizer is the friction plate. The indentation pattern on the plate can have various designs, which correspond to specific pur poses. The most common design is the cross hatch pattern with grooves intersecting each other at 90° angles. In order to form spheroids, the extrudates are brought onto the rotating friction plate of the spheronizer, which imparts a rolling motion to the material.[10]

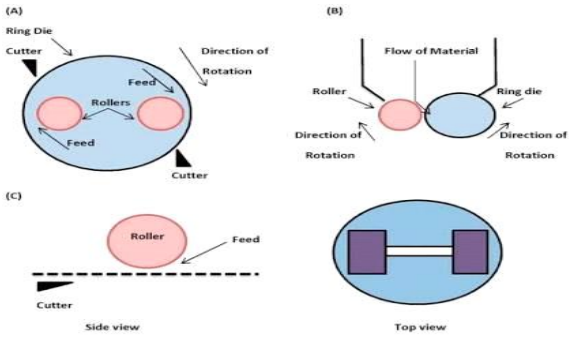


Figure 7. Extrusion spheronization.

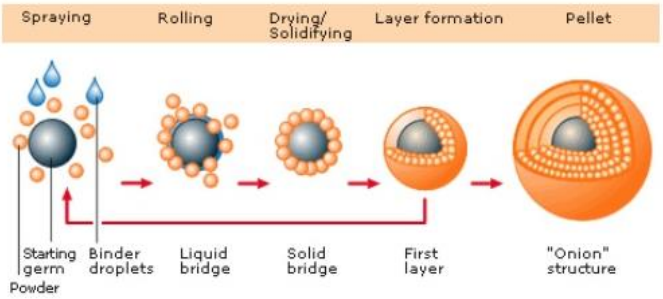
A] Internal rollerB] roller external to die
C] roller on flat die plate.

10.3. Drug layering

It is the technique of pelletization which is used to coat or layer the seed material in powder, solution or suspension form. Initially, drug solution or suspension is prepared by using suitable solvent or non-solvent, respectively. Prepared solution or suspension of the drug is then sprayed over the inert spherical core, usually prepared by using microcrystalline cellulose or sugar. This process results in the formulation of varying sized pellets with inner core and outer shell having different composition. This technique has different types including: dry powder layering, solution and suspension layering and direct pelletization. [14]

10.3.1. Powder layering

This is the process in which consecutive layers of dry powder of the drug or/and excipients are deposited on preformed core. First, a binding solution is prepared having a suitable binder. The prepared binding solution is sprayed over the inert core of microcrystalline cellulose or sugar to prepare a sticky core with the ability to bind the drug powder over it. The drug, which is to be layered over prepared core, is grinded or micronized, if required, to prepared fine powder and then the finally divided powder is sprinkled over the inert spherical core in controlled manner to achieve uniform sized circular pallets Conventional coating pan is usually used for this purpose but it has few drawbacks like poor mixing and poor drying. The substrate particles are fluidized and suspended by heated and conditioned air. One or several nozzles atomize and spray the drug powder onto the substrate.



10.3.2 Suspension / Solution layering technique

This technique involves the deposition of successive layer of solution and /or suspension of drug substances and binders on starter seeds which may be inert material or crystal of granules of the same drug. In this technique drug particles and others component are dissolved or suspended in the application medium .The droplets impringe on the starter seeds or cores and spread evenly as the solution or suspension is sprayed on the cores. Followed by drying phase allows dissolved material to crystallize and form solid bridges between the cores and initial layer of the drug substances and among the successive layer of drug substances or polymer. Continue this process until the desired layer of drug or polymer formed. Consequently conventional coating press, fluidized bed centrifugal granulator of Wurster coater has been used successfully to manufacture pellets. The most common configuration for bottom spray coating is known as the Wurster system. In this study solution/ layering of neutral pellets has been conducted applying novel fluidized bed technology from .This technology claims to improve the product movement in defined direction in all the equipment by the Disk jet gas distribution plate. Further more, a 3 component spray nozzle is used in order to improve the film formation on the pellets due to constant and reproducible drop size distribution. Accessibility of clogged nozzles without stopping and interrupting the process makes the equipment advantageous in respect to Wurster system. Hüettlin's three

component nozzle is an air nozzle with an additional channel through which a second gas or component can be introduced to create a special microclimate around the nozzle which prevents excessive spray drying or clogging of the nozzle. Such microclimates near nozzle apertures are very useful when a film former with a relatively high minimum film-forming temperature (MFT) issued [12].

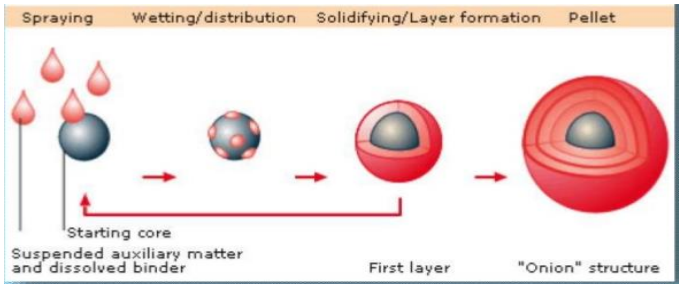


Figure 9. Principles of Solution and Suspension Layering Process

10.4. Globulation

Globulation or droplet formations consists two related processes spray drying and spray congealing.

10.4.1. Spray drying:

It is the process in which drugs in the suspension or solution without excipients are sprayed in to a hot stream to produce dry and more spherical particles. This process is commonly used for improving the dissolution rates; hence bioavailability of poorly soluble drugs.

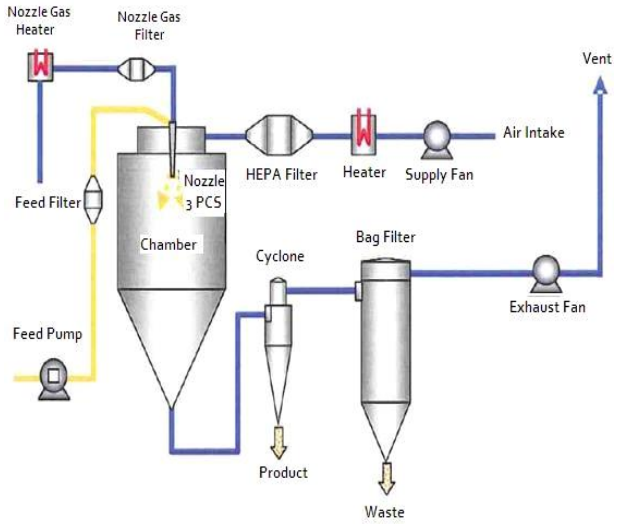


Figure 10. Spray drying.

10.4.2. Spray congealing

It is the process in which a drug is allowed to melt, disperse or dissolve in hot melts of gums, waxes or fatty acids, and is sprayed into an air chamber where the temperature is kept below the melting point of the formulation components, to produce spherical congealed pellets. Both immediate and controlled release pellets can be prepared in this process depending on the physiochemical properties of the ingredients and formulation variables[5]

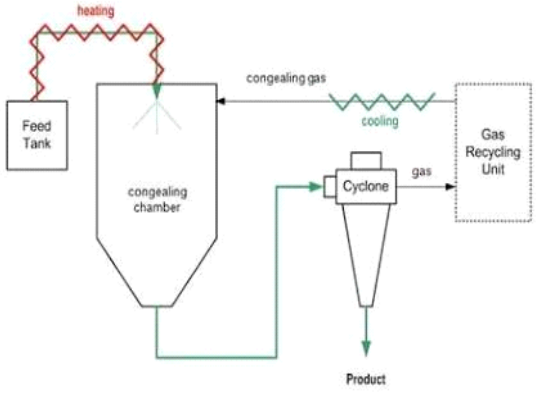


Figure 11. Spray congealing

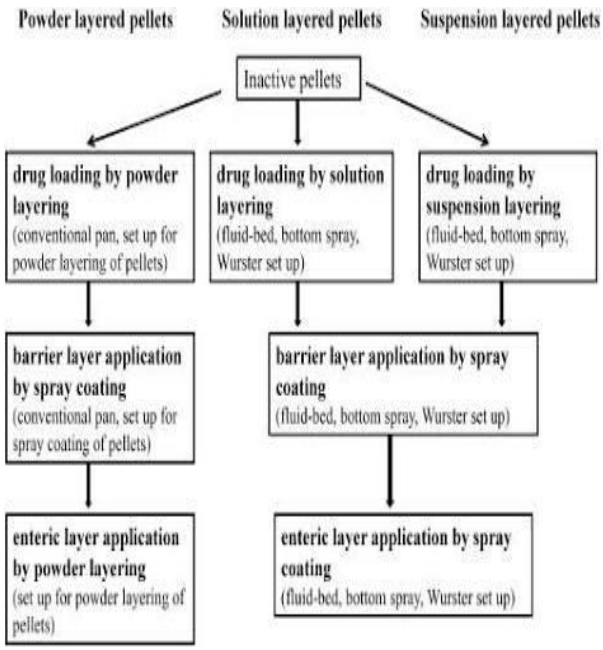


Figure 12. Representation of Powder layering, Solution layering and Suspension layering.

11.Factors affecting pelletization technique

1. Moisture content:

Moisture in the wet mass brings cohesiveness to powder so that the wet mass can be extracted and spheronizer to give spherical shape. High moisture contents lead to agglomeration of pellets during the process of spheronization

2. Rheological characteristics:

The optimum rheological condition leads to good flow ability in order to extrudate the wet mass. The rheological variations make improper and non-uniform extrudate.

3. Solubility of excipients and drug in granulating fluid:

Soluble drug get dissolve in a granulating liquid. Thus increasing the volume of liquid phase leads to over wetting of pellets. But increase in wetting liquid increases plasticity but includes sticky mass

4.Composition of granulating fluid:

Besides water, alcohol, water/alcohol mixture, ethyl ether, dilute acetic acid, isopropyl alcohol is used as a granulating liquid. Aqueous polymer dispersion containing HPMC, PVP, etc can also be used as granulating fluid.

5. Physical properties of starting material:

Quality of pellets depend not only composition but also on different grades of the same product. The swelling property of material used in pelletization technique decides the release rate of drug in pellets.

6. Speed of Spheronizer:

It affects the size, hardness, sphericity and density of pellets. The high speed gives high sphericity, lower friability, smooth surface and higher crushing strength.

7.Extrusion screen:

The quality of pellets is greatly influenced by the characteristics of orifice of the screen. And increase in orifice dimension resulted in increased mean pellet size. The increase in orifice depth decreased with the presence of water at the extrudate surface. [1]

12. APPLICATIONS OF PELLETS

12.1 Taste masking

Micro pellets are ideal for products where perfect abatement of taste is required. Although various technique have been utilized to mask the bitter taste of a drug such as the addition of sweeteners and flavors, filling in capsules, coating with water insoluble polymers or pH dependent soluble polymers, complexing with ion-exchange resins, microencapsulation with various polymers, complexing with cyclodextrin and chemical modifications such as the use of insoluble prodrugs, few reports have described the masking of unpleasant taste without lowering of bioavailability especially for oral products. The micropelletization technique solves difficult taste masking problems while maintaining a high degree of bioavailability due to their high surface area, especially for oral products. Furthermore, because of the special design of the manufacturing process, dust fractions that representing an uncoated fragments which could cause taste problems are absent in micro pellets. Many products, such as antibiotics (clarithromycin, roxithromycin and cephelexin) and anti-inflammatory drugs with a prohibitively bitter taste, can now be formulated in products with high patient compliance, thus markedly increasing the sales potential of the product.

12.2 Immediate release

Administering drugs in pellet form leads to an increased surface area as compared to traditional compressed tablets and capsules. This would considerably reduce the time required for disintegration and have the potential for use in rapidly dispersible tablet.

12.3 Sustained release

The pellet form provides a smoother absorption

profile from the gastrointestinal tract as the beads pass gradually through the stomach in to the small intestine at a steady rate. Pellets are being increasingly used in the manufacture of sustained release dosage form of drugs. The advantage of the dosage form is well known and some examples are given below:

- Extend day time and night time activity of the drugs,
- Potential for reduced incidence of side effects,
- Reduced dosage frequency of dosage forms,
- Increased patient compliance, patients who are required to take 2 or more doses of formulation a day are thought to be less likely to forget a dose then if they are required to take 3 or 4 times a day,
- Potential lower daily cost to patient due to fewer dosage units.

12.4 Chemically incompatible products

At times such ingredients are required to be delivered in a single dose. In the compressed tablet dosage form separate tablets would have to be administered, but the pellets can be administered in a single capsule.

12.5 Varying dosage without reformulation

Pellets have excellent flow properties, due to this; they can be conveniently used for Filling capsules and the manufacturer can vary the dosage by varying the capsule size without reformulating the product. [12]

13.Conclusion

Development of pelletization has acquired the market of novel drug delivery involving both the controlled as well as immediate release. They are having simple design, high efficiency of producing spherical pellets, flexibility and robustness. Pelletization lays the scope for different oral immediate or controlled delivery system. Due to its simple design, greater flexibility, efficiency of producing spherical pellets and fast processing; it has found a special place in the Pharmaceutical industry. Pellets are the multi-unit dosage forms which offer improved safety and efficacy of the active ingredients with excellent flow properties which is then fabricated in single dosage form.



II. CONCLUSION

Pellets are spherical or nearly spherical, free-flowing granules with a narrow size distribution, typically varying between 500 and 1500 μm for pharmaceutical applications. They are generally produced via a pelletization process whereby a powder blend consisting of an API and excipient particles is agglomerated into spherical granules. This review article deals with various aspects of the extrusion–spheronization technique. Pelletization is a technique to convert drugs or excipients to small free flowing, spherical or semi spherical units, which are produced by agglomerating fine powdered drugs/ excipients with a binder solution. Pellets range in size, typically, between 0.5 – 2 mm. In relation to pharmaceuticals, pellets offer high degree of flexibility in design and development of oral dosage form. Pelletization technique help in the formation of spherical beads or pellets having a diameter 0.5 -1.5 mm which can be eventually coated for preparation of modified release dosage form. The manufacturing techniques include Drug layering, Extrusion-Spheronization, Cryopelletization, Compression, Balling, Hot-Melt Extrusion Technology, Freeze pelletization, Spray-drying & Spray-congealing. Factors affecting pelletization technique and advantages, disadvantages of pellets are discussed.



Figure 13. Pellets to preaparing capsule pelletization technique.

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[13]. Pellets Ans Pelletization: Emerging Trends In The Pharma Indusry. Acta Poloniae Pharmaceutica ñ Drug Research, Vol. 73 No. 6 pp. 1415ñ1425, 2016. usion) a conclusion is the last part of something, its end or result.

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Secured and Reliable Urban Area Applications Based on IoT

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ABSTRACT

There is requisite and is iteratively expressed for a smart city kind development from different organisations in various countries around the world. Many countries are already looking forward to eliminate intricacies in different fields comprising those of industrial, technical and medicine by keeping a regular eye on as well as bringing a better kind communication. Perpetuating on cost and being reparatory on time makes to an exceptional level of progress. We can observe that automated type system is de facto taken over by the manual type system. Automation of home or any organisation utilising IoT is a system, which considers laptops or smart type phones primarily to superintendence the functions required in homes or even business premises. Appliances of house hold type, which in general comprises of television; lighting system and even doors and gates, and these, can be handled with a switch of a button. This is comprehended as centralised type and much security can be expected. Embedded kind technology chosen and worked herein helps in making to the best overall composition. Weather type conditions are imperative for monitoring primarily to keep goingness of a healthy growth of crop throughout the year. Due to a prelation of technology, environmental kind parameters have become plain sailing when compared to prior days. Superb kind sensors are worked out primarily to guesstimate measure and arrive with the physical and environment kind of parameters. In the successive pages, there is a discussion on how an IoT type platform is developed, various devices, which makes to overall composition. Various software and hardware systems are enlisted, which it is considered for the successful IoT type operation.

Keywords : Arduino, Wi-Fi (ESP 8266), Load cell, Database System

I. INTRODUCTION

Notion behind IoT as part of promoting to smart kind city makes or comprises of various newfangled services along with the rigorous utilisation of information and following to technology. Technologies behind smart type city constitute the usage of smart type phones, which are nowadays identified as the coalesce in the real world. In the broader sense, IoT and the cloud type computing can be indubitably recognised as the most significant among the ICT type models, which are in the point of fact, shaping the generation in next sequential years especially at computing. Hardware and also software essentials can be premeditated and made to deployment of applications specially developed for smart type cities. Healthcare type industries are the one to be got the most mileage. There are contemporary generation kind devices, which constitute devices like sensors, which are virtual as well as physical type and these are brought in link by an Internet means, especially for applications, which are value added type. In present times, crowd is considering shifting to developed kind cities for an

enhanced type lifestyle hence naturally this concept becomes more demanding and less convoluted communication system.

Different department can work like knowledge sharing, considering digitalising, make to marketing and suggestion board for an incessant success in any future course of works. A city can be made in comparison to nervous kind organisation in human and communication, which can be expected likewise in flow. With repercussion from surge of Internet, information made for availability, has become rised herein. There is a need for well-regulated kind of interaction especially between the entities represented. An intelligent city herein reckon on digital type infrastructure, which actually interlinks between local type community and drives forth the growth, efficiency, furthering to productivity and even competitiveness. Role of the smart city kind managers need to be analysed and re-established.

II. PROPOSED WORK

Overall the goal of this work is to use a heterogeneous network of SOs using different communication technologies in order to perform real time traffic estimation in the cities, with the following principles like

(i)Sensing correctly the environment,
(ii)Exchanging the information securely
(iii)Safeguarding private information.

Users are reluctant to adopt this new technology that will be a part of their everyday lives, which decreases the market value of SC applications for the service providers. Therefore if these concerns are not addressed proactively at the early stages of IoT deployment for SCs they may act as a barrier to the adoption of this technology by users and businesses. In this respect, the FP7 project RERUM aims to improve the IoT technology making it more reliable, trustworthy and secure for enabling both users and service providers to adopt it and enjoy its benefits.

III. METHODOLOGY

PROPOSED AREAS OF APPLICATION:

TRAFFIC CONTROLLING (E.g.: AMBULANCE)

Existing System:

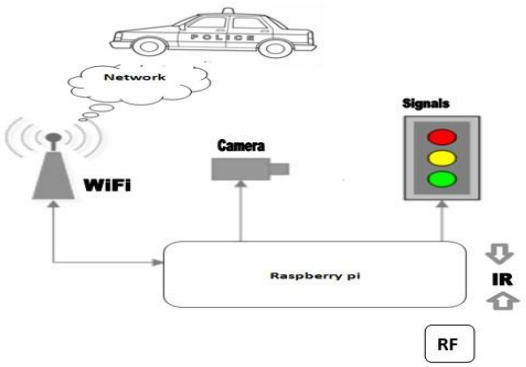
- It is Difficult to identify the Traffic Violators.
- There is no IOT based Traffic management System.

Proposed System:

- IOT based traffic management
- Easy to find the path for emergency condition in ambulance.
- The Traffic violators are captured and send to Police.

Making way for Ambulance:

RFID reader will be placed at the place such that it can detect the ambulance whenever it approaches the traffic around 100 meters near the traffic control system and will be connected to the controller. When the ambulance RFID tag will be read the RF transmitter will send signal to RF receiver which changes the traffic signal from red to green and makes way for the ambulance.



IV. LITERATURE REVIEW

To address the notion of Trust, RERUM will introduce the concept of trust in the core of the system and facilitate this through all its layers developing a cross-layer reputation management framework. The key concept is that using advanced fusion techniques only trusted SOs will be allowed to exchange data and malicious or misbehaving nodes sending false data will be excluded from the network. Thus, the reliability of the gathered data will be ensured. To measure the trustworthiness of SOs, a weight model capturing the data context will be used. Weight will not only determined by the input provided by users, but also by the time it was last updated and by the effect that the context really has in the related service.

Additionally, the reputation management framework will use advanced fusion techniques for the data gathered by all SOs for evaluating the results to identify malicious or misbehaving objects. Finally, the cryptographic mechanisms that RERUM will employ are also able to identify the source, integrity and accuracy of the information exchanged by the SOs.

V. CONCLUSION

This work discusses the visions of the newly launched FP7 project RERUM towards enhancing the reliability and the security of SC applications. This in return makes service providers also reluctant to investing in SC applications. RERUM has the citizen at the center of attention and by including city administrations in all phases of the project; it ensures that the citizens' requirements will drive the system design. Additionally, RERUM adopts the concept of "reliability, security and privacy by design" and employs a number of security, privacy and trust mechanisms, most of which will be embedded on the SOs to provide inherent security and reliability to the SC applications.

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Corn Cutting Machine

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ABSTRACT

The Crop reaper machine targets the small-scale farmers who have land area of less than 2 acres. This machine is compact and can cut up to two rows of plant. It has cutting blades which cut the crop in a scissoring type of motion. There are cutters on two metal strip (plate) upper cutter plate will be reciprocate by scotch yoke mechanism. It runs on engine, this power, is provided through pulley and gear box arrangement to the cutter. A collecting mechanism is provided for the collection of crops to one side after cutting. This mechanism is also powered by pulley arrangement, two sprockets and chain arrangements given for collection of crops. This compact harvester is manufactured using locally available spare parts and thus, it is easily maintainable. This harvester might be the solution to the problems faced by a small-scale farmer regarding cost and labor implementation. After testing this machine in farm, it is found that the cost of harvesting using this harvester is considerably less as compare to manual harvesting. The 3D model will be drawn with the help of CATIA software. All the components required for the project are collected and manufacture. After making the parts assembly was done and after that the result and conclusion was carried out.

Keywords : Metal Strip, Small-Scale Farmer, Agricultural Products, CATIA

I. INTRODUCTION

A reaper is a farm implement or person that reaps (cuts) crops at harvest when they are ripe. Usually the crop involved is a cereal grass. The first documented reaping machines were Gallic reaper that was used in modern day France during Roman times. The Gallic reaper involved a comb which collected the heads, with an operator knocking the grain into a box for later threshing.

These reapers are costly and only available of very large-scale farming. However, agriculture groups make these available for rent on an hourly basis. But the small holding farm owners generally do not require the full-featured combine harvesters. Also, these combine harvesters are not available in all parts of rural India due to financial or transportation reasons. Thus, there is a need for a smaller and efficient combine reaper which would be more accessible and also considerably cheaper.

Farming is most widely followed profession in India. Agricultural products contribute a major portion to our economy. Engineering science has brought tremendous changes in traditional methods of agriculture viz. sowing, planting, irrigation, fertilizer spraying, harvesting, etc. However, to increase our economic condition, we must increase the productivity and quality of our farming activities. Nowadays very few skilled labors are available for agriculture. Because of this shortage the farmers prefer to use reaper harvesters.

The mission is to create a portable, user-friendly and low-cost mini harvester taking into account the requirements of current situation; the idea was created to prepare a machine which is cheap and will reduce the labor required to cut crops. This machine has the capability and the economic value for fulfilling the needs of farmers having small land holdings. This machine is cost effective and easy to maintain and repair for the farmers. The machine model is designed based on the demand for a compact and economical reaper. This demand is taken into consideration by consulting farmers in person, for their problems and requirements.

Taking into account the present scenario of sugarcane harvesting we decided to prepare a model of sugarcane reaper with compact construction which will be mostly suitable for farmers having small and for agriculture. The machine prototype will be economical and most convenient for cutting corn stalks and other similar plants having same or less shear strength than corn. Harvesting is the process of gathering a ripe crop from the fields. Reaping is the cutting of grain or pulse for harvest, typically using a scythe, sickle, or reaper. Process automation has increased the efficiency of both the seeding and harvesting process.

Most modern mechanical reapers cut the grass; most also gather it, either by windrowing it or picking it up. Modern machines that not only cut and gather the grass but also thresh its seeds (the grain), winnow the grain, and deliver it to a truck or wagon it are called combine harvesters or simply combines; they are the engineering descendants of earlier reapers.

Hay (grass) is harvested somewhat differently from grain; in modern haymaking, the machine that cuts the grass is called a hay mower or, if integrated with a conditioner, a mower-conditioner. As a manual task, cutting of both grain and hay may be called reaping, involving scythes, sickles, and cradles, followed by differing downstream steps. Traditionally all such cutting could be called reaping, although a distinction between reaping of grain grasses and mowing of hay grasses has long existed; it was only after a decade of attempts at combined grain reaper/hay mower machines (1830s to 1840s) that designers of mechanical implements began resigning them to separate classes.

Mechanical reapers substantially changed agriculture from their appearance in the 1830s until the 1860s through 1880s, when they evolved into related machines, often called by different names (self-raking reaper, harvester, reaper-binder, grain binder, binder), that collected and bound the sheaves of grain with wire or twine.[3] Today reapers and grain binders have been largely replaced by combines in commercial farming, but some smaller farms still use them.

Types of reaping:

1. Hand Reaping –

Hand reaping is done by various means, including plucking the ears of grains directly by hand, cutting the grain stalks with a sickle, cutting them with a scythe, or a scythe fitted with a grain cradle. Reaping is usually distinguished from mowing, which uses similar implements, but is the traditional term for cutting grass for hay, rather than reaping cereals. The stiffer, dryer straw of the cereal plants and the greener grasses for hay usually demand different blades on the machines.

The reaped grain stalks are gathered into sheaves (bunches), tied with string or with a twist of straw. Several sheaves are then leant against each other with

the ears off the ground to dry out, forming a stook. After drying, the sheaves are gathered from the field and stacked, being placed with the ears inwards, then covered with thatch or a tarpaulin; this is called a stack or rick. In the British Isles a rick of sheaves is traditionally called a corn rick, to distinguish it from a hay rick ("corn" in British English retains its older sense of "grain" generally, not "maize"). Ricks are made in an area inaccessible to livestock, called a rick-yard or stack-yard. The corn-rick is later broken down and the sheaves threshed to separate the grain from the straw.

Collecting spilt grain from the field after reaping is called gleaning, and is traditionally done either by hand, or by penning animals such as chickens or pigs onto the field.

Hand reaping is now rarely done in industrialized countries, but is still the normal method where machines are unavailable or where access for them is limited (such as on narrow terraces).

The more or less skeletal figure of a reaper with a scythe – known as the "Grim Reaper" – is a common personification of death in many Western traditions and cultures. In this metaphor, death harvests the living, like a farmer harvests the crops.

2. Mechanical Reaping –

A mechanical reaper or reaping machine is a mechanical, semi-automated device that harvests crops. Mechanical reapers and their descendant machines have been an important part of mechanized agriculture and a main feature of agricultural productivity.

Mechanical reapers in the U.S.[edit]

The 19th century saw several inventors in the United States claim innovation in mechanical reapers. The various designs competed with each other, and were the subject of several lawsuits.

Obed Hussey in Ohio patented a reaper in 1833, the Hussey Reaper. Made in Baltimore, Maryland, Hussey's design was a major improvement in reaping efficiency. The new reaper only required two horses working in a non-strenuous manner, a man to work the machine, and another person to drive. In addition, the Hussey Reaper left an even and clean surface after its use.

Objective

a) To formulate an idea to suit our required functionality that is to reap the crops.
b) To develop the idea to suitable mechanical principles and to design the idea to practice.

Problem Definition

a. Manual labor takes time and is not effective as they can work for 3-4 hours at a stretch.
b. Even if the land holding is small, it takes two or three days to completely harvest the crop.
c. High costs of machines and maintenance, non-availability of appropriate agricultural machines and equipment that cater to and suit the requirements of small-scale farms.

II. LITERATURE REVIEW

Performance evaluation of reaper-binder in rice crop
R. JAYA PRAKASH, B. ASHWIN KUMAR, G. ARAVIND REDDY AND K.V.S. RAMI REDDY

Field performance of reaper-binder was assessed in rice crop and compared with manual method of harvesting by sickle at farmer's field under farm implements and machinery scheme during Rabi 2013.

The effective field capacity of the reaper-binder was found 0.294ha h-1 with a field efficiency of 67 per cent at an average operating speed of 3.6 kmph compared to 0.025 ha h-1 for manual harvesting. The fuel consumption was found 5.27 l ha-1. Labor requirements for mechanical and manual harvesting were 36 and 176 man-h ha-1, respectively. The harvesting losses for mechanical and manual harvesting were 1.44 and 1.88 per cent, respectively. The cost of harvesting operation was Rs.5500/ha for manual harvesting and Rs.2241/ha for mechanical harvesting. The harvesting cost of reaper binder was reduced by 40.74 per cent compared to manual harvesting method with sickle. The feedback of machine operation was collected by some farmers at the time of harvesting and the performance of the reaper-binder at the farm was satisfactory.

A CRITICAL STUDY ON CROP HARVESTING MACHINES Manjeet Prem, Nikhlesh Kumar Verma, K. L. Dabhi, R. Swarnka

Harvesting of crop is one of the important agricultural operations which demand considerable amount of labor. The availability and cost of labor during harvesting season is the serious problem. The shortage of labor during harvesting season and vagaries of the weather cause great losses to the farmers. It is therefore, essential to adopt the mechanical methods so that the timeliness in harvesting operation could be ensured. The use of mechanical harvesting device has been increased in the recent years. The farmers using reapers or combines to harvest their crops. But these means especially combine, are very costly making it un-affordable to most of the small farmers. Although, some manual operated reapers were developed. But, due to limitations of manual power, none of them become popular as the power available for transportation of the machine as well as cutting and conveying of the crop was not sufficient. In this research, study on different types of harvesting machines and techniques were carried out.

