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Conference Details

A national level Student's 4th National Conference on Advances in Engineering and Applied Science, NCAEAS-2020 was organized by Anjuman College of Engineering and Technology in the Nagpur City of Maharashtra state during 17th March 2020 to 21st March 2020. It provided a general platform to UG, PG students and delegates from Industry for exchanging and sharing ideas, discussing recent developments and motivation from eminent researchers & academicians. NCAEAS-2020 was a multi-disciplinary conference with wide range of Tracks and Topics. The objective of the conference was to promote research and innovation at undergraduate and postgraduate level. High quality papers are presented in the conference and selected papers were published in the proceedings of the conference. Total 200 papers were received from all over India, out of which 124 paper were selected for presentation and publication.

About the College:

Anjuman College of Engineering And Technology is:

- ✓ Affiliated To Rashtrasant Tukdoji Maharaj Nagpur University
- ✓ Approved By Directorate of Technical Education, Maharashtra
- ✓ Approved By A.I.C.T.E. New Delhi

The Anjuman College of Engineering and Technology [A.C.E.T.] is managed by Anjuman Hami-E-Islam, Nagpur. It is a pioneer Educational Trust, serving the cause of education in the region. For well over 131 years. Irrespective of the considerations of the various caste and creed It has wide spread reputation in the field of education in Vidharbha and is currently running 20 educational Institutions. Anjuman Hami-E-Islam started an Engineering College from academic year 1999-2000 with three branches Mechanical , Electrical , Electronics and Telecommunication, two more branches viz. Computer Science & Engineering and Civil Engineering has been added. Slowly and steadily the College has carved a niche for itself and has established itself as a name to be reckoned with providing quality Technical Education at a very affordable cost.

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Stabilization of Black Cotton Soil by Using Tamarind Seed Powder

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ABSTRACT

The purpose of this research is to improve the engineering properties of expansive soil by using tamarind seeds. The expansive soil is most likely to be unsaturated and has montmorillonite clay materials. The black cotton soil is mostly present in region around Mumbai, Madras, Nagpur and even on the river banks. The various tests are performed on soil to evaluate their engineering properties for increasing strength of soil by using tamarind seed powder. Like liquid limit and plastic limit are performed on the soil samples by using tamarind seed powder with black cotton soil at the different percentage. The tamarind seed powder are used to improve the strength of black cotton soil. Soil proportion changes depending upon their constituent our water content, density, sieve analysis etc. Experimental work is based on different percentage of tamarind seed in soil on further test for soil liquid, plastic limit, grain size analysis etc. Problems identified with black cotton soil.

Keywords : Black Cotton Soil, Tamarind shells.

I. INTRODUCTION

Black cotton soil also known as expansive soil, is one if the most challenging soil for engineers because of their swelling and shrinking property due to variation in moisture content. It has a low bearing capacity, low shearing strength and high compressibility. Foundation of any structure depend on type of soil. Soil property changes depending on their constituents. The civil structures are needed to construct over the soils. The soil which is unable to provide the desired properties to civil structures for the construction in such cases stabilization is the only method to get the desired properties of soil.

STABILIZATION & IT'S EFFECTIVENESS

Stabilization is the process of blending and mixing materials with a soil to improve certain properties of the soil. The process may include the blending of soils to carry out a desired gradation or the mixture of commercially available additives that may change the gradation, texture or plasticity, or act as a binding for cementation of the soil. Pavement design is based on the premise that minimum specified structural strength will be achieved for each layer of material in the pavement system. Each layer must resist shearing, avoid excessive deflections that sources fatigue cracking within the layer or in overlaying layers and prevent excessive permanent deformation through

densification. As the quality of a soil layer is increased, the ability of that layer to distribute the load over a greater area is generally increased so that a deduction in the required thickness of the pavement layers may be permitted.

In this project stabilization has been done using tamarind seeds powder to improve the strength of the black cotton soil. Tests were performed to evaluate index and engineering properties

II. MATERIAL

A. Black Cotton Soil

Black cotton soils are the major form of soil groups found in India, and cover approximately 20% of the total area and found in most of the places. Most commonly founded in the central and western parts of India this includes the Maharashtra, Madhya Pradesh, Gujarat, and some part of Andhra Pradesh.
Black cotton soil is a type of problematic expansive soil which causes many problem in the construction of structure founded on them.
It is having a swelling and impervious nature with poor geotechnical sub-grade characteristics. As we know in Maharashtra, there is abundance of black cotton soil, so there is need to overcome the problems that are causing damage to the structure.

Fig 1. Black cotton soil

B. Tamarind peels powder

Tamarind is a hardwood tree known scientifically as Tamarindus indica. It's native to Africa but also grows in India, Pakistan and many other tropical regions. The tree produces bean-like pods filled with seeds surrounded by a fibrous pulp. An 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.

Fig 2 Tamarind peels powder

III. RESULTS AND DISCUSSION

The following tests were performed on the soil.

A. Moisture content of in-situ black cotton soil.
It was found to be 21.05%

B. Specific gravity of the soil was found to be 2.66.

C. Sieve analysis of black cotton soil is well graded soil.

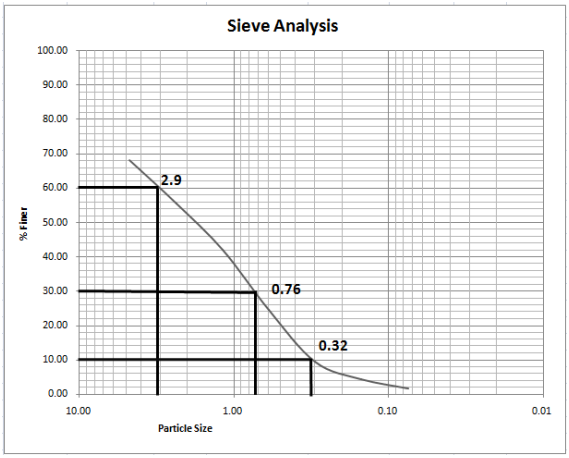


Fig 3 Sieve analysis Graph

D. The table 1 shows the results of Liquid Limit, plastic limit and Plasticity Index.

Description	Black cotton soil	BCS + 2.5% additives	BCS + 5% additive
Liquid limit (%)	45%	26.78	51.05
Plastic limit (%)	16.98%	47.22	31.11
Plasticity index (%)	28.04%	20.44	19.94

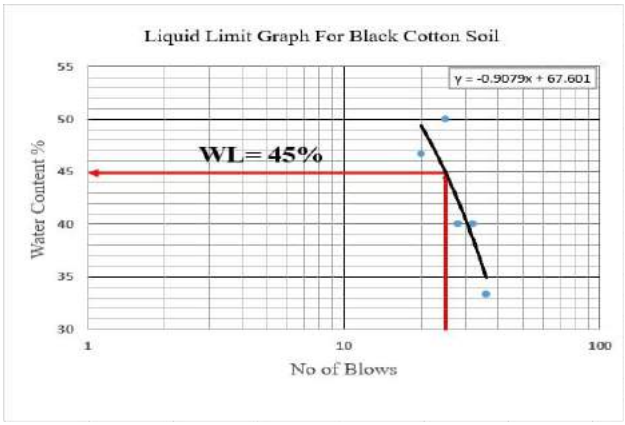


Fig 4 Liquid limit for Black cotton soil

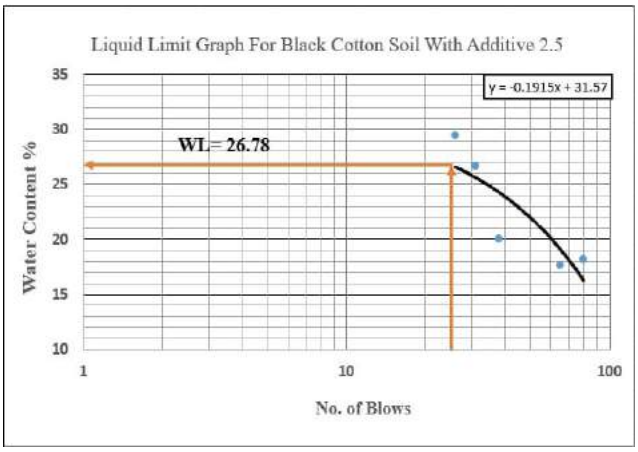


Fig 5 Liquid limit for Black cotton soil with 2.5% additive

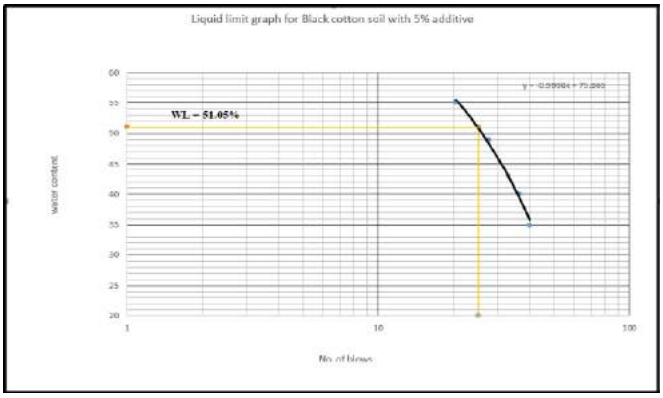
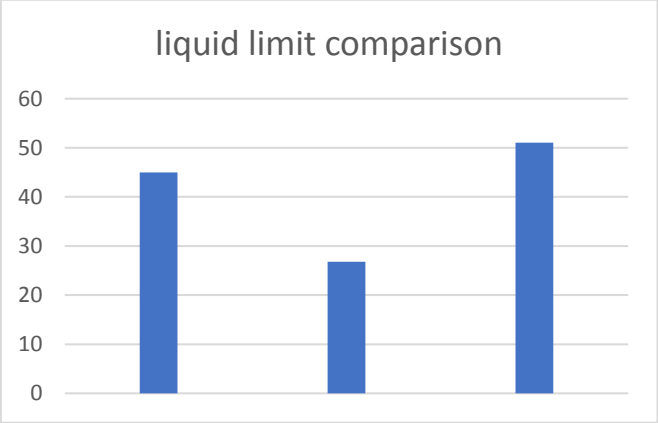


Fig 5 Liquid limit for Black cotton soil with 5% additive

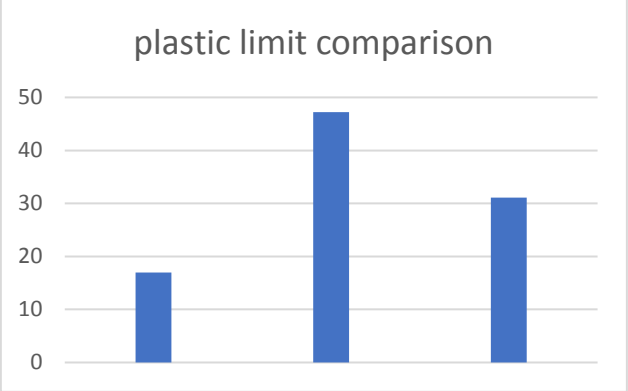
IV. CONCLUSION

The expansive soil was treated with tamarind seed powder to improve its properties. Following

conclusions were drawn based on the results of the tests conducted on Black Cotton soil. The effect of stabilizers varies based on the quantity of Stabilizers that are mixed with the Black Cotton soil sample. Black cotton soil was stabilized with tamarind seed powder with 2.5% and 5%.



It was observed that at 2.5% and 5% addition of additive the liquid limit first decreased and then increased respectively.



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A Review on Analysis of IOT Based Health Monitoring System

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ABSTRACT

Nowadays Health-care Environment has developed science and knowledge based on wireless-sensing Technology oriented. People are mislaying their life owing to heart attack because of the nonexistence of medical attention to patients at correct time. This is specially monitoring for a old age people and physically challenged patients informing doctor and loved ones. Hence, in this project we are implementing temperature and heart rate monitoring system using IoT. Both the sensors are connected to Arduino-uno. Sensors collects patients body parameters and transfers that data to Arduino Uno which further transfer that data to cloud with the help of WiFi module. Thus the data is stored in cloud database server. User can view this data with the help of website. This system shows the temperature and heartbeat of the patients live data with time over the internet. Thus Patient health monitoring system based on IoT helps the user monitoring their loved ones.

Keywords : Internet of Things, Arduino-uno, Healthcare, Cloud Computing.

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GoAgro - An Agriculture App

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ABSTRACT

It is an agricultural app that gives solutions to farmers in India. Go-Agro aims to disseminate useful information about improved technology to the farming community and service providers in rural areas. The major focus of the Agriculture sector presently in this app is to provide utility to farmers to concern about the fertility of soil as well as the fertilizers. To develop an android application, several technologies must be studied and understood. Client-side scripting techniques, implementation technologies such as Framework, languages and relational databases.

Keywords: Agriculture, Farming, Technology, Android

I. INTRODUCTION

Go Agro is an agricultural app that gives solutions to the farmers and students of agricultural studies in India. Go-Agro aims to disseminate useful information about improved technology to the farming community and service providers in rural areas. The major focus of the Agriculture sector presently in this app, is about Agricultural Policies & Schemes, Market Information.