DESIGN AND EVALUATION OF SELF-PROPELLED REAPER FOR HARVESTING MULTI CROPS

Muhammad Nadeema, Muhammad Iqbalb, Aitazaz Farooquec, Anjum Munirb, Manzoor Ahmadb, Qamar Zama

Harvesting of cereal crops is one of the major operations in agriculture production, which requires great attention. The objective of this work was to design of self-propelled reaper, and to evaluate its performance for harvesting of rice, brassica and wheat crops. Fields of rice, wheat and brassica were selected University of Agriculture Faisalabad, Pakistan. Factorial experiments (3 x 3) were conducted at each site with three levels of moisture content i.e.27%, 22% and 19 % for rice, 16.7%, 14.5% and 13% for wheat, and 18.32%, 16.05% and 15.7% for brassica were selected. The levels of machine's ground speed were1.94, 2.54 and 3.18kmh-1. Twenty-seven plots (1.524 x 3m) were selected randomly in each field to collect data for average percentage (%) slippage, shatter losses and field efficiency. The machine was operated at selected levels of ground speeds and moisture contents for each crop. Factorial analysis of variance (ANOVA) showed that the selected levels of ground speed and moisture contents have significant (p=0.05) effect on % slippage and field efficiency and non-significant on shatter losses for rice and wheat crops, whereas significant effect in brassica. Results indicated that in early harvesting at high moisture content, the shatter losses were significantly lower with the higher % slippage. Results reported that the shatter losses, field efficiency and % slippage were influenced by selected levels of ground speed and moisture contents. A

suitable combination of ground speed and moisture content can minimize the grain losses and increase the yield and profitability of the farmer's community.

Design and Development of Manually Operated Reaper Machine

Tesfaye Olana Terefe

Grain harvesting is the important part in agricultural mechanization. The use of reaper technology in developing countries to minimize the product cost which will be result in economic development of agricultural production. This paper tends to provide the design and development of manually or mechanically operated reaper machine. The current situation in our country the traditional use of harvesting mechanism is more tedious, time consuming and not able to develop the agricultural sector of the low farmers in economic. Depending on the problem stated through abstraction of literature and the existing reapers, to satisfy the customer needs the gathered data has been interpreted to meet the requirement of the objective of the problem. The mission of this project through which the product is developed to spread out the appropriate technology to the countries primary and the secondary market are identified with the stakeholders. The general procedure of conceptual design used; concept generation by decomposing into main and sub function, product ideas from internal and external search, generating alternative solution by setting criteria's and Digital Logical Approach has been used for concept evaluation and selection. The product architecture and configuration finally introduced in the embodiment design after the selection of final concept. Design and development of mechanically or manually operated reaper for grain harvesting machine which is evaluated against the technical and economical criteria's can be carried out to be suitable with the most Ethiopians low farmers capacity.

Design and Fabrication of Agricultural Crops Reaper

A R Bhabad, G S Puranik, I S Sonawane, M R Pawar, A.R.Mali

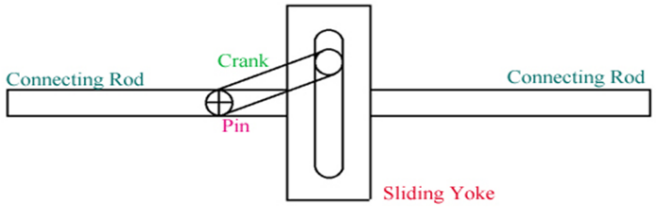
Recently India has seen a shortage of skilled labor available for agriculture. Because of this shortage the farmers have transitioned to using crop reaper. These agricultural crop reapers are available for purchase but because of their high costs, they are not affordable for small scale farmers. The idea was to create a machine which is cheap and will reduce the labor required to harvest crops. This machine is suitable for the small-scale farmers who have farm area of less than 2 acres. This reaper is compact and capable to cut up to 2 rows of maize stalk / bajara stalk and 60 cm width of wheat crops rows. It has a high strength cutting blade which cuts the crops in a scissoring type of motion. It runs on an engine of 3HP, this power from engine is provided through pulley and gear box arrangement to the cutter. A collecting mechanism is provided for the collection of crops to one side of reaper after cutting. This mechanism is powered by pulley arrangement. This reaper might be solution to the problems faced by small scale farmers regarding cost and labor implementation.

III. METHODS AND MATERIAL

OPERATIONAL MECHANISM

This mechanism is used for converting rotary motion into a reciprocating motion. The inversion is obtained by fixing either the link 1 or link 3. In Fig. 5.35, link 1 is fixed. In this

Mechanism, when the link 2 (which corresponds to crank) rotates about B as center, the link 4 (which correspond to a frame) reciprocates. The fixed link 1 guides the frame.



Scotch yoke Mechanism

Components:

Shaft: A shaft is a rotating or stationary component which is normally circular in section. A shaft is normally designed to transfer torque from a driving device to a driven device. If the shaft is rotating, it is generally transferring power and if the shaft is operating without rotary motion it is simply transmitting torque and is probably resisting the transfer of power. A shaft which is not rotating and not transferring a torque is an axel .

Mechanical components directly mounted on shafts include gears, couplings, pulleys, cams, sprockets, links and flywheels. A shaft is normally supported on bearings. The torque is normally transmitted to the mounted components using pins, splines, keys, clamping bushes; press fits, bonded joints and sometimes welded connections are used. These components can transfer torque to/from the shaft and they also affect the strength of the shaft a must therefore be considered in the design of the shaft.

Shafts are subject to combined loading including torque (shear loading), bending (tensile & compressive loading), direct shear loading, tensile loading and compressive loading. The design of a shaft must include consideration of the combined effect of all these forms of loading. The design of shafts must include an assessment of increased torque when starting up, inertial loads, fatigue loading and unstable loading when the shaft is rotating at critical speeds (whirling).

Drive may be inclined at any angle with tight side either at top or bottom. In order to increase the power output, several V-belts may be operated side by side.

Pedestal bearing: Pedestal bearing (Pillow blocks) is also known as housings which have a bearing fitted into them. Pillow blocks are usually mounted in cleaner environments and generally are meant for lesser loads of general industry. The fundamental application of the pedestal bearing is to mount bearings safely enabling their outer ring to be stationary while allowing rotation of the inner ring. The housing is bolted to a foundation through the holes in the base. Bearing housings are of two types. They are split type or un-split type. Split type housings are two piece housings where the cap and base can be detached, while certain series are one single piece housings. Various seals are provided to prevent dust and other contaminants from entering the housing. Thus the housing provides a clean environment for the expensive bearings to freely rotate, hence increasing their performance and duty cycle. Bearing housings are usually made of grey cast iron. However various grades of metals can be used to manufacture the same.

V-Belt Pulley: The pulleys are used to transmit power from one shaft to another by means of flat belts, V-belts or ropes. Since the velocity ratio is the inverse ratio of the diameters of driving and driven pulleys, therefore the pulley diameters should be carefully selected in order to have a desired velocity ratio. The pulleys must be in perfect alignment in order to allow the belt to travel in a line normal to the pulley faces. The pulleys may be made of cast iron, cast steel or pressed steel, wood and paper. The cast materials should have good friction and wear characteristics. The pulleys made of pressed steel are lighter than cast pulleys, but in many cases they have lower friction and may produce excessive wear. In this, I have used a Cast Iron Pulleys

V-Belt: Generally, we know that a V-belt is mostly used in factories and workshops where a great amount of power is to be transmitted from one pulley to another when the two pulleys are very near to each other. The V-belts are made of fabric and cords molded in rubber and covered with fabric and rubber as shown in Fig. below. These belts are molded to a trapezoidal shape and are made endless. These are particularly suitable for short drives. The included angle for the V-belt is usually from 30° to 40°. The power is transmitted by the wedging action between the belt and the V-groove in the pulley or sheave. The wedging action of the V-belt in the groove of the pulley results in higher forces of friction. A little consideration will show that the wedging action and the transmitted torque will be more if the groove angle of the pulley is small. But a small groove angle will require more force to pull the belt out of the groove which will result in loss of power and excessive belt wear due to friction and heat. Hence the selected groove angle is a compromise between the two. Usually the groove angles of 32° to 38° are used. A clearance must be provided at the bottom of the groove as shown in Fig. below, in order to prevent touching of the bottom as it becomes narrower from wear. The V-belt drive may be inclined at any angle with tight side either at top or bottom. In order to increase the power output, several V-belts may be operated side by side.

Bevel gear: Two important concepts in gearing are pitch surface and pitch angle. The pitch surface of a gear is the imaginary toothless surface that you would have by averaging out the peaks and valleys of the individual teeth. The pitch surface of an ordinary gear is the shape of a cylinder. The pitch angle of a gear is the angle between the face of the pitch surface and the axis.

The most familiar kinds of bevel gears have pitch angles of less than 90 degrees and therefore are cone-shaped. This type of bevel gear is called external because the gear teeth point outward. The pitch surfaces of meshed external bevel gears are coaxial with the gear shafts; the apexes of the two surfaces are at the point of intersection of the shaft axes.

Bevel gears that have pitch angles of greater than ninety degrees have teeth that point inward and are called internal bevel gears. Bevel gears that have pitch angles of exactly 90 degrees have teeth that point outward parallel with the axis and resemble the points on a crown. That's why this type of bevel gear is called a crown gear.

Engine: Engine is power producing device its work on fuel to perform the operation the engine output shaft connected to bevel gear shaft by pulley arrangement through v belt. Its work on scotch yoke mechanism for the cutting operation through help of v shape cutter.

Mileage:	67 Kmpl
Engine Displ.	99.7 cc
Speed	6000 rpm max
Max Power:	4.35 PS
Weight:	5 Kg
Starting:	Kick Start Only
Standard Warranty	1 Year

Step 1

Calculation of Torque

1ps =735Watt

4.35 pHs = 3310 Watt

Max RPM = 6000

$P= 2\pi nt/60$

$3310=2*\pi*6000*T/60$

T=5.27 N-M

Step 2

Calculation

Selection of Belt Drive

Engine RPM= N1

=2400RPM

Output of belt drive required=N2

=2100 RPM

Diameter of input pulley= D1 (From table no. 21-4 B)

=75mm

Diameter of output pulley = D2

= 280mm

Selection of belts

Power to be transmitted=1.8KW

Service factor=Fa=1.2 (Service factor = 1.1 to 1.4 from table 21.1)

Therefore

Design power=Fa x Power to be transmitted

=1.2*1.8

=2.16kw

Hence the Engine output power is safe

Pitch length of belt:

Center distance = 2x D2

=2*280

=560mm

L= 2C + π (D+d)/2 + (D-d)2 /4C

=2(560) + π (75+280)/2+(280-75)2 /4*560

=1120+258+18.76

=1396.76 mm

=1397 mm

Cutting blade types = V edge section

V section= standard Blade type

Rectangle Width=38mm (From Table 21-30B)

Thickness=3mm

Angle between cutting edge and axis of knife section=31°

Material-High carbon steel

Determine number of blades on reel Deflection angle Ø =54º (constant angle)

Reel rotational speed=100 Rpm

Rotational velocity of the reel

ω=2ɹN/60

=2ɹ*100/60

=10.47 Rad/sec

Design of shaft

Specification of shaft

Material of shaft (MS-low Carbon Steel)

Grade (40C8)

Max Power =2.5HP

Speed=1400rpm

Tensile strength (sut) =640N/mm^2

Yield strength (syt) =380N/mm^2

tmax =0.18*sut

=O.18*640

=1 15.2MPa

tmax =0.3*Syt

=O.3*380

=1 14MPa

tmax 1 is greater than rmax 2

Hence the design is done by t max 2,

Now considering keyway effect on shaft:-

tmax 2 =0.75*114

=85.5MPa

Taking Bevel Gear Torque 180 Nm

t actual =16*Td/(π*d^3)

85 5 =16*180*10^3/(3.14*d^3)

d=22.45mm

As per the standard diameter is 28 mm.

But while doing production we consider the diameter of shaft as 30mm.

Now, checking shear stress for diameter 28 mm.

Design Torque (W): 180 N-m.

Actual =16*Td/(π*d^3)

=16*180000/(3.14*28^3)

=41 .76MPa

tactual<tmax

Hence the design for shaft is safe.

Advantages

1) The cost of harvesting using this machine is considerably less as compare to manual harvesting.
2) Simple to construct.
3) Low capacity motor is sufficient.
4) Easy maintenance.
5) Less skilled operator is sufficient.
6) Less power consumption.
7) Noise of operation is reduced.

IV. CONCLUSION

The crop reaper machine is used to cut the crops. This machine is developed so that the efforts of human are decreased. We have produced this machine which is helpful for the farmers which is available in cheap cost. The design can be carried out with affordable capacity and better-quality product is manufactured.

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An Observational Study to Assess the Surgical Asepsis among Nurses Working in Narayana General Hospital, Nellore, Andhra Pradesh

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ABSTRACT

Background: Surgical asepsis refers to destruction of organisms before they enter the body, it is used in caring for open wounds and in surgical procedure. Surgical asepsis is the medical practice of maintaining sterility whenever dressing wound or performing any kind of surgery to prevent cross infection. Aseptic technique are used in infection control to prevent cross infection between health care worker and between patients. **Aim:** The aim of the study was to assess the level of knowledge and practice of staff nurses regarding surgical asepsis. **Objectives:** 1. To assess the practice regarding surgical asepsis. 2. To find an association between practice with socio demographic variables. **Methodology:** 100 staff nurses working in NMCH, Nellore were selected by using convenience sampling method. **Results:** Regarding the level of practice among staff nurses, 10(10%) of them had good practice 80(80%) of them had moderate practice and 10(10%) had poor practice.

Keywords : Practice, Surgical Asepsis, Staff Nurses.

I. INTRODUCTION

Surgical asepsis refers to destruction of organisms before they enter the body, it is used in caring for open wounds and in surgical procedure. Surgical asepsis is the medical practice of maintaining sterility whenever dressing wound or performing any kind of surgery to prevent cross infection. Aseptic technique are used in infection control to prevent cross infection between health care worker and between patients.[1]

Aseptic technique is a set of specific practices and procedures performed under carefully controlled conditions with goal of minimizing contamination by pathogens. The effectiveness of infection control practices depends on nurse's conscientiousness and consistency in nursing effective aseptic technique. It is human nature to forget key procedural steps, on when hurried, to take shortcuts that break aseptic procedures.[2]

The nurse follows certain principles and practices including standard precautions to prevent and control of infection and it spread. During daily routine care the nurse basic medical aseptic techniques to break the infection change for example, use glove and masks during dressing change to break the entry of pathogens.[3]

A key difference between the operating room and other clinical environment is that the operating room high standards of sterility at all times, while most other setting are not designed to meet such standards surgical asepsis all known as sterile technique. Surgical asepsis is most strictly applied in the

operation room because of the direct and often extensive disruption of skin and underlying tissue.[4]

Surgical asepsis help to prevent or minimize post-operative infection. The patient is prepared by shaving hair from surgical site, cleansing with a disinfectant such as iodine applying sterile drops. Sterile surgical clothing or protective devices such as gloves, face masks and transparent eye face shields serve as a barrier against microorganism and donned to maintain asepsis in the operating room.[5]

National health care central services and sterile processes week to be celebrated in October 16/02/2002. The American Society for health care central services professionals announced this week. The salient working principle of CSSD to ensure adequate control of cross infection are responsibility for that supervision of sterilization takes should be clearly defined, clearly understood. Aseptic techniques training aims at teaching health care workers to create a sterile environment without the presence of harmful microorganisms any instrument and equipment that is used on a patient must be sterilized cleaning disinfection and sterilization are good practices, although on their own they do not keep pathogens completely away.[6]

Practicing aseptic techniques is the best way to keep an area sterile and to prevent spread of infection. The operating rooms come highest level of asepsis required, nonetheless wards, and other clinical areas also need to free of infections. The high dependent and vulnerable patients are placed here for care.[7]

NEED FOR STUDY

The infection is due to the involvement of pathogenic organisms. It occur not only in communicable disease but also in surgical asepsis is approximately 2,40,000 addition residents of long term care facilities become infected each year with anticipated growth of elderly population this number may increase to approximately 7,50,000 by 2010.[8]

The most widely incidence of nosocomial around infection is more in patients mostly. The bacterial organism are responsible from various studies. It is revealed that staphylococcus infection rate is 41.3% E.coli infection rate 29.5% and pathogens according for 70.5% and 80.2% patient with positive culture.[9]

Issues in aseptic technique challenge every perioperative practitioner equally challenging to creatively, present information to large group of staff members in a way that facilitates learning. The process is used to address practice issues in aseptic technique and to present educational in service programs to a large number of staff members and health care workers.[10]

Kanchana.M (2010) conducted a study on aseptic technique among staff nurses. The result shows that the program was efficient to enhance the knowledge skills on nursing procedures related to sterile technique. The low costs and simple structure teaching program may improve the quality of nursing in the hospital practice. 25.4% nurses were followed sterile techniques during the procedures.[11]

There are >30 million major operations performed in hospitals each year in the United States. The incidence of post-operative complications ranges from 6% for patients undergoing non cardiac surgery. >30% for patients undergoing high risk surgery.[12]

Adams JS & Korniewicz DM (2010) a study was conducted with preoperative nurses are expected to demonstrator strict adherence with asepsis principles to prevent surgical site infections as breaching of these principles poses a serial risk of infection to surgical patients. A descriptive study was conducted with a convenience sample of 87 perioperative personal to desire self-reported compliance with the principles of asepsis during surgery. The results a sizable percentage of participants indicated that they never or severely observe in the sterile field during surgery with surgical instruments (39.7%) (n=35) perioperative scrub RNS were less likely to wear shoe covers during surgical procedure than ORTS (m=3.42 and 4.17) concluded compliance and noncompliance with the principle of asepsis.[13]

STATEMENT OF PROBLEM:

Observational study to assess the surgical asepsis among nurses working in Narayana General Hospital, Nellore, A.P.

OBJECTIVES:

1) To assess the level of practice staff nurses regarding surgical asepsis.
2) To determine the association between level of practice with demographic variables among staff nurses.

DELIMITATIONS

The study is limited to staff nurses;

- Working in Narayana Medical College Hospital in Nellore.
- The study limited to four weeks.

II. METHODS AND MATERIAL

Research Approach:

A quantitative approach was adopted to determine the research study.

Research Design:

The present study was conducted by using descriptive research design.

Setting:

Setting of the study was conducted at Narayana Medical College Hospital, Nellore.

Population:

Target population: All staff nurses.

Accessible population: Staff nurses working in Narayana Medical College Hospital, Nellore.

Sample: Staff nurses working in Narayana Medical College Hospital, Nellore and who fulfilled the inclusion criteria.

Sampling Technique:

Non-probability convenience sampling technique was adopted for the study.

Sample Size: The sample size selected for the present study includes 100 staff nurses.

Criteria for Sample Collection:

Inclusion Criteria

- The staff nurses who are willing to participate in the study.
- The staff nurses who are available during data collection.

Exclusion Criteria

- Subjects who are not willing to participate in the study.
- Subjects who are working in OPD.

Description of the tool

Part A → Demographic data consisting of items namely age, sex, education, religion, designation, experience, religion, income and working hours.
Part – II: An observational checklist to assess the practice of staff nurses surgical asepsis which consists of 35 statements.

Variables of the study:

Independent variable: Staff nurses.
Dependent variable: Level of practice.
Score interpretations:

III. DATA ANALYSIS AND DISCUSSION

Table-1 : Frequency and percentage distribution of level of practice among staff nurses.

(N=100)

Level of Knowledge	Frequency (F)	Percentage (%)
Good practice	10	10
Moderate practice	80	80
Poor practice	10	10

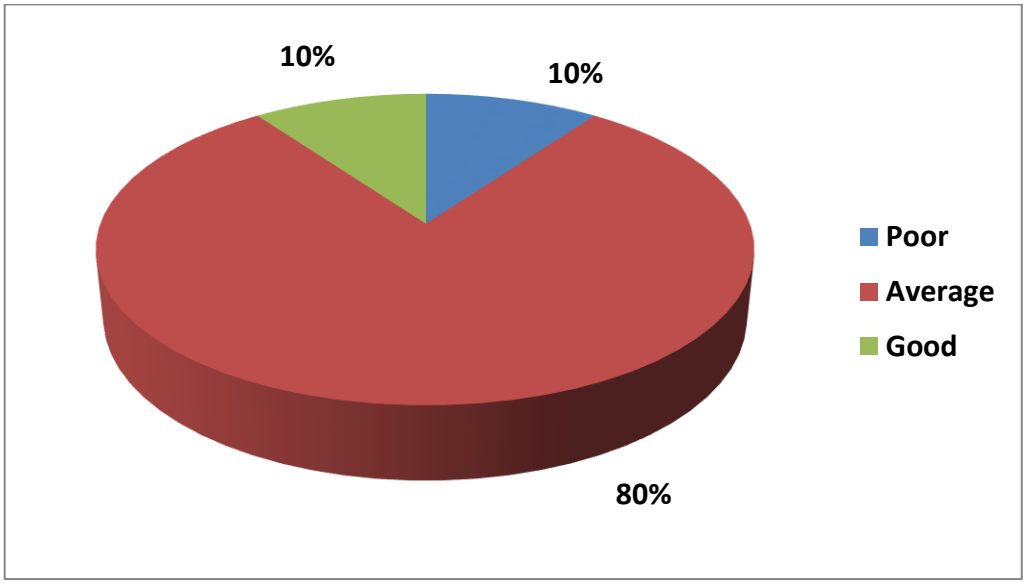


Fig 1. Frequency and percentage distribution based on level of practice among staff nurses.

Table 2 : Frequency and percentage distribution of Mean and Standard deviation of practice.

(N=100)

CATEGORY	MEAN	S.D
Level of practice	13.67	3.6

Table 3 : Association between level of knowledge and socio demographic variables among staff nurses.

(N=100)

S. No	Demographic Variables	Poor practice		Moderate practice		Good practice		Chi Square
		F	%	F	%	F	%	
1.	Working hours: a. 7 years b. 8 yrs. c. 12 yrs.	 4 5 1	 4 5 1	 73 6 1	 76 6 1	 8 2 -	 8 2 -	C=19.121 T=14.03 Df=4 P<0.05 S*
2.	Education a. ANM b. GNM c. B.Sc.(N)	 1 4 5	 1 4 5	 1 73 6	 1 73 6	 - 8 2	 - 8 2	C=19.4 T=15.2 Df=6 P<0.05 S*

MAJOR FINDINGS OF THE STUDY

- ✓ Regarding the level of practice among staff nurses, 10(10%) of them had good practice 80(80%) of them had moderate practice and 10(10%) had poor practice.
- ✓ Among 100 staff nurses, the mean practice score was 13.67 with standard deviation of 3.6.

IV. CONCLUSION

Hence it can be concluded that majority of the staff nurses (80%) had moderate practice regarding surgical asepsis. Hence there is an immense need to implement an educational programme for all staff nurses regarding surgical asepsis.

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An Observational Study to Assess the Knowledge Regarding Physical Examination among III Year GNM students at Narayana Medical College Hospital, Nellore, Andhra Pradesh

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ABSTRACT

Background: Physical examination is an integral part of nursing care. It is the basic nursing care. A good physical examination leads to identification of the client – status, strengths and concern for nursing diagnosis. This provides discretion for nursing implementation and alleviation of client concern. Assessing a client health status is a major component of nursing care. A complete health assessment may be conducted starting at the head and proceeding in systematic manner downward (head-to-foot) assessment. **Aim:** The aim of the study was to assess the level of knowledge physical examination. **Objectives:** 1. To determine the level of knowledge regarding physical examination among IIIrd year GNM students. 2. To associate the level of knowledge with selected demographic variables. **Methodology:** 30 III yr GNM students posted at Narayana Medical College Hospital were selected by using simple random sampling method. **Results:** Regarding the level of knowledge among GNM III yr students, 6, (20%) had adequate knowledge, 22(73.3%) had moderate knowledge and 2(6.6%) had inadequate knowledge regarding physical examination.

Keywords : Knowledge, Physical Examination, GNM Students.

I. INTRODUCTION

"Declare the past, Diagnose the present, foretell the Future:" - Hippocrates

Assessing a client health status is a major component of nursing care. A complete health assessment may be conducted starting at the head and proceeding in systematic manner downward (head-to-foot) assessment. Most people need an explanation of the physical examination. The nurse should explain when and where it will take place, why it is important and what will happen during examination.[1]

Physical examination refers to process by which a professional investigate the body of a patient for signs of disease. It generally follows taking medical history an account of the symptoms are experienced by the patient. Together with the Medical history, physical examination aid in determining the correct diagnosis and devising the treatment plan. This data become part of the Medical history. The main purposes of physical examination is to help the doctor determine the general status of the health. It is also help to talk to patient about ongoing pain or symptoms that are experiencing.[2]

Equipment's required for health examination should be clear, in good working order and readily

accessible. The equipment includes flash light to view pharynx, Cervix and reactions of pupils, Nasal speculum to permit visualization of the lower and middle turbinate's, ophthalmoscope to visualize the inferior eye, tuning fork to test hearing capacity and vibratory sense. Gloves to protect the nurse and Lubricants to ease insertion of instruments.[3]

Preparation of the client include explanation of the physical examination. The nurse should explain when and where it will take place. Health examination are usually painless. However, it is important to determine in advance any position that are contraindicated for a particular client. The sequence of examination differs with children and adult. It is very important to prepare the environment before starting the assessment. The time for the physical examination should be convenient to both the client and the nurse.[4]

The physical examination done in a sequential head to toe fashion to ensure thorough assessment of each system. The method not only prevents the nurse from forgetting to an area it also decreases the number of client have to change position. The nurse performs the physical or the head to toe assessment by using special assessment techniques. These techniques include inspection, palpation, percussion and auscultation. The nurse should position the client to ensure accessibility to body part being assessed.[5]

Normal results of a physical examination correspond to the healthy appearance and normal functioning of the body and normal functioning of the body. Abnormal results of physical examination include any findings that indicated the presence of a disorder, disease or underlying condition. Nursing staff and students should have good skills in performing physical examination to identify the abnormalities which further helps to determine the diagnosis and to plan for quality of patient care.[6]

NEED FOR THE STUDY

Physical examination is an integral part of nursing care. It is the basic nursing care. A good physical examination leads to identification of the client – status, strengths and concern for nursing diagnosis. This provides discretion for nursing implementation and alleviation of client concern.[7]

According to OMICS group (2013) report, 1603 journals, 83 conferences and several workshops are presently dedicated exclusively to physical examination. In terms of research annual, USA, India, Japan, Brazil and, Canada are some of the leading countries where studied related to physical exam native are being carried out.[8]

Acc. to **British Journal of Nursing (2013)** report, The role of a nurse continues to change with the point where nursing stops and medicine begins become increasingly blurred. Arguably, the main driver for this change could be the recent reduction in junior doctor's working hours. However, modern nursing therapy for innovation and nurses are taking on more and more task and skills that were traditionally part of doctors remit. One example is physical assessment, which has very little evidence to support its use in any setting.[9]

Globally 70-80% of patients underwent physical examination, about 45-79% of patients in adult critical care units had physical examination, 38% in surgical wards and in 3% rehabilitation units.[10]

Alireza Fazel (2011): conducted a cross- sectional study on 200 nurses working in Isafan Hospital. The data was collected by a researcher made

questionnaire including two parts: The first part was included demographic data and the second part was included 18 skills in cardiovascular physical examination in two different columns. In the first column, the frequency of using skills and in the second column, the proficiency was self-assessed by nurses. The study concluded that most of nurses used skills to assess the patient with system wise analysis. And fewer nurses' skill was lower than desirable.[11]

PROBLEM STATEMENT:

An observational study to assess the knowledge regarding physical examination among IIIrd year GNM students at Narayana Medical College and General Hospital, Nellore.

OBJECTIVES

- To determine the level of knowledge regarding physical examination among IIIrd year GNM students.
- To associate the level of knowledge with selected demographic variables.

DELIMITATIONS:

The study is limited to;

- The IIIrd year GNM students posted at Narayana Medical College General Hospital.
- The sample size is 30 only.

to keep the city clean by informing about the garbage levels of the bins by providing graphical image of the bins via IOT Php web development platform.

II. METHODS AND MATERIAL

Research Approach:

A quantitative approach was adopted to determine the research study.

Research Design:

The present study was conducted by using descriptive research design.

Setting:

Setting of the study was conducted at Narayana Medical College Hospital, Nellore.

Population:

Target population: All III yr GNM students.

Accessible population:

III yr GNM students posted at Narayana Medical College Hospital.
Nellore.

Sample:

III yr GNM students posted at NMCH, Nellore and who fulfilled the inclusion criteria.

Sampling Technique

Probability-simple random sampling technique was adopted to the selected samples.

Sample Size:

The sample size selected for the present study includes 30 III yr GNM students.

Criteria for Sample Collection:

Inclusion Criteria

- Students of III yr GNM.
- Students posted in NMCH, Nellore.

Exclusion Criteria

- Those who are not present during the time of data collection.
- Those who are not willing to participate in the study.

Variables of the study:

Independent variable: GNM III yr students.
Dependent variable: Level of knowledge.

Description of the tool:

Part-A: Demographic variables data include the age, educational qualification, religion, working hours.

Part-B: Self structured questionnaire to assess the knowledge regarding the physical examination among III rd GNM students. It consist of 40 questions.

III. DATA ANALYSIS AND DISCUSSION

Table 1: Frequency and percentage distribution of level of knowledge among GNM III yr students (N=30)

Level of Knowledge	Frequency (F)	Percentage (%)
Adequate knowledge	6	20
Moderate knowledge	24	80
Inadequate knowledge	-	-

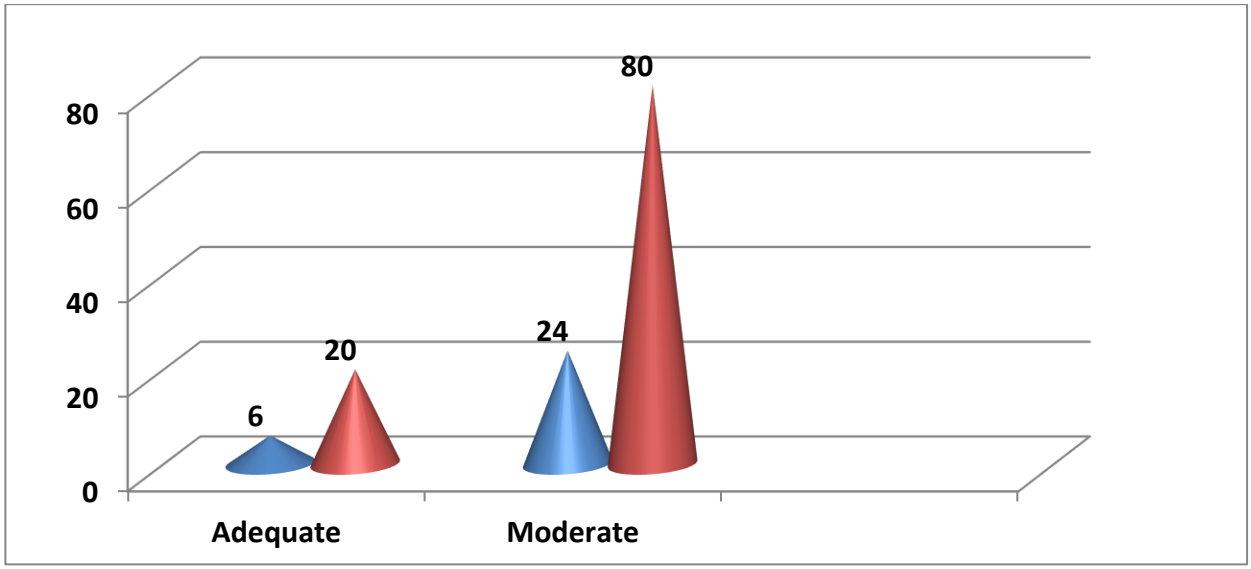


Fig 1 : Frequency and percentage distribution based on level of knowledge among III yr GNM students.

Table 2 : Frequency and percentage distribution of Mean and Standard deviation of knowledge.

CATEGORY	MEAN	S.D
Level of knowledge	20.6	3.15

Table 3: Association between level of knowledge and socio demographic variables among III yr GNM students. (N=30)

S. No	Demographic Variables	Adequate knowledge		Moderate knowledge		Chi Square
		F	%	F	%	
1.	Age in years a)18-20 years b)>20 years	 10 1	 33.3 3.3	 17 2	 56.6 6.6	C=18.159 T=12.59 Df=6 P<0.05 S*
2.	Working area a)Medical wards b)Surgical wards	 1 1	 2 2	 2 9	 4 18	C=8.7049 T=7.82 Df=3 P<0.05 S*

IV. MAJOR FINDINGS OF THE STUDY

- ✓ Regarding the level of knowledge among GNM III yr students, 6, (20%) had adequate knowledge, 22(73.3%) had moderate knowledge and 2(6.6%) had inadequate knowledge regarding physical examination.
- ✓ The mean knowledge score of GNM III yr students was 20.6 and standard deviation was 3.15.
- ✓ There was a significant association found between level of knowledge and demographic variables such as age and working area at P<0.05 level.

V. CONCLUSION

Hence it can be concluded that, majority of GNM III yr students, 22(73.3%) had moderate knowledge on physical examination. Hence there is an immense need to implement an educational programme for all nursing students about physical examination.

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A Study to Assess the Knowledge and Practice of Various Splints Among Staff Nurses Working in Narayana Medical College Hospital, Nellore, Andhra Pradesh

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ABSTRACT

Background: Splints may be used in all stages of musculoskeletal injuries. Initially, splints may be used for fractures because they are not circumferential there by accommodating swelling without risks of constriction. They are easy to apply and remove, allowing for monitoring of soft tissue and skin integrity. A splint may be definitive treatment for sprains and some fractures. Splints may also be used after initial treatment with casting to provide continued support. There are various forms of splints made of wood states to prefabricated splints and immobilizers are pneumatic walker and wrist immobilization. **Aim:** The aim of the study was to assess the level of knowledge and practice of staff nurses regarding various splints. **Objectives:** 1. To assess the knowledge and practice regarding admission process. 2. To find an association between knowledge and practice with socio demographic variables. **Methodology:** 100 staff nurses working in NMCH, Nellore were selected by using convenience sampling method. **Results:** Regarding the level of knowledge among staff nurses, 15(15%) of students are had good knowledge, 75(75%) of them had average knowledge and only 10(10%) of them had poor knowledge regarding various splints. Among 100 staff nurses, 20(20%) of them had good practice 66(66%) of them had moderate practice and 14(14%) had poor practice.

Keywords : Knowledge, Practice, Splints, Staff Nurses.

I. INTRODUCTION

Splints may be used in all stages of musculoskeletal injuries. Initially, splints may be used for fractures because they are not circumferential there by accommodating swelling without risks of constriction. They are easy to apply and remove, allowing for monitoring of soft tissue and skin integrity. A splint may be definitive treatment for sprains and some fractures. Splints may also be used after initial treatment with casting to provide continued support. There are various forms of splints made of wood states to prefabricated splints and immobilizers are pneumatic walker and wrist immobilization.[1]

Splints may play an important role in treating persons with musculoskeletal condition. The purpose of immobilization is to secure the injured part of the musculoskeletal system to prevent further injury, promote healing, promote a functional result and reduce pain the term s injured part that is cast among splints.[2]

Statistical analysis of splint is national center for injury prevention and control. National center for chronic disease prevention and health promotion and epidemiology program office centers for disease control program and prevention. The prevention of spin splint in sports systematic review of literature. The purpose are to review the published and

unpublished evidence regarding risk factors associated with shin splint. Assess the effectiveness of prevention to coaches, athletes and researches.[3]

Benefits of splinting and cast serve to immobilize orthopedic injuries. They promote healing, maintain bone alignment, diminish pain, protect the injury and help compensate for surrounding muscular weakness. The benefit from immobilization fractures, sprains, severe soft tissue injuries, reduced joint dislocations, inflammatory condition: Arthritis, synovitis, deep laceration repairs across joints tendon laceration. The use of splints an essential part of the first aid treatment is immobilizing the injured part with splints so that the sharp ends of broken won't move around and cause further damage to nerve, blood vessels or vital organs.[4]

Splinting of a limb is one of the very common procedures adopted in the treatment of orthopedic conditions. Splints are used for various purpose as 1) to provide absolute rest to limb. As first aid to a fracture limb. This relieves the pain and the immobilization prevents complications due to movements of the fragments, as a regular treatment after reducing a fracture by the application of plaster splint as a slab or cast. To give rest to an inflamed joint to relieve pain as in the treatment of arthritis. Eg: Thomas splint for arthritis of the hip or knee.[5]
Post-operative splints are applied after operations limb and joints to maintain correct position and relieve pain 2) To stabilize a joint that has become unstable due to dialysis of the muscle controlling the joint. Eg: Full leg, below knee. 3) Splint are used to correct certain deformities and also to maintain the correction of bone deformities. 4) To prevent overstretching of paralyzed muscles.[6]

Splints can be made out of metals like iron and aluminum or materials like leather plastic and wooden planks. The most common material in use is the plaster of Paris. More recently inflatable bags are being used to splint injured limbs as first aid splints in RTA. These are radio translucent and light. They also prevent shock by preventing edema and hemorrhage.[7]

Need for the study

A study compared surgery and splinting for subjects suffering from carpel tunnel syndrome. It was found that among 73 patients treated with surgery, there was 92% success rate. Among 83 patients treated with splint there was a 72% success rate.[8]

In 2009 December, a low volume urban emergency medical services (EMS) system, 16 persons (0.35%) total patients presented with mid-thigh injuries. Data collected included patients with chief complaints injury, mechanism of injury, clinical findings and splint application 12.50% of patients are used traction splints applied successfully.[9]

II. LITERATURE SURVEY

Zenios M et al., (2012) was conducted a study on the use of knee splints after total knee replacements. The prospective study was selected and sample size was 81 patients undergoing total knee replacements who were randomized in to a splint and a no splint group. The results shows that 77 patients used splint total knee replacement, 4 patient no splint group achieved and 88%. Patients help to splint in knee replacement.[10]

Jalen David (2011) was conducted a study on to describe and evaluate the design and effects of splint & exercise programs in hand osteoarthritis. The descriptive design was selected and sample size 12. Convenient sample technique selected. The pretest score was 7 assessed the effect of splint, 3 the effect of exercise and 2 combinations of splints & exercise. A

meta-analysis of the randomized trials with the low risk of bias demonstrated that splints significantly reduce hand pain at short term <3 months and long term >/- 3 months, with a standardized mean difference of 0.37 (95%) confidence interval and 0.80 respectively. The results showed that splints reduces hand pain ,but limited evidence for the effects of hand exercise, and a combination of had exercise and splints in hand osteoarthritis.[11]

Problem Statement

A study to assess the knowledge and practice of various splints among staff nurses working in Narayana Medical College Hospital, Nellore.

Objectives

- To assess level of knowledge and practice regarding the various splints among staff nurses.
- To find an association between level of knowledge and practice with selected socio demographic variables.

Delimitations

The study is limited to staff nurses;

- Working in Narayana Medical College Hospital in Nellore.
- The study limited to four weeks.

III. METHODS AND MATERIAL

Research Approach:

A quantitative approach was adopted to determine the research study.

Research Design:

The present study was conducted by using descriptive research design.

Setting:

Setting of the study was conducted at Narayana Medical College Hospital, Nellore.

Population:

Target population: All staff nurses.

Accessible population: Staff nurses working in Narayana Medical College Hospital, Nellore.

Sample: Staff nurses working in Narayana Medical College Hospital, Nellore and who fulfilled the inclusion criteria.

Sampling Technique:

Non-probability convenience sampling technique was adopted for the study.

Sample Size: The sample size selected for the present study includes 100 staff nurses.

Criteria for Sample Collection:

Inclusion Criteria

- The staff nurses who are willing to participate in the study.
- The staff nurses who are available during data collection.

Exclusion Criteria

- Subjects who are not willing to participate in the study.
- Subjects who are working in OPD.

Description of the tool

Part A → Demographic data consisting of items namely age, sex, designation, experience, religion, income and working hours.

Part B → Deals with the questionnaire on knowledge regarding various splints.

Variables of the study:

Independent variable: Staff nurses.

Dependent variable: Level of knowledge and practice.

Score interpretations:

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IV. DATA ANALYSIS AND DISCUSSION

Table-1 : Frequency and percentage distribution of level of knowledge among staff nurses. (N=100)

Level of Knowledge	Frequency (F)	Percentage (%)
Good knowledge	15	15
Average knowledge	75	75
Poor knowledge	10	10

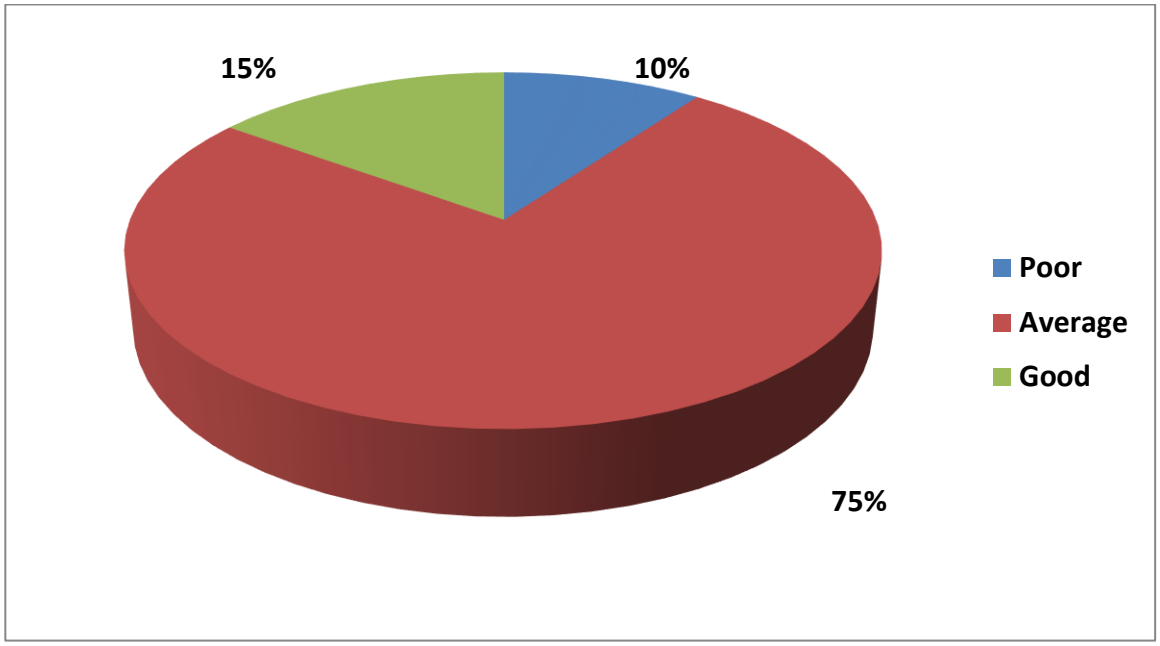


Fig 1 : Frequency and percentage distribution based on level of knowledge among staff nurses.

Table 2 : Frequency and percentage distribution of Mean and Standard deviation of knowledge. (N=100)

CATEGORY	MEAN	S.D
Level of knowledge	15.66	4.74

Table-3 : Frequency and percentage distribution of level of practice among staff nurses. (N=100)

Level of practice	Frequency (F)	Percentage (%)
Good practice	20	20
Moderate practice	66	66
Poor practice	14	14

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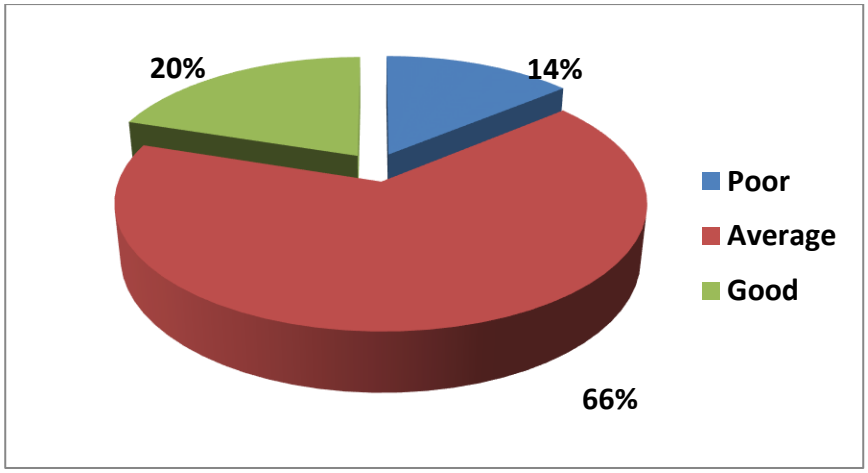


Fig 1 : Frequency and percentage distribution based on level of practice among staff nurses.

Table 4 : Frequency and percentage distribution of Mean and Standard deviation of practice. (N=100)

CATEGORY	MEAN	S.D
Level of practice	7.23	2.37

Table 3 : Association between level of knowledge and socio demographic variables among staff nurses. (N=100)

S. No	Demographic Variables	Inadequate knowledge		Moderate knowledge		Adequate knowledge		Chi Square
		F	%	F	%	F	%	
1.	Gender							C=14.359
	a. Male	9	9	8	8	3	3	T=9.77
	b. Female	1	1	67	67	12	12	Df=4
								P<0.05
								S*
2.	Experience							C=16.274
	a. < 1 year	5	12	27	27	8	8	T=11.82
	b. 1-3 yrs	4	4	22	22	5	5	Df=4
	c. 4-7 yrs	1	1	22	22	2	2	P<0.05
	d. > 7 yrs	-	-	3	3	-	-	S*
3.	Designation							C=22.107
	a. ANM	4	4	15	15	3	3	T=14.53
	b. GNM	3	3	23	23	4	4	Df=6
	c. B.Sc	3	3	34	34	8	8	P<0.05
	d. PP BSc	-	-	3	3	-	-	S*

4.	**Any CNE/Work shop attended**							C=18.25 T=14.74
	a. Yes	5	5	10	10	10	10	Df=4
	b. No	5	5	65	65	5	5	P<0.05 S*

V. MAJOR FINDINGS OF THE STUDY

- Regarding the level of knowledge among staff nurses, 15(15%) of students are had good knowledge, 75(75%) of them had average knowledge and only 10(10%) of them had poor knowledge regarding various splints.
- Among 100 staff nurses, 20(20%) of them had good practice 66(66%) of them had moderate practice and 14(14%) had poor practice.
- Among staff nurses, mean knowledge score was 15.66 with standard deviation 4.74. And mean practice score was 7.23 with standard deviation 2.37.

VI. CONCLUSION

Hence it can be concluded that majority of the staff nurses (71%) had average knowledge and moderate practice (66%) regarding various type of splints. Hence there is an immense need to implement an educational programme for all staff nurses regarding type of splints, its uses and method of application with principles and after care etc.

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A Study to Assess the Knowledge Regarding Care of Unconscious Patients among Staff Nurses at NMCH, Nellore, Andhra Pradesh

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ABSTRACT

Background: Nursing the unconscious patient can be a challenging experience. Unconscious patients have no control over themselves or their environment and thus are highly dependent on the nurse. The skills required to care for unconscious patients are not specific to critical care and theatres as unconscious patients are nursed in a variety of clinical settings. Nursing such patients can be a source of anxiety for nurses. **Aim:** The aim of the study was to assess the level of knowledge regarding care of unconscious patients among staff nurses. **Objectives:** 1. To determine the level of knowledge regarding physical examination among staff nurses. 2. To associate the level of knowledge with selected demographic variables. **Methodology:** 100 staff nurses working at Narayana Medical College Hospital were selected by using purposive sampling method. **Results:** Regarding the level of knowledge among staff nurses, 17 (17%) had adequate knowledge, 76(76%) had moderate knowledge and 7(7%) had inadequate knowledge regarding care of unconscious patients.

Keywords : Knowledge, Care, Unconscious Patients, Staff Nurses.

I. INTRODUCTION

"*The first step towards knowledge is to know that we are ignorant*"

Nursing the unconscious patient can be a challenging experience. Unconscious patients have no control over themselves or their environment and thus are highly dependent on the nurse. The skills required to care for unconscious patients are not specific to critical care and theatres as unconscious patients are nursed in a variety of clinical settings. Nursing such patients can be a source of anxiety for nurses. However with a good knowledge base to initiate the assessment, planning and implementation of quality care, nursing patients who are unconscious can prove highly rewarding and the skills acquired can promote confidence in the care of all patients.[1]

The unconscious patient will require skilled emergency management. As a patient starts to become unconscious he or she loses control of his or her ability to maintain a safe environment. It cannot be stressed enough that the nurse has a crucial responsibility to anticipate, where possible, deterioration in a patient's condition (nursing and midwifery council (NMC) 2004). Thus in relation to consciousness, the nurse has an essential role in the assessment of the central nervous system using the GCS, monitoring vital signs, pupillary reaction and limb movements. Such skills will provide information that can allow for interventions to correct a life threatening deterioration and potentially avert a decline to unconsciousness. The A (airway), B (breathing), C (Circulation), D (Disability) approach

to resuscitation should be adopted, and the maintenance of a clear airway is the first priority.[2]

Respiratory function, maintaining a patent airway and promoting adequate ventilation are nursing priorities. Assessment of the mouth and teeth is also important. Positioning the patient is important and will facilitate the drainage of secretions. The supine position compromises the mechanics of breathing and lung volumes (Hickey 2003). The accumulation of secretions over time can contribute to the development of atelectasis and hypostatic pneumonia. To maintain a patent airway the lateral recumbent position is advised (Allan 2002) with the head of the bed slightly tilted upwards, about 10-30 degrees.[3]

Pulse oximetry will aid the ongoing monitoring of respiratory function. Oxygen saturation is a measure of the percentage of hemoglobin molecules that combine with oxygen. Pulse oximetry assists in monitoring the effectiveness of oxygen therapy. Cardiovascular function – Monitoring the cardiovascular function in unconscious patients is of high importance. Alteration in blood pressure need to be viewed in relation to pulse rate, pulse quality and pulse pressure.[4]

The risk of venous thromboembolism and pulmonary emboli from the effects of immobility is well organized .The use of ant embolic stockings should be considered once the risk of venous thromboembolism has been identified. Nutrition and hydration is a fundamental need and yet evidence suggests that up to 40% of hospital patients remain malnourished. Therefore regular blood and urine tests to monitor electrolyte and metabolic changes are essential to promote accurate assessment of each individual patient. Nasogastric feeding is the most commonly used method and is recommended for short term feeding. Immobility also alters glucose insulin intolerance. An IV insulin sliding scale regimen may be required to maintain blood glucose levels within the normal range of 4-7 mmol/l.[5]

Hygiene needs and skin care – Attending to the hygienic needs of the unconscious patient should never become ritualistic, and despite the patient's perceived lack of awareness, dignity should not be compromised. Personal hygiene is considered part of the essence of care and needs to be carried out to a un compromising standard.[6]

NEED FOR THE STUDY

The World Health Organization (WHO) estimates that 5 million death occurs every year in Intensive Care Units.[7]

In India every year approximately 3.2 million ICU's admissions are occurring. In which 80% patients are in coma stage and in that 48000 deaths are occurring.[8]

In South India the overall ICU's admission in 2014 was 56.6% but Zimbabwe and Iran the admission was 20% 19.6% respectively. The overall causes in world about 20 million peoples are admitting in ICU's by various causes.[9]

A longitudinal study was conducted on unconscious patients in neurological intensive care unit (NICU) at sub-Saharan Africa. The aim of the study was to determine morbidity-mortality and survival of unconscious patients in NICU. It was a prospective longitudinal study for a period of 15 months. The study included over all 169 (n=169) patients. The mean age of the patient was 58.04+/-17.55 years with a sex ratio of 0.92. The mean time from installation of disorders and initial consultation was (8.88%). The mean duration of hospitalization was 8.89+/-9.53 days associated with mortality rate of 82.25% for a same period. Survival at day 90 was 10.65%. Mortality was

related to infection condition (28.4%) renal failure (14.78%) cardiovascular failure (13.16%). Cerebral engagement (12.43%), multiorgan failure (11.24%), pulmonary embolism (1.18%) and unknown cases (18.34%). The study concluded that unconsciousness is associated with a high mortality rate in our context and suggests that early consultation, a good control of vascular risk factors and better management of infectious condition could reduce this impact.[10]

PROBLEM STATEMENT:

A study to assess the knowledge regarding care of unconscious patients among staff nurses at NMCH, Nellore.

OBJECTIVES:

- To assess the knowledge of staff nurses regarding care of unconscious patients.
- To find out association between knowledge of staff nurses regarding care of unconscious patients with their selected socio demographic variables.

DELIMITATIONS:

The study is limited to;

- Who are working in NMCH, Nellore.
- Working in ICU, emergency and selected medical wards.
- Who are willing to participate

II. METHODS AND MATERIAL

Research Approach:

A quantitative approach was adopted to determine the research study.

Research Design:

The present study was conducted by using descriptive research design.

Setting:

Setting of the study was conducted at ICU, Emergency, and selected medical wards of NMCH, Nellore.

Population:

Target population: All staff nurses.

Accessible population:

Staff nurses working at ICU, Emergency, and selected medical wards of NMCH, Nellore.

Sample:

Staff nurses working at NMCH, Nellore and who fulfilled the inclusion criteria.

Sampling Technique

Non-probability purposive sampling technique was adopted to the selected samples.

Sample Size:

The sample size selected for the present study includes 100 staff nurses.

Criteria for Sample Collection:

Inclusion Criteria

The staff nurses who are:

- Willing to participate in the study.
- Available during the period of data collection.
- Staff nurses who are working in NMCH, Nellore.

Exclusion Criteria:

- Nurses who are not available at the time of data collection.
- Nurses with managerial responsibilities like floor supervisor, nursing superintendent etc.
- Those who are not willing to participate in the study.

Variables of the study:

Independent variable: Staff nurses.

Dependent variable: Level of knowledge.

Description of the tool:

Part-A: Demographic data consisting of items namely age, sex, qualification, experience, department where working, religion and designation.

Part-B: Self structured questionnaire to assess the knowledge care of unconscious patients among staff nurses.

III. DATA ANALYSIS AND DISCUSSION

Table-1 : Frequency and percentage distribution of level of knowledge among staff nurses. (N=100)

Level of Knowledge	Frequency (F)	Percentage (%)
Adequate knowledge	17	17
Moderate knowledge	76	76
Inadequate knowledge	7	7

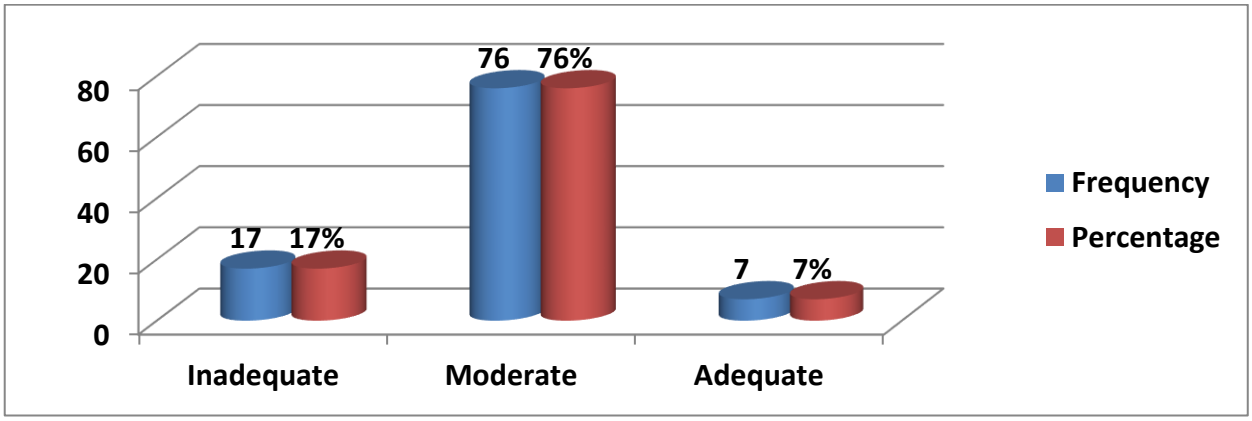


Fig 1 : Frequency and percentage distribution based on level of knowledge among staff nurses.

Table 2 : Frequency and percentage distribution of Mean and Standard deviation of knowledge. (N=100)

CATEGORY	MEAN	S.D
Level of knowledge	20.85	6.87

Table 3 : Association between level of knowledge and socio demographic variables among staff nurses. (N=100)

S. No	Demographic Variables	Adequate knowledge		Moderate knowledge		Inadequate knowledge		Chi Square
		F	%	F	%	F	%	
1.	Age in years							C=13.413
	a. 15-20 years	13	13	-	-	-	-	T=11.76
	b. 20-25 years	10	10	76	76	1	1	Df=6
								P<0.05
								S*

2.	**Educational Status** a. GNM b. B.Sc.Nursing	11 5	11 5	- 76	- 76	1 7	1 7	C=18.654 T=17.97 Df=4 P<0.05 S*
3.	**Area of Work** a. ICU b. Emergency c. OT d. Ward	12 2 - 2	12 2 - 2	15 43 9 9	15 43 9 9	- 5 1 1	- 5 1 1	C=22.701 T=19.11 Df=3 P<0.05 S*

IV. MAJOR FINDINGS OF THE STUDY

- ✓ Regarding the level of knowledge among staff nurses, 17 (17%) had adequate knowledge, 76(76%) had moderate knowledge and 7(7%) had inadequate knowledge regarding care of unconscious patients.
- ✓ The mean knowledge score of staff nurses was 20.85 and standard deviation was 6.87.
- ✓ There was a significant association found between level of knowledge and demographic variables such as age and working area at P<0.05 level.

V. CONCLUSION

Hence it can be concluded that most of the staff nurses had average knowledge (76%) towards care of unconscious patients. Hence there is an immense need to implement an educational programme for all nursing students about care of unconscious patients.

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Conflict between Individual and Society : A Brief Review of Victims and Survivors in Anita Desai's Fiction

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ABSTRACT

Anita Desai's novels catch the shattered psyche of the individuals who are striving for defining themselves in the form of identity in the familial and social set-up but it is hard to say that all the characters are strong enough to survive after dealing with the cruelties of life. Apart from a few, they become the victims of their personal and social affairs of life. It may be observed that almost all the protagonists of Anita Desai are sensitive or hypersensitive that makes them victims. On the other hand, some characters try hard to cope with the abnormalities of life but in the long run they also surrender yet they are able to survive. Through a brief study of the selected novels of Anita Desai, this paper will try to examine who are the victims and who are the survivors?