Agricultural Based Practices, soil quality predictions, and fertilizers. So it provides soil analysis for all regions and suggestions on which fertilizers to use where and how much? And which crop, herb or vegetable to be grown where and in which season? It also provides the facility of generating the report of soil. This work is done on an online basis. An authorized agent would serve as a way for the farmers for soil analysis and report generation. This facility reduces the manpower and resources. Farmers and Agents provided with a Unique ID for logging into their accounts leading towards secure access. Go Agro app would make all the things automatic which make it easier to serve as the best solution to all the problems. It also helps to get valuable information regarding soil and fertilizers and also crops. It also helps the agricultural students to get practical information regarding various crops. It also helps the farmers to get information regarding soil, crops in awareness programs being conducted in villages. It provides information about crops, fertilizers, and market details that are requested. Go Agro App is an application that will help farmers to perform the agriculture activities leading to achieve and increase their standard of living. This project is useful for farmers as well as agricultural students also. Through this project, we are providing those facilities to farmers who are lacking in their village. The villages are not well developed like cities that's why many

things are unavailable in villages and have to go to cities to make that thing available.

II. Existing System

The previously existed systems where farmers were able to get all relevant information on specific subjects around their village/block /district or state. This information was delivered in the form of text, SMS, email. Farmers were also able to ask specific queries as well as give valuable feedback. Several services also provide news, market prices, technical advice, opinion and a range of vital interactive services for farm businesses of all shapes and sizes. It welcomes farmers and agri-business professionals helping them to find the latest agriculture information, farming news. There is a service named AgWeb is a source for agriculture news online which provides the latest articles on Corn Growing, Soybean Farming, Crop Farming, and live future trading information. But these systems do not provide soil testing reports as well as sales and purchase of fertilizers online. The major drawback of existing systems is that they only include informational websites and do not provide actual door to door facility.

III. Research and Findings

India is an agricultural country where 70 % of its rural households still depend primarily on agriculture for their livelihood. To succeed in taking the crops for the country and the livelihood the major aspects are the quality of soil and the usage of fertilizers. Around 66.46% of the Indian population still resides in rural areas and facing problems such as unavailability of soil testing laboratories so that they need to travel to the nearby cities or the soil remains untested. Another major problem faced by these farmers is the unavailability of the specific fertilizers required for taking the specific crop. For this again they need to travel to the urban regions which are near to them. Hence the problem is how to get rid of these situations facing by the farming community.

IV. CONCLUSION

By this project, we provide various information required for farmers and agricultural students and also providing solutions to them about queries posted by them. This makes agriculture more eco-friendly and this portal is very useful to farmers and agricultural students. Go Agro app would make all the things automatic which makes it easier to serve as the best solution to all the problems. Go-Agro provides the utility by which farmers can easily buy fertilizers for crops online which are unavailable in that region.

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Use of Magnesium Sulphate for the Stabilisation of Black Cotton Soil

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ABSTRACT

Black cotton soils are present in larger amount all over the world. Black cotton soil can ingest large amount of water which possess swelling of soil and shrinkage when water is evaporated. Searching the best stabilizer to overcome the problems in expansive soil and reducing swell-shrink phenomenon is still main concern, because every construction is built with or upon the soil. If the subgrade is not having enough robustness to resist heaves, the whole structure has to face problems like base failure, cracks etc. So keeping the stability of whole structure in mind the subgrade is replaced with stronger soil, but it is not so economical in case of large construction. Problems identified with black cotton soils, are well known to engineers. During the last few decades damage due to swelling-shrinkage process has been observed clearly in many areas in the form of cracking and breakup of pavements, roadways, building foundations, reservoir linings, irrigation systems, water lines, and sewer lines. In this research paper, efforts had been made to decrease the plasticity of highly plastic black cotton soil, by the use of additives i.e. Magnesium sulphate. The main focus of this study is to reduce the swell-shrink property black cotton soil and increase its strength by the use of magnesium sulphate.

Keywords : Black Cotton Soil, Ingest, Robustness, Stabilization, Magnesium Sulphate.

I. INTRODUCTION

The natural cohesive soil is very bad as an engineering material as it is having very low bearing capacity it is highly spongy in nature. Soil is naturally occurring material which is stabilized to increase the robustness and imperishability of the soil. The soil in subgrade is normally overstretch to assured minimum level of pressure due to the traffic loads [2]. The index properties of soil are determined by tests such as sieve analysis, specific gravity, liquid limit and plastic limit [1,7] Since we are dealing with Cohesive soil, which include Black cotton soil, it is highly cohesive in nature and is having swelling and shrinkage characteristics in cold and hot weather due to the presence of the clay Montmorillonite. Bumping and shrinkage of Expansive soil cause differential settlement resulting in severe damage to the foundation, building, roads, retaining structures etc. It has been noted that many civil engineering structures failed because of the presence of weak underlaying soil strata [5]. This kind of soil possess behaviour like liquidity behaviour, plasticity behaviour, compaction behaviour and many more. The swelling pressure of Black cotton soil will be imposed on Infrastructures such as the Foundation slab, Tunnels and results in Extensive damages to the structure [2]. the basic objective of present study is to examine the possibility 0f using magnesium sulphate in, in the context of expansive soil [3].road pavements , buildings, dams, sewer linings experience huge damage due to heaving caused because of loss of

strength, bumping of soil in rainy season and shrinking of soil in winter season in the form of cracks. Foundation founded of black cotton soil experience uneven settlement, more on the central portion than on the edges [4]. This troublesome behaviour of expansive soil from Engineering consideration is due to the presence of kaolinite, illite, and mainly because of Montmorillonite.

Engineers are very careful about using black cotton soil as a construction material for building, embankment etc rather they replace soft soil with strong soil. Sometimes it is not possible to replace expansive soil in some sites because of non-availability of strong soil with good load bearing capacity. The stabilization of expansive soil in such location is not possible, therefore it is required to add additives in the soil to increase its robustness. By the use of certain Organic and Inorganic Additives, we are going to stabilize the soil by the improvement of its bearing capacity and by calculating the contents of additives to be added to enhance the strength of soil. In this project we are going to stabilize the soil by enhancing its bearing capacity by using certain Additives and to make a foundation bed strong and lasting.

II. LITERATURE REVIEW

Kola Srinivas (2016):
They had used CNS (Cohesive non swelling) layer for improvement of Expansive soil. They had also concluded that swelling pressure increases with increase in dry density and decreases with increase in water content. They had also proved that other than CNS soils the techniques for stabilizing soil are very expensive. They had also studied that in non-Expansive cohesive soil, the movement of heave is uniform and more tolerable. From this study they had enhanced the property of expansive soil thereby balancing the existing soil.

Srinivas Ganta (2017):
They had done the study on stabilizing the soil by the use of rise husk and lime sludge by adding rise husk ash alone they had reduced the plasticity of soil. By adding rise husk Ash they had decrease the value of maximum dry density (MDD) and increases the (OMC) optimum moisture content by adding lime and rice husk ash to the soil. They had also observed that with increase in percentage of lime and rise husk ash the value of specific gravity increases and permeability of clayey soil decreases.

Geethu Chandran (2016):
They had concluded a study on heave control and stabilizing the Expansive soil using lime mixed GGBS ground granulated blast furnace slag) column. they had also performed strength tests on three combinations of GGBS and lime. They had observed in the study that by adding only GGBS in expansive soil only 18% heave reduction is obtained but by mixing lime with GGBS column 24% heave value is obtained. By providing 2 GGBS column 30% heave reduction is obtained. They have also obtained maximum strength improvement from this study.

III. METHODS AND MATERIAL

The materials used in this project are magnesium sulphate.

A) Black cotton soil:
In India, near about 16 to 20% of land is covered by expansive soil deposits, which includes black cotton soil. This soil has low shear strength and compressibility and it is highly plastic in nature. The soil that we had used in this project is organic soil.

Fig A shows Black cotton soil.

Fig A) black cotton soil

B) Magnesium sulphate:

$MgSO_4$ is a white crystalline solid, odourless having a density of 2.66g/cm² {anhydrous} 2.445g/cm² {monohydrate}. It is commonly called as Epsom salt. its molecular weight is 120.36{anhydrous} 138.38{monohydrate} & 246.47{heptahydrate}. Organic formula of magnesium sulphate is $MgSO_4$ $\{H_2O\}$.It does not cause any skin irritation or harm to the environment .Historically, $MgSO_4$ has wide variety of uses in construction ,so we had used magnesium sulphate to increase the safe bearing capacity of soil as well as decreasing the plasticity of highly plastic soil. It is more economical in case of large construction. We had done certain tests like specific gravity to identify the type of soil whether it is Organic or Inorganic, Sieve Analysis to assess the particle size distribution of Granular Material, Water content test to find out the Natural Moisture content of soil, liquid limit and plastic limit to find out the plasticity Index, Proctor test to find out the maximum dry density and Optimum moisture Content and direct shear test. we are going to counter the heaves using certain Additives so that we can reduce Unification and desiccation of soil, to improve soils Robustness as well as its imperishability by the use of additive i.e. Magnesium sulphate. Fig B shows magnesium sulphate powder.

Fig B) magnesium sulphate powder

IV. RESULTS AND DISCUSSION

The following index and engineering properties are found out on standard field soil and then tests are conducted for the magnesium sulphate mixed in soil. The magnesium sulphate was taken in proportion as 5%, 10%, 20% by the weight of soil.

The following tests were performed on standard Black cotton soil:

A) Specific gravity:

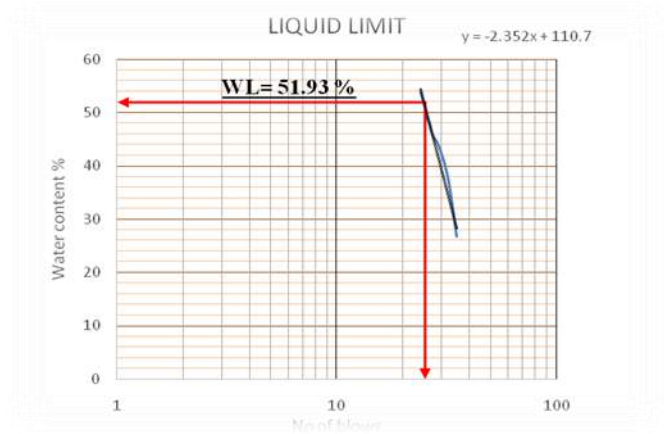
1)specific gravity is coming under the range of 2 to 2.5 i.e. the soil is organic soil in nature.

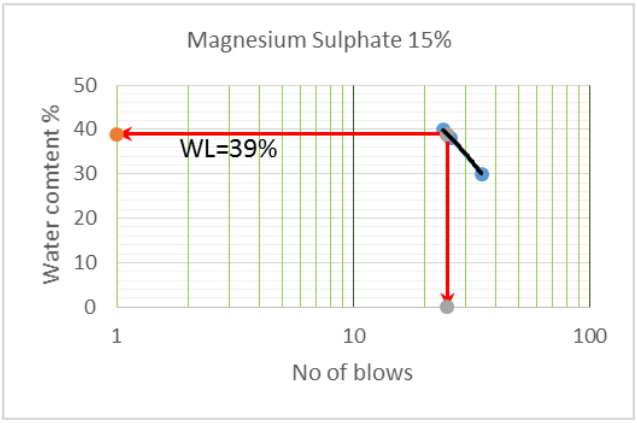
B) liquid limit:

1) The liquid limit of soil is found out to be 51% with standard field soil.

2) Whereas it was coming out to be 39% by adding 15% magnesium sulphate.

Graph:





C) plastic limit:

1) Plastic limit of standard soil or untreated soil is coming out to be 28.96%.

2)The plastic limit of soil is coming out to be 30.66% by adding 15% of magnesium sulphate.

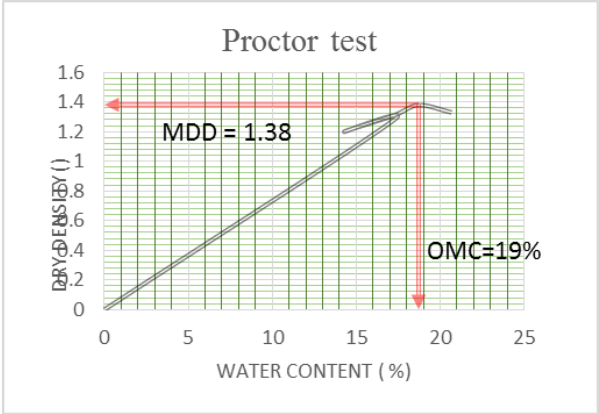
From liquid limit and plastic limit we found that the plasticity index of soil,

Plastic limit = liquid limit- plastic limit

= 22.04%

Therefore, the plastic limit of soil comes 22.04% which shows that the soil is highly plastic and cohesive in nature.

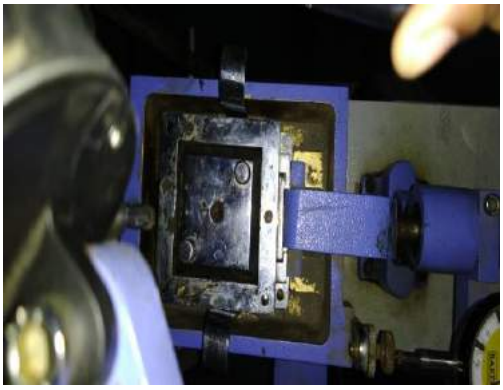
D) Proctor test:



RESULTS:

Optimum moisture content of untreated soil is coming out to be 19% at maximum dry density 1.38g/cc.