Keywords : Conflict, Society, Victim, Survivor

Anita Desai was writing at a time when Indian society was facing the impact of modernity in urban areas to a great extent. She portrays in her novels the impact of modernity on a traditional society of India and the ramifications of such change on a society and relationships with great sensitivity. She portrays female characters, their response, behavioural attitudes and outlook to changes coming into their lives. Although her protagonists have an intense strive for defining their identity in the familial and social setup but it is hard to say that all the characters are strong enough to survive after confronting with the cruelties of life. Apart from a few, they become the victims of their personal and social affairs of life:

> Looking at the sensitive portrayal of characters, it can be concluded that she cares for the individual human beings irrespective of their being male or female. Her characters appear to be exceptionally talented but constantly disturbed by familial ties. As a result, they experience discomfort and feel trapped in an oppressive environment. In most cases the hostile environment frustrates the aspirations of the individual either leading them to their annihilation on a humiliating compromise (George 159).

'Annihilation or humiliating compromise' – it depends on an individual that how long he or she is tortured by the failures and how much he or she is sensitive. But it may be observed that almost all the protagonists of Anita Desai are sensitive or hypersensitive that makes them victims. On the other hand, some characters try hard to cope with the abnormalities of life but in the long run they also surrender yet they are able to survive. Now we will try to examine through a brief study of the novels of Anita Desai that who are the victims and who are the survivors?

In *Cry, the Peacock*, a hypersensitive young girl Maya lives a life of horror and fear because she believes in the prophecy of albino astrologer that either she or her husband has to die in the fourth year after her marriage. Now it is four years since Gautama and Maya are married. Maya feels uneasy when Gautama never gives her chance of being close to him because he believes in the theory of attachment preached by *the Gita.* Maya has no other friend who can pacify her.

As an ideal wife she loves Gautama very much and she always thinks of getting close to him because her own world was "...hell. Torture, guilt, dread, imprisonment–these were the four walls of my private hell, one that no one could survive in long. Death was certain..." (*Cry, the Peacock* 102). In her alienation she is always aware of the fact that she is gradually going insane. She says, "I am moving further and further from all wisdom, all calm and I shall be seen mad, if I am not that already..." (*Cry, the Peacock* 108). This shows her neurotic condition. The doctor advises her to free herself from "anxieties and excitements" (*Cry, the Peacock* 227). But Gautama, instead of being a friendly and cooperative husband, always criticises her by saying "neurotic" to her. He also remarks, "From a passion of wonder and excitement you are led surely to a passion of unhappiness in its loss, depression and disillusionment" (*Cry, the Peacock* 103).

While criticizing Maya's state of mind, Gautama is not aware of her fears, desires and loneliness. But the prediction of the albino creates a terrible commotion in her consciousness. She turns insane and kills her husband. When she is taken to her father's house, she forgets the death of her husband in the joy of her getting back to her father's house. When her sister-in-law Nila asks her about the incident she describes casually, "So then I pushed him, hard, and he fell. And when I went down the stairs to the terrace he was lying there – don't you like your tea?" (*Cry, the Peacock* 214) Suddenly, Maya's frightened voice is heard from the balcony. It indicates that she also kills herself:

> Maya's tragedy is that there is no one to share her feelings. Childless, with an uncaring husband, she is lonely and loneliness is the bane and burden of her psyche. And to cap it all she is not even sexually satisfied (Pandey 83).

Maya becomes the victim of the prediction of the albino, her father's over protectiveness, Gautama's detachment and her hypersensitivity. When she is unable to bear the burden of life, she is victimised by death itself. With her, Gautama also falls in the category of victims because of his extreme sense of non-attachment while living in the system of attachment i.e. family.

In *Voices in the City,* Nirode's mother and her three children come to Calcutta and are lost in the city of Goddess Kali. Where Monisha lives with her in-laws seems to her a prison. She says, "I am locked apart from all of them, they cannot touch me" (*Voices in the City* 240). Manisha's marital life is an expansion of Maya–Gautama relationship. Like Maya, she is also frustrated, alienated and childless. Her desires of intimacy and her lack of communication with her husband make her existence insignificant. In her dejection she cries out, "I have not given birth, I have not attended death. All the intervening drama has gone by, unwound itself like a silent blurred film that has neither entertained nor horrified one (*Voices in the City* 115). Her relation with her husband Jiban is marked by loneliness. Even the other members of the family are not on equal terms with her. The culmination of her married life is when she is alleged of stealing money from her husband's pocket without his knowledge. Instead of establishing the authority of her wife, Jiban supports his mother. The only way to escape from this state of non-existence is to live in solitude: "I find on this level that solitude

that becomes for me most naturally. I am willing to accept this status then, and to live these, a little beyond and below everyone else, in exile" (*Voices in the City* 138).

Thus she has to make a choice between death and mean existence and finally she chooses death and commits suicide:

> Monisha prefers non-existence to a meaningless existence; she defines love as 'an awake condition of the conscience' but fears and avoids it, because love then implies a sense of duty. Hence she remains in 'an exile' in her two families – mother's as well as husband's. Thus Monisha's hypersensitivity does not help her relate herself meaningfully to the outer reality; she fails to synthesise the ideas of personal freedom, domestic duties and social responsibilities (Rao 170).

Her brother Nirode is another victim of Calcutta being confronted with a long series of failures. Amla also realizes the hollowness of life and the futility of her existence in city in spite of all the "stimulation of new experiences, new occupations, new acquaintances and mild sweet winter air, this sense of hollowness and futility persisted." (*Voices in the City* 157). We also have the glimpses of marital disharmony between Nirode's parent too. But all remain survivors despite being entirely frustrated except Monisha because she cannot tolerate her tortured life and commits suicide.

The major characters Dev, Adit and Sarah in *Bye-Bye Blackbird* experience a different type of defeat and disillusionment. Dev arrives in London to join London School of Economics. But soon he feels frustrated and develops hatred for the city and its dwellers because he is horrified by the ill-treatment given to the coloured immigrants. Dev comes across many different incidents of insult that torture him emotionally. He feels insulted and unwanted. But as time passes by, Dev develops a great fascination for the English people and the English countryside. It creates a dilemma for him so that he cannot decide whether to go back to India or, "not to marry and breed, go to office, come home and go to office again but to know a little adventure, to know, to know" (*Bye-Bye Blackbird* 123). Initially, Adit enjoys his life with his wife Sarah in England. Soon he begins to realize that he has been betraying his self so long. He starts disliking England. Finally, he realises he should face the reality by going back to India where his son would be born.

Sarah feels displaced in her own country after her marriage with an Indian. She tries hard to adjust herself with her Indian husband, his culture and his friends. To some extent, she succeeds in it but her own society is not ready to accept her as an Indian wife. She begins to feel alienated in her own society. Every moment she deliberately tries to avoid people talking about her life, her husband and India as well. She feels tortured about the loss of her own name and identity in her own society:

> An anguish it seemed to her of loneliness and then it becomes absurd to call her by her own name–to call her by any name. She had become nameless, she had shed her ancestry and identity and she sat there staring, as though she watched them disappear (*Bye-Bye Blackbird* 3).

In the end, Sarah is given an unavoidable option by Adit to move back to India and being a woman how can she reject it. Despite being frustrated by their situations, most of the characters are trying to survive by making the ways of their own.

In Custody marks a departure from Anita Desai's earlier novels where women sensibility is dealt with but this novel has a male protagonist who comes from a lower middle class family and who puts his step into a wider world in the hope of self fulfillment. Deven Sharma is a lecturer in Hindi in a college in Mirpore a small town near Delhi. A turning point comes in his life when his childhood friend Murad asks him to take an interview of the great poet Nur. He wants to publish this interview in his magazine. Deven agrees at once. He is aware of his personal incompetency of fulfilling his wife's dreams and desires. He lives with a sense of defeat and failure because he feels alone even with his wife:

> He understood because like her, he had been defeated too; like her he was a victim. Although each understood the secret truth about the other, it did not bring about any closeness of spirit, any comradeship, because they also sensed that two victims, ought to avoid each other, not yoke together their joint disappointments (*In Custody* 40).

Finally, the proposal given by Murad makes him disappointed. Deven is entrapped gradually in Nur's world:

> Deven's great rootless, restless, mobility, loneliness, and his paralyzing helplessness are objectified by the people with whom he comes in contact his wife, Sarla; Mr. Jain; and his two nephews; his colleague, Mr. Siddiqui; the head of the department, Mr. Trivedi, and the two wives of the poet (Inamdar 58).

Thus, Deven finds no sympathetic soul to console him instead he gets failure and frustration and his consciousness makes him realize, as R.K. Gupta points out that "reality is always depressing but the answer does not lie in escapist sense" (218). Now he realizes the ultimate truth of life:

> He walked up the path. Soon the sun would be up and blazing. The day would begin, with calamities. They would flash out of the sky and cut him down like swords. He would run to meet them. He ran, stopping only to pull a branch of thorns from under him foot (*In Custody* 40).

Hence, the very struggle against failures shows him a spark of hope to survive in the battle of life.

'Accepting–not accepted' is the story of Hugo Baumgartner's life in Anita Desai's next novel *Baumgartner's Bombay*. It is ironical that he remains alone throughout his life not only in India but in his own country also. In India, he tries to maintain a distance with other Europeans because he did not like their "probing questions, their determination to discover his background, his circumstances, his past, and present and future, before they accepted him" (*Baumgartner's Bombay* 167). So he moves to Bombay. The behaviour of Chimanlal's sons and others at the time of cremation frustrates him deeply as it may be;

> …all of whom shrank away from him, horrified by the presence of a foreigner, a 'firang' at such an intensely private rite. Hearing the babbling chant of the priests, seeking the confusion around the pyre, smelling the odours of burnt flesh and charred wood under the noontime sun, Baumgartner too wished he had not come, and shuffled away (*Baumgartner's Bombay* 214).

After living thirty years in Bombay, he fails to enter in its life and the city too remains absolutely unknown to him. This his life becomes the tale of betrayal given by his own country by separating him from his mother, by India where he is deceived, arrested, humiliated, being considered as a 'firangi' is killed at last by the boys

without thinking the fact that he was the same person who saves his life by giving him shelter in his own house.

Lotte is another victim of the struggle for existence. She marries Kanti but she is rejected by his family. After Kanti's death, she is kicked out of the house given by Kanti. Although Lotte is alone yet she is able to survive. In fact, Baumgartour is also an isolated fellow but after understanding life deeply he has learnt to live in isolation. But the irony is that death does not spare him even in his isolation and of course, he becomes the most pitiable victim before and after his life.

To conclude, Anita Desai particularly deals with the institution of marriage in her novels where woman is the victim. She is caught in the trap of marriage and she finds only two ways. First, she denies such a miserable life and commits suicide and second, she lives but in alienation:

> To revolt against injustice is human and if the victim is hypersensitive, the situation becomes sensitive enough. If the victim is sensitive young woman, her actions may ratter be intense-alternating between the two extremes of resignation and rebellion. In either case, the victims, as in Anita Desai's fiction, is driven into herself in order to realise one's own self. Anita Desai's female protagonists perceive the psychic truth which is distinctly different from the reality confront. They develop fears obsessions, neuroses, paranoia or schizophrenia and gradually withdraw from the society including their families and husbands. They develop in communication and tend to ponder over existential problems and end up in alienation (George 162).

Thus, alienated life becomes the fate o
f Anita Desai's women protagonists who are survivors. Here, living is not the matter but the matter is how long a person can survive alone.

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Seismic Response of Multistoried Building Considering Effect of Cohesive and Non-Cohesive Soil

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ABSTRACT

The response of a structure under earthquake loading is directly associated with the response of soil to ground shaking. Thus, the extent and degree of damage during an earthquake is mainly influenced by the response of soil to ground vibrations. Therefore, it is vital to evaluate the response of soil due to ground vibration. Though the structures are supported on soil, most of the designers do not consider the soil structure interaction and its subsequent effect on structure during an earthquake. Different soil properties can affect seismic waves as they pass through a soil layer. When a structure is subjected to an earthquake excitation, it interacts the foundation and soil, and thus changes the motion of the ground. It means that the movement of the whole ground structure system is influenced by type of soil as well as by the type of structure. The present study is an effort towards analysis of the structure during the earthquake. G+10 stories residential building is considered. To study various parameters such as shear force, bending moment, storey drifts, storey shear, lateral displacement.

Keywords : Cohesive and Non-Cohesive Soil, Soil-Structure Interaction (SSI), Time History Method.

I. INTRODUCTION

The procedure in which the action of soil imparts the movement of the structure and the movement of the structure affects the action of the soil is called as SSI. Impendence difference is characterized as result of speed and thickness of soil. Seismic wave ventures quicker in hard shakes in contrasted with milder shakes and silt. As the waves goes from harder to milder rocks, they turn out to be moderate and should get greater in abundance to convey the same measure of the energy, in this way shaking tends to more grounded at sides with gentler surface layers, where seismic waves move more gradually. Resonance obtained when signal frequency matches with fundamental frequency of soil, they say that in resonance with one another, this results in to tremendous increase in ground motion amplification. Irregular basement topography when subjects to body wave incidence results in focusing and defocussing effect. This strongly depends on angle of incidence wave. The impact on a structure during an earth quake relies upon the properties of the ground soil, intensity of earth quake and structural system. When the foundation is on firm ground the foundation motion is basically taken at the soil level with the absence of structural system. For foundation on soft soil foundation motion varies from that in the free field due to the coupling of soil and structure during earth quake this is due to the scattering of waves and energy released due to the vibration of structures. Due to these impacts the condition of displacements in the supporting soil is different from free field because of these dynamic response of a structure is differ greatly in amplitude and frequency. Cohesive soil means soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can significant cohesion when submerged.

Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay be excavated with vertical side slopes and is plastic when moist. Cohesive soil is hard to break up when dry and exhibit Composition, Cohesion and Consistence. In the present study various field penetration tests were conducted on cohesive and non-cohesive soils and design the optimum size of the footing based on the field tests.

Soil-structure interaction (SSI) analysis evaluates the collective response of three linked systems: the structure, the foundation, and the soil underlying and surrounding the foundation. Problems associated with practical application of SSI for building structures are rooted in a poor understanding of fundamental SSI principles. Implementation in practice is hindered by a literature that is difficult to understand, and codes and standards that contain limited guidance. It provides a synthesis of the body of SSI literature, distilled into a concise narrative, and harmonized under a consistent set of variables and units. Techniques are described by which SSI phenomena can be simulated in engineering practice, and specific recommendations for modeling seismic soil-structure interaction effects on building structures are provided.

Observations from past earthquakes of failure of structures.

Fig.1.1 shows a remarkable ground failure occurred near the Shinano river bank where the multistoried apartment buildings suffered bearing capacity failures and tilted severely. In Fig (1.2), sand boils and ground fissures were observed at various sites in Niigata, lateral spreading caused the foundations to move laterally so much that the simply supported spans became unseated and collapsed.



Fig.1.1 Failure of multistoried buildings during Niigata earthquake (1964), a city located on Sad island, in the Chūbu region of Japan.

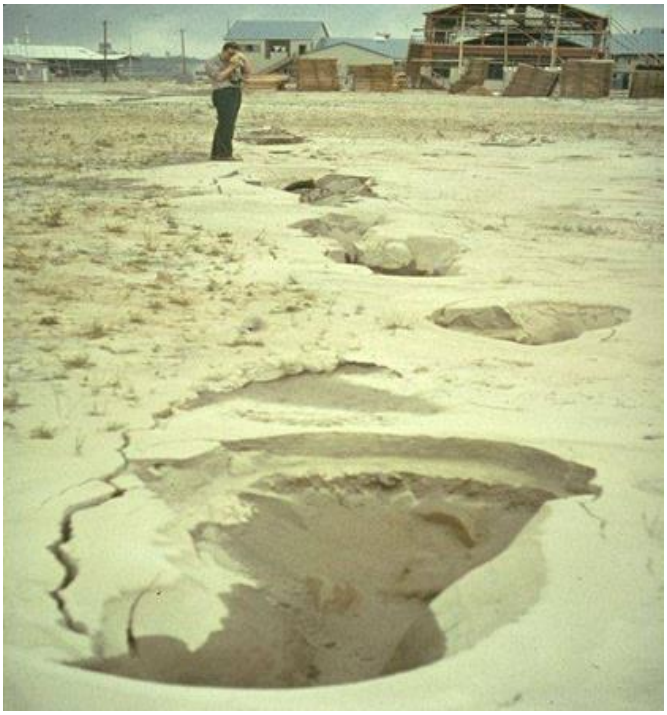


Fig.1.2 A remarkable ground failure occurred near the Shinano river bank in Niigata earthquake



Fig.1.3 Bhuj (Jan 26, 2001) earthquake, in Gujrat, India.

Reinforced concrete buildings have been damaged on a very large scale in Bhuj earthquake of Jan 26, 2001 (Fig.1.3).These buildings have been damaged due to various reasons. Identification of a single cause of damage to buildings is not possible. There are combined reasons, which are responsible for multiple damages. This is because of seismic action and inelastic response of structures. The principal causes of destruction to buildings are soft stories, floating columns, mass irregularities, poor quality of material, faulty construction practices, inconsistent seismic performance of soil, foundation effect, pounding of adjacent structures and inadequate ductile detailing in structural components.

The present study is an effort towards analysis of the structure during the earthquake. G+10 stories residential building is considered. To study various parameters such as shear force, bending moment, storey drifts, storey shear, lateral displacement, four models as mentioned below are considered.

- Model I: Building with fixed base on cohesive soil.
- Model II: Building with fixed base on non-cohesive soil.
- Model III: Building with SSI on cohesive soil.
- Model IV: Building with SSI on non-cohesive soil.

For all the models mentioned above the base shear result are compared.

II. OBJECTIVES

The main aim of this project is to generate fundamental research information on the seismic performance of building structural systems having cohesive and non-cohesive soil media.

- The structure should withstand the moderate earthquakes, which may be expected to occur during the service life of structure with damage within acceptable limits.
- Create computer models of building with fixed base for cohesive and non-cohesive soil.
- Create computer models of building with soil interaction.
- To study the seismic performance of the regular building for different types of soils.
- To study the seismic performance of the regular building for fixed base and soil interaction.
- To analyze the displacement of the structure along different direction by using time history method.
- Various static checks are applied on the results.
- Study the effect of important parameters such as base shear and lateral displacement.
- Use the research to find axial force and moments in columns and shear and moments in beams.

III. METHODOLOGY

From the previous chapter, it has been decided to proceed with Time history analysis for finding the

seismic response of the building. This study deals with the seismic performance of G+10 storey building in cohesive and non-cohesive soil media for seismic zones III of India. Total four models are made for analysis of building. Seismic analysis is done by time history method.

This chapter explains the Indian standard codes guidelines for the analysis of such structures, study the suitability of fixed base and soil structure interaction (SSI). Building is modeled and analyzed for earthquake forces as per IS1893:2016 guidelines for Indian Seismic zone III. Also the seismic analysis of building is done by using time history method using FEM Software ETAB 2016.

3.1 Analytical Model

In this section, the detailed procedure of Time history analysis and parameters to be considered are explained for building model according to IS 1893 (Part 1): 2016

3.1.2 Considerable Parameters

Historically, seismic loads were taken as equivalent static accelerations which were modified by various factors, depending on the location's seismicity, its soil properties, the natural frequency of the structure, and its intended use. The method was refined over the years to enable increasingly adequate designs. The underlying design philosophy was basically unchanged; some modifications were made to the coefficients as a result of strong earthquakes. Other modifications to account for new information were introduced by specifying acceptable structural details for different construction materials.

(a) Seismic zone factor, Z: India has been divided into four seismic zones as per IS 1893 (Part 1): 2016 for the Maximum Considered Earthquake (MCE) and service life of the structure in a zone. Different zone have different zone factor. India is divided into four seismic zones. There are three types of soil considered by IS 1893 (Part 1): 2016 i.e. soft, medium and hard soil.

TABLE 3.1: ZONE FACTOR (IS1893-2016)

Seismic Zone	II	III	IV	V
Seismic intensity	Low	Moderate	Severe	Very Severe
Z	0.10	0.16	0.24	0.36

b) Seismic weight of the floors: For calculation of design seismic forces of building, imposed load on roof need not be considered. But, weight of equipment and other permanently fixed facilities should be considered in such a case the reduction of imposed loads mentioned in Table 3.2

TABLE 3.2: PERCENTAGE OF IMPOSED LOADS TO BE CONSIDERED SEISMIC WEIGHT (IS1893-2016)

Imposed uniformity distributed floor loads (kN/m^2)	Percentage of imposed load
Up to and including 3.0	25
Above 3.0	50

c) Design Seismic Base Shear:-The total design lateral force or design seismic base shear (VB) along any principal direction shall be determined by the following expression:

$$V_B = A_h W$$

Where,

A_h - Design horizontal acceleration spectrum value as per clause 6.4.2 of IS 1893-2016, using the fundamental natural period T, in the considered direction of vibration, and

W - Seismic weight of the building.

d) Design Spectrum:- For the purpose of determining seismic forces, the country is classified into four seismic zones the design horizontal seismic coefficient Ah for a structure shall be determined by the following expression:

$$A_h = \frac{Z}{2} \times \frac{S_a}{g} \times \frac{I}{R}$$

Where,

Z – Zone factor (The factor 2 in the denominator of Z is used so as to reduce the Maximum Considered Earthquake (MCE) zone factor to the factor for Design Basis Earthquake (DBE).)

I - Importance factor.

R - Response reduction factor.

S_a/g - Average response acceleration coefficient

e) Structural response factor, (Sa/g):

It is a factor denoting acceleration response spectrum of the structure subjected to earthquake ground vibrations, and depends on natural period of vibration and damping of the structure.

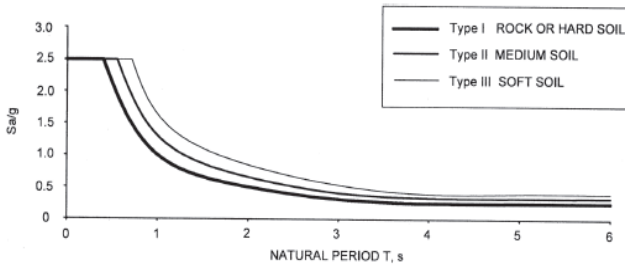


Figure 3.1: Spectra for equivalent static method

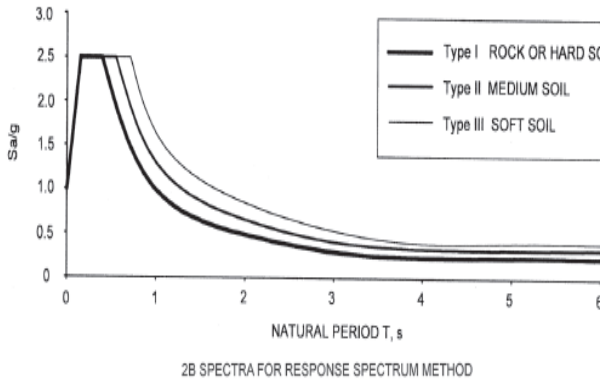


Figure 3.2: Spectra for response spectrum method

3.2 Load combinations as per IS 1893:2016 (part 1)

For the analysis following load combinations specified by the IS 1893: 2016 are used. The basic load combinations given by the code as per clause 6.3.4.1 are as follows

1. 1.2(DL+LL±(EQX±0.3EQY±0.3EQZ))
2. 1.2(DL+LL±(EQY±0.3EQX±0.3EQZ))
3. 1.5(DL±(EQX±0.3EQY±0.3EQZ))
4. 1.5(DL±(EQY±0.3EQX±0.3EQZ)
5. 0.9DL±1.5(EQX±0.3EQY±0.3EQZ)
6. 0.9DL±1.5(EQY±0.3EQX±0.3EQZ)

3.3 Time History Analysis

The basic idea of time-history analysis is to reproduce the actual behavior of a structure under the action of ground motions. The time history analyses technique represents the most sophisticated method of dynamic analysis for structures. In this method, the mathematical model of the structure is subjected to acceleration from earthquake records that represent the expected earthquake at the base of the structure. Time history method consists of a step by step direct integration over a time interval; the equation of motion are solved with the displacements, velocities and acceleration of the previous step serving as initial function. For that selected earthquake ground motions are considered as an input motion for time history analysis and applied at the base of structure.

The seismic performance of structure under selected earthquake records has been examined in severe load combination condition.

3.4. Inputs Ground Motions and Analysis Procedure

The horizontal component of "EL-Centro" earthquake ground motion is chosen for time history analysis. The details of the ground motion like PGA and recording station is presented in graph .the ground motion are applied along the X direction. The time history analysis in ETAAB 2016 was performed.

The present study adopts the time history analysis which is the most accurate method available to get the seismic response of a structure. In this method, structure's response history is evaluated by subjecting it to a ground motion corresponding to the zone III of IS code 1893 design spectrum with peak ground acceleration of 0.09g. The duration of the earthquake is 30 seconds. Time history of acceleration was applied in the global X direction of the entire soil-structure model. The analysis was carried out for each incremental time interval and at each stage structural response was evaluated. ETAB 2016 finite element software was used for the time history analysis. The material damping ratio was assumed as 5% for structure.

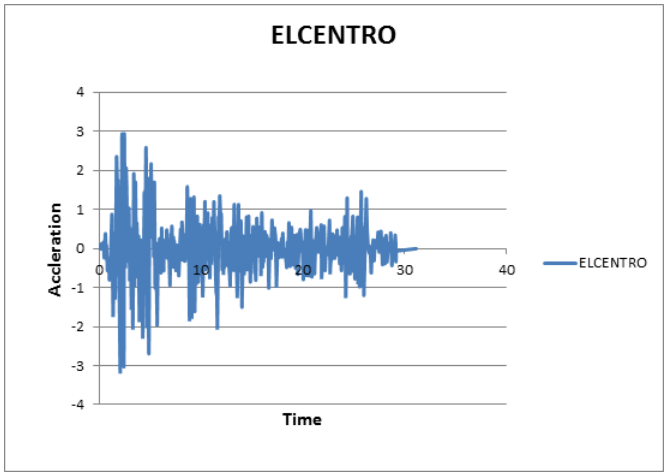


Figure 3.3 Graph showing El-Centro ground motion data up to 30 sec

3.5 Soil Idealization

At prsent Soil Structure Interaction is a standout amongst the most thriving zones of exploration in Structural Engineering. It can be characterized as the coupling between structures and its supporting medium (bedrock or soil bed) during an earthquake. Tackling such problems has become possible lately due to a revolution in computer technology. Works done in the late decade have demonstrated the significance of structure-soil structure interaction on the dynamic response of key structures such as silos, storage tanks, and offshore structures. Hence SSI calls for improvement in Codal provisions for the seismic design and communications between geotechnical and structural engineers. Compared with the counterpart fixed-base system, SSI has two basic effects on structural response. Firstly, the SSI system has an increased number of degrees of freedom and thus modified dynamic characteristics. Secondly, a significant part of the vibration energy of the SSI system may be dissipated either by radiation waves, emanating from the vibrating foundation–structure system back into the soil, or by hysteretic material damping in the soil. The result is that SSI systems have longer natural periods of vibration than their fixed-base counterparts.

To examine the structure-foundation- soil system, soil is treated as a homogenous, isotropic and elastic half space medium. The inputs considered for the linear analysis of structure are density of soil, Young's modulus (Es) and Poisson's ratio (μ). The soil medium beneath the foundation was modeled employing soil spring. The width and the thickness of the soil medium were taken as 1.5 times and 2 times the least width of the foundation which shows a negligible influence on the settlement and the contact pressure. The study primarily attempts to see the effect of soil–structure interaction on buildings resting on different

types of non-cohesive soil, viz., soft, stiff, dense soil and rock. The details of different soil parameters are as tabulated in Table 3.3.

TABLE 3.3: DETAILS OF SOIL PARAMETERS CONSIDERED (FEMA 273:1997[11] AND FEMA 356:2000[12])

Soil profile type	Description	Shear wave velocity (Vs) (m/sec)	Poisson's ratio	Unit weight (ρ) (kN/m3)	Shear modulus (G) (kN/m^2)	Cohesion (kN/m^2)	Friction angle (deg)
Cohesive Soil	Clay	150	0.4	16	447950	25	30
Non cohesive soil	Sand	600	0.3	20	2073600	5	35

IV. Modeling

4.1 Introduction

In the current study, to depict the influence of soil structure interaction on the seismic response of a structure due to earthquake loading, a 11 storied (G+10) simple square building supported on individual foundation resting on stratified soil was selected. The building sections were modelled and analyzed for different configurations i.e., with fixed support and with SSI using finite element method ETAB 2016 subjected to Elcentro earthquake ground motion in the time domain. The deformations under seismic loading in the structure and by incorporating the effect of soil-structure interaction and fixed base condition were extracted, compared and discussed. Impact of variety of the parameters on different soil conditions like cohesive and non-cohesive are considered for which the buildings are modelled by alternate approaches, namely, (1) bare frame with fixed supports, (2) frames including with support accounting for soil-flexibility (SSI). Variations in the natural period are noted down for both support conditions and a comparative study has been done.

4.2 Defining the material properties, structural components and modeling the structure:

Beam, column and slab specifications are as follows:

Column - 400mm x 400mm

Beam - 400mm x 250mm

Slab thickness - 115mm

Brick wall thickness - 230mm

The plan of building is shown in fig. 4.1

Span of each beam is 4.5 m in X-direction and Y-direction both.

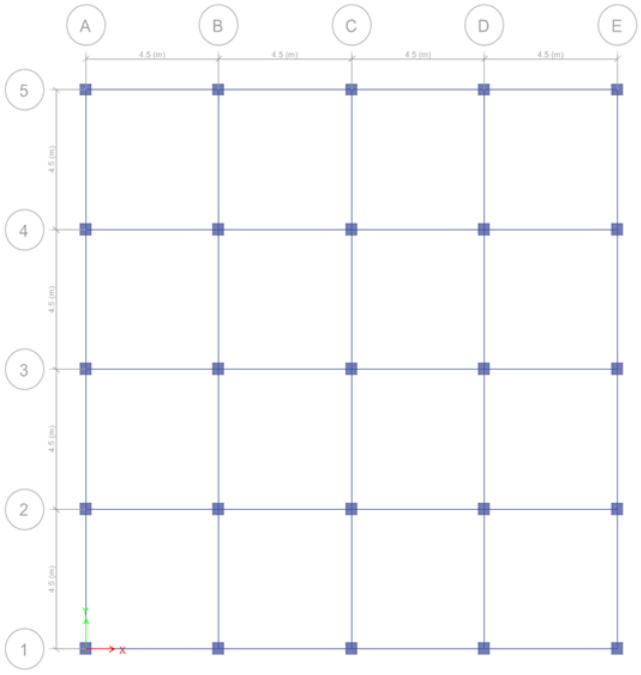


Fig. 4.1 Typical Plan of G+10 RCC building

The required material properties like mass, weight density, modulus of elasticity, shear modulus and

design values of the material used can be modified as per requirements or default values can be accepted.

Beams and column members have been defined as 'frame elements' with the appropriate dimensions and reinforcement.

Soil structure interaction has been considered and the columns have been restrained in all six degrees of freedom at the base.

Slabs are defined as area elements having the properties of shell elements with the required thickness. Slabs have been modeled as rigid diaphragms.

4.3 Assigning loads.

After having modeled the structural components, all possible load cases are assigned. These are as follows:

4.3.1 Gravity loads

Gravity loads on the structure include the self-weight of beams, columns, slabs, walls and other permanent members. The self-weight of beams and columns (frame members) and slabs (area sections) is automatically considered by the program itself. The wall loads have been calculated and assigned as uniformly distributed loads on the beams.

Wall load = unit weight of brickwork x thickness of wall x height of wall.

Unit weight of brickwork = 20KN/m3

Thickness of wall = 0.23m

Thickness of parapet wall = 0.23m

Wall load on roof level = 20 x 0.23 x 0.75 = 2.50KN/m (parapet wall height = 0.75m)

Wall load on all other levels = 20 x 0.23 x 3 = 13.8KN/m (wall height = 3m)

Live loads have been assigned as uniform area loads on the slab elements as per IS 1893 (Part 1) 2016

Live load on roof = 1.5 KN/m^2

Live load on all other floors = 2.5 KN/m^2

Floor Finish = 1.0 KN/m^2

As per Table 10, **Percentage of Imposed load to be considered in Seismic weight calculation**, IS 1893 (Part 1) 2016, since the live load class is up to 3 KN/m2 , 25% of the imposed load has been considered.

4.3.2 Defining load combinations:

According to IS 1893 (Part 1) 2016 for the limit state design of reinforced and prestressed concrete structures, the following load combinations have been defined.

The basic load combinations given by the code as per clause 6.3.4.1 are as follows

1. 1.2(DL+LL±(EQX±0.3EQY±0.3EQZ))
2. 1.2(DL+LL±(EQY±0.3EQX±0.3EQZ))
3. 1.5(DL±(EQX±0.3EQY±0.3EQZ))
4. 1.5(DL±(EQY±0.3EQX±0.3EQZ)
5. 0.9DL±1.5(EQX±0.3EQY±0.3EQZ)
6. 0.9DL±1.5(EQY±0.3EQX±0.3EQZ)

4.3.3 Analysis of the structure

Namely three types of analysis procedures have been carried out for determining the various structural parameters of the model. Here we are mainly concerned with the behavior of the structure under the effect of ground motion and dynamic excitations such as earthquakes and the displacement of the structure in the elastic range. The analyses carried out by Time History method.

Here we are primarily concerned with observing the deformations, forces and moments induced in the structure due to dead, live loads and earthquake loads. The load case 'Dead' takes care of the self-weight of the frame members and the area sections. The wall

loads have been defined under a separate load case 'Wall' and the live loads under the case 'Live'. Analysis is carried out for all three cases for obtaining the above mentioned parameters.

Modal analysis is carried out for obtaining the natural frequencies, modal mass participation ratios and other modal parameters of the structure. Time history analysis of the eight models are done in the zone III where

Z = 0.16 considering zone factor III
I = 1.0 considering residential building.
R = 5.0 considering special RC moment resistant frame (SMRF)
S a /g = By software `
Time history analysis is carried out using the spectra for cohesive and non-cohesive soil as per **IS 1893 (Part 1)** 2016.

4.3.4 Time history analysis in ETAB 2016

- The step by step procedure is as follows Defining a time history function by adding a function from file. In our case, the Elcentro earthquake record of 1940 has been linked to the program.
- Defining a separate analysis case under the load type 'quake' with the appropriate analysis case type i.e. linear direct integration time history.
- Applying earthquake acceleration values from the defined time history function.
- Specifying the damping coefficients by calculating the mass and stiffness proportional coefficients as per the equations mentioned above or inputting the frequency or time periods of two consecutive modes of the structure in the same direction whereby the program itself calculates the required damping coefficients.
- Specifying a direct integration method in the program.
- In our case, we have adopted Newmark's direct integration method.
- Running the analysis.

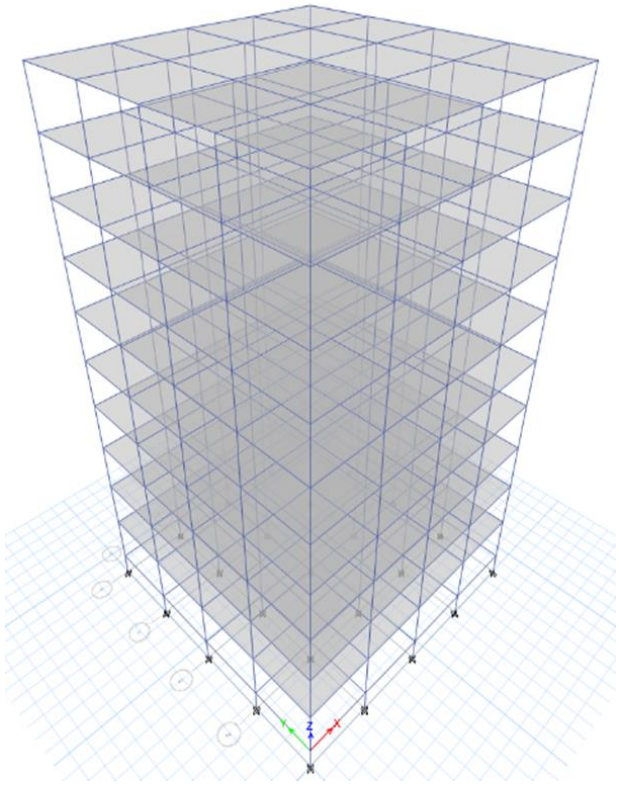


Fig 4.2 3D View of G+10 building

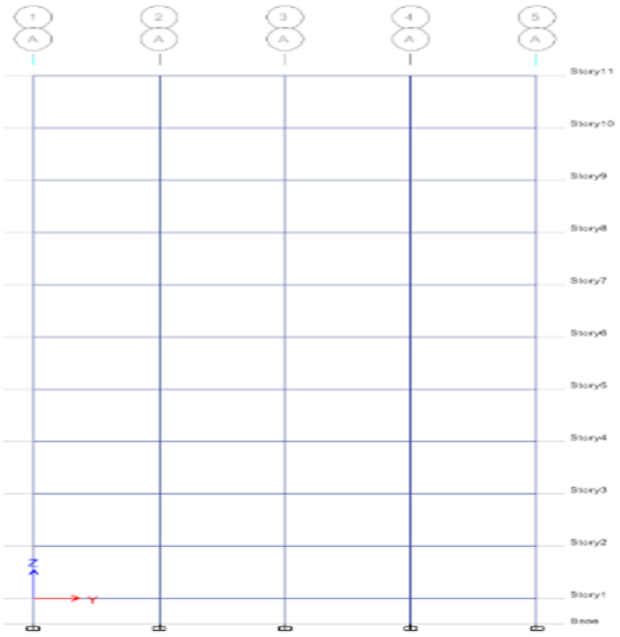


Fig. 4.3 G+10 building with Fixed Base

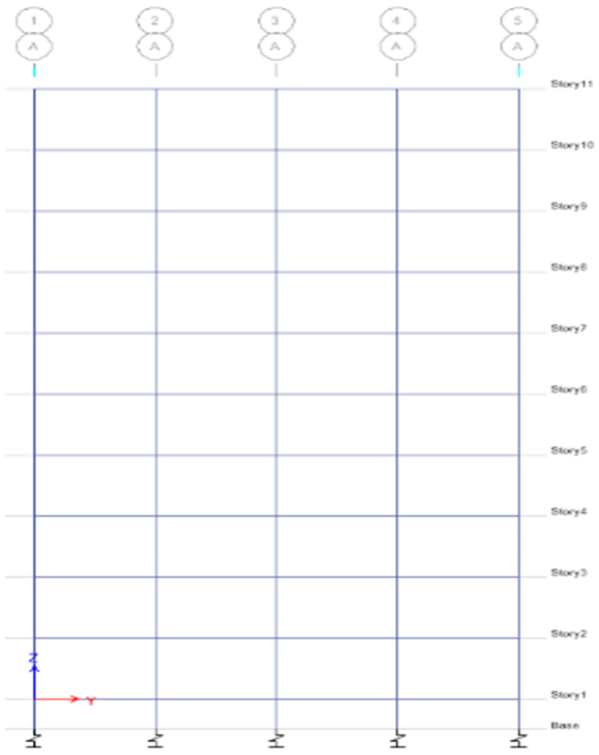


Fig. 4.4 G+10 building with SSI

TABLE 4.1: BASE SHEAR IN KN

Soil media	Fixed Base	SSI
Cohesive soil	1700.9651	1717.78
Non-Cohesive soil	1398.8714	1402.91

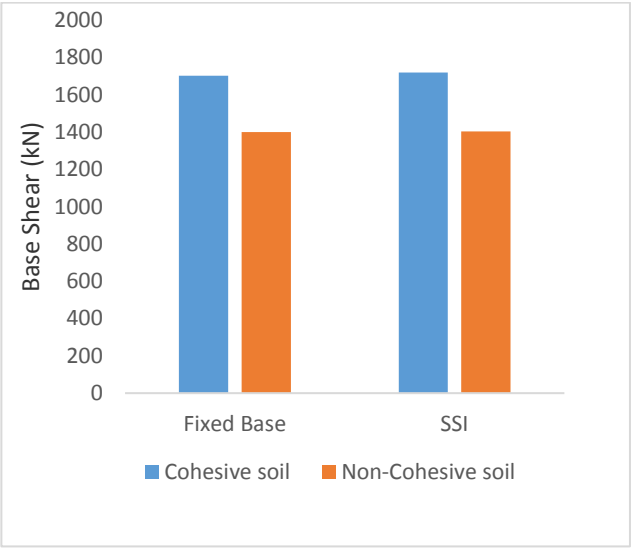
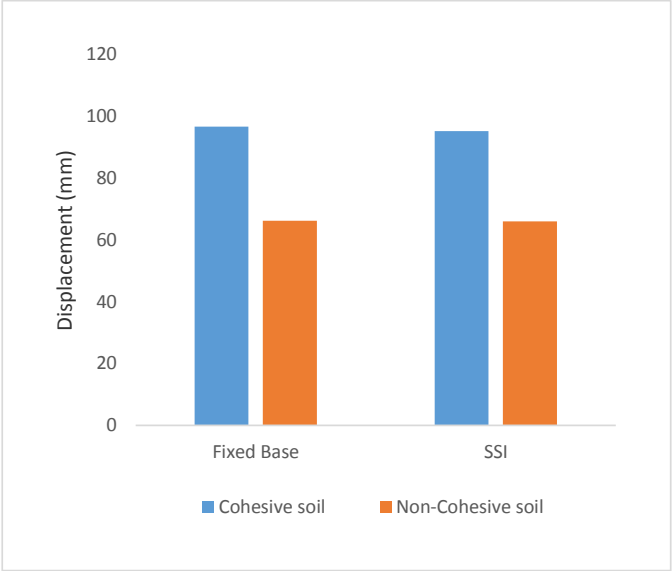


TABLE 4.2: MAXIMUM LATERAL DISPLACEMENT IN MM

Soil media	Fixed Base	SSI
Cohesive soil	96.734	95.221
Non-Cohesive soil	66.253	66.061



V. CONCLUSION

1. Base shear obtained for the fixed base condition in cohesive soil is 18% higher than non-cohesive soil.
2. Soil structure interaction in cohesive soil is 18% higher than non-cohesive soil.
3. The Maximum lateral displacement obtained for the Fixed Base and SSI in Cohesive soil is 31% higher than Non-cohesive soil.
4. This variation increases with increase in flexibility of soil.
5. Cohesive soil shows higher displacement or result than non-cohesive soil.
6. Study done clearly shows that base support condition has an impact on the behavior of structure which can be clearly observed from

linear static analysis. Soil structure interaction should be considered in analysis.

7. Finally it concludes that the always consideration of fixed base while designing the building is not correct.
8. Finally, it can be concluded that although conventional design procedure omitting SSI is conservative it is required to ensure the structural safety of buildings resting over soft soil due to lateral deflection.

VI. ACKNOWLEDGMENT

I would like to show my admiration and gratitude to all the concerns who helped and facilitated me whenever I required, during this paper completion, particularly Mrs Tushar G. Shende, my guide for his unconditional support.

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Concentration, Memory and Gender – A Case Study on High School Students

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ABSTRACT

Concentration and memory are considered as sisters. Without classroom concentration, students cannot memorize the subject matter. Even a student has a good concentration, without memory it may not be useful. The present study was observed the level of concentration and memory in 8th to 10th studying high school students. A total of 2132, students from 9 High schools were selected for the study. Out of them, 1352 are male and 780 are female. Using simple questions, student's response was taken. The study revealed that high percent of male students expressed concentration and memory problem compared to female students.

Keywords : Concentration, Memory, Gender, High School Students.

I. INTRODUCTION

The academic success of student dependents mainly on the Level of concentration in the classroom and memory.

Mehralizadeh et al., (2013) studied about the factors affecting student's concentration in the classroom. Lamba et al., (2014) observed the impact of teaching time on attention and concentration and found that 46% students had average concentration and 10% had poor concentration. The study made by Attia et al., (2017) revealed the effect of technology on the student's concentration. Learning assessment and neurocare center had suggested some management techniques to eliminate concentration difficulties (https://www.lanc. org.uk). Gaines (2001) reported the various factors that affect retention in the classroom. In a study, how technology was warping our memory is explained (https://www.huffing tonpost.in).

In the present study concentration and memory of High school students was observed with reference to the gender.

II. METHODOLOGY

Nine High schools located in and around Guntur, Andhra Pradesh, India were selected for

the study. 8th to 0th class students were chosen as subjects. A total of 2132, students from 9 High schools were selected for the study. Out of them, 1352 are male and 780 are female (Tables 1 and 2). The response was taken for two questions i.e.

1. How much percent of time concentrate in the classroom (<50% are >50%)? and
2. Are you able to recall and produce the prepared subject matter at least 75% in the examination?

The response was analyzed using statistical analysis. School wise percent variation of concentration and memory was studied in relation to male and female students.

TABLE 1
SCHOOL WISE AND GENDER WISE STUDENTS STRENGTH

Schools	Male	Female	Total
SK	329	198	527
SKS	168	143	311
P	194	58	252
KSR	120	70	190
SCMP	141	104	245
CH	46	25	71
MD	42	9	51
NC	203	86	289
KP	109	87	196
Total	**1352**	**780**	**2132**

SK- Smt. Kasturiba; SKS- Smt. Kasu Sayamma; P- Pattabhipuram; KSR- Kaveti Sankar Rao; SCMP- Smt. Chebrolu Mahalakshmi Pullaiah; CH-Chinmaya; MD-Margadarsi; NC-Namburu Coed; KP- Koppuravuru

TABLE 2
SCHOOL WISE AND GENDER WISE STUDENT'S WITH CONCENTRATION AND MEMORY PROBLEM

	Concentration			Memory		
Schools	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
SK	191	66	257	195	133	328
SKS	55	29	84	78	82	160
P	144	34	178	138	39	177
KSR	37	16	53	69	62	131
SCMP	55	30	85	80	71	151
CH	28	16	44	26	10	36
MD	26	4	30	19	4	23
NC	86	24	110	103	42	145
KP	58	35	93	84	53	137
Total	**680**	**254**	**934**	**792**	**496**	**1288**

III. RESULTS AND DISCUSSION

The percent variation was presented in Table 3 and Figures 1 to 6.

TABLE 3
GENDER WISE STUDENTS WITH CONCENTRATION AND MEMORY PROBLEM (%)

	Concentration		Memory	
Schools	Male	Female	Male	Female
SK	58.05	33.33	59.27	67.17
SKS	32.74	20.28	46.43	57.34
P	74.23	58.62	71.13	67.24
KSR	30.83	22.86	57.50	88.57
SCMP	39.01	28.85	56.74	68.27
CH	60.87	64.00	56.52	40.00
MD	61.90	44.44	45.24	44.44
NC	42.36	27.91	50.74	48.84
KP	53.21	40.23	77.06	60.92

Concentration

Male

High percentage of P school students (74.23) expressed Concentration problem, i.e., they are

unable to concentrate in the classroom (figure 1), followed by MD (61.90) and CH (60.87). Comparatively the problem is low in KSR school students (30.83%).

Female

64.00% of CH school students marked concentration problem (figure 2), followed by P (58.62%) and MD (44.44%). The lowest percentage is observed with SKS (20.28%).

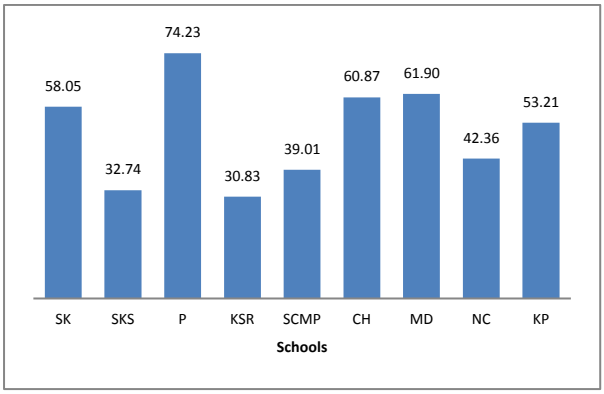


Figure 1 School wise male students with concentration problem (%)

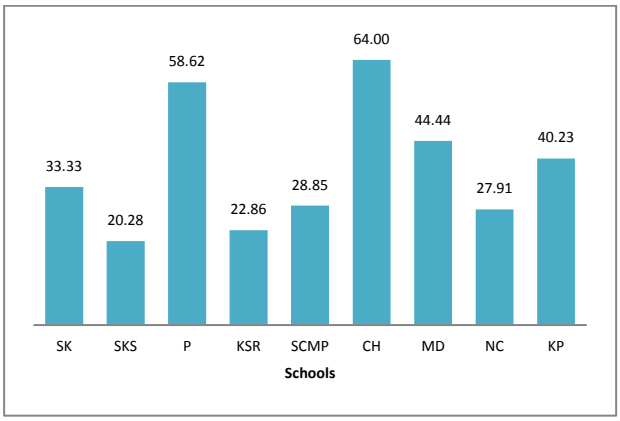


Figure 2 School wise female students with concentration problem (%)

Comparative Study

74.23% of P school male students expressed concentration problem, compared to 58.62% of the female (Table 3 and Figure 3). In case of female students, 64.00% of CH students expressed poor concentration compared to 60.87% of male students.

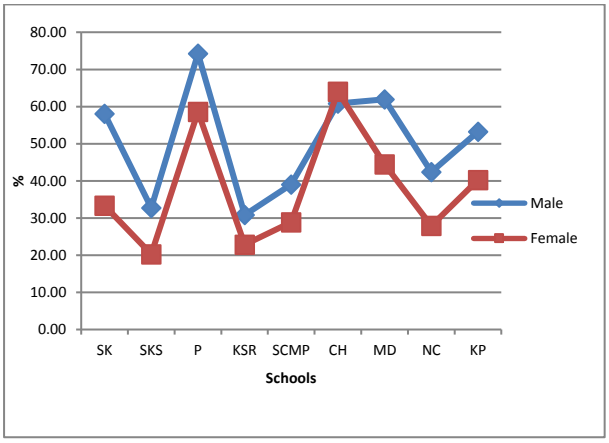


Figure 3 Comparison between male and female students

Memory

Male

The highest percentage of KP school students (77.06) marked memory problem, i.e., that they are unable to recall the subject (figure 4), followed by P (71.13) and SK (59.27). The lowest problem is observed with MD school students (45.24%).

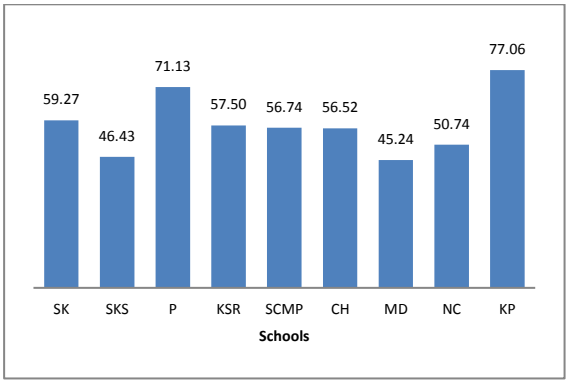


Figure 4 School wise male students with memory problem (%)

Female

88.57% of KSR school students marked the problem (Figure 5), followed by SCMP (68.27%) and P

(67.24%). The problem is low in CH school students (40.00%).

Comparative Study

77.06% of KP school students of male expressed memory problem, compared to 60.92% of female (Table 3 and Figure 6). In case of female students, 88.57% of KSR students expressed poor concentration compared to 57.50% of male students.

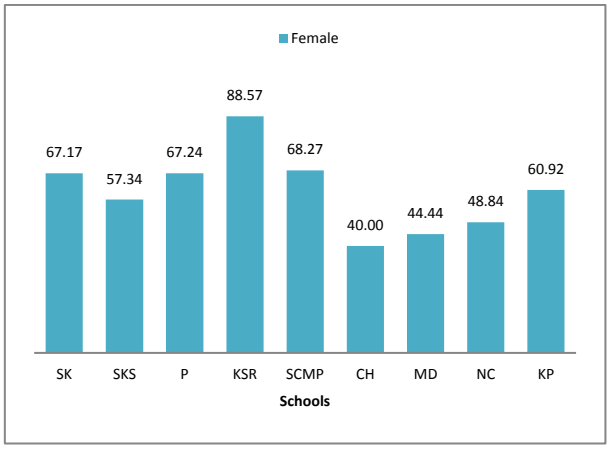


Figure 5 School wise female students with memory problem (%)

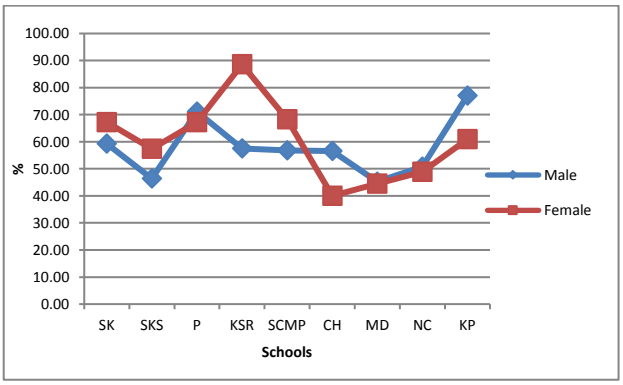


Figure 6 Comparison between male and female students

On average, girls are more motivated than boys to perform well in school, at least during elementary school. By the time girls reach high school, however, some may try to downplay their own academic ability in order make themselves more likeable by both sexes (Davies, 2005). Girls earn slightly higher average grades, than boys (Freeman, 2004). Males are better at spatial tasks involving mental rotation, whereas females have superior skills (https://www.memory-key.com).

Psychologists determine significant sex differences in episodic memory, a type of long-term memory based on personal experiences, favoring women (https://www.science daily.com).

Past research suggests that males and females differ in memory associated with gender stereotyped objects. Specific findings, however, have been inconclusive with regards to the specifics of these differences. Baer et al., (2006) found that females recalled more items overall and performed better at recalling gender neutral and female stereotyped items. Gabriel and Sridevi (2016) revealed that short term memory showed statistically significant increase in females compared to males. A profile of normal variations in patterns of memory test performance across gender revealing relative strengths for females on verbal tasks and males on spatial tasks (Lowea et al., 2003).

The study found that concentration and memory are two important aspects. Each and every student shall have knowledge about improving techniques. Out of the total 1352 males, 50.29% expressed concentration problem and 58.57% recall problem against 32.56 and 63.59% females respectively.

IV. CONCLUSION

Concentration and memory are two important aspects in a student's life. Each and every student shall have knowledge about improving their techniques. Out of the total 1352 males, 680 expressed concentration problem (50.29%) and 792 recall problem (58.57%) against 254 (32.56%) and 496

(63.59%) females respectively. The study found that the number of males have concentration problem than females and comparatively, more females have a recall problem than males.

V. ACKNOWLEDGMENT

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Delay Reduction in SDR Communication System

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ABSTRACT

Data communication plays an important role nowadays, used in many applications like financial transactions, social interactions, education, national security and commerce. As there is increase in the growth in the mediums, people used to communicate i.e. data communications, voice communications video communications, etc. So, there is requirement for modification in the conventional radio devices. The Software defined radio is a technology in which software modules running on a generic hardware platform consisting of DSP's and general purpose microprocessors are used to implement radio functions. This paper presents two methods which increase the efficiency of SDR: The Standard beacon based SDR and parallel processing based SDR. The proposed system will reduce the delay of SDR using beacon based technique.

Keywords : SDR, Radio Communication, Beacon, Transmitter, Receiver, Pipelining, Parallel Efficiency, Delay.

I. INTRODUCTION

Radio is now a necessary part of everyday life from broadcast radio to mobile communications and much more.

Issues with conventional radios

- These radio systems were designed to communicate using one or two waveforms.
- Different set of hardware for different type of radio communication. Example mobile phone having wifi, Bluetooth and GSM antenna.

SDR

- Radio in which some or all of the physical layer functions are software defined.
- A radio in which the RF operating parameters including, but not limited to, frequency range, modulation type , or output power can be set or altered by using software.
- A technique in which all the processing includes mixing, filtering, demodulation, etc.
- Used to implement different demodulation scheme and different standards can be implemented in the same device.
- Can be updated so the device becomes obsolete with time.

The objective of this paper is

- To design a SDR
- To reduce delay of SDR

Using beacon based technique and using Pipelined and parallel processing based SDR.

II. PROPOSED DESIGN

This section focuses on the design of SDR transceiver using ModelSim SE PLUS 6.3f. Design includes transmitter block, channel sources, channel sinks, channel and receiver block. Simulation is carried out

in the Simulink environment of MATLAB and at last, the implementation and simulation of SDR is done in ModelSim SE PLUS 6.3f.

ModelSim is a multi-language HDL simulation environment of hardware description languages such as VHDL, Verilog. Simulation is performed using graphical user interface (GUI). For building system models for any specific processing operation, performing simulations, as well as analyzing results, graphical user interface (GUI) is generally used.

Fig 1 below shows the SDR based transmitter and receiver.

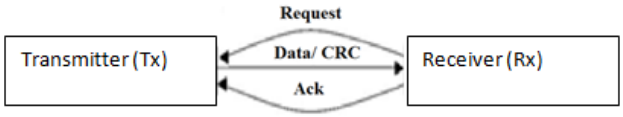


Figure 1 : Beacon based SDR

The request and acknowledgment policy is used by Beacon based SDR for transferring the data. As shown in the figure, there are two nodes namely transmitter and the receiver. The data acquired by transmitter is the data which the receiver requires. When the transmitter is free to accept the data, receiver will send a Beacon Packet to the transmitter. The Beacon Packet consists of the request from the receiver to transmit the data.

When the request reaches to the Transmitter, it will check the request first and the data required by the receiver. If all the constraints match, the transmitter will transmit the data. The error detection and removal technique is applied to the transmitted data with CRC so that at the receiver node if the data received is found to be faulty, CRC will reconstruct it. The Data and CRC are received at the receiver node and thus, from the newly received data, again CRC is calculated and it will be XORed with the received CRC and so it will be easy to detect the error bits. The error bits are then XORed with the received data and finally the original data can be reconstructed at the receiver node. When the original data is retrieved, the receiver will send an acknowledgment to the transmitter. The acknowledgment consists of the receiver's received (the desired data) and the transmitter will stop sending the data and will wait until the next Beacon request from the receiver.

The algorithm for the Beacon based SDR is as follows

Step 1: Checks if the transmitter is free to accept the data if yes then initialize the Beacon packet

Step 2: Send the Beacon packet to the transmitter,

Step 3: Calculate the CRC for the data.

Step 4: Send the transmitted data with CRC to the receiver.

Step 5: At the receiver node, calculate the CRC for the received data.

Step 6: XOR operation is done with the CRC received and CRC calculated.

Step 7: To get the Original Data, XOR the Error bits with the received data.

Step 8: Send acknowledgment to the transmitter.