E) Direct shear Test:

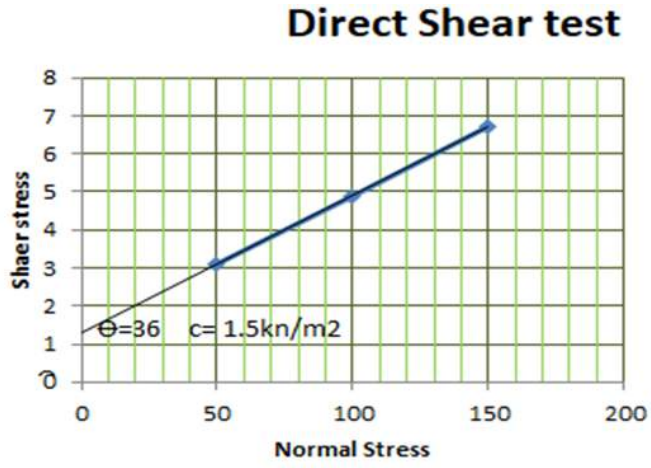


RESULTS:

1)Shear strength parameters for soil used in this test are

Cohesion, c=1.5kn/m ^{2}

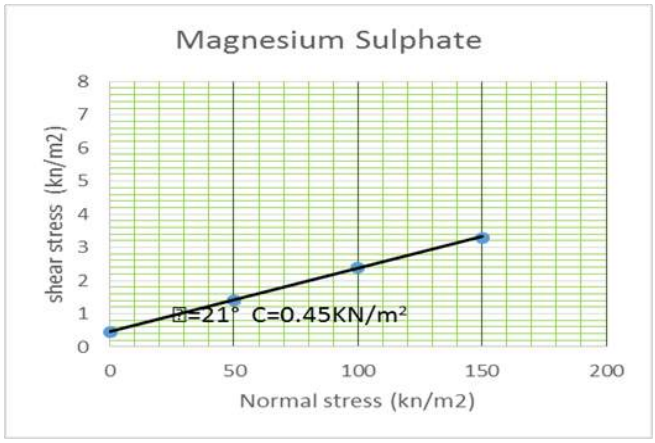
Shear Angle = 36˚



2)with treated soil with 15% Magnesium sulphate:

Cohesion(c) =0.45kn/m^2

Shear angle =21%



V. CONCLUSION:

The expansive soil was treated with magnesium sulphate to enhance its properties. From results based on the results of the tests conducted on black cotton soil, it is concluded that:

1) Expansive soil being problematic in nature is treated with magnesium sulphate to reduce its plasticity and improving the safe bearing capacity of soil.
2) Also, it is economical to add magnesium sulphate in soil to increase its strength because it is economical in case of large construction rather than replacing it with soft soil.

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Design of Scaffolding

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ABSTRACT

Temporary scaffolding on any construction site plays a vital role to ensure the safety of the work and for constructing any stable structure. These temporary structure are used to support worker and the required materials during the construction or repairing any building and other large structure, when performing any exercise at heights above the major concern for the scaffolding and so use of traditional scaffolding are now outmoded, so the contractors have to now use special scaffolding in the industry of construction. The proper design of scaffolding guarantee safety, easy accessibility and positioning so designing of the scaffolding should be done. Proper design of scaffolding will make sure the working on a secure structure. This research paper concern the importance, safety, design of scaffolding, types and analysis on STAAD pro. The paper contains the design of scaffolding for slab plastering work and box culvert and also the analysis on software

Keywords : STAAD Pro, Scaffolding

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Analysis of Various Losses in HVAC System

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ABSTRACT

Variable Refrigerant Volume (VRV) arrangement is one of the Heating, Ventilation and Air Conditioning (HVAC) type in the construction. VRV system is a multi-split type air conditioner that uses variable refrigerant flow supervises to offer consumers with the capacity to keep individual region be in charge of in each room and floor of a construction. VRV used in construction is made by DAIKIN Heavy Industries that was totally installed in 2020 with two pipes system format. The objectives of this study are to recognize the Variable Refrigerant Volume (VRV) system and also to study the root reason of its problem in Building, SARDA TILES, NAGPUR. The result of the study suggests poor workmanship during installation progression and not enough electrical bases are suspected as the causes of on-going and repeating troubles occurred. Hence, site engineer has worked out with the service provider to make out the core problem and leaking area before proceeding with repair and commissioning activities.

Keywords : Variable Refrigerant Volume (VRV), Variable Refrigerant Flow (VRF), Fan Coil Unit (FCU), heating Ventilation Air conditioning system (HVAC)

I. INTRODUCTION

Variable Refrigerant Volume (VRV) system is a heating, ventilation and air conditioning (HVAC) technology that quite new to the Indian market. In theory, VRV has a bunch to propose in terms of efficiency, running expenses, flexibility in use and manage. As with any system, it suits some buildings, applications and climates superior than others. In India, VRV has been installed in Sarda Tiles Building been serviced monthly by service provider. The objectives of this study are to know the Variable Refrigerant Volume (VRV) system and also to study the root reason of its crisis in Building.

II. BACKGROUND

Sarda Tiles Building consists of 4 main floors as a part of facilities in providing public services. There are 2 units of VRV outdoors to serve 12 units of VRV indoors. Also VRV system, there are a number of air-cooled split unit and air-cooled split ducted that have been install in construction as a part of HVAC system. VRV Indoors unit that have been used are wall mounted, ceiling concealed, ceiling balanced and cassette type. VRV system used in Building, are made by DAIKIN Heavy Industries which completely installed in 2020

Table 1.

Vrv System Design Summary For Shah Nanji Nagsi Office												
Sr.No	**Description**	**Length Rft**	**Width Rft**	**Area Sqft**	**No. Of Person**	**Type Of Indoor**	**Model No**	**Selected Tr.**	**UnitQty**	**TotalTr**	**Ci**	**Total Ci**
1	Sudeep's Cabin	12.1	10.1	122	4	Hi Wall Split	Fxaq40pve	1.3	1	1.3	40	40
2	Snehal's Cabin	12.1	10.4	124	4	Hi Wall Split	Fxaq40pve	1.3	1	1.3	40	40
3	Rajeshji's Cabin	12.1	9.7	117	4	Hi Wall Split	Fxaq40pve	1.3	1	1.3	40	40
4	Ashwin's Cabins	13.1	12.1	159	7	Cassette Unit 1 Way	Fxeq50av36	1.5	1	1.5	50	50
5	Javan's Cabin	12.1	10.4	126	4	Cassette Unit 1 Way	Fxeq40av36	1.3	1	1.3	40	40
6	Waiting & Reception			415	13	Cassette Unit 4 Way	Fxfq80avm	2.6	2	5.2	80	160
7	Workstation			1400	40	Ducted Unit	Fxmq140pbv36	4	3	12	125	375
7.1						Ducted Unit	Fxmq140pbv36	4.5	1	4.5	140	140
8	Workstation	19.7	17.8	351	11	Cassette Unit 4 Way	Fxfq100avm	3.3	1	3.3	100	100
				2815					**12**	**31.7**		
										Total Ci		**985**
										System Hp		**39**
										Diversity 116%		**34**

Site Engineer has observed VRV systems in building which experience on-going problems, seeming to go from bad to worse. In addition, the troubles keep reported in Helpdesk system although the same problems have been resolved before. Most faults experienced on a VRV system will effect in the complete system being out of action. With systems serving 2-8 indoor units, a fault on one unit could affect many people. As noted above, this adds severe pressure to get the problem fixed and the system operational as soon as achievable.

III. THEORY

Variable Refrigerant Volume (VRV) system is a multi-split type air conditioner. VRV has also been referred as Variable Refrigerant Flow (VRF) that uses variable refrigerant flow control to offer clients with the capability to sustain individual zone control in each room and floor of a building. The compressor unit is controlled by a variable-speed drive, which may control more efficiently than conventional compressors of parallel size. VRV technology was invented in Japan by Daikin Company in 1982. At the present time, most of HVAC system manufactures

have propose VRV systems to be used in mid and large size buildings. Figure 1 shows a typical layout of VRV system.

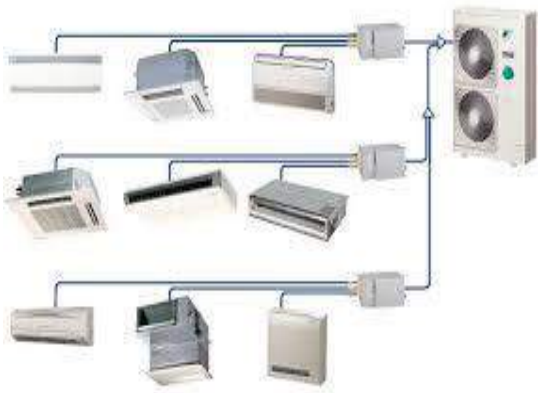

Fig 1 : Typical Layout of VRV System

VRV use refrigerant as the cooling and heating intermediate. This refrigerant is conditioned by a single outdoor condensing unit, and is spread within the building to multiple fan-coil units (FCUs).Approach in two system format, two pipe and three pipe systems. In a two pipe system which usually referred as heat pump system, all of the region must either be all in cooling or all in heating. A three pipe Heat Recovery (HR) systems has the capability to at the same time heat certain zones while cooling others. That is means VRV systems have a exclusive ability to extract heat out of areas have need of cooling and Put it into zones requiring heating. In both two-pipe and three-pipe systems

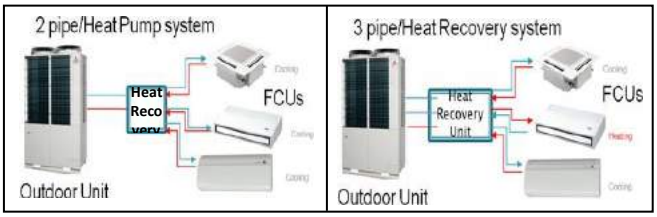

Figure 2. VRV Heat Recovery System Configuration Options

With refrigerant heat recovery, one or more heat recovery units are integrated between the compressor unit and the fan coil units. This unit controls the run of liquid and vapor refrigerants between the fan coil units in heating or cooling mode, and minimizes the load on the compressor. Methods vary by manufacturer who provides their own valves, heat exchangers, controls and other components. Figure 2 includes simplified diagrams of two configurations with heat recovery.

I. METHODOLOGY

The process flow chart of the study is explained in fig. 3. Process 1 is the definition of the problem and objectives of the study. Then process 2 is the specify study of the basic kind of the Variable Refrigerant Volume (VRV) system and collects the appropriate data from service report that had been prepared by contractor service. The next process is the analysis on the possible root reason with necessary proof and theory before concluding the study.

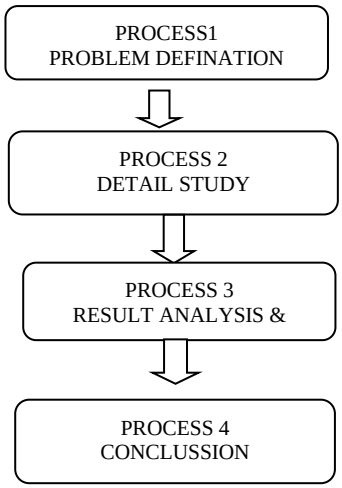

Figure 3. Flowchart of the methodology

II. RESULTS AND DISCUSSION

VRV system in the construction can save space for installation. The space efficiency is improved by the compact size of the individual units, the long maximum piping length, and the ability to use a large scale air conditioning system with a single piping circuit. Besides that, the system provides higher design flexibility especially in changing of layout that can be made easily. New compressor technology eliminates the need for piping calculations, which cut down the time needed for design. Outdoor units can be placed on the roof where they have no consequence on the design of the building interior. The lightweight and compact units of VRV mechanism can be transported using a regular lift. The pipes are few in number, making design simpler. Hence, the technology in VRV system simplifies the installation process in term of time and charge.

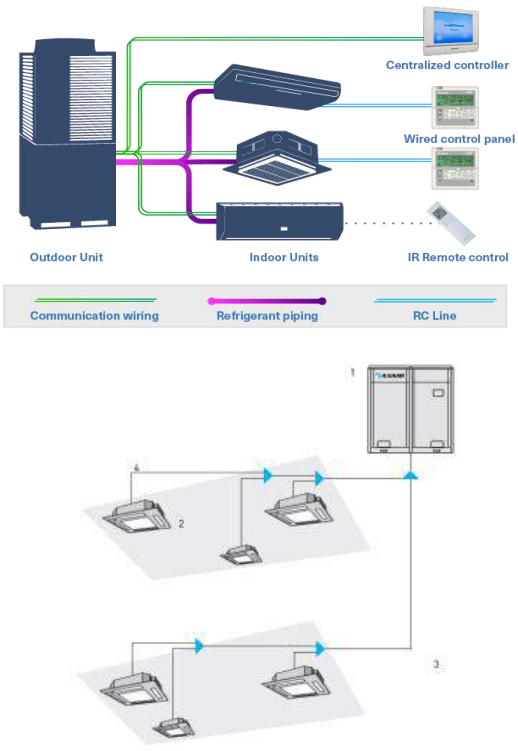

Figure 4 : Central air conditioning layout

VRV systems approval individual climate control settings for every zone to supply the maximum in comfort to commercial building setting. For vacant room, the system can be switched off individually as compared with centralized air conditioning system that use chilled water from chiller. Hence, the operational cost of the building will be reduced. Precise individual manage and inverter technology decrease energy consumption to transport best energy savings. VRV can get about 30% or higher energy cost saving relatively with other conventional HVAC system. In addition, VRV offers adaptable design that helpful to the building designer in selecting the matching unit in order to suit with their requirements. Modular design of outdoor units and wide selection of indoor units ensure system designs that are perfectly suited to the environments where they are installed. The noise level of VRV system is also extremely low. Units are designed to operate quietly and are also equipped with a function for silent operation that gives benefit to operate at night without disturbing people. In addition, the lesser number of compressors that can serve a lot number of FCU will contribute towards low level of noise for the whole building.