Flowcharts for Beacon Based Transmitter and Receiver are as shown in figure 2 and figure 3

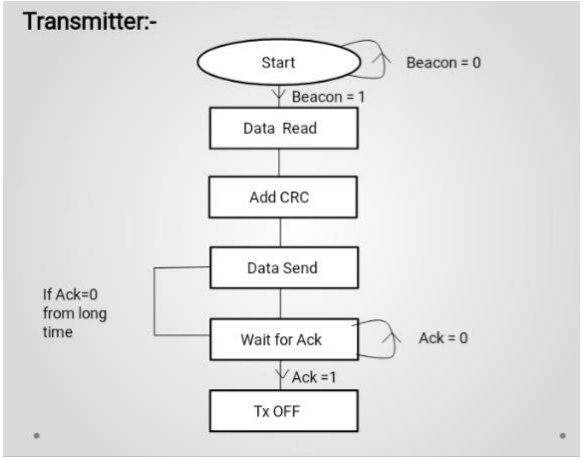


Figure 2 : Flowchart for transmitter used in Beacon based SDR

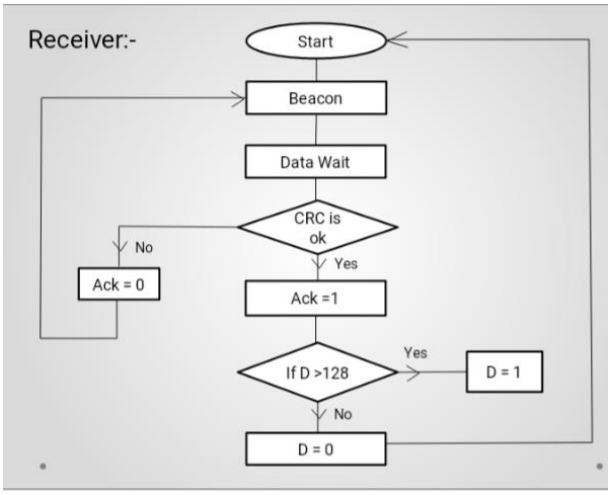


Figure 3 : Flowchart for transmitter used in Beacon based SDR

In Beacon based SDR , figure below shows the Main controller (Combination of Transmitter with Receiver) is designed to meet the objectives of this project i.e. to improve power efficiency and reduction in delay of SDR .

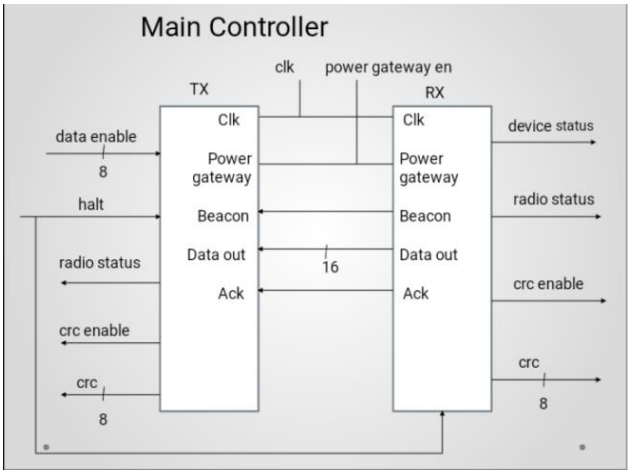


Figure 4 : Main Controller used in Beacon based SDR Pipelining and Parallel processing based SDR

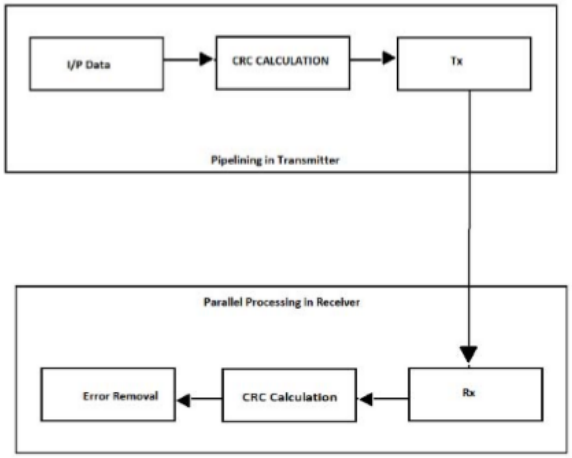


Figure 5 : Pipelined and Parallel process based SDR

In Pipelining and parallel processing based SDR, pipelining is applied in the transmitter side and parallel processing is in the receiver side.

Pipelining

This technique is generally used in advanced microprocessors where the microprocessor begins executing a second instruction before the first has been completed.

The pipelining stages are

- Instruction Fetch(IF)
- Instruction Decoder(ID)
- Execution
- Memory Access(MEM)
- Write back (ST)

Modules

The figure below shows the four pipelined instruction

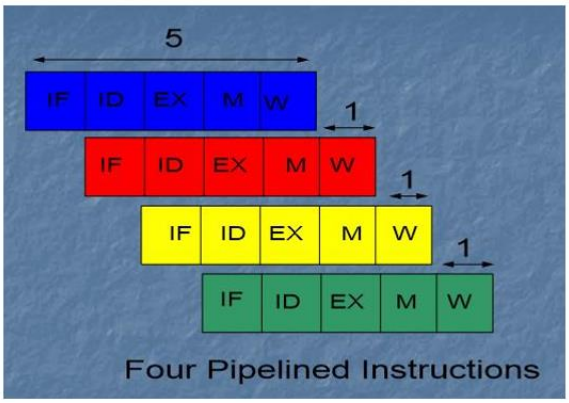
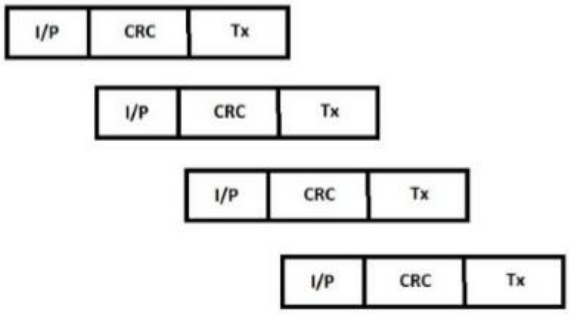


Figure 6 : Four Pipelined Instructions

Similar type of pipelining process used in the proposed system which is shown in the figure below



As shown in the above figure, at the transmitting side, the system has three operations the data input, calculating its CRC and transmitting the data. In first clock cycle, instruction pipeline reads the input data. In second clock cycle, an instruction pipeline reads the input data while CRC calculation is also being executed. Similarly, in the third clock cycle, transmitter receives the input, CRC calculation and also an instruction pipeline read the input data. Hence, with in the proposed method, with the help pipelining, multiple operations run without disturbing each other and also saves the time.

At the receiving side, parallel processing is used. In the old times, to run one operation requires one processor, which uses to create a long queue of processes to run, causing increase in the delay of the processes to run. To solve this problem, the Parallel Processing was introduced. In parallel processing, the processes are divided into multi-processes, where they can run individually without affecting the other operation.

There are three processes, also at the receiving side, which are executed parallel to each other. When the data reaches the receiver, the first step is to calculate the CRC and second step is the error removal. These two processes run, parallel to each other. So the time will be saved while processing these operations. Finally, the acknowledgement is sent to the transmitter.

In this process, a lot of time is saved without affecting the output but increasing the efficiency of the system.

III. PERFORMANCE PARAMETER

Arithmetic Logic Unit (ALU):

The ALU is a digital electronic circuit, responsible for performing all arithmetic and bitwise logical operations which takes place within the processor. These operations can have one operand or two, these values it takes either from the register file or from the immediate value from the instruction directly. All operations are done according to the control signal, coming from ALU control unit.

Cyclic Redundancy Check (CRC):

CRC is an error-detecting code which is commonly used in digital networks. CRCs are popular because they are simple to implement, easy to analyze and particularly good for detecting the common errors caused by the noise in the transmission channel.

Synthesis results of top module

For the purpose of implementation, the top module is the root of the design hierarchy. All the sub modules

are combined in the top-level module to form the final system and synthesized in ModelSim SE PLUS 6.3f. After synthesizing the design, the RTL schematic can be viewed as black box. It shows the inputs and outputs of the system as shown in figure 7 and figure 8 which shows the RTL Schematic of ALU and CRC respectively. On double-clicking the diagram of the RTL Schematics, Technology schematic can be viewed as shown in figure 9. It shows the Technology Schematic of Main controller.

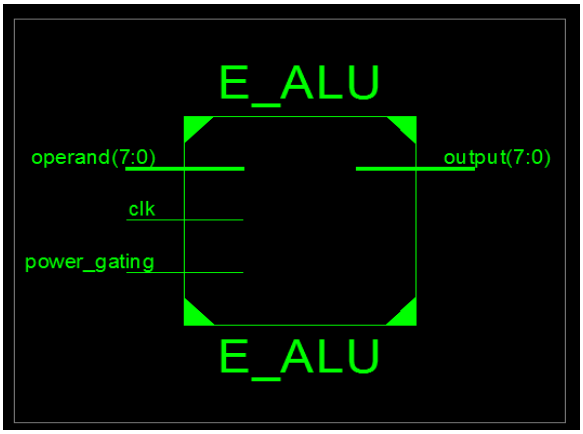


Figure 7 : RTL Schematic of ALU

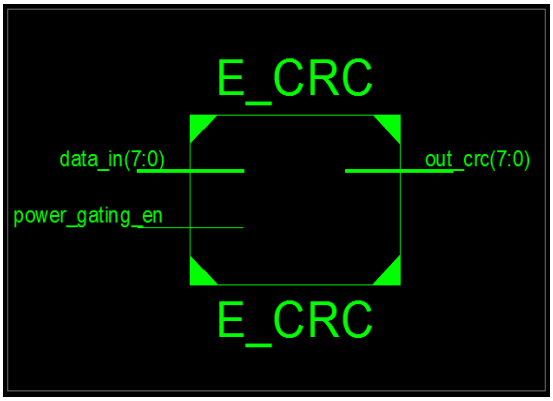


Figure 8 : RTL Schematic of CRC

IV. SIMULATION AND RESULTS

The simulation waveforms of Standard Beacon based SDR Simulation and Pipelined and Parallel processing based SDR Simulation are shown below. In the proposed work, both inputs and outputs will be binary streams of data as shown in figure.

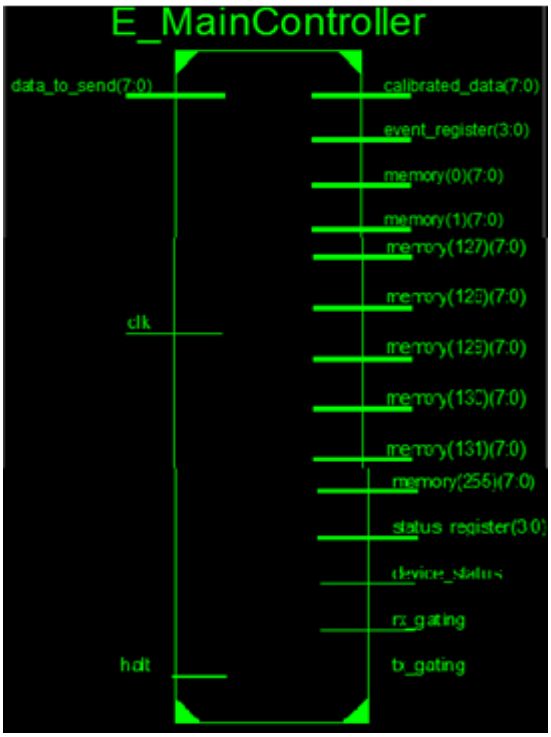
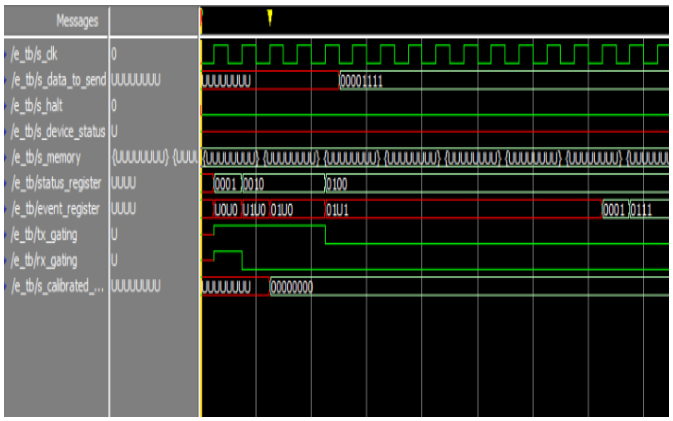
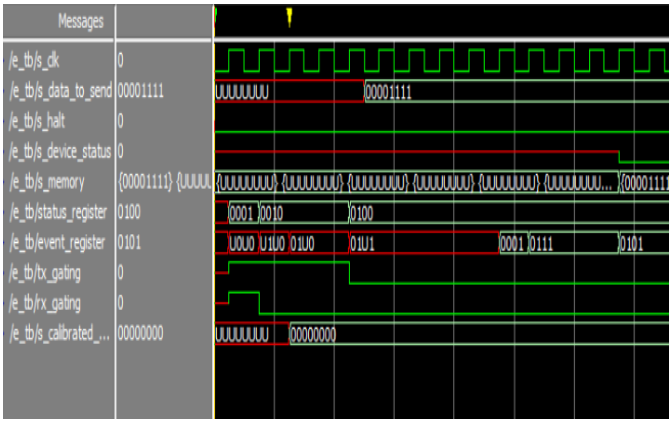


Figure 9 : Technology Schematic of Main controller

Standard Beacon based SDR Simulation



Pipelined and Parallel processing based SDR Simulation



V. OBSERVATIONS

Table 1 : Analysis

	Standard Beacon SDR	Pipelined and Parallel Processing SDR
Tx(Time)	500ns	500ns
Rx(Time)	1850ns	1350ns
Delay	1350ns	850ns

When the Standard Beacon based SDR is used, for transmitting the data, the time required is 500 nanoseconds and that for receiving the data is 1850 nanoseconds. So, the time required to process the data (delay) is 1350 nanoseconds. However when the pipelined and parallel processing SDR, for transmitting the data, the time required is 500 nanoseconds and that for receiving the data is 1350 nanoseconds. So, the time required to process the data (delay) is 850 nanoseconds.

So, when the pipeline and parallel processing SDR is used, it also transfers the same amount of data per unit time, the delay required is only 0.6 times the standard Beacon based SDR. The pipeline and parallel processing helps in saving the delay.

$$\textbf{Delay improvement} = \frac{1350 - 850}{1350} \times 100$$

Delay improvement = 37.07%

VI. CONCLUSION

The SDR is designed using beacon based technique and using Pipelined and parallel processing based SDR**.** As per the analysis taken, it can be concluded that the normal SDR which was studied in this paper takes N time to transfer the data. Whereas, it takes over a lesser amount of time in Pipelining and Parallel Processing SDR, making it the best technique.

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An Overview of Diverse Techniques on Mobile Charging in the Wireless Rechargeable Networks

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ABSTRACT

Wireless rechargeable sensor networks (WRSNs) have actually become a Traditional Service in order to solve the concern such as network dimension as well as procedure time brought on by typical battery-powered sensor networks. In this paper, the research of wireless energy transfer methods which opened as a brand-new measurement to solve the network lifetime issue exists. Based upon this significant layout restraints on the energy in the sensor network has actually been developed with ideal service. The ideal service is attained in regards to optimizing the billing energy of sensor with rate control in the energy transfer. Despite determining the efficiency proportion of the remedy, its time intricacy, billing proportion was analyzed in each strategy of wireless energy transfer to design a unique service versus the spatial as well as temporal constraints. Additionally, sensor replenishment organizing needs to be automated based upon energy and also navigating of the mobile battery chargers. Ultimately considerable research was likewise continued the speculative results of the conventional formulas in order to evaluate their efficiency versus the network utility rate.

Keywords : Wireless Rechargeable Sensor Network, Mobile Charging, Network Utility Maximization.

I. INTRODUCTION

Wireless Sensor Connect with minimal energy is significant style restrictions versus the far away information interaction[1]. Wireless energy transfer modern technology is manipulated in the wireless rechargeable sensor network (WRSNs), making it possible for the transmission of electric energy from a battery charger to sensor nodes, leads a brand-new means of renewing the energy or expanding the lifetime of sensor nodes[2]. In many mobile billing situations, the activity of the battery charger is time and also room constricted. In addition, the mobile battery charger can be incorporated with the mobile base terminal to aid relieve network blockage as well as prevent energy locations throughout information collection. When it comes to unidirectional wireless charging, the quantity of energy butted in nodes is defined in regards to the range in between sensor nodes and also the battery charger as well as the period of billing each node. Particularly, the billing power at nodes reduces as the range to the battery charger boosts. It is hence preferable to bill nodes as long as feasible as well as at minimal ranges from the battery charger. Nonetheless, as a result of area variety, the billed energy at various nodes cannot be optimized all at once.

The rate of the battery charger plays an essential function in energy stipulation in WRSNs Because of the non-uniform circulation of sensor nodes; it is non-trivial to constantly establish if the battery charger needs to relocate much faster or slower along the course, in order to take full advantage of the billed energy at nodes. In this paper, a substantial research study is brought in the varied strategy

related to the node butting in the wireless rechargeable Sensor Network. Based upon this significant layout restraints on the energy in the sensor network has actually been created with ideal service.

The optimum remedy is accomplished in regards to optimizing the billing energy of the sensor via rate control in the energy transfer. Rather than gauging the efficiency proportion of the service as well as its time intricacy, the billing proportion was analyzed in each strategy of wireless energy transfer to design a unique option versus the spatial as well as temporal restrictions. Additionally, sensor replenishment organizing needs to be automated based upon energy and also navigating of the mobile chargers.

II. REVIEW OF LITERATURES

The evaluation of the literary works is evaluated in regards to Wireless Energy Transfer as well as billing restrictions in the Wireless Rechargeable sensor networks. Additionally, its significance in the enhancing the Network energy is likewise parallelly examined thoroughly.

A. Collaborative mobile charging for sensor networks

The joint mobile charging is an energy billing method to Wireless Sensor Network in these mobile chargers is enabled to bill each node in the comparable network geography. The Organizing several mobile chargers are taken a look at carefully which collaboratively charge sensing units, to make the most of the proportion of the quantity of haul energy to overhanging energy, such that every sensor will certainly not lack energy. 2 various restrictions are assessed in which initial think about the consistent situation where all sensing units take in energy at the very same price, an organizing formula, Press Wait, which has actually been shown to be optimum in one-dimensional WSN of unlimited size. Second, in the non-uniform situation, which is assumed to be NP-hard, 2 monitorings from the area and also time facets to get rid of some difficult organizing options exists with a heuristic formula called as ClusterCharging(β), which collections sensing units right into teams and also splits an organizing cycle right into billing rounds. Its estimation proportion is likewise offered [5].

B. Data gathering in WRSNs and Joint mobile energy replenishment

In this Literary works, consistent as well as high reenergizing prices and also energy effective information event from sensing units has actually been supplied by using the movement for joint energy replenishment and also information event[6]. Specifically, a multi-functional mobile entity, called SenCar has actually been used, which offers not just like a mobile information enthusiast to collect information through short-range interaction yet additionally serves as an energy carrier that bills fixed sensing units on its movement by means of wireless energy transmissions. Using SenCar's regulated flexibility, the joint optimization of reliable energy billing as well as high-performance information collections is accomplished with arbitrary geographies. A two-step technique for the joint layout has actually been performed. In the very first step, the places of a part of sensing units are regularly chosen as support factors, where the SenCar will sequentially circulate to bill the sensing units at these areas as well as collect information from close-by sensing units in a multi-hop style. To accomplish a preferable equilibrium in between energy replenishment quantity as well as information event latency, an option formula to look for an optimal

variety of support factors where sensing units hold the least battery energy was given [6] In the 2nd action, information event efficiency when the SenCar moves amongst these support factors have actually thought about. A dispersed formula to change information prices at which sensing units send out buffered information to the SenCar link organizing and also circulation directing so regarding adjusting to the updated energy restoring condition of sensing units is likewise been examined.

C. Controlled sink mobility for prolonging wireless sensor networks lifetime

In this literary works, regulated wheelchair in wireless sensor networks (WSNs) for boosting their life time has actually been assessed i.e., the time period the network has the ability to supply its designated performances. Extra particularly, for WSNs that consist of a lot of statically positioned sensor nodes transferring information to a collection factor (the sink), can be made it possible for by managing the sink motions to acquire impressive life time enhancements.

In order to establish sink activities, a Mixed Integer Linear Programming (MILP) logical version whose option establishes those sink paths that make best use of network life time has actually been made it possible for. By specifying the heuristics for regulated sink motions are been developed as completely dispersed and also local [7] The Greedy Maximum Residual Energy (GMRE) heuristic relocates the sink from its present area to a brand-new area as if attracted towards the location where nodes have the highest possible recurring energy. The relocating sink constantly boosts network life time is been identified from every protocol.

D. Optimization of Data gathering by dynamic sensing and routing in rechargeable sensor networks

In this literary works, the energy collected by sensing units ought to be very carefully assigned for information noticing and also information transmission in order to maximize information collecting versus time-varying renewable resource arrival as well as minimal battery ability. Furthermore, the vibrant function of network geography has actually been considered, considering that it can impact the information transmission. In the very first component, a well-balanced energy allowance plan for every sensor to handle its energy usage, which is confirmed to fulfill 4 demands increased by sensible circumstances. After that in the 2nd component, a dispersed noticing price and also directing control (DSR2C) formula to collectively enhance information picking up as well as information transmission, while assuring network justness has actually been talked about. In DSR2C, each sensor can adaptively readjust its transmission energy usage throughout network procedure according for offered energy, and also choose the optimum picking up directing and also the price which can effectively boost information celebration.

III. OUR PROPOSED MODEL

The speed control of the mobile chargers taking a trip the 2D Trajectories is maximized making use of the Spatio Temporal Dynamic Routing (STDR) Strategy to Rechargeable Wireless Sensor Network. The Wireless Nodes energies the vibrant node surveillance versions need to collect the information regarding the energy of each node to information tasting price, Node failing and also link failing and so on. Every node shows various efficiency versus the motion of mobile battery charger depends upon the numerous requirements; for this reason, we make use of joint heuristic service to manage to bill activity of the mobile fees based upon the need. The

recommended formula, as a result, attains greater network energy than existing methods. Additionally, the influence of link/battery ability and also preliminary battery degree on the network energy is additionally explored.

IV. CONCLUSION

In this paper, a considerable testimonial is performed on the mobile billing control device of Wireless rechargeable sensor networks (WRSNs). The thorough evaluation of those system returns efficient info versus making the most of the network lifetime. Based upon this, ideal remedy in the direction of regulating the node billing can be designed making use of heuristic problem integrating both spatial and also temporal restraints. The problems make the best use of the billing energy of sensor with rate control in the energy transfer. Automating of the sensor replenishment organizing offers network utility rate. Joint optimization of relocating course as well as rate is likewise worth checking out in order to boost the network lifetime as well as energy harvesting.

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Blockchain in Aerospace and Aviation Industry – Fundamentals and use cases

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ABSTRACT

For many years, businesses and in some cases many industries have been built on simple principle of trust between multiple parties. However, this business of trust is about to be disrupted and transformed with the advent of blockchain technology. Blockchain can be defined as distributed ledger technology that can record transactions between parties in a permanent and secure way. Blockchain has been identified as one of the technology that may have a major impact on the future of aerospace and aviation industry among other drivers of change such as supply chain management. The future will likely to be a place where every part has a trusted digital identity and historical records that are immediately accessible to those with the right authorization. This paper to some extent explains the blockchain capability that facilitate the use of blockchain technology in Aerospace and Aviation Industry with various use case. Through its methodology, a detailed analysis of the blockchain fit in the industry is made in this paper. Blockchain technology offers a simple and easy way in which the information is immutable and temper proof.

Keywords: Blockchain; Distributed Technology; Aerospace And Aviation; Consensus; Supply Chain Management

I. INTRODUCTION

Blockchains are considered as public as well private ledgers containing transactional data within their decentralized data structures, which form the series of tightly connected blocks. Distributed consensus algorithms are implemented for achieving ledger consistency, data integrity, auditability and authentication. The distributed and decentralized nature of blockchains makes the transactions temper proof once they are officially validated by the peers of the network and registered in the block of the chain. Blockchain can allow transactions and payments to be implemented without any intermediary, thus effectively disrupting the way traditional businesses working to date.

What kind of impact could this have on everyday life? Imagine in healthcare, sensitive data from all the stakeholders – from patients to medical companies could be shared using the highest levels of encryption and data protection to greatly improve service efficiency and quality. Or in shipping from the administrative and operational risk of the shipowners to the charter and broker, by bringing more transparency and efficiency. And in Aerospace and Aviation, the data sharing across supply chain, accounting and reconciliation, tracking and locations of assets, certifications, digital identity enable higher level of transparency across various parties involved in the business. These are just some of the many opportunities that blockchain presents. By facilitating the move from a centralized to a decentralized and distributed system (see figure 1), blockchain

effectively liberates data that was previously kept in safeguarded silos.

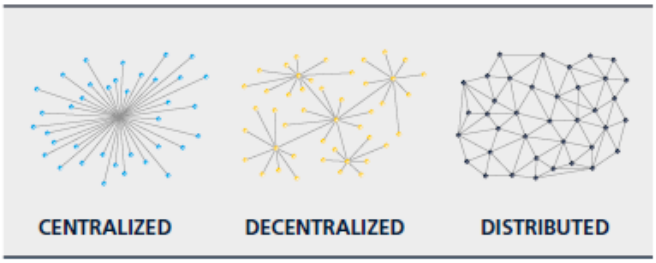


Figure 1 : Going from Centralized to Decentralized to distributed database

Blockchain technology started gaining significant traction when Bitcoin was launched and became popular (See figure 2). Blockchain is the underlying technology of Bitcoin and other digital currencies such as Ethereum. While these cryptocurrencies have unlocked innovation in the digital currency space, there are many use cases leveraging the Blockchain technology for non-currency related areas. Despite its brief history blockchain is gaining popularity in corporate world as well as in the media. Still there are open questions about the roadmap where blockchain is headed, when it will give results and who will benefit most out of it. At this point it is clear that the blockchain applications may have one of the most profound impact on the Aerospace and Aviation Industry, especially the supply chain. This is because supply chain are highly complex with diverse stakeholders, different interest and many intermediaries – challenges that blockchain is well suited to address.

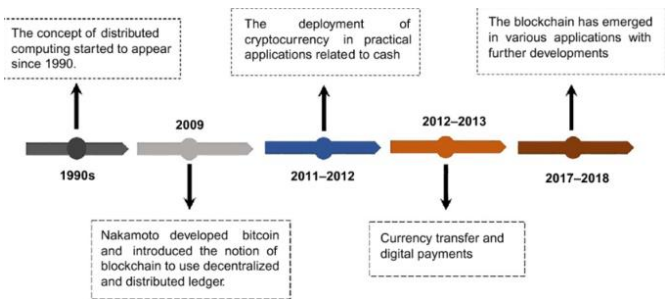


Figure 2 : History of Blockchain

With significant benefits, the overall market for blockchain is expected to boom with some researchers projecting growth of blockcchain technology from USD $411.5 million in 2017 to $7.68 billion by 2022 (Figure 3). Reasons for this rapid growth are the rise in financial sector as well as continuing development of this technology and growth from major vendors. Companies need to understand how blockchain technology can solve many of the underlying challenges through innovations and the likely value and rewards it can deliver especially in Aerospace and Aviation sector too.

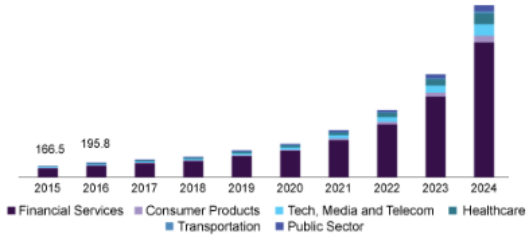


Figure 3 : Blockchain growth in various sector

II. BLOCKCHAIN TECHNOLOGY – KEY FEATURES

The Blockchain technology is fascinating, innovative and impactful and conceptually it is a type of distributed structure where transactions are transparent among parties and these transactions will be added into the database only on their consensus or agreement. Hence at the end, it's a trusted decentralized database where it is not administered by a single member but the group of members in the network. Whilst traditionally data resides on a central infrastructure, with back-ups and redundancy measures, the Blockchain technology embraces a distributed architecture. In simple terms the Blockchain technology is a decentralized database, additionally leveraging crowd computing and infrastructure. The transformative power of

blockchain makes its different because of its features. The key features are:

1. **Data transparency**: The data into the blockchain is entered with a proper validation and the records are accurate, secured and temper proof. Instead of multiple parties maintaining copies of their own dataset, every stakeholder receive controlled access to a shared dataset creating a single source of truth. Hence the data in use is most recent and reliable.
2. **Security**: All transaction records in the blockchain are encrypted and permanently stored making it really hard to modify. All records are linked through hash function and whole chain need to be altered for changing a single transaction.
3. **Consensus**: Consensus in blockchain provides trust in the network. The transactions in the blockchain is committed only when the nodes are agreed to that transactions. Hence at the end whatever the transactions are committed in the blockchain are true to all the nodes.
4. **Smart Contracts**: Legal contracts that are normally executed manually are automated or digitized in blockchain. It enforces the stakeholder to follow rules and process steps as per agreement. These are self-executing computer programs where the actions occur automatically once the contract conditions are met.