III. Types of Failure Found

The leaks specially on joints which may involve re-purging the lines with nitrogen or reassembling flared joints. The systems must then be thoroughly evacuated, to eliminate all air and moisture that may take several days.

Figure 5. Leaking detected during pressurized test

Electrical, electronic and control component failure can and do arise. These can be exacerbating by vibration from fans & compressors, excessive temperatures and poor quality power supplies. Obsolescence of control boards has been an issue with some brands with early generation apparatus. A compressor failure is the most regular serious problem and generally classified as electrical (compressor motor) or mechanical (compressor) failure. Assessment of the system's oil condition and physical inspection of the failed compressor provide the clues as to what may have contributed to the crash.

IV. Root Cause

After a problem being reported in Help Desk system, Site Engineer staff with service contractor will investigates the problem on site. Among the troubles reported was indoor unit is not functioning which leading the room not being cool. A large amount of trouble occurs is due to leaking on pipe work which roots causes stemming from poor installation, poor workmanship and also poor maintenance practice. With dry nitrogen, brazing work, retighten, vacuum work, and renew refrigerant R-410A and also testing and commissioning.

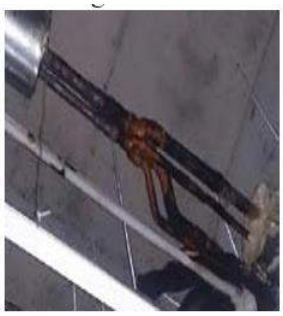

Figure 6 : Improper installed pipe due to poor workmanship

Comparison between R22 and R410a

	R22	**R410a**
REFRIGERANT	SINGLE COMPONENT REFRIGERANT	NON-AZEOTROPIC REFRIGERANT
REFRIGERANT OIL	MINERAL OIL	SYNTHETIC OIL
PRESSURE	1.9 MPA	3 MPA
COMPONANT PROPERTIES	CONTAIN CHLORINE (Ci)	DOES NOT CONTAIN CHLORINE
EFFECTS ON ENVIRONMENT	LESS ECOLOGICALLY FRIENDLY	MORE ECO FRIENDLY FOR ENVIRONMENT

The most common reason of a mechanical or more specifically a compressor failure is be short of oil at the compressor, usually caused by sludge and blocked strainers and oil-ways within the outdoor unit. As a result, that cause mechanical harm to the compressor bearings, suction and discharge valves. The service statement is likely to say 'compressor failure'.

Mechanical or valve break can only be confirmed if a compressor is cut- open for diagnosis. As per record in INDIA, 1 unit of compressor has been replaced. There is one unit of compressor that shown symptom of failure that wants to be replaced.

PROBLEM	CAUSE	SOLUTION
COMPRESER WILL NOT OPERATE	NO ELECTRICAL POWER	TURN ON POWER. PUSH RESET BUTTON
	LOW OIL LEVEL	CHECK OIL LEVEL, REPLACE OIL IF NECESSARY
	PRESURE SWITCH NOT MAKING CONTACT	SEE PRESURE SWITCH ADJUSTMENT
EXCESSIVE NOICE IN OPERATION	LACK OF OIL IN CRANK CASE	CHECK FOR POSSIBLE DAMAGE TO BEARING REPLANISH THE OIL LEVEL
EXCESSIVE OIL CONSUMPTION	OIL LEAK	TIGHTEN BOLT OR REPLACE GASKET
COMPRESSOR SUDDENLY STOPS WORKING	BAD UNLOADER VALVE	REPLACE THE UNLOADER VALVE

V. CHALLENGES

Mechanical damage due to constant lack of oil or foaming oil due to low refrigerant levels will result in metal fines being released as metallic components wear extremely. These fines will chunk strainers within the refrigeration system which are normally non serviceable and hard to find, causing a further lack of oil return to the compressor. As mention above if this process is allowed to repeat, further compressor failures are likely to result. Physical leak finding is difficult as the refrigerant pipes are insulated, and is even harder where they are run in hard to find or difficult to access spaces. Also leaks on internal parts of equipment, such as indoor units, can be not easy to find without disassembly. It is almost not possible to decide how much refrigerant has been lost. If the oil has become acidic it must be virtually totally removed from the system. To achieve this, the suction accumulators should be replacing along with failed compressors. The piping and indoor units should also be ruined, but this is very hard and time-consuming. Therefore the new compressor starts out life in an acidic environment, which is likely to lead to another early failure. If this process is allowed to replicate, a runaway trail of compressor failure is likely to result.

CLIMATE

The air conditioning companies are recognized to be the busiest especially when the weather is very cold or very hot. The extreme temperatures are known to put more pressure on equipments and can with no trouble make the service calls more urgent. Most of the HVAC technicians are usually known to work on the roofs or in move slowly spaces in cold and hot conditions. Definitely, your HVAC business will always come across seasonal lows and highs hence,

you will always need to manage your funds in order to take advantage of the time and flush times.

Costs

The HVAC companies require invest in top class and particular equipments such as vans or tacks that will help in carrying the equipments and software for carrying out diagnostic testing and managing equipment controls. However, this will take you some steep funds in order to get started. As the business owner, you will also be responsible for the medical insurance, workers compensation insurance, payroll taxes and liability insurance which will add up to some major costs.

VI. PRECAUTION

During Installation of VRV system, some safety measure action need to be considered as listed below:

a) The system shall be planned by a competent, experienced professional air conditioning engineer.
b) Use a supplier-approved qualified installer.
c) Use corrosion-treated outdoor units, to make the most of their life.
d) Make sure isolating valves with service-ports are fitted for every indoor unit.
e) Make sure all brazing is done using nitrogen purging and at least some joints are witnessed.
f) Make sure pipe work pressure tests are undertaken in accordance with the manufacturer's recommendations and are witnessed.
g) Make sure proper system evacuations are undertake to remove all moisture and are witnessed.
h) The system shall be commissioned by a supplier-approvedagent.
i) During installation double check your equipment.
j) On daily basis you are likely to encounter a range of chemicals that can pose a serious threat to your health. You should familiarize yourself with it or ask an expert before handling it. It's better to be safe than sorry.

Pressure testing is frequently absent or carried out lower than recommended levels due to time constraint. Pressure testing pipe work and joints stresses the metals in dissimilar directions than achieved by system evacuation procedures. Proper triple evacuation procedures must be followed and will preferably be left until a specific level of vacuum is attained slightly than by time alone. Enough time must be allowed, particularly in cold weather for all of the moisture to be drawn out of a system. There is no short-cut to this process. It will take as long as it takes and on a vast system, it could sit under vacuum for 3-5 days before suitable results are achieved. If a system requires repairs such as a compressor replacement or alteration work such as relocation of an indoor unit, all of the measures linking to a new installation must be followed.

VII. CONCLUSION

VRV system requires the same level of care and awareness to detail as afforded to large chillers or industrial refrigeration systems. As a conclusion, poor workmanship during installation process and cause of a mechanical or more specifically a compressor failure is lack of oil at the compressor, usually caused by sludge and blocked strainers and oil-ways within the outdoor unit in Sarda Tiles building. Hence, site Engineer has worked out with service contractor to identify the main problem and leaking area before proceed with repair and commissioning activities. One of the major repair activities done was replacing

the piping especially at joint area and some mechanical parts, like refinite, compressor, etc.

VIII. ACKNOWLEDGEMENTS

Thanks to all the contributors, especially to site Engineer, Contractor, staff and our project Guide whose gave the authors fully support and guidance to complete this paper.

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Solar PV Operated Circulating Air Cooler

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ABSTRACT

Solar power systems being considered as one of the path towards more sustainable energy systems, considering solar-cooling systems in villages would comprise of many attractive features. This technology can efficiently serve large latent loads and greatly improve indoor air quality by allowing more ventilation while tightly controlling humidity. Despite increasing performance and mandatory energy efficiency requirements, peak electricity demand is growing and there is currently no prevalent solar air cooling technology suited to residential application especially for villages, schools and offices. This project reviews solar powered air cooler for residential applications.

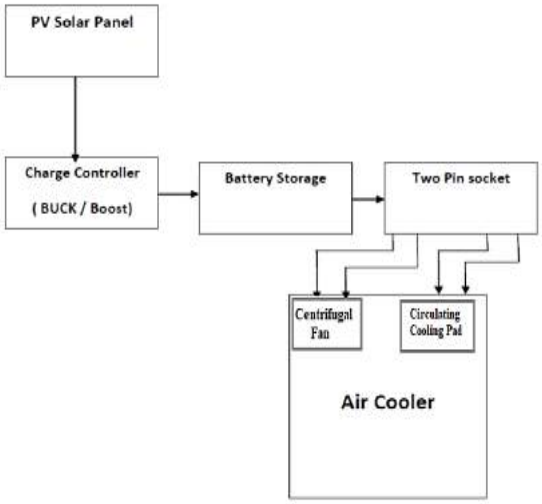
The development of renewable energy is on the rise worldwide because of the growing demand on energy, high oil prices, and concerns of environmental impacts. In recent years, progress on solar-powered air cooling has increased, nowadays it is observed that there are many accident which takes place due to shock from body of air cooler and it was analyzed that, problem occurs due to submerged water pump used in the traditional design of the cooler, so to overcome this problem we have introduce new design of cooling with circulatory arrangement in such a fashion that there is no need of water pump for air cooling.

Keywords : Circulating, Ventilation, Cooling.

I. INTRODUCTION

The demand of air cooling is increasing due to the effect of climate change and global warming if we still rely on the conventional electric air cooling but electricity is generated from fossil fuel,the green house gas emission would continuously worsen global warming ,in turn the demand of air cooling would be further increasing. In subtropical cities, air cooling is a standard provision for buildings. However ,air cooling would commonly take up half of building electricity consumption.

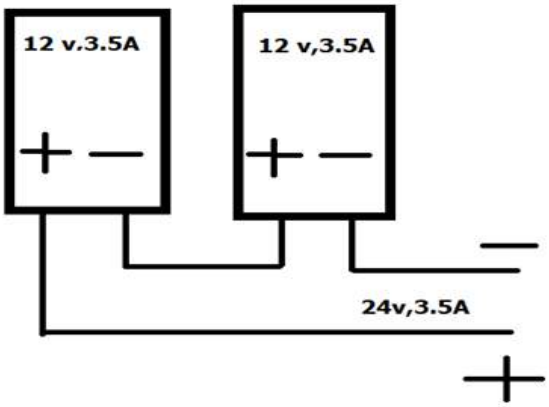
II. BLOCK DIAGRAM



III. SOLAR PANEL (PV)

Solar photo voltaic technology converts the sun energy into direct current electricity by using semiconductor material (silicon). The electrical charge is consolidated in the PV panel and directed to the output terminals to produce low voltage (Direct Current) - usually 6 to 24 volts. The most common output is intended for nominal 12 volts, with an effective output usually up to 17 volts. A 12 volt nominal output is the reference voltage, but the operating voltage can be 17 volts or higher much like your car alternator charges your 12 volt battery at well over 12 volts.

We are connecting two solar panel of 12 v and 3.5A in series .In output ,the voltage of both solar panel get added and the current is remain same .so we get desired output of 12 v with 3.5 A.



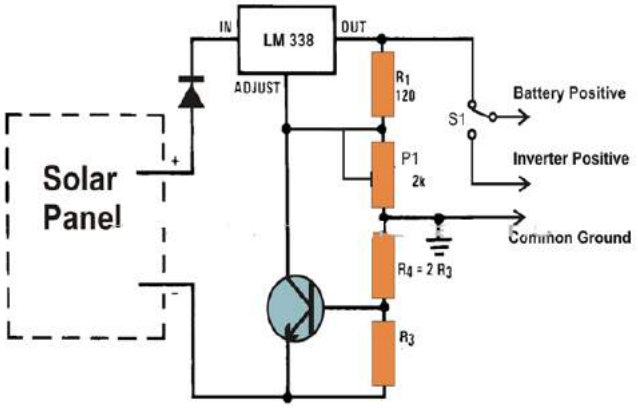
IV. CHARGE CONTROLLER

A solar charge controller is fundamentally a voltage or current controller to charge the battery and keep electric cells from overcharging. It directs the voltage and current hailing from the solar panels setting off to the electric cell. Generally, 12V boards/panels put out in the range of 16 to 20 V, so if there is no regulation the electric cells will damaged from overcharging. Generally, electric storage devices require around 14 to 14.5V to get completely charged. The solar charge controllers are available in all features, costs and sizes. The range of charge controller are from 4.5A and upto 60 to 80 A.

V: FUNCTION OF CHARGE CONTROLLER:

- Charges the battery.
- Gives an indication when battery is fully charged.
- Monitors the battery voltage and when it is minimum, cuts off the supply to the
- load switch to remove the load connection.
- In case of overload, the load switch is in off condition ensuring the load is cut off

VI :CIRCUIT USING LM 338 FOR CHARGE CONTROLLER:



V. VARIOUS COMPONENT FOR HARDWARE IMPLEMENTATION

1.**Battery Description**

A battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, mobile phones, and electric cars. When a

battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that will flow through an external electric circuit to the positive terminal. When a battery is connected to an external electric load, a redox reaction converts high-energy reactants to lower-energy products, and the free-energy difference is delivered to the external circuit as electrical energy. Historically the term "battery" specifically referred to a device composed of multiple cells, however the usage has evolved to include devices composed of a single cell.
Rating of Battery :12V, 8AH

2.Centrifugal Fan

A fan is a powered machine used to create flow within a fluid, typically a gas such as air. A fan consists of a rotating arrangement of vanes or blades which act on the air. The rotating assembly of blades and hub is known as an impeller, rotor, or runner. Usually, it is contained within some form of housing or case. This may direct the airflow or increase safety by preventing object from contacting the fan blades. Most fans are powered by electric motors, but other sources of power may be used, including hydraulic motors, hand cranks, internal combustion engines, and solar power.
We are using DC motor of 12V, 2A . when the motor is operating at normal condition, it will attain the speed of about 1462rpm and when the speed is further increase it will reach to 2800rpm.

3.Circulating Cooling pad:

The cooling pad material play significant role in the cooling. The hot air is first passed through cooling pads the cooling pads is already absorb the cool water are ready to transfer the cooling to the air. Cool air comes out the cooling pads immediately circulating outside with the help of fan.
In solar PV operated air cooler we not used submerged water pump instead of this we make new design of cooling with circulatory arrangement in such a way that there is no need of water pump for air cooling purpose. The cooling pad are made up of wood shavings and synthetic fibre they look like almost grass the most important accepts of cooling pad is they are much cheaper and very economical. The only problem with cooling pad is they need high maintenance, You need to clean the cooling pads very frequently apart from that. They are very less durable and need to replace it frequently.

We are using DC motor of 24V, 2A , 612rpm for rotating the cooling pads.

VI. HARDWARE IMPLEMENTATION

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Sentiment and Text Analysis

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ABSTRACT

In this process, the goal is to identify and extract object features that have been commented on by the opinion holder and determine whether the opinion is positive, negative, or neutral. An objective sentence presents some factual information, while a subjective sentence expresses personal feelings, views, emotions, or beliefs. However, just knowing that sentences have a positive or negative opinion is not sufficient. This is an intermediate step that helps filter out sentences with no opinions and helps determine to an extent if sentiments about entities and their aspects are positive or negative.

Keywords : Sentiment analysis, Lexicon learning, WordNet, Appraisal theory.

I. INTRODUCTION

We'll be building a real-time chat application in which we are suggesting emojis and text based on the context of messages received.Using our application users can get emojis and text suggestions as replies to received messages while engaging in a chat.We are implementing the Pusher's pub/sub pattern to ensure the security of the system.We'll be using Angular JS technology for developing real time chat application.This chat application is basically used for chatting purpose and allow it's user to chat with their friend circles to join this chat system.Using sentiment analysis, we can suggest emojis to be used as replies to messages based on the context of the received message.Whereas using text analysis, we can suggest text to be used as replies to messages based on the context of the received message.

Chat Application has become a day-to-day utility for everyone. The reason for choosing this chat application is that it provides a good scope for beginners to implement a network based system. IC is a type of chatting application that provides text-transmission over the Internet. Chat Application operates in a similar way as that of a LAN Messenger

over a Local Area Network. Messages are transmitted between two parties i.e. The sender and the receiver, it can also be between more than two parties (group chatting). The messages transmitted are bi-directional in nature. Messaging applications also use push technology to provide real-time transmission of messages as they are composed, character by character.

II. MATERIAL AND METHOD

TECHNOLOGY USED

AngularJS is a JavaScript-based open-source front-end web framework mainly maintained by Google and by a community of individuals and corporations to address many of the challenges encountered in developing single-page applications. It aims to simplify both the development and the testing of such applications by providing a framework for client-side model–view–controller (MVC) and model–view–viewmodel (MVVM) architectures, along with components commonly used in rich Internet applications.

AngularJS is the frontend part of the MEAN stack, consisting of MYSQL database, Express.js web application server framework, Angular.js itself, and Node.js server runtime environment.

DATABASE

MySQL is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter and "SQL", the abbreviation for Structured Query Language.

MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL was owned and sponsored by the Swedish company MySQL AB, which was bought by Sun Microsystems (now Oracle Corporation).

SUPPORTING TECHNOLOGY

Visual Studio Code is a source code editor that can be used with a variety of programming languages. Instead of a project system it allows users to open one or more directories, which can then be saved in workspaces for future reuse. This allows it to operate as a language-agnostic code editor for any language, contrary to Microsoft Visual Studio which uses the proprietary .sln solution file and project-specific project files. It supports a number of programming languages and a set of features that differs per language. Unwanted files and folders can be excluded from the project tree via the settings. Many of Visual Studio Code features are not exposed through menus or the user interface, but can be accessed via the command palette.

1) AFINN-BASED SENTIMENT ANALYSIS

AFINN is a list of words rated for valence with an integer between minus five (negative) and plus five (positive). Sentiment analysis is performed by cross-checking the string tokens (words, emojis) with the AFINN list and getting their respective scores. The comparative score is simply: sum of each token / number of tokens. So for example let's take the following:

I love cats, but I am allergic to them.

That string results in the following:

```
{
  score: 1,
  comparative: 0.1111111111111111,
  calculation: [ { allergic: -2 }, { love: 3 } ],
  tokens: [
    'i',
    'love',
    'cats',
    'but',
    'i',
    'am',
    'allergic',
    'to',
    'them'
  ],
  words: [
    'allergic',
    'love'
  ],
  positive: [
    'love'
  ],
  negative: [
    'allergic'
  ]
}
```

- Returned Objects

Score: Score calculated by adding the sentiment values of recognized words.

Comparative: Comparative score of the input string.

Calculation: An array of words that have a negative or positive valence with their respective AFINN score.

Token: All the tokens like words or emojis found in the input string.

Words: List of words from input string that were found in AFINN list.

Positive: List of positive words in input string that were found in AFINN list.

Negative: List of negative words in input string that were found in AFINN list.

In this case, love has a value of 3, allergic has a value of -2, and the remaining tokens are neutral with a value of 0. Because the string has 9 tokens the resulting comparative score looks like: (3 + -2) / 9 = 0.111111111

This approach leaves you with a mid-point of 0 and the upper and lower bounds are constrained to positive and negative 5 respectively (the same as each token! 😈). For example, let's imagine an incredibly "positive" string with 200 tokens and where each token has an AFINN score of 5. Our resulting comparative score would look like this:

(max positive score * number of tokens) / number of tokens

(5 * 200) / 200 = 5

2) Tokenization

Tokenization works by splitting the lines of input string, then removing the special characters, and finally splitting it using spaces. This is used to get list of words in the string.

III. RESULT AND DISCUSSION

Module 1: Login and Signup

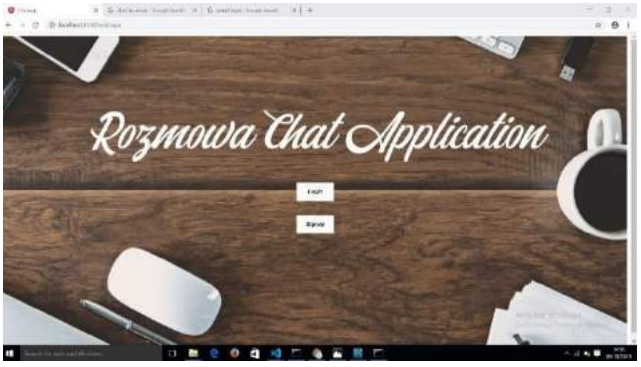


Fig (a): Home Page of proposed system

The home page shows all the basics of the task which the user wants to perform it can be login or signup for chatting.

Module 2: Chat Application Module

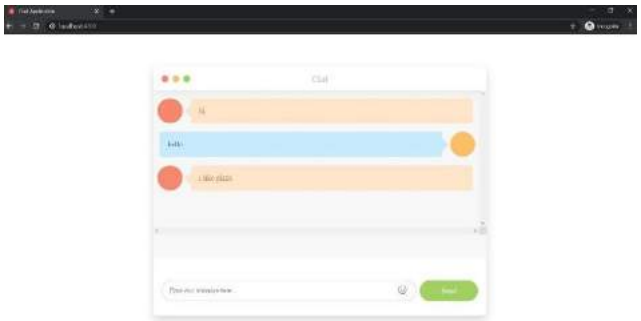
Fig(b): Chat Page

The chat sessions are stored locally on the client computer. The user can easily review the messages that are exchanged by using the chat history. The main use case is: user A sees B online, A sends a message to B, B receives it.The secondary use case is: user A sees B offline, A sends a message to B. When B comes back online, B receives the message. The goal is to minimize latency. Speed matters. The messages should arrive in order. We cannot lose messages but receiving duplicates once in a while is fine. Just text data, no binary data

Module 3: Text Analysis Module

This module suggests the text while chatting.

Module 4: Sentiment Analysis Module



This module suggest the emojis based on the context of messages recived.

IV. CONCLUSIONS

Finally, to conclude, a prototype chat application which demonstrates how real time sentiment analysis can be used to detect user's mood by analyzing the chat messages has been developed.

In its current form, it is a prototype of a chat application having Real-Time Sentiment Analysis capabilities.

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Linear Gantry Robot Control System

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ABSTRACT

A Linear Robot comprises of a controller mounted onto an overhead framework that permits development over a flat plane. Gantry are likewise called Cartesian or straight robots. Direct Gantry Robot will be made which will pick and place the things in ideal spot. Initially, a robot with two hub primarily x-hub and y-hub will be made utilizing different electronic instruments after that one programming will be made will provide guidance to the robot to move according to the necessity. The product will be configuration utilizing python programming and will be constrained by Linux working framework and furthermore by Raspberry pi's GPIO header. By making this framework the effectiveness will expand, takes less floor space, will be lower in expense and it can accomplish substantial payloads.

Keywords : Pick and place movement, Cycle Time, Estimation, Axes, Control system, Path planning, Driver, Linear motion.

I. INTRODUCTION

With its two tomahawks, the straight gantry robot LGR is prefect for stacking and emptying machines and installations, just as taking care of parts between various stations. The framework, made up of aluminium and steel tomahawks can ship heaps of up to 1500 kg and has stroke of up to 40m per carriage. The all out length of the robot is up to 100m.

II. INTERCONNECTIONS IN MACHINE

1) Input and output

Raspberry Pi is a sort jack of all trades when it comes to being a single board computer based on the Arm processor. The general purpose input output(GPIO) pins on the Raspberry pi speak and listen to the outside world and can be controlled or programmed. Each pin has a specific role. Its hardware has a limited number of digital I/O pins.

A discrete signal (digital signal) supplied to Raspberry Pi is known as digital input. This signal can be generated manually using a push button switch.

Push button switch is a switch which provides connectivity between its terminals when pressed. When the button is released terminals get disconnected.

Python coding with Raspberry Pi connects your project to the real world.[5]

2) Coordinates of the input

A coordinate system with axes or dimensions that are intersecting and perpendicular(orthogonal). The origin is the intersection of the three coordinates-x,y

and z axes that locate a point in space and measure its distance from any of three intersecting coordinate planes. The coordinates are used to identify points for the positioning of an end-effector.

A python code is used to find the coordinates of the input. These coordinates are further segmented to get a precise and smooth curves and lines. The coordinates found in such a way that it can be easily implemented by the stepper motor.

Sometimes it is impossibles to get the precise curve, in such cases the point nearest to the original path of the curve is used to get a curve like structure. More the precision and less the degree of the motor used, smother the curve generated.

This method is quite similar to how pixels are used to get better resolution.[5]

III. CONTROLLED PATH

This robot is thought its motions according to capabilities inherent in point-to-point and continuous path systems: robot axes need not be specified, while the desired contour, acceleration, and deceleration are automatically generated. Special features of this kind of robot are path computations, programmable velocities, coordinated axis motions, abilityto make changes in end-effector length.

Optimization Method by Dynamic Programming:

Suppose the time taken by the Cartesian robot in one cycle time is T. Then our is to minimize cycle time Hence the Optimization Function is as follow.

$$Tmin = \min \left[\sum_{i=1}^{17} ti \right]$$

Where reduced Robot Cartesian Cycle time is depends only on distance between patch1 to patch2. Because we cannot make any anywhere else Hence:

$$Tmin = \min \left[\sum_{i=2}^{6} ti \right]$$

Where t2, t4, t6 are constant, because these are the necessary distance which have to travel by Cartesian robot.[5]

Now our goal reduce the is only to reduce t3 and t5. Only t3 and t5 are varying. Hence the optimization function is only depends upon t3 and t5.Means our goal is to minimize the distance travel by the Cartesian robot in time t3 and t5. So the final optimization of function is:

Tmin =min(t3+t5)

IV. CONSTRAINTS

We have to minimize the distance travel during time t3 and t5 such that the distance travel in these time should be greater then the height of stopper placed there.