Blockchain as a digital platform keeps whole history of all the transactions between the stakeholders across the network in a temper and revision proof. All transactions that were created between the stakeholders are checked by cryptographic algorithms and then grouped into blocks that are then added to the blockchain. To illustrate how these features discussed above works in blockchain, here is an example (Figure 4):

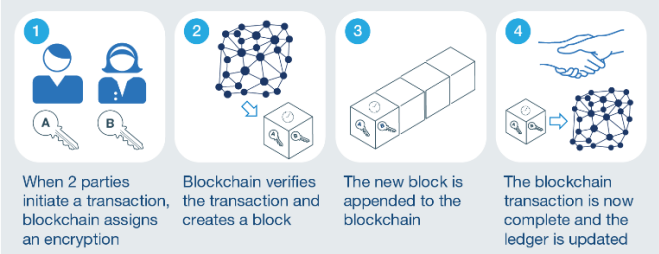


Figure 4 : Method of operations in Blockchain

Blockchain technology does not introduce an entirely new pattern. Instead, it builds on the old template of a ledger, which logs the transactions over a period of time (See figure 5). Traditional ledger are owned by one entity such business, organization, banks or groups and controlled by designated administrator. The administrator can implement changes to the ledger without requiring consensus from the ledger's stakeholder (See figure 5).

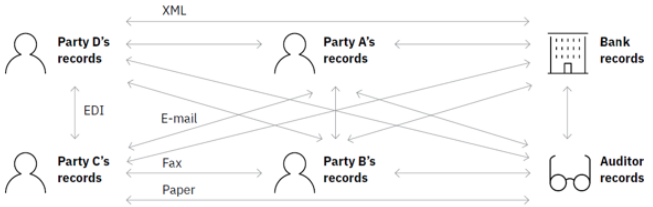


Figure 5 : Traditional way of sharing information

In contrast blockchain is a shared, distributed ledger among a network of stakeholders that cannot be updated by any one administrator. Instead, it can only be updated with agreement of network participants and all changes to the distributed ledger are auditable. (See figure 6)

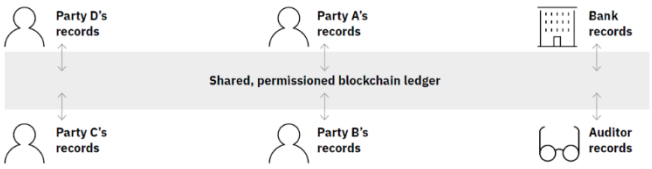


Figure 6 : Sharing information in Blockchain

Blockchain can be of three types:

1. Public Blockchain
2. Private Blockchain
3. Federated/ Consortium Blockchain

Bitcoin is considered to be the first public blockchain. Most of the business organization either for private blockchain or federated blockchain depending on the use case. In private or federated blockchain the stakeholders or entities are known and the transaction is committed only after the permission of certain set of stakeholder consensus (See figure:7)

Table 1: Types of Blockchain

Characteristics	Public Blockchain	Private Blockchain	Federated/ Consortium Blockchain
Access	Anyone	Single Organization	Multiple Selected Organization
Participants	Permission less	Permissioned Known entities	Permissioned Known entities
Security	Consensus mechanism Proof of work	Pre-approved participants	Pre-approved participants
Transaction speed	Slow	Lighter and Faster	Lighter and Faster

III. AEROSPACE AND AVIATION - AREAS OF APPLICATION

As blockchain technology takes its shape, businesses in almost every industry are researching how to capture new opportunities. This will give some of the examples as an area of applications focusing on aerospace and aviation sector:

1. **Supply chain management**: Supply chain is defined as the line of various points (See figure 7) involved in producing and delivering goods, from procurement stage to the end customer. In aerospace industry as well there are large supplier base from where different parts are procured from different regions of the world. Since because of the complexity of the supply chain network, it has become difficult to trace events in the entire supply chain. Lack of transparency into the network, buyer and customers cannot be sure of the true value of the products and services. Blockchain in this case can give below advantages:

a. Tracking and tracing in blockchain gives the opportunity to digitise the physical assets and products and can be tracked right from the place of origin to the end customers where it is used in manufacturing and delivering.

b. Decentralized structure gives the ability for the participation of the stakeholders in the entire blockchain network. The records are created digitally and with the consensus with the stakeholders.

c. The records are cryptographically immutable make it more secure and temper proof.

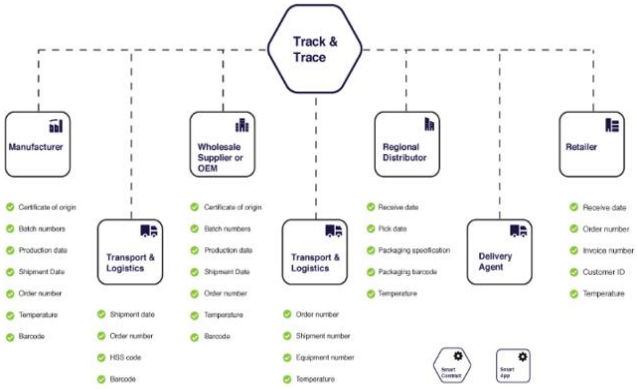


Figure 7 : Points in Supply Chain to track

2. **Aircraft Maintenance records**: In the current state many aircraft manufacturers and airlines stores the aircraft maintenance records in a

centralized database system. Some of the challenges the current industry faces with the current architecture are:

a. Airlines data in a centralized database could be easily manipulated or tempered.
b. Since every stakeholder maintain their own database and set of copies, it become time consuming to extract information in case of audit or accident.
c. It is difficult to share the information with other parties like manufactures or airlines companies. They are all working in silos.
d. Paper based records are stored currently which has a high chance of loss of information.

Blockchain will make the different stakeholder to come to a common platform which is secured and temper proof. Hence the reliability of information in blockchain will be more as every record is stored in an encrypted form. Some of the benefits it can have is:

a. It is more transparent to the passengers to know the health score of any aircraft.
b. Maintainance information in blockchain can help companies to lease or buy resale aircraft
c. Maintenance records stored in blockchain can be used in investigation and audit in case of any accidents.
d. It can help to calculate the annual cost of the repair and can help in taking decision on the ROI.

3. **Smart Contract**: The aerospace and aviation industry involves many stakeholders such as aircraft manufacturer, airlines, travel agents, airports ground handlers and other industry suppliers. All these stakeholders depend on each other for products and services to serve the customers. The blockchain technology is suitable to streamline procure to pay process through the use of smart contracts. For example to make a settlement upon the service delivery, the digital legal contract called as smart contract can be invoked in order to monitor, invoice, reconcile settlement in the process (See figure 8)



Figure 8 : Steps in Smart Contract

4. **Asset Management**: A digital twin is a dynamic, digital representation of a physical asset which enables companies to track its past, current and future performance through the asset lifecycle. The asset for example a spare part, sends performance data and events directly to its digital twin, even as it moves from hands of the manufacturer to the dealer and ultimately to the owner. Blockchain can be used to securely document everything related to the asset.
5. **Trace and Track**: Trace and track is another important capability which blockchain can facilitate by tracking status and location of valuable assets that change with a high frequency. For example bags of passengers, cargo, spare parts and even aircraft and in more particular if the parties do not trust each other in the process. Blockchain technology offers simple and easy way to record events in the way that is immutable and temper proof.
6. **Certifications**: safety and security are the top priority in aerospace and aviation industry. And it has to undergo a rigorous process of certifications weather its individuals, equipment's or spare parts. With blockchain the certifications process can be streamlined making it more safe and secure in terms of products and services.

IV. BUILDING BLOCKCHAIN CAPABLITY

It's evident that in certain use case blockchain works well. In general the approach should start with a

specific problem and remain solution oriented throughout the process. To decide on the design all possible solution should be analysed and then decide on the type of blockchain weather it's public or private and permissioned or permission less. There are few factors which is encouraged to practice in order to have a success in blockchain initiatives:

1. **Culture of collaboration**: When a company agrees to work with blockchain technology, it requires a close collaboration with various other companies. This is because a huge part involve facilitating collaboration between multiple parties including both public and private entities such as – Aircraft Manufacturer, Airlines, Cargo Service providers, government agencies and many others.

   All these entities have to come together in order to make it successful and get the full advantage of such technology as the trust is involved and the contracts are executed as per the agreement. When more parties agree to use a single blockchain solution, more value is created for such participating organization.

2. **Building knowledge and capability**: For any organization building knowledge and capability is the key to identify and realize the value of new operating model. The companies has to start with a small step and is essential to provide empowering partner organizations and individuals contributors with time, tools and resources. These contributors must be able to liaise effectively within the blockchain ecosystem and with relevant technology players, implementation partners and associations.

3. **Value realization and stakeholder's engagement**: Stakeholders are able to prove and understand the business value of new initiative as well as understand the technical feasibility for their architecture by engaging with blockchain based prototype. Realizing the full value of this technology depends on collaboration with the entire stakeholder ecosystem. It's also important for any company to have the right skillset and resources to execute the prototype for blockchain and understand the full business value. Most commonly below are the questions any organization has to have the answers before taking a decision to go for blockchain technology:

a. Is there a need for a shared common database?
b. Are multiple parties involved?
c. Do the parties involved mistrust each other?
d. Is there a need for an objective, unchangeable log of records?
e. Do the rules behind transactions rarely change?

If the above answers to the questions is "Yes", probably there might be a use case to go for the blockchain technology within the organization.

V. CONCLUSION

Since with every new technology framework, it passes through many phases and many challenges, similar is the case for Blockchain technology. It is necessary to invest further research to overcome those challenges which will pave the intermediate steps towards the adoption in Aerospace and Aviation industry. An intermediate step of having consortium-based, permissioned ledgers, which can be applied on specific cross-organizational domains, can be regarded a s starting point for tackling the research challenges and facilitate the necessary changes based on controlled private ledger environments, where such blockchain features can be managed effectively. Nevertheless, such approaches cannot be regarded as totally decentralized as they still have to rely on central trusted parties who will be responsible to validate the identity of the participating actors and assign the necessary credentials of the blockchain.

Moving from today's era of proving concepts and piloting applications to actually deploying productive solutions at scale will require further technology development, organizational transformation and, crucially, collaboration between all stakeholders. Success depends on all parties working together to transform legacy processes and to jointly adopt new ways of creating logistics value. In the highly fragmented logistics industry, consortia that bring together stakeholders will play a key role in achieving blockchain's potential in the industry.

Finally it is recommended to validate Blockchain as a solution by conducting low risk and low cost testing outside of production environments through prototyping. Open source Blockchain solutions are recommended for early stage prototyping purposes and in some cases for more advanced prototypes and even production solutions.

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पर्यावरण संरक्षण – एक दार्शनिक अध्ययन



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पर्यावरण 'परि' तथा 'आवरण' इन दो शब्दों के योग से बना है। परि का अर्थ है चारों ओर तथा आवरण का तात्पर्य है ढकना या आच्छादन। पर्यावरण के अन्तर्गत हमारे चारों ओर विद्यमान प्राकृतिक व्यवस्थाएँ, सम्पूर्ण सौरमण्डल में होने वाली परिस्थितियाँ एवं शक्तियाँ आती है जो मानवीय क्रियाकलापों को प्रभावित करती हैं। अतः भूमि, जल, वायु, वनस्पति, वृक्ष, जीव–जन्तु इत्यादि जिनका हम अपने जीवन में नित्य अनुभव करते हैं, समवेत रूप से पर्यावरण का निर्माण करते हैं।

पारिस्थितिकी पर्यावरण अध्ययन का वह भाग है जिसमें हम जीवों, पौधों, जन्तुओं और उनके सम्बन्धों या अन्य जीवित या गैर जीवित पर्यावरण पर परस्पराधीनता के बारे में अध्ययन करते हैं।

प्रसिद्ध पर्यावरणविद् **डॉ0 डगलस एवं हालैण्ड**[1] के अनुसार पर्यावरण या वातावरण वह शब्द है जो समस्त बाह्य शक्तियों, प्रभावों, परिस्थितियों का सामूहिक रूप से वर्णन करता है जो जीवधारी के जीवन, स्वभाव, व्यवहार, अभिवृद्धि, विकास तथा प्रौढ़ता पर प्रभाव डालता है।

आदिकाल से ही प्रकृति तथा मनुष्य का अन्योन्याश्रित सम्बन्ध रहा है। प्रकृति तथा प्राकृतिक उपादान मानवीय जीवन के अनिवार्य अंग रहे हैं। कालान्तर में मनुष्यों द्वारा प्राकृतिक संसाधनों के असीमित एवं अविवेकपूर्ण दोहन, औद्योगिकीकरण एवं भौतिक उष्मीय जैविक अथवा रोडियोधर्मी गुणों के द्वारा जब पृथ्वी, जल, वायु, वनस्पति इत्यादि पर्यावरणीय अवयवों में अवांछनीय परिवर्तन एवं विकृति उत्पन्न की गयी, जो मानव अस्तित्व के लिए संकटकारक हो गयी उसे हम पर्यावरण प्रदूषण कहते हैं।

जब यह अति औद्योगिकीकरण, रसायनों के अविवेकशील प्रयोग तथा परमाणु शक्तियों के अति प्रयोग से जल, वायु, वनस्पति, पशु, पक्षी इत्यादि पर संकट गहराने लगा तब मानव का ध्यान इस ओर गया क्योंकि प्रदूषण के कारण उसके स्वयं के अस्तित्व पर भी खतरा मंडराने लगा। पर्यावरण संरक्षण के सम्बन्ध में अनेक विचारधाराएँ सामने आयी तथा अनेक बैठकों के माध्यम से इसके संरक्षण हेतु विचार विमर्श तेज हो गए। पर्यावरणीय संकट या प्रदूषण वैश्विक समस्या बन गया है क्योंकि विकसित देशों ने अपनी विकासशील अवस्था में तथा विकासशील देश तो अद्यतन भी पर्यावरणीय घटकों को निरन्तर हानि पहुँचाने में लगे हुये है।

उन विविध विचारधाराओं को जिसमें पर्यावरण संरक्षण के स्वर मुखर हुए उनमें मुख्य रूप से दो विचारधाराएँ सामने आयीं–**पूर्वी** तथा **पश्चिमी** विचारधारा।

पूर्वी विचारधारा के अन्तर्गत हमारे वेद एवं वेदान्त दर्शन, जैन एवं बौद्ध दर्शन, ताओवाद, कन्फ्यूशियसवाद तथा शिन्तो धर्म प्रमुख रहे है जिसमें पर्यावरणीय चिंताएँ उपयोगिता नहीं वरन् नैतिकता के स्तर पर विकसित हुयी है। वेद एवं वेदान्त दर्शन प्रकृति को ईश्वर मानता है। वेदों में औषधियों तथा वनों के प्रति नमन करते हुए इनके हितकारी, अनुकूल तथा शान्तिदायक होने की प्रार्थना की गई है–

नमो वृक्षेभ्यः (यजु0 16.17)

नमो वन्याय च (यजु0 16.34)

औषधीनां पतये नमः। (यजु0 16.19)

औषधयः शान्तिः वनस्पतयः शान्ति (36.16)

ऋग्वेद के सम्पूर्ण **अरण्यानी सूक्त (10.146)** में अरण्य को देवत्व पद पर प्रतिष्ठित कर उसके प्रति अकारण हिंसा न करने का निर्देश प्राप्त होता है– **अरण्यानी न वै हन्ति।**[2] वैदिक ऋषि इस तथ्य से अवगत थे कि मनुष्य तथा पशु–पक्षियों के सह निवास से ही पारिस्थितिकी सन्तुलन बनाए रखा जा सकता है–

सं सं स्त्रवन्तु पशवः समश्वाः समु पुरूषाः।

सं धान्यस्य या स्फाति संस्त्राव्येव हविषा जुहोषि। (अथर्व. 2.26.3)

अर्थात् जैसे सियार, गिध्द, कौवे, शूकर इत्यादि जन्तु दुर्गन्धयुक्त शवों तथा पदार्थों को खाकर जल तथा वायु को प्रदूषित होने से बचाते हैं। सर्प चूहों की तथा नेवले सर्प की संख्या संतुलित रखते हैं। ऋग्वेद में वृक्षों के प्रदूषणरोधी होने के कारण उनके संरक्षण का[3] तथा वृक्षारोपण करने का निर्देश है क्योंकि ये जलीय स्रोतों के रक्षक हैं।[4]

यजुर्वेद में **''मापो औषधी हिंसीः''** (यजु. 6.22) कहकर वृक्षों को क्षति पहुँचाने का निषेध किया गया है। वेदों में ऋषि पृथ्वी को माता, अन्तरिक्ष को भ्राता, द्युलोक को पिता तथा स्वयं को उसका पुत्र घोषित करते हैं–

माता भूमिः पुत्रो अहं पृथिव्याः (अथर्ववेद 12.1.12)

भूमिर्माता भ्रातान्तरिक्षम्, द्यौर्नः पिता (अथर्ववेद 6.12.2)

इस प्रकार के सम्बन्ध स्थापित करने के कारण मनुष्य इसके प्रति आत्मीयभाव एवं श्रद्धाभाव रखते हुये इन्हें हानि पहुँचाने से बचेगा। इतना ही नही पृथ्वी सूक्त के एक मन्त्र में कथन भी है कि हे पृथ्वी। मैं तेरे वृक्षों को इस प्रकार काटूँ कि वे पुनः अंकुरित हो जाए। हे विमृग्वरि (विशेष रूप से शोधन करने वाली) मैं तेरे मर्मस्थल पर प्रहार न करूँ।[5] उपर्युक्त मन्त्र पर्यावरणीय समस्या के समाधान प्रस्तुत करते हैं। इस प्रकार के अनेकानेक विचार हमारे वैदिक दर्शन में मिलते हैं जिसका यदि थोड़ा भी अनुपालन किया जाये तो पर्यावरणीय संकट हो ही नहीं सकता।

इसी प्रकार जैन दर्शन का भी प्रकृति में चेतना मानने का विश्वास, जैन तथा बौद्ध दर्शन का अहिंसावाद, ताओवाद तथा कन्फ्यूशियसवाद तथा शिंतो धर्म का प्रकृति को ईश्वरतुल्य महत्व देना उपयोगितावाद नहीं है। इन

दर्शन में अन्तर्निहित भाव यह है कि प्रकृति को उपयोगिता की दृष्टि से न देखकर नैतिकता की दृष्टि से देखा जाये क्योंकि यदि ऐसा होगा तो हम पर्यावरण के प्रति अपने कर्तव्यों को समझते हुऐ इसके अंधाधुध दोहन से बचेंगे।

वहीं दूसरी ओर पश्चिमी विचारधारा अथवा पश्चिमी दर्शन और सामी धर्मों की सामान्य प्रवृत्ति इस सन्दर्भ में उपयोगितावादी है क्योंकि उनकी मानसिकता प्रकृति को मनुष्य से भिन्न हीन और उपभोग्य मानने की रही है। इस दर्शन के अनुसार ईश्वर ने प्रकृति मनुष्य के उपयोग के लिए निर्मित की है। पर्यावरण संकट उत्पन्न होने पर पर्यावरण संरक्षण हेतु चिन्ता के मूल में मात्र यह भाव निहित था कि मानव श्रेष्ठ है और उसका जीवन कैसे बचा रहे। यदि पर्यावरण पर संकट आएगा तो निश्चित रूप से मानव के अस्तित्व पर संकट आएगा। इसलिए पिछले 20–30 वर्षों में समाधान के जो प्रयास किए गए, चाहे वह पृथ्वी सम्मेलन हो या मांट्रियल प्रोटोकॉल हो, इन सभी सम्मेलनों में विभिन्न राष्ट्रों की यह कोशिश रही है कि किस प्रकार पर्यावरण के उपभोग अथवा दोहन का स्तर बनाए रखते हुए इस समस्या का समाधान हो। इस प्रकार के पर्यावरण संरक्षण के मुद्दे पर अपर्याप्त सोच (ींसववू म्दअपतवदउमदजंसपेउ) के विरोध मे ंनार्वे के प्रसिद्ध दार्शनिक आर्ने नेस ने अपने विचार गहन पारिस्थितिकी (क्समच म्बवसवहल) के रूप में दिया। उनके पारिस्थितिकी दर्शन के केन्द्र में अनेक मुद्दे हैं–

सर्वप्रथम, पारिस्थितिकी संकट का मूल कारण सामाजिक है, आर्थिक है या दार्शनिक?

दूसरा, पर्यावरण और मानव के सम्बन्धों का फैसला शक्ति के आधार पर होना चाहिए या नैतिकता के आधार पर?

तीसरा क्या मानव अधिकारों की तरह पशु अधिकारों को भी स्वीकार करना चाहिए या नहीं?

चतुर्थ, क्या विकास या संपोष्य विकास जैसी कोई भी धारणा स्वीकार्य है या नहीं, इत्यादि।

इन प्रश्नों के उत्तर में आर्ने नेस ने स्पष्ट किया कि पारिस्थितिकीय संकट का मूल कारण आर्थिक या सामाजिक न होकर दार्शनिक है। उन्होंने कहा कि न्यूटन की भौतिकी और डेकार्ट के मन शरीर भेद जैसी धारणाओं ने आधुनिक पश्चिमी मानसिकता को जन्म दिया जो मूलतः विभेदीकरण पर बल देती है न कि समन्वय पर। यह मानसिकता जड़ की तुलना में चेतन को श्रेष्ठ मानती है। यह द्वैतवादी मानसिकता अन्ततः प्रकृति के प्रति साधनवादी दृष्टिकोण पैदा करती है। अरस्तू, कार्ल मार्क्स, सार्त्र आदि दार्शनिक किसी न किसी रूप में जड़, वनस्पति और पशु जगत को मानव जगत से हीन मानते रहे हैं। आर्ने नेस के अनुसार जब तक यह मूल दृष्टिकोण अथवा द्वैतवादी मानसिकता (क्पबीवजवउपब टपमू) ही न बदल जाए तब तक पर्यावरण की समस्या सुलझ नहीं सकती है।

दूसरा मुद्दा यह है कि मानव तथा प्रकृति के बीच सम्बन्धों का आधार शक्ति हो अथवा नैतिकता ? मनुष्य दास व्यवस्था का अन्त, सामंतवाद का अंत अथवा किसी भी प्रकार के शोषण का अन्त शक्ति नहीं अपितु नैतिकता के आधार पर करने में सक्षम हुआ। तो क्या प्रकृति के प्रति यह नैतिकतावादी दृष्टिकोण नहीं अपनाया जा सकता है ? अतः मनुष्य को स्वयं को प्रकृति से श्रेष्ठ नहीं अपितु पारिस्थितिकी समुदाय का ही एक अंग मानना चाहिए।

तीसरा, संपोष्य विकास की अवधारणा भी स्वयं में विवादित है। संपोष्य विकास (नेजंपदंइसम क्मअमसवचउमदज) की अवधारणा तो यह कहती है कि मानव का विकास प्राकृतिक दोहन की कीमत पर होता रहे

परन्तु उसकी गति धीमी कर दी जाए अर्थात् पर्यावरण में व्याप्त असंतुलन अथवा प्रदूषण तो होता रहे, प्रकृति की हत्या होती रहे परन्तु उसकी गति कम हो जाये। यह अपने आप में एक अस्वीकार्य धारणा है।

चौथा मुद्दा हमारे पर्यावरण संतुलन बनाने में मुख्य घटक पशुओं की स्वतन्त्रता से सम्बन्धित है। जिस प्रकार मानव को मानव होने मात्र से मानवाधिकार मिल जाते हैं तो क्या पशुओं को इस आधार पर पशु अधिकार नहीं मिलने चाहिए। कैलिकॉट जैसे जैव केन्द्रित पारिस्थितिकी दार्शनिकों ने पशु अधिकारों का पूर्ण समर्थन किया है। वैश्विक स्तर पर च्म्ज्। ;च्मवचसम वित म्जीपबंस ज्तमंजउमदज ूपजी ।दपउंसेद्ध और च्मवचसम वित ंदपउंसे जैसी संस्थाएँ भी पशु अधिकारों के लिए प्रयासरत हैं। प्रकृति में असन्तुलन व्याप्त होने के कारण तथा मानवों की पशुओं के प्रति हिंसात्मक प्रवृत्ति के कारण पशुओं की अनेक प्रजातियाँ लुप्त हो गयी हैं तथा अनेक लुप्तप्राय हैं। इन पशुओं का भी प्राकृतिक सन्तुलन बनाये रखने में महत्वपूर्ण योगदान है।

नेस, पारिस्थितिकी बोध (म्बवसवहपबंस न्दकमतेजंदकपदह) व पारिस्थितिकी चेतना (म्बवसवहपबंस ।ूतमदमे) के बीच में भेद बताते हैं। उनके अनुसार यदि पर्यावरण की समस्याओं की जानकारी देने मात्र से पारिस्थितिकीय बोध पैदा होता और सभी मानव अपने पारिस्थितिकीय दायित्वों का निर्वहन करेंगे तो ऐसा नहीं है। व्यावहारिक सत्य तो यह है कि अत्यधिक शिक्षित व्यक्ति भी ऐसे कार्य आदतन करते हैं जो पर्यावरण विरूद्ध हैं जैसे पॉलीथीन का प्रयोग, धूम्रपान, नदियों में अस्थिविसर्जन, पुष्प विसर्जन इत्यादि। इस समस्या का समाधान जानकारी से नहीं बल्कि मूल्यों में परिवर्तन से सम्भव है। अतः इसका समाधान पाठ्यपुस्तकों द्वारा न होकर मानव की मूल चेतना में परिवर्तन द्वारा हो सकता है जो कि धर्म के माध्यम से ही संभव है क्योंकि धर्म में निहित तत्त्व मीमांसा के आधार पर भी मनुष्य प्रकृति के प्रति अपना दृष्टिकोण तय करता है।

अतः पश्चिमी विचारधारा यद्यपि प्रकृति के प्रति उपयोगितावादी दृष्टिकोण अपनाती है तथापि आर्ने नेस जैसे दार्शनिकों के द्वारा प्रकृति अथवा पारिस्थितिकी संतुलन हेतु दिए गए नवीन विचार भी प्रासंगिक हैं जिनका आधार उपयोगिता न होकर नीति मीमांसा है। इन्होंने पर्यावरण संरक्षण की दिशा को न केवल एक मौलिक सोच दी है अपितु आधुनिक पश्चिमी दृष्टिकोण पर गंभीर सवाल भी खड़े किए हैं। यदि आर्ने नेस द्वारा प्रतिपादित मानव प्रकृति सम्बन्ध स्थापित किया जाये तथा प्रकृति के प्रति नैतिक दृष्टिकोण अपनाकर उसके अधिकारों के प्रति सचेत रहा जाये तो पर्यावरण संरक्षण की दिशा में सकारात्मक परिणाम प्राप्त किए जा सकते हैं। पर्यावरणीय संतुलन बनाए रखने हेतु वैश्विक स्तर पर जो विविध सम्मेलन समय–समय पर आयोजित किए जा रहे हैं वो मात्र खानापूर्ति बनकर न रह जाए अपितु पूर्वी विचारधारा तथा आर्ने नेस द्वारा दिए गए मौलिक बिन्दुओं के आधार पर ही उनकी कार्ययोजना बननी चाहिए तथा उसका सफल कार्यान्वयन भी होनी चाहिए।

आज विकसित तथा विकासशील देशों का यह दायित्व है कि वे जिस प्रकार अपने वर्चस्व को बनाए रखने के लिए प्रयत्नशील रहते हैं उतनी ही ऊर्जा एवं शक्ति से प्रकृति को बचाए रखने का प्रयास करें। विकसित देशों ने हरित ऊर्जा (ळतममद मदमतहल) तथा अनेकानेक ऐसी तकनीकी इजाद की है जिससे पर्यावरण प्रदूषित नहीं होता परन्तु वे इस तकनीक को विकासशील देशों को हस्तान्तरित नहीं करना चाहते। इसके अलावा स्वच्छ एवं सस्ती ऊर्जा तथा उच्च तकनीक को विकासशील देशों को उपलब्ध कराने का दायित्व भी विकसित देशों का है परन्तु विकसित

देश विकासशील देशों पर अपना वर्चस्व बनाए रखने हेतु इस तरह का कोई भी प्रयास नहीं करना चाहते। उनकी यह मानसिकता भी पर्यावरण संरक्षण के प्रयासों को कमज़ोर करती है। वहीं दूसरी ओर विकासशील देशों को भी पर्यावरणीय प्रदूषण कम करने के लिए जीवाश्मीय ऊर्जा यथाः कोयला, गैस, पेट्रोलियम पदार्थों का उपयोग, बायोमास इत्यादि से उत्पन्न ऊर्जा पर अपनी निर्भरता को कम करना चाहिए। इनके स्थान पर नवीकरणीय ऊर्जा (त्मदमूंइसम मदमतहल) अपनाने की ओर प्रयास करने चाहिए। नवीकरणीय ऊर्जा यथा भूतापीय ऊर्जा (जीमतउंस मदमतहल), भूतरंग ऊर्जा, सौर ऊर्जा (वसंत मदमतहल), समुद्री ऊर्जा (ज्पकंस मदमतहल) इत्यादि से ऊर्जा का बड़ा स्रोत प्राप्त हो सकता है और वो भी प्रकृति को हानि पहुचाएँ बिना।