Suppose the height of stopper is hs and distance travel in time t3 or t5 is d.Then our constraints for minimization function is:d>hs

(d=Distance Travel in Time t3 or t5,hs=Height of Stopper)

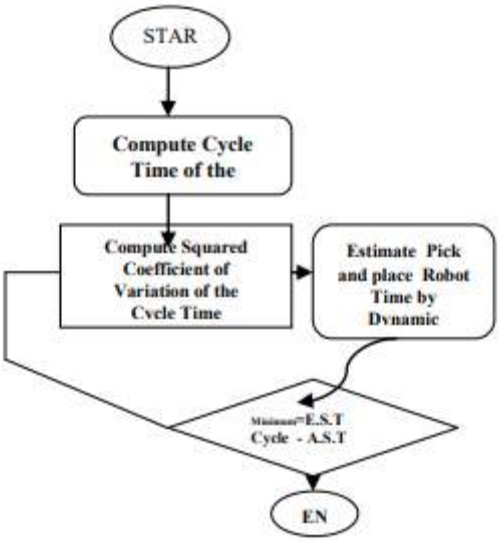

Figure 1. Estimating Parameters of Cycle Time[5]

V. SIMULATION OF ACTUAL & ESTIMATED TIME AND DISTANCE

Parameter of robot movement to pick and place crown gear to evaluate of reducing time parameter of Cycle in comparison actual robot working cycle by calculating Matlab Software.[5]

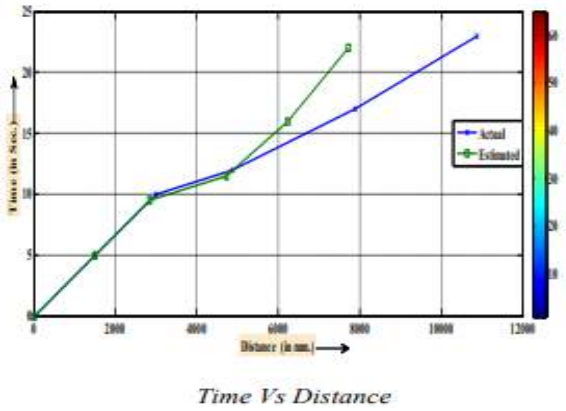

Figure 2. Actual Vs Estimate(1)

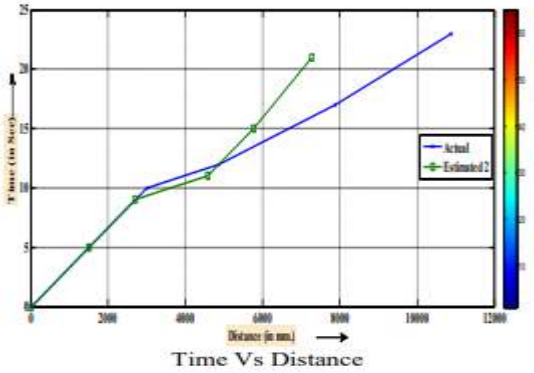

Figure 3. Actual Vs Estimate(2)

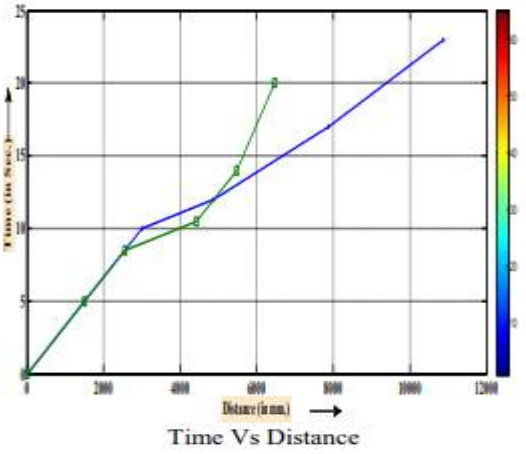

Figure 4. Actual Vs Estimate(3)

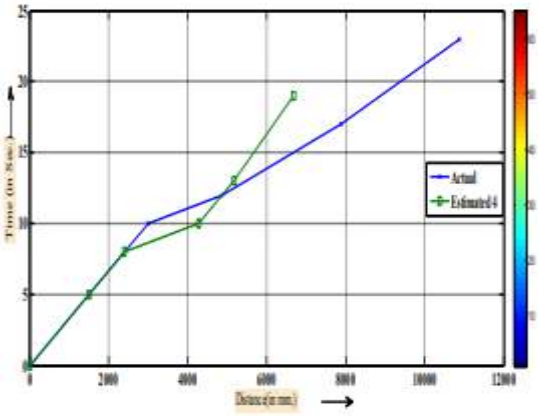

Figure 5. Actual Vs Estimate(4)

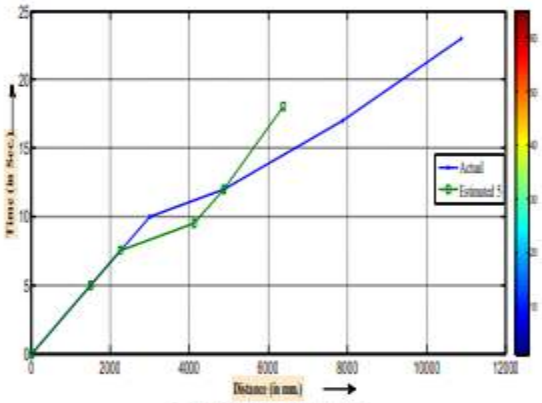

Figure 6. Actual Vs Estimate(5)

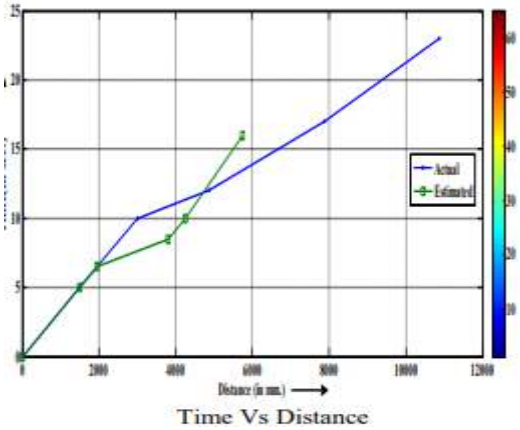

Figure 7. Actual Vs Estimate(6)

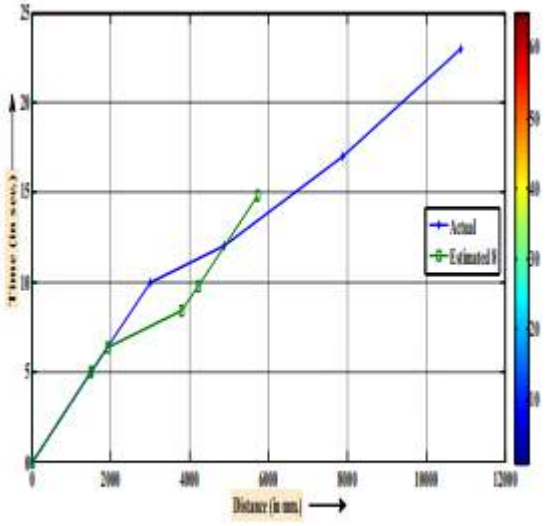

Figure 8. Actual Vs Estimate(7)

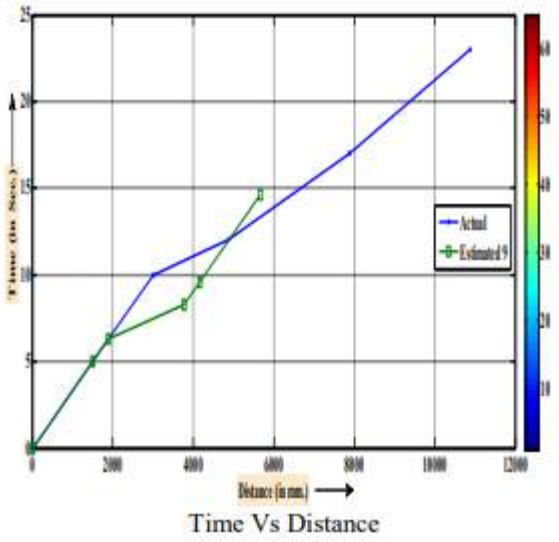

Figure 9. Actual Vs Estimate(8)

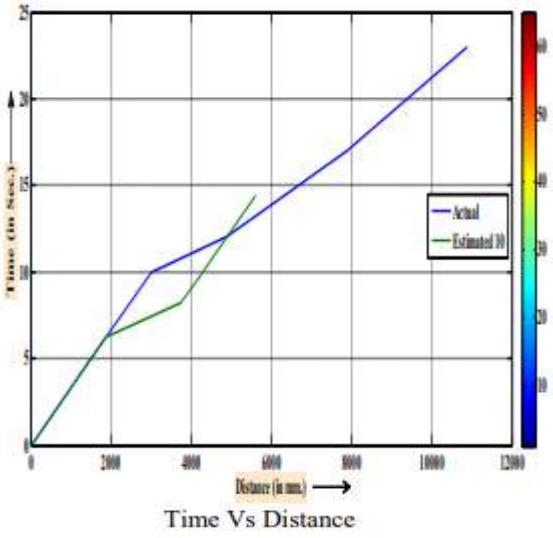

Figure 10. Actual Vs Estimate(9)

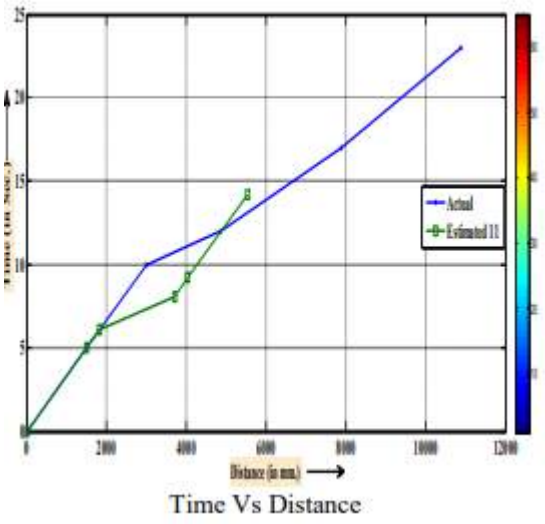

Figure 11. Actual Vs Estimate(10)

TABLE 1. Comparison data Actual Vs Estimate Time

Actual time (in second)	Estimated time (in second)	Reduced time(in second)
15	15	0
5	5	0
5	1	4
2	2	0
5	1	4
6	6	0
6	6	0
9	9	0
5	5	0
3	3	0
2	2	0
3	3	0
3	3	0
1	1	0
2	2	0
1	1	0
7	7	0
80	72	8

VI. PATH PLANNING USING BEZIERCURVES

Bezier curve is a space curve, which is credited to Pierre Bezier of the French car firm Renault. Unlike other type of curves like polynomials or cubic spines, Bezier curve does not pass through all the data points used to define it. The points that are used to define a Bezier curve are called control points. A polygon that can be drawn through these control points is known as Bezier polygon. Bezier curves is contained within convex hull of the defining polygon. The turning points are the points where the slope of the curve changes its sign. Bezier curves have fewer turning points so that it is smoother that cubic spines. The first first and the last points on the curve are coincident with the first and last control points. The tangent vectors at the end points of the Bezier curve are directed along the first and last span of the polygon. The radius of curvature of the Bezier curve varies smoothly from the starting point to the end point because of its continuous higher order derivatives.[1]

The three points P0, P1, P2 are the control points of the quadratic Bezier segment. On the images these points are connected with straight lines. P0 and P2 are the endpoints of the curve, P1 (marked with ×) usually is not on the curve. The formula

$$B(t) = (1-t)^2 P_0 + 2(1-t)tP_1 + t^2 P_2, \quad t \in [0,1]$$

is parametric, that is there are two expressions in terms of parameter t, that define x(t)and y(t):

Example for a=3:

$$B_x(t) = (1-t)^2 P_{0x} + 2(1-t)tP_{1x} + t^2 P_{2x},$$
$$B_y(t) = (1-t)^2 P_{0y} + 2(1-t)tP_{1y} + t^2 P_{2y}.$$

So for the first image we can assume that the control points looks like

$$P_0 = (0, a), \quad P_1 = (0, 0), \quad P_2 = (a, 0),$$

for some constant a.

Note, that coordinates of the points are completely independent of the parametric range [0,1].

The two images demonstrate how the curve changes, when just one endpoint is moved.

Example for a=3:

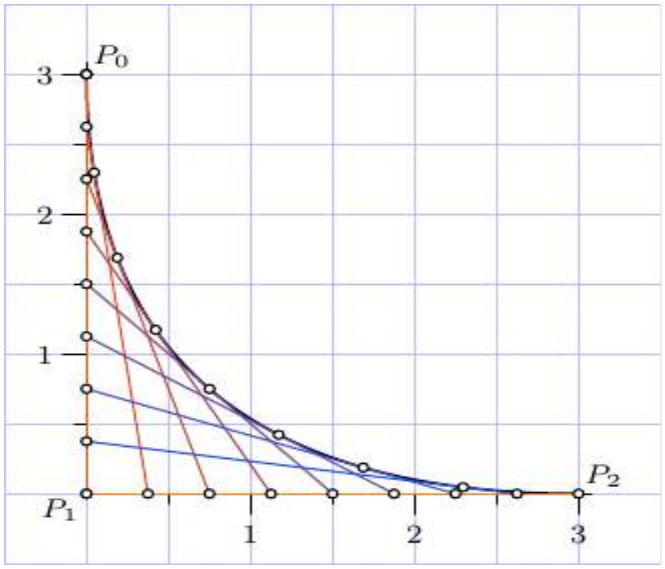

Figure 12. Bezier curve shown by points through tangents

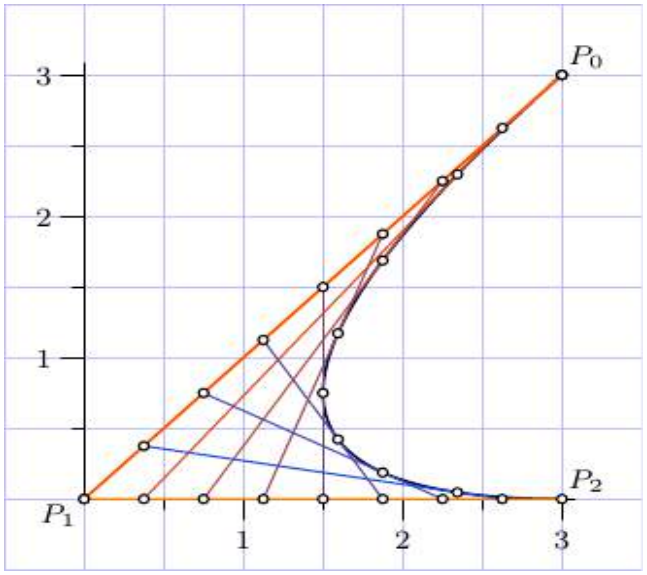

Figure 13. Bezier curve shown by points through tangents

The tangent lines on the images illustrate the process of construction of the points on a quadratic Bezier curve by means of the points on linear Bezier segments:

1. Connecting the control points P0–P1–P2, we create two linear Bezier segments: P0P1P0P1 with control points P0 and P1, and P1P2 with control points P1 and P0,
2. For any t∈[0,1], find points ut,vton the line segments P0P1and P1P2

$$u_t = P_0(1-t) + P_1(t),$$
$$v_t = P_1(1-t) + P_2(t).$$

Next, find the point wtwt on the linear Bezier segment is utvt with control points ut and vt.

$$w_t = u_t(1-t) + v_t t,$$

and the point wt is the point on the quadratic Bezier curve.

In the image, the curve seems to be the envelope of the lines whose x and y intercepts add to 11. These lines are given by

$$y = y_0 \left(1 - \frac{x}{1-y_0}\right) ,$$

where y0 is the y intercept.

The envelope maximizes y with respect to y0 for given x. Setting the derivative of y with respect to y0 to zero yields

$$1 - \frac{x}{1-y_0} - \frac{y_0 x}{(1-y_0)^2} = 0$$

and thus y0=1–√x. Substituting this into the equation for the lines yields y=(1–√x)^2, or in more manifestly symmetric form,

√x+√y=1

This can also be written parametrically as:

(x,y)=(sin^4t,cos^4t).

DRIVER A4988

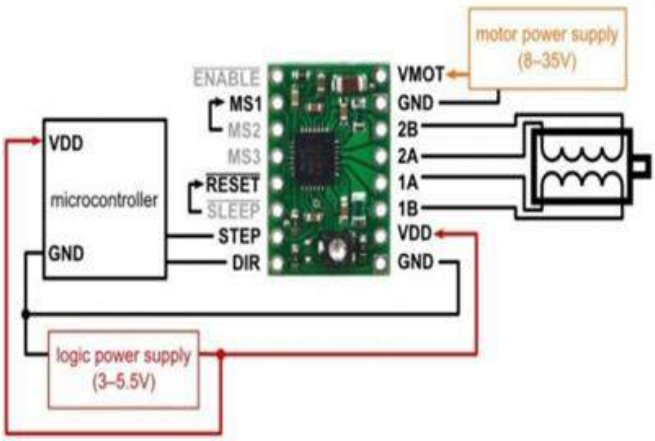

Figure 14. Driving A4988 driver with NEMA-17 stepper motor

The A4988 is a complete Micro stepping Motor Diver with built-in translator for easy operation. The driver has a maximum output capacity of 35V and ±2A. It can operate bipolar stepper motors in full-, half-, quarter-,eight-, and sixteenth-step modes.

The driver requires a logic supply voltage(3-5.5V) to be connected across the VDD and GND pins and a motor supply voltage(8-35V) to be connected across VMOT and GND. These supplies should have appropriate decoupling capacitors close to the board, and they should be capable of delivering the expected currents (peaks up to 4A for the motor supply).

Stepper motors typically have a step size specification (e.g. 1.8 degree or 200 steps per revolution), which applies to full steps. A microstepping driver such as the A4988 allows higher resolutions by allowing intermediate step locations, which are achieve by energizing the coils with intermediate current levels. For instance, driving a motor in quarter-step mode will give the 200-step-per-revolution motor 800 microsteps per revolution by using four different current levels.

The resolution (step size) selector inputs (MS1,MS2, and MS3) enable selection from the five step resolutions according to the below. MS1 and MS3 have internal 100kΩ pull-down resistors and MS2 has an internal 50kΩ pull-down resistor, so leaving these three microstep selection pins disconnected results in full-step mode.For the microstep modes to function correctly, the current limit must be set low enough (see below) so that current limiting gets engaged. Otherwise, the motor will skip microsteps.

TABLE 2

Step Resolution in A4988

MS1	MS2	MS3	Microstep Resolution
Low	Low	Low	Full step
High	Low	Low	Half step
Low	High	Low	Quarter step
High	High	Low	Eighth step
High	High	High	Sixteenth step

Each pulse to the STEP input corresponds to one microstep of the steppermotor in the direction selected by the DIR pin. Note the the STEP ans DIR pins are not puled to any particular voltage internally, so you should not leave either of these pins floating in your application. If you just want rotation in a single direction, you can tie DIR directly to VCC and GND. The chip has three different inputs for controlling its many power states:RST,SLP, and EN.

To achieve high step rates, the motor supply is typically much higher than would be permissible, without active current limiting. For instance, a typical stepper motor might have a maximum current

rating 1A with a 50 coil resistance, which would be indicate a maximum motor supply of 5V.Using such a motor with 12V would allow higher step rate, but the current must actively be limited to under 1A to prevent damage to the motor.

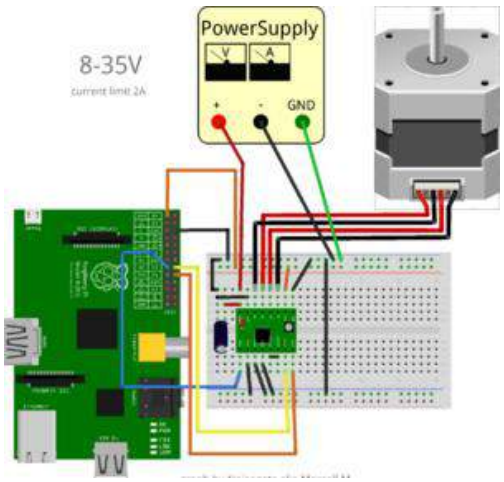

Figure 15. Driving A4988 driver with NEMA-17 stepper motor using Raspberry pi 3 b+

The above diagram represents the connection of stepper motor to A4988 driver using Raspberry Pi. Raspberry Pi GPIO Pin 7 is connected to STEP pin of A4988 Driver, GPIO Pin 11 is connected to DIR pin of A4988 Driver. Then after connecting the 4 pins of A4988 Driver with 4 wired cable Stepper Motor. The power supply to motor will be given by SMPS (Switch Mode Power Supply) of which VMOT and GND pins of A4988 Driver is connected to 12V pin and Common of SMPS.

VII. RESULT

Our research work are to be the estimated new cycle time of a robot movement is 72 sec per process, estimated no. Of Cycle increases of a robot movement is 5 cycle per hour, automatically saving a time is 8 sec by Shortest Travelling problem to reducing the travel path of robot movement.

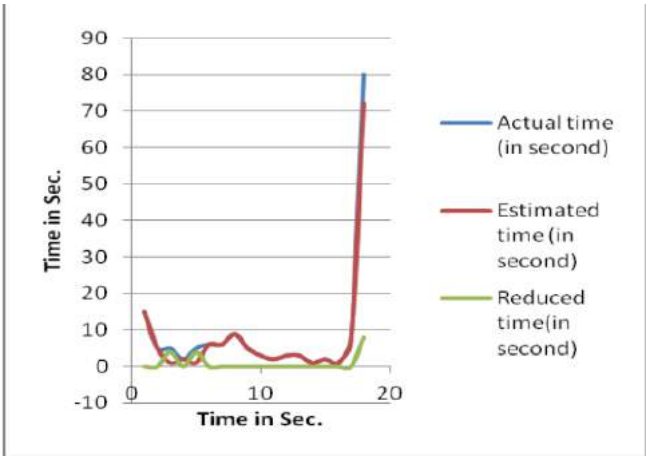

Figure 16. Comparison of Actual time Vs Estimate time

VIII. CONCLUSION

The Gantry robot scheduling problem considered in this paper can be formulated as type of dynamic programming problem. An effective path planing technique for the robots based on Bezier curves have been found compatible for the robot path planning.

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Solar Grass Cutter

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ABSTRACT

This paper describes the different features And technologies present in Solar Grass Cutter. The sun has been the major source of energy for life on the earth. The solar energy was being used directly for purposes like preserving food articles, drying clothes, curing agricultural produce, etc. Nowadays manually handled devices are commonly used for cutting the grass for domestic purposes. This uses results in the loss of energy and pollution. To reduce pollution, an old vehicle needs to be replaced by robots using battery as a power source. These days' pollution and power cut being major problem we have thought of developing a device which will overcome these problems. This project aims at developing a solar operated grass cutting device. A grass cutter is a device that uses blades to cut a grass at an even length. The construction of this device is very simple. Solar plate delivers the power in this device. Battery is used for storage of solar energy. There is no need of charging the battery externally as solar panel is connected to the battery. This device is the prime example of how technology can be used to reduce human efforts as well as to efficiently utilize renewable sources of Energy.

Keywords : Solar panel, Battery, Pollution, Robot

I. INTRODUCTION

In today's world, pollution is the major issue around the globe. Sun has been the major source of energy for life on the earth. Technological developments are mostly designed to reduce manual labor, operating time and manpower. But sometimes it may cause pollution and may lead to human distraction by pollution of noise. So to overcome this problem solar grass cutter is useful.

The different types of grass cutter are available in the market like electrical grass cutter and gasoline grass cutter. In gasoline grass cutter there is required a fuel for running a cutter and due to the engine it produce gases so it increases pollution and it has a noisy operation. An electrical grass cutter is working on electricity through electrical motor. It uses single phase induction motor so it requires AC power. Due to single phase induction motor the weight of the device is more so it is more difficult to operate.
To solve this entire problem we try to design a remote control solar power based solar grass cutter.

Remote control solar grass cutting device is a device which is cutting the grass by its own through. This device reduces both environment and noisy pollution. It can be made with help of solar panel, battery, DC motor, sensors, blade, and ATmega328 microcontroller. This system uses 12 V batteries to power the robot. A solar panel is used to charge a battery.

An Atmega328 controller is used as the brain of the system. The grass cutter motors and the wheel motors are interfaced to the Atmega328 microcontroller that controls the working of all the motors. Detection of objects or obstacles is a very important factor for safety of the machine as well as human safety. On detection of object or obstacle a pre- programmed action is taken by the controller as per the condition sensed by the sensor. There is no need any fuel and any extension wires for run the cutter. So there is no pollution to environment. So it is pollution free or Eco- Friendly.

II. LITERATURE SURVEY

1) Sachin Prabha1, Dattatray G. Biradar2, Sachin Panshette3, Veerbhadrappa.T4 1, 2, 3 M. Tech student, 4 Assistant Professor, "SOLAR GRASS CUTTER MACHINE", Volume 3, Issue 10, pp- 2702, June-2016

In this paper they are using the handle or frame which is depend on the size of the lawnmower. They are also using a bearing which is machine part, which support a moving element and confines its motion. DC motors are used for movement of wheels.

2) "Grass Cutting Machine by Solar Energy Power". May 2017(International Journal & magazine of engineering, technology, management & research)

They are focused on force which is required to cut the grass force is require for moving should be greater than 10 Newton's. Precise torque and speed control without sophisticated electronics.

3) "A Review on Smart Solar Grass cutter with Lawn Coverage" (2017) Imperial Journal of Interdisciplinary Research (IJIR)-

Moisture based sensors used for measure humidity. Ultrasonic sensor for obstacle detection from (2-400) cm. Due to ultrasonic sensor give high accuracy & stable Reading. It operates at night time also because of facilities to charge the batteries.

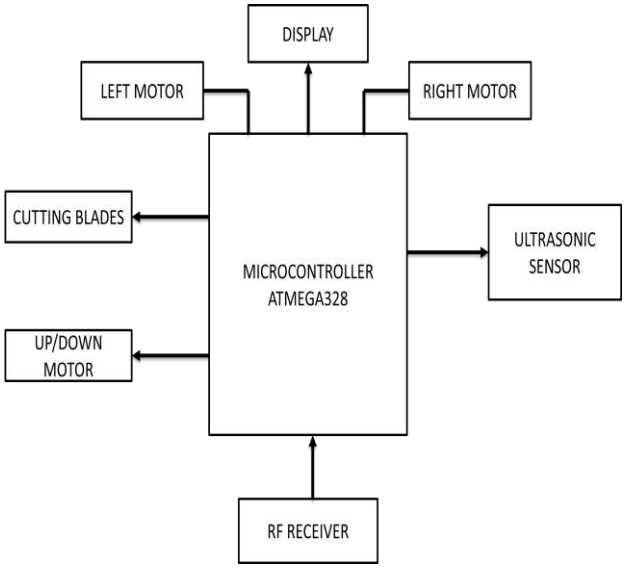
4) "A Portable and Automatic Weed Cutter Device". (IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE))

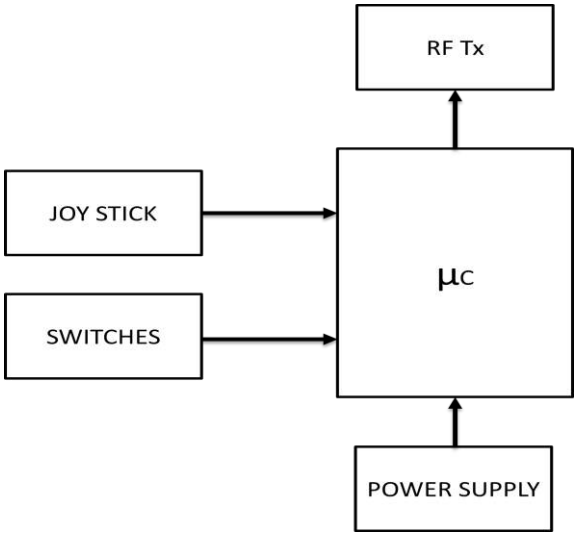
They have used GSM module. This vehicle is easy to operate, pollution free and automatic. As this cutter vehicle design is automatic, reduce the manual efforts. This system leads to improve the agricultural production.

5) Bincy Abhraham1, Darsana P S2, Isabella Sebastian3, Sisy N Joseph4 Prof. George John P5, "Solar Powered Fully Automated Grass Cutting Machine", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 6, Issue 4, pp-2520, April 2017

In this paper grass cutter and vehicle motors are interfaced to pic microcontroller that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for obstacle detection. The microcontroller moves the vehicle motors in forward direction in case no obstacle is detected. On obstacle detection the ultrasonic sensor monitors it and the microcontroller thus stops the grass cutter motor to avoid any damage to the object/human/animal whatever it is and it also provides an alarm. Microcontroller then turns the vehicle as long as it gets clear of the object and then moves the grass cutter in forward direction again otherwise it changes the direction.

III. BLOCK DIAGRAM





IV. MAIN COMPONENTS

Solar panels and ATmega328 microcontroller are the two main components of this robot.

A. Solar panel

The solar panel is charged through the sun radiations and it generates the power. There are mainly three type of solar panels are available in market like, monocrystalline, polycrystalline and thin film. Monocrystalline panel is more efficient than other so here this type of solar panel used. Monocrystalline panels are generally constructed from high quality silicon cell. In this device used solar panel in between ration of 12V and 240mA. This solar panel is connected with the 12V battery through the solar battery charger.

B. ATmega328 Microcontroller

ATmega-328 is basically an Advanced Virtual RISC (AVR) micro-controller. It supports the data up to eight (8) bits. ATmega-328 has 32KB internal built in memory.

V. ADVANTAGES

- ✓ Reduces both Environmental and Noisy pollution
- ✓ i.e. it is pollution free.
- ✓ It is economical.
- ✓ Vehicle is light weighted.
- ✓ Easy to move from any place to another place.
- ✓ Compact in size and portable.
- ✓ Non skilled person can also operate.

VI. CONCLUSION

This paper has presented the design and development of solar grass cutter. It will be easier for the people who will take this project for modification. This project is developed in such a way that it is easier for common man to use and is very advantageous i.e. it uses renewable energy source, no fuel cost. This vehicle has having the facility of charging the battery while grass cutter is in motion.

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Wheel Driven Spraying Machine

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ABSTRACT

In agricultural sector generally farmer uses traditional way that is spray carried on backpack and spraying crop. This becomes time consuming and human fatigue is major concern. These problems can be overcome by using agricultural reciprocating multi-sprayer. In our project we use slider crank mechanism to convert rotary motion into reciprocating motion to operate the pump. This mechanism is free of fuel and its operation is easy and painless.

Keywords : Agriculture Sector, Human Fatigue, Science, Reciprocating Multi-Sprayer, Fuel Free.

I. INTRODUCTION

A. Status of Agriculture in India

India is predominantly an agricultural based country with approximately 75% of population of India is very much dependent on farming either directly or indirectly. The farmers have been using the same methods and equipment for ages for example the seed sowing, spraying, weeding etc. operations are carried out by same techniques. There is need for development of an effective spraying machine for increasing productivity levels. Most of the late developing countries of Asia have the problem of higher population and low levels of land productivity as of compared to the developed nations. One the main reasons for lower productivity is insufficient power availability for the farms and very low levels of farm mechanization. This is especially true for India.

B. Mechanization of Agriculture

It is now accepted all over the world that in order to meet the food requirements of growing populations and rapid industrialization, the modernization of agriculture is indispensable. It is said that at many farms, production suffers due to no use of farm fertilizers or correct time pesticides and insecticides or improper application of these at required destination area of the affected crop. Mechanization enables conservation of inputs by precision in metering and ensuring better distribution, reducing the level of quantity required for the best response and prevention of loss or wastage of inputs applied. The Mechanization reduces the unit costs for the production by the high level of productivity and by input conservation.

C. A new prospect of implementation of Mechanization in Agriculture

In this sector, the effective spraying and weeding with cheap and beneficiary equipment are used for

increase in productivity for better contribution of India's GDP which is very important. The principles of motion of project that transmits rotary motion of chain drive and sprocket arrangement and reciprocating piston pump for pumping and spraying pesticides or fertilizers over the field. Usually cheap knapsack sprayer is carrying certain major drawbacks such as back pain, arm pain due to continuous pumping of fluid and exertion of user due to its heavy weight. Manually operated hand pumping isn't uniform and may generate uneven pressure inside the tank. The flow becomes turbulent due to fluctuation in pressure in tank which is undesirable. As there is an increase in pressure in cylinder, spray width increases. This results in pesticides waste.

II. LITERATURE REVIEW

A. Existing Spraying Methods:

I. Hand operated sprayers (backpack with spray pump)

Backpack sprayer are fitted with a harness so the sprayers can be carried on the operator back. Tank capacity may be large as 20 liters. A hand lever is continuously operated for to maintain the pressure which make the backpack sprayers output more uniform than that of a hand held sprayers. Basic low cost backpack sprayer will generate only low pressure and lack feature such as high-pressure pumps, pressure adjustment control (regulator) and pressure gauge found on commercial grade units.

Fig: Hand operated sprayers

II. Engine driven sprayers.

The engine operated sprayers typically produce more consistent sprayer's outputs, cover the sprays swath more uniformly, operate at constant speed and results in much more uniform coverage than the hand spraying. Motorized sprayer are also capable of higher pressure spray where required to provide a better coverage. There are many other type of hand operated sprayer that are not widely used throughout the agriculture. Some may be used wide extensively for the productions of specific commodities.

Fig: Engine driven sprayers.

III. High Pressure Sprayer

The High pressure sprayer are often called as hydraulic sprayers. They usually operate with a dilute mixture and at different pressure from two

hundred and fifty up to several hundred psi limits. The design of high pressure sprayer is similar to that of low pressure sprayer, the only difference is that the component have to withstand high pressure.

When fitted with boom they can do any work done by the suitable low pressure boom sprayers. These can also be fitted with handgun. The handgun are used for spraying shade tree and ornamental, livestock, orchards, building, unwanted brush, rights-of-way, commercial crop etc.

Fig: High Pressure Sprayer

B. Conclusion from Existing Spraying Methods.

I. Mechanization for spraying operation is costlier for specialized operations such as High pressure sprayer, Engine operated sprayer.
II. Skills of labour required depends upon the complexity of the equipment machinery used.
III. All the pre-existing methods have concentrated on providing feasible easy solutions to reduce cost of production by reducing cost of mechanization and increasing productivity.

1. **Sandeep H. Poratkar, Dhanraj R. Raut (2013),** the author presents a summary on the development of the multi nozzle. Pesticides spray pump. The agricultural land in India is made up of small marginal, medium and rich farmers. The small-scale farmer of about 30% is used manually. Use of this sprayer cannot maintain the required uniform pressure. This leads to the problem of back pain. The suggested model has eliminated the problem of back pain, since it is not necessary to bring the tank (pesticide tank) in the back

2. **Varikuti Vasantha Rao, et al(2013),** the authors studies on the fertilizer sprayer given by different feeders. The layout and execution of multi-nozzle pesticide sprayers and the proposed structure is the two-sort out sprayer balanced with a gas engine that constrains the present inconveniences of the sprayer, for instance, working costs, fuel change, etc. replaced by an electric DC motor set away in the battery related with the unit, which is the authentic source of imperative to restrict regular degradation and agribusiness enhancement. Reasonable power source and cultivating are a triumphant blend. Wind, sun controlled and biomass imperative can be used continually, giving agriculturists a whole deal wellspring of pay. Inexhaustible power source can be used as a piece of the association to supplant distinctive fills or can be sold as cash crops. It is among the most promising and basic open entryways for regard included things in agribusiness.

3. **Alaa Kamel Subr,et al(2015),** the authors were examined on the practical deviation in the process of sustainable application of pesticides. The use of agrochemical becomes an important practice for modern agriculture, but at the same time endangers human health, animals and the environment. Initial actions to create a balance between this negative impact and the need to use pesticides in relation to the environment, people's living conditions and the economy, these factors are defined as sustainable development. In this article, the calculation for obtaining the ability to sustain the pesticide.

4. **Shivaraja kumar,et al(2014),** the authors were examined on the design and development of the wheel and pedal sprinkler. The equipment, which is a wheel and foot sprinkler, is a portable device and does not require any fuel to operate, which is easy to move and spray the pesticide by moving the wheel and also selling the equipment. In this equipment an alternative pump is used and an accumulator is provided for the continuous flow of liquid to create the pressure necessary for the spray action. This pesticide spraying equipment consumes less time and prevents the pesticide from reaching the front of the nozzles that come into contact with the person spraying the pesticides.

IV. CONCLUSION

From the above literature it is concluded that :

1. An upgraded design of manually operated sprayer is needed.
2. Spraying should be less time consuming and economical.
3. Spraying should consume less elemental use of fuel and electricity.
4. Spraying should be such that, it should not induce back pain and should consume less effort.

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To Counter the Heaves on Soil - A Review

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ABSTRACT

Heave is the resulting upward movement of an underlying soil layer due to the addition of moisture to an unsaturated expansive soil. Heaves in soil creates more economic loss than any other problems, so there is a great need to overcome this problem. As per the research to overcome the heaves on soil are still a big problem on soil. Black cotton soil causes mainly heaving property with change in water to the soil. Heaves is one of the major problems of soil which occurs everywhere such as roads, bridges, buildings etc. By analysing some paper there are some methods which analyse the heaves and improves the strength and bearing capacity of the soil which tends to reduce the heaving property of soil are one dimensional oedometer, diagnosing heave and to stabilize the heaves by GGBS and lime. The material was discussed in this paper and their effectiveness for reducing the heaves on the black cotton soil. By these methods heaves can reduce effectively and it is economical and do not effect on the environment.

Keywords : Black cotton Soil, heaves stabilization on soil.

I. INTRODUCTION

The black cotton soil has a possibilities to rise and reduction in volume under rising and reducing water content [1] black cotton soil cause destruction to structures, pavements, pipelines, foundation, roads and other buildings and contribute to remarkable financial losses that far run over other natural losses such as earthquakes and tornados. [4] In the soil heave can be a hard movement to forecast, diagnose and mitigate. Local geotechnical engineers sometimes do not supply the necessary testing or engineering vital to accurately forecast heave. [6] Black cotton soil swells and shrinks because of periodic variation, while subjected to turn out to be different in the moisture directions causing, large distress to the construction built on them. Lightweight strengthened concrete structures built over black cotton soil are subjected to super upward movement, which may purpose undesirable destruction to the structure [7] although efforts had been attentive for properly built estimation of heave in black cotton soil [3] recently; several techniques have been proposed to measure the swelling pressure, swell possibilities and soil movement forecasting[1] investigated the relevance of the swell parameters, obtained under oedometer test, in forecasting the awesome heave of black cotton soil [8]and to govern the heaves using blast furnace slag[2], Optimum renewal Depth to Control Heave of Swelling Clays[5] in black cotton soil stabilization and the use of Heave Control Soil Using Micro piles and Geotextile Layers[7]. Ground granulated blast-furnace slag (GGBS) is a spinoff

acquired from iron and steel-making industry. GGBS to the black cotton soil sustain by using adjust the beneficial impact on the reduction of growth and development of mechanical properties. [2] The layers of geotextiles were reinforced into the soil at pre established optimum depth, which decreases swelling of black cotton soil due to their pushing operation. [7]

II. ANALYSIS OF HEAVES BY OEDOMETER TEST

2.1. CAUSE OF HEAVES

Basically heave take place because the moisture growing in a cellular soil. At the molecular level, a negative stress potential (suction) within the soil bit entice water molecules to a tight bond around the surface of the soil bit. Because water is incompressible, the soil particles bit are compelled apart, causing soil action. [6]

2.2 FORECAST BY OEDOMETER

Forecasting methods primarily based on oedometer tests are more considerably used [4] the consolidation-swell (CS) test became used to apprehend the swelling properties of the soil samples. The series of CS tests was completed to acquire some variable which are needed inside the heave forecasting analysis [1] Oedometer is typically used to analyse the settlement and the heave actions of soil. One of the edges of this take a look at is that The micro pile technique is based on placing 16 and 20 mm diameter mild steel bars as piles in pre-drilled holes of remarkable diameter more than mild steel piles in a black cotton soil, which are then provide with and without sand to better the frictional withstand to the micro piles. The peak sections of every micro pile had been mounted to the footing. Upon water soaking up by way of the underlying soil, the generated lateral swelling pressure is hooked up to the primary horizontal normal stress on the micro pile surface. The satisfied the soil stress and strain state are near to the "inset" state: zero lateral strain and controlled vertical stress. Obviously, the oedometer test can not precisely imitate the "in-situ" state which are rather two-dimension and three-dimension problem