अभी हाल ही में 2017 में च्ंतपे में आयोजित 19जी प्दजमतदंजपवदंस ब्वदमितमदबम वद म्दअपतवदउमदज – ब्सपउंजम में अमरीका जैसे विकसित देश अपनी ज़िम्मेदारी न निभाते हुए इससे यह कहकर अलग हो गया कि चीन तथा भारत सबसे ज़्यादा प्रदूषण फैलाते हैं, चूँकि वो विकसित देश है अतः उसका इस समस्या से कोई सारोकार नहीं है – यह अत्यन्त ही दुःखद है। ऐसी असंवेदनशीलता एवं गैर ज़िम्मेदाराना व्यवहार यदि इतने बड़े देश करेंगे तो पर्यावरण संरक्षण की मुहिम को गति कैसे मिल पाएगी – यह शोचनीय है।

अतः पर्यावरण संरक्षण अथवा पारिस्थितिकीय सन्तुलन बनाए रखने हेतु दार्शनिक दृष्टिकोण से सोचने की आवश्यकता है। अपने स्वार्थों तथा क्षणिक लाभ के लिये प्रकृति के अंधाधुंध दोहन पर रोक लगानी चाहिए। यदि हम प्रकृति को उसके अधिकारों को प्रदान करने के विषय में सोचे तो काफी हद तक इस समस्या का समाधान हो सकता है।

आज आवश्यकता है कि हम पूर्वी विचारधारा को अपनाकर नैतिकता की दृष्टि से इस विषय पर मंथन करें। अपनी प्राचीन वैदिक संस्कृति में वर्णित पर्यावरणीय तत्त्वों के अवलोकन, अनुशीलन एवं आचरण से हम पर्यावरण प्रदूषण की समस्या से मुक्ति पा सकते हैं तथा उसकी सार्थकता एवं सत्यता को सम्पूर्ण विश्व में प्रसारित कर पश्चिमी देशों को भी इस ओर प्रेरित कर सकते है। पर्यावरण संरक्षण की दृष्टि से वेदों में सम्पूर्ण पर्यावरणीय तत्वों के सन्तुलन हेतु शान्ति की कामना वैदिक मनीषा करती है[6] –

'ऊँ धौ शान्तिरन्तरिक्षँूशान्ति पृथ्वी शान्तिरापः शान्तिरोषधयः शान्तिः। वनस्पतयः शान्तिर्विश्वेदेवाः शान्तिर्ब्रह्म शान्तिः सर्वूँशान्तिः शान्तिरेव शान्तिः सा मा शान्तिरेधि।'

1. डॉ. जसवीर सिंह मलिक – पर्यावरण शिक्षा, पृ0 5
2. ऋग्वेद 10.146.5
3. ऋग्वेद 6.48.17
4. ऋग्वेद 3.20.4
5. अथर्ववेद 12.1
6. यजुर्वेद 36.17

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श्रमविभाजन का उन्नतस्वरूप–वर्णव्यवस्था



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शोधसारांश–भारतीयवर्णव्यवस्था परये आक्षेप प्राप्त होते है कि वर्णव्यवस्था ने समाज को कभी न पाटी जाने वाली परिखा में विभक्त कर दिया जहां एक ओर सर्वोच्च पद पर ब्राह्मण को आसीन कर दिया वहीं दूसरी ओर उनके संरक्षकों के रूप में क्षत्रिय और वैश्य को नियुक्त कर दिया। शोषक वर्ग की इस त्रिपुटी ने भारत की सामाजिक समरसता को ध्वस्त कर दिया और त्रिवर्गेतर जनसमूह का शोषण करके उन्हें दलित बना दिया। प्रस्तुत शोध आलेख में वर्णव्यवस्था के उद्गम, आवश्यकता, वर्णों से अन्य जातियों की उत्पत्ति का परिचय प्रस्तुत करते हुए यह निरूपित किया गया है कि वर्ण महत्ता और हीनता के निर्धारक नहीं अपितु मानवीय सामर्थ्य और कार्यकुशलता का निर्धारक है। यही कारण था कि भारत सदियों तक अपनी इसी थाति के कारण सोने की चिडिया के रूप में विख्यात था। वर्तमान में बढते जातीयसंघर्ष में इस प्रकार के विचारों का अन्वेषण आवश्क है जिसे प्रकृत शोधपत्र में प्रस्तुत किया गया है।

वर्णशब्द का सामान्य अर्थ स्वभाव है। स्वभाव का तात्पर्य प्रवृति या सहजधर्म होता है। प्रायः सभी प्राणियों का स्वभाव अलग–अलग होता है। प्राणियों की यह पृथक्ता उनके भौगोलिक परिवेश और जीवन की आवश्यकताओं की पूर्ति हेतु शारीरिक एवं मानसिकस्तर तथा दृष्टिकोण पर निर्भर है। इसलिये धर्मशास्त्रों में प्राणियों के श्रम विभाजन वर्णव्यवस्था के रूपमें विवेचित किये गये हैं।

यह ध्यातव्य है कि भारतीयसंस्कृति जीवन को एक दैवीयनिधि के रूप में स्वीकार करती है इसलिये जीवन का उद्गम, ब्रह्मा के ही विस्तार के रूप में स्वीकृत किया गया है। यह भी विचारणीय है कि परमात्मा,ब्रह्मा, आत्मा इत्यादि एक ही तत्त्व के भिन्न–भिन्न अभिधान हैं जो जीवन को आधारभूमि प्रदान करने के साथ ही उसके सूक्ष्मतमांश से लेकर स्थूलतमांश में विद्यमान रहता हुआ सर्गान्त में सभी कुछ आत्मलीन कर लेता है।

वर्णव्यवस्था का उदगम– यह सृष्टि विविधरूपा है अर्थात् यह विविधवर्णा है वैसे तो संसार असीमित वर्ण(प्रकृति) वाला है परन्तु ज्ञानार्जन, रक्षण, अर्थोपार्जन और शिल्पकर्मष्तथा सहयोग, ये चार उद्देश्य मनुष्य के लिये आवश्यक है अतः उक्त चारों को उद्देश्य मेंरखते हुए मनुष्यवर्ग में चार वर्ण निर्धारित

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किये गये– ब्राह्मण, क्षत्रिय, वैश्य, शूद्र तथा इनकी उनकी उत्पत्ति विराटपुरुष (सृष्टिकारक तत्त्व) के के नाना अवयवों से कल्पित की गई–

ब्राह्मणोऽस्य मुखमासीद् बाहू राजन्यः कृतः।ऊरू तदस्य यद्वैश्यः पद्भ्यां शूद्रोऽजायत।।[1]

अर्थात् ब्राह्मण इस विराटपुरुष का मुख, क्षत्रिय इस विराटपुरुष की भुजाएँ, वैश्य इस विराटपुरुष का उदर तथा शूद्र इस विराटपुरुष के पैरों से उत्पन्न हुए। ये चारों अंग, अंगी के निर्माण में आवश्यक है तथा इनमें से किसी एक के भी अभाव में अंगी का स्वरूप अपूर्ण है। ये चारों वर्ण परस्पर एक दूसरे से अविभाजित और एक दूसरे के पूरक हैं। यह मन्त्र चारों वर्णों की समान महत्ता और एकता का प्रतिपादक है। यद्यपि उक्त चारों विभाजन एक ही पुरुषाकृति अंगी के प्रमुख अंग हैं तथापि क्षमता के अनुसार एक ही स्वरूप के भेदक होने के कारण ब्राह्मण, क्षत्रिय, वैश्य और शूद्र को वर्ण कहा गया। वर्णों की यह व्यवस्था जड और चेतन में भी विद्यमान है।

यदि उक्त चारों वर्णों के नामकरण की शाब्दिकव्याख्या की जाये तो भारतीयवर्णव्यवस्था में निहित एकत्व और वर्णव्यवस्था की उदात्तभावना और प्रस्फुट होती है– ब्राह्मण का अर्थ है **ब्रह्मां(ज्ञानं) अधीते वा ब्रह्मां(ज्ञानं) जानाति** अर्थात् जो ज्ञानार्जन में सक्षम है ज्ञान का अधिष्ठान है, वह जाति ब्राह्मण है। क्षत्रिय का अर्थ है–**क्षतात्त्रायते**।अर्थात् जो विविध उपद्रवों से प्राणियों की रक्षा करें वह वर्ण क्षत्रिय है। वैश्य अर्थात् **आजीव्ये विशन्तिइति वैश्य**। इसका तात्पर्य यह है कि जो आजीविका के लिये नाना प्रदेशों में प्रवेश करें वह वर्ण वैश्य है तथा शूद्र का तात्पर्य है **आशु द्रवति** अर्थात् श्रम करने में जो कुशल हो वह शूद्र है। इस प्रकार स्वरुचि और सामर्थ्य के अनुकूल जीवनोपयोगी योग्यता का विभाजन करके एक निर्द्वन्द्व और उन्नत समाज की स्थापना के लिये ष्यह व्यवस्था धर्मशास्त्रों ने प्रदान की ।

वर्णव्यवस्था का आधार–मूलतःवर्णव्यवस्था का निर्धारण व्यक्ति की योग्यता के अधीन था तथा यह स्वतन्त्रता भी इस बात की द्योतक है कि अपनी क्षमतानुकूल सभी को भिन्न–भिन्न रूप से आत्मविकास करने का अवसर प्राप्त है इस भिन्नता को ही वर्णधर्म के रूप में व्यवस्थित किया गया। ऐसी व्यवस्था आज भी देखी जाती है कि प्रत्येक कार्यशैली या कार्यस्थल की कार्यप्रणाली होती हैं और उसी के आधार पर एक नियमावली बना कर और प्रशिक्षण की व्यवस्था करके कार्य किये जातें हैं। व्यक्तिगतस्तर पर प्राप्त होने वाला यह विकास वैश्विकस्तर पर भी प्रतिक्षण प्राप्त हो रहा है क्योंकि व्यक्ति और समाज का विकास परस्पर सापेक्ष है इसलिये गुण और कर्मविभाजन ही वर्णव्यवस्था का आधार स्वीकृत किया गया है–**चातुर्वर्ण्यं मया सृष्टं गुणकर्मविभागशः**।[2]

वर्णव्यवस्था में परिवर्तन–वर्णपरम्परा की यह व्यवस्था ई पू 3शताब्दी तक चलती रही।उसके बाद विदेशी आक्रमणकारियों का दौर आया । यह एक ऐसा संक्रमणकाल था जिसने न केवल भारतीय राजनैतिकव्यवस्था अपितु भारतीयसमाजव्यवस्था को भी प्रभावित किया । लम्बे समय तक वर्णव्यवस्था की कर्मपरकव्यवस्था के स्थान पर वंशपरम्परा से प्राप्त कर्म में कुशलता की अधिक संभावना होती है अतः वर्णव्यवस्था धीरे–धीरे जातिव्यवस्था में परिणत होनेलगी। जाति का शाब्दिक अर्थ है जन्म। जहाँपूर्व में ब्राह्मणक्षत्रियत्वादि विभाजन का आधार व्यक्ति की प्रवृत्तियाँ थी वहीं पौराणिक काल तक आते आते जिसवर्ण के व्यक्ति की संतति होती , वह संतति उसी जाति की होने लगी। अर्थात् ब्राह्मण का पुत्र ब्राह्मण क्षत्रिय की संतान क्षत्रिय वैश्य की वैश्य तथा शूद्र की शूद्र । किस प्रकार स्वैच्छिक वर्णप्रवृत्ति जन्मबन्धन में बन्दिनी हो गई, जातिव्यवस्था उसका प्रत्यक्षोदाहरण है।

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नवीन जातियां–जातिव्यवस्था के साथ ही एक क्रान्तिकारी परिवर्तन आया – ब्राह्मणक्षत्रियादि जातियों में परस्पर विवाह। यह परिवर्तन अनुलोम और प्रतिलोम विवाहव्यवस्था के रूप में व्यवस्थित किया गया । अर्थात् ब्राह्मण का क्षत्रिया से , क्षत्रिया का वैश्या से वैश्य का शूद्रा से विवाह इस प्रकार के अनुलोमविवाह को सम्मत ठहराया तथा एक वर्ण को छोडकर हीनवर्ण में विवाह को हेय अथवा वर्णसंकर की श्रेणी में माना गया। उससे भी बढकर ब्राह्मणी और शूद्र, ब्राह्मणी और क्षत्रिय,ब्राह्मणी और वैश्य का प्रतिलोमविवाह अत्यन्त निन्दित माना गया उसमें भी ब्राह्मणी और शूद्र का विवाह तो अत्यन्त कुत्सितकर्म माना गया। उच्चकुल की कन्या और हीनकुल का वर, इस प्रकार का प्रतिलोमविवाह अधर्मकारक माना गया । इस मान्यता के पीछे याज्ञवल्क्य का यह दृष्टिकोण उचित प्रतीत होता है कि संतति पिता के कुल के अनुरूप होती है अतः प्रतिलोम विवाह में ज्ञान के स्तर में न्यूनता आने के कारण इस प्रकार के विवाह समाज को बौद्धिकस्तर पर हीन करते हैं।

अनुलोम और प्रतिलोम विवाह के कारण चार जातियों के अतिरिक्त और नयी जातियां अस्तित्व में आयी जिनका विवरण मनुस्मृति में इस प्रकार प्राप्त होता है–

वर्ण	जाति	कर्म
ब्राह्मण और असंस्कारित ब्राह्मणी	व्रात्य[3]	अनुष्ठानकर्म,
ब्राह्मण और क्षत्रिया	ब्राह्मण[4]	
ब्राह्मण और वैश्या	अम्बष्ठ[5]	
ब्राह्मण और शूद्रा		
क्षत्रिय और ब्राह्मणी	सूत[7]	रथसंचालन और अश्वशाला नियन्त्रण, अश्वपालन, अश्वविद्या
क्षत्रिय और वैश्या	माहिष्य[4]	
क्षत्रिय और शूद्रा	उग्र[6]	जंगल में रहने वाले जीव जन्तुओ को मारने से आजीविका चलाना
वैश्य और ब्राह्मणी	वैदेहक[7]	अन्तःपुर का रक्षण
वैश्य और क्षत्रिया	मागध[7]	स्थलमार्ग से व्यापार करना
वैश्य और शूद्रा	करण[4]	
शूद्र और ब्राह्मणी	चण्डाल[8]	श्मशानकर्म
शूद्र और क्षत्रिया	क्षत[8]	जंगली जीवों को मारकर जीवन यापन
शूद्र और वैश्या	अयोगव[8]	बढई
व्रात्य और ब्राह्मणी	भूर्जकण्टक, आवन्त्य,	

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	वाटधान,पुष्पध, शैख[12]– ये जातियां अलग– अलग स्थानों पर निवास करने के कारण हैं।	
व्रात्य (असंस्कारित ब्राह्मण)और क्षत्रिया	झल्ल, मल्ल, निच्छवि,नट, करण, खस ,द्रविड[13]	
व्रात्य और वैश्या	सुधन्वाचार्य, कारुष , विजन्मा, सात्वत[14]	
ब्राह्मण और अम्बष्ठ	आभीर[9]	
ब्राह्मण और अयोगव	धिग्वण[9]	चर्मकार
ब्राह्मण और उग्र	आवृत[9]	
अम्बष्ठ और शूद्रा[5]	निषाद या पारशव[5]	मछुआरे
निषाद और शूद्रा	पुक्कस[10]	आखेटकर्म
शूद्र और निषादिनी	कुक्कुट[10]	आखेटकर्म
क्षत्ता और उग्रा	श्वपाक[11]	वादनकर्म
वैदेह और अम्बष्ठ	वेण[11]	ठठेरा
दस्यु और अयोगवा	सैरन्ध्र[15]	प्रसाधनकर्म
वैदेह और अयोगवा	मैत्रेयक[16]	श्राजमहल में घण्टावादन और स्तुतिगान
निषाद और अयोगव	मार्गव[17]	मल्लाह
निषाद और वैदेही	कारावर[18]	नाई
वैदेहक और निषादिनी	अन्ध्र[19]	शिकारी
वैदेहक और कारावर	भेद[19]	शिकारी
चण्डाल और वैदेही	पाण्डुसोपाक[20]	बंस का काम
निषाद और वैदेही	आहिण्डक[20]	
चाण्डाल और पुक्कस	सेपाक[21]	जल्लाद
चण्डाल और निषादी	अन्त्यवसायी[22]	श्मशानकर्म
करण और माहिष्य	रथकार[23]	रथनिर्माता
दस्यु	पौण्ड्र, चौड्र, द्रविड, कम्बोज, यवन, शक, पारद,पह्लव,चीन, किरात, दरद, खश[24]	

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इस प्रकार देखा गया कि वर्ण जो गुण और कर्म से अर्जितप्रस्थिति थी वह धीरे–धीरे जन्मार्जितप्रस्थिति में बदलने लगी। इसके अनेक कारण रहें जिनमें अनुलोम और प्रतिलोम विवाह, आचारनियमों में शिथिलता, विदेशी आक्रमण, वैदेशिक सम्बन्ध तथा यागानुष्ठानों का विस्तार आदि प्रमुख कारण रहें ।

शासनसंचालन में जातियों का योगदान– यह भी एक विचारणीय बिन्दु है कि समय–समय पर सत्ता का नेतृत्व विविध वर्णों ने किया जिनमें सर्वाधिक शूद्रवंश का माना जाता है। धनानन्द से पूर्व अनेकशूद्रवंशीय राजाओं ने शासन किया। तत्पश्चात् मुरा नामक दासी के पुत्र चन्द्रगुप्त ने शासन किया और उसे सत्ता पर आधिपत्य ब्राह्मण चाणक्य के सहयोग से किया। चाणक्य ने किसी राजनैतिकपद पर न रहते हुए साधारणजीवन को व्यतीत किया। चन्द्रगुप्त के पौत्र अशोक ने बौद्धधर्म को अंगीकार किया और फिर शासन पुनः बौद्धधर्म के हाथ में आ गया। तत्पश्चात् ब्राह्मणों ने पुष्यमित्रशुंग के नेतृत्व में शासन किया पुनः गुप्तवंश के रूप में वैश्यों ने भारतभूमि पर शासन किया । ऐतिहासिक दृष्टि से इस सुसंक्षिप्त अवलोकन से ज्ञात होता है कि भारतवर्ष पर समय–समय पर विविध जातियों ने शासन किया है अतः यह तो कदापि नहीं कहा जा सकता कि धर्मशास्त्रीय सिद्धान्तो के कारण ष्ब्राह्मणक्षत्रियेतरवर्ग को आत्मविकास का समुचित अवसर नहीं मिला।

प्रायः रामायण एवं महाभारत पर वर्णभेद या जातिभेद को फैलाने की कथाओं के प्रमाण प्रस्तुत किये जाते रहें हैं परन्तु रामायण के मूल कथानक में क्षत्रिय और ब्राह्मणवंश एक ही समय में शासन करते चित्रित हुए हैं तथा अपेक्षाकृत हीनवर्ण क्षत्रियराजा राम ब्राह्मणवंशीयराजा रावण का वध करतें हैं। महाभारत में भी प्रायः हीनवर्ग के शोषित के रूप में कर्ण की कथा का उल्लेख प्राप्त होता है जबकि वही सूतपुत्र अंगराज के रूप में अपनी योग्यता से प्रतिष्ठित होता है। अहीरपुत्र कृष्ण राजसूययज्ञ में प्रथज्ञमपूजन का अधिकारी बनता है । क्षत्रियराजा मनु मनुस्मृति का प्रणयन करता है जो ब्राह्मणप्रणीतस्मृतिशास्त्रों के मध्य सर्वप्रमुख स्मृतिग्रन्थ है।

वर्णसंघर्ष के कारण– निष्कर्षरूप में कहा जा सकता है कि भारतीय धर्मशास्त्रीय व्यवस्था के अनुसार वर्णव्यवस्था का मूल आधार **क्षमता और रुचि के अनुसार श्रमविभाजन है**। कालान्तर में पारिवारिक वातावरण में प्रदत्त संस्कारों के कारण कार्यकुशलता में वृद्धि तथा स्वतः रुचि विकसित होने के कारण एवं स्वाभाविक प्रशिक्षण कर्म की प्राप्ति होने के कारण वर्णपरम्परा को कौलपरम्परा से सम्बद्ध किया गया इससे वर्णपरम्परा जातिपरम्परा के रूप में विकसित हुई। विदेशी आक्रमणों के कारण इसे और अधिक सुदृढ करने के प्रयास में जातिव्यवस्था के नियमों को कठोर किया गया। इसी उपक्रम में योरोपियनजातियों का भारत में आगमन हुआ और उन्हें भारतीयसमाज के रूप में ऐसा अनोखा स्वसंचालित मानवसमूह प्राप्त हुआ जो बिना किसी वैमनस्य के परस्पर सहयोग से भारत को प्रत्येक स्तर पर उन्नत किये हुए थे । ब्राह्मणवर्ग महाराज के रूप में धार्मिक कार्यों एवं शिक्षा–दीक्षा के अनुष्ठानों का निष्पादन करता था वहीं कृषक जजमान के रूप में शस्यसम्पदा का उत्पादन और वितरण का कार्य करता था । व्यापारिक कार्य तथा धन को ऋण पर देने का कार्य बनियावर्ग का था। बढई, दर्जी, लौहार, चर्मकार, जुलाहा आदि जातियां इन तीनों ही वर्गों का सहयोग करती थी। पीढी दर पीढी भारतवर्ष का श्रमकौशल चरमोत्कर्ष को प्राप्त कर रहा था ।ढाका की मलमल इसका उदाहरण है। योरोपीयन जातियों ने इस समृद्धि के रहस्य को जानने के लिये भारतीयग्रन्थों का अध्ययन किया और उन्हें आश्चर्य हुआ कि जहाँ योरोपीयनजातियां रंगभेद , कुलपरकभेद के कारण एक लडाका

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और यायावर जीवन को व्यतीत कर रही हैं वहीं भारतवर्ष श्रमविभाजन की इस सौहार्दपूर्ण विभाजन से स्वर्णभूमि के समान समृद्धशली है । बिना इसे विखण्डित किये आर्थिकसमृद्धि सम्भव नहीं है अतः उन्होनें भारतवर्ष की समृद्धि की नींव इस सुदृढजातिव्यवस्था को खण्डित करने के उपक्रम निर्मित करने प्रारम्भ किये । इसी के परिणामस्वरूप भरतीय समाज में शोषक और शोषित दो वर्ग कल्पित हुए। ब्राह्मणजाति ज्ञान और संस्कृति की अधिष्ठात्री थी इसलियेशोषण के सर्वाधिक आक्षेप ब्राह्मणजाति पर आरोपित किये गये।

भारतीय समृद्धि की नींव शूद्रवर्ग के श्रमप्रधानकार्य के प्रति ब्राह्मणवर्ग की हेय दृष्टि की भ्रामक कहानियों और वैदिकवांगमय से प्राप्त उद्धरणों को मिथ्यारूप से प्रचारित किया गया कि तुम्हारे ही शास्त्रों में कहा गया है कि शूद्रवर्ग तो पैरों से उत्पन्न हुआ है अतः हीनवर्ग का है। अन्य जातियों ने सदा ही उनका शोषण कया है। शोषक और शोषित वर्ग का इतिहास 500 वर्ष से पुराना नहीं है और इस व्यवस्था का खलनायकत्व भारतीय धर्मशास्त्रों को बतलाया गया। यह भी प्रसारित किया गया कि किस प्रकार ब्राह्मणों ने समाज के अन्य वर्ग का दलन किया। वर्तमान में भी दलित इतिहास में इसी प्रकार के विचार प्राप्त होते हैं ।

जैसा कि मैंने पूर्व में उल्लेख किया है कि भारतीय समाज में शासन में विविध वर्गों का प्रतिनिधित्व रहा है अतः यह नही कहा जा सकता कि केवल तथाकथित उच्चजातियां ही अवसर को प्राप्त करती थी अन्य जातियों को च्युत किया गया।

दलितवर्ग के इतिहास के मनोवैज्ञानिक और वर्तमान में राजनैतिक कारण अधिक प्राप्त होते हैं । मनुष्य के पास सम्पत्ति , प्रभाव, पद आदि उसकी मनोस्थिति में आमूलचूल परिवर्तन लाते हैं वह स्वयं को श्रेष्ठ समझने लगता है फिर उसे अपने ही वर्ग के साधनविहीन लोगों से कुछ दूरी को बनायें रखना अपने लिये उचित प्रतीत होता है। यही मनोदशा विविध पिछडे वर्ग में भी देखने को मिलती है जब एक जाति दूसरी अपने ही समान अन्य काम करने वाली जाति की अपेक्षा स्वयं को श्रेष्ठ सिद्ध करती है। इसी प्रकार ब्राह्मण में भी अनेक उपजातियां बन गई उनमें भी परस्पर स्वयं को श्रेष्ठ करने की होड रहती है यही परम्परा क्षत्रियों ,वैश्यों , कृषकों, लोहार, बढई, दर्जी, स्वर्णकार यहां तक कि हरिजनों में भी प्राप्त होती है । हरिजन भी रजक को अस्पृश्य मानतें हैं और इसमें कोई तार्किक कारण नहीं है। वर्तमान में सामाजिकव्यवस्था में आर्थिककारण प्रधान हो गया तथा सौहार्द का आधार अर्थ हो गया वहीं अर्थ के अभाव ने पुनः एक ही जाति में भेद कर दिया। इसलिये यह तो नहीं कहा जा सकता कि धर्मशास्त्रों में वर्णित विधान ने समाज में संघर्षपूर्ण स्थिति पैदा की।

समाधान– यह एक बडा विवादित विषय है और समय–समय पर इसके समाधान के उपायों पर मन्थन किया जाता है परन्तु इसका समाधान इसके उद्गम में ही प्राप्त हो सकता है। वैश्विक परिवेश में भी यह समस्या व्यापकरूप से फैली हुई है ।इस समस्या का निदान वैदिकवांगमय में निहित है, जहाँ स्थान–स्थान पर समरसता और एकत्व का घोष प्राप्त होता है। यदि जातिव्यवस्था का विवेचन किया जायेंतो विभेदवादियों द्वारा शूद्रों को यह कहकर भ्रमितकिया गया कि तुम्हारें शास्त्र ही तुम्हें पैरों के समान हीन मानते हैं परन्तु इस कथन का समाधान यह है कि शूद्र परमात्मा के पैर माने गये हैं क्योंकि शूद्रों के अभाव में समाज की गति ही सम्भव नहीं है। द्विजातियों की गति का आधार शूद्र ही हैं–

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पादौतु पद्येते याभ्यां शरीरं सर्वस्तथा। शूद्रसेवाप्तावकाशाः पद्यन्ते कर्मणि द्विजाः।।[25]
इसका अभिप्राय यह है कि जिसप्रकार पैरों से सम्पूर्ण शरीर का भार वहन किया जाता है उसी प्रकार शूद्रसेवा के कारण समय प्राप्त होने के कारण द्विज(अन्य जातियाँ) गति करती हैं।
धर्मशास्त्र कभी भी शूद्रों की उपेक्षा का विधान नहीं करते–
यथा तु द्विजपादानामुपेक्षा हानिदा मता । समाजपादभूतानां शूद्राणामपि साा तथा।।[26]
अर्थात् जिस प्रकार शरीर के पैरों की उपेक्षा हानिकारक है उसी प्रकार समाज के चरणभूत शूद्रों की उपेक्षा हानिकारक है।

स्पष्ट है कि भारतीय वर्णव्यवस्था का आधार पारस्परिक स्पर्धा न होकर पारस्परिक विकास है तथा जन्म से इस व्यवस्था को जोडने का आधार यह है कि अगली पीढी के सामने रोजगाार का संकट न हो तथा कार्य में उत्तरोत्तर कुशलता प्राप्त हो। भारतीयचिन्तन में वस्तुतः शूद्र अर्थव्यवस्था की नींव है इसीलिये यजुर्वेद कहता है–
नमस्तक्षभ्यो रथकारेभ्यश्च वो नमो नमः कुलालेभ्यः कर्मारभ्यश्च वो नमः।।[27]
इस मन्त्र का भाव यह है कि सभी श्रमशीलजाति को नमस्कार है जो अपने श्रम और कौशल से धर्म, अर्थ और काम की सम्प्राप्तिपूर्वक मोक्षमार्ग के साधक बनते हैं। जिस शास्त्र में इस प्रकार का समन्वय और सौहार्द पद–पद पर प्राप्त होता है उस शास्त्र का विधान समाज को संघर्षशील स्थिति में नहीं डाल सकता। जिस शास्त्र के कथनों को क्षत–विक्षत करके समाज में वर्गभेद का विष सवंर्धित किया गया उस विष को उसी शास्त्र के वचनामृत से पुनः संजीवित कर **सर्वे भवन्तु सुखिनः** की उदात्तभावना को जीवन्त किया जा सकता है।

सन्दर्भ–

1–ऋ. 10/90
2–श्रीमद्भगवद्गीता4/13
3–द्विजातयः सवर्णासु जनयन्त्यव्रजांस्तु यान्। तान्सावित्रीपरिभ्रष्टान्व्रात्यानिति विनिर्दिशेत्।मनुस्मृति 10/20
4– सूतानामश्वसारथ्यमम्बष्ठानां चिकित्सनम्। वैदेहकानां स्त्रीकार्यं मागधानां वणिक्पथम्।।
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5–ब्राह्मणाद्वैश्यकन्यायामम्बष्ठो जायते। निषादः शूद्रकन्यायां यः पारशव उच्यते।मनुस्मृति–10/8
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9–ब्राह्माणादुग्रकन्यायामावृत्तो नाम जायते ।आभीरोऽम्बष्ठकन्यायायोगव्यां तु धिग्वणः।। वही 10/15
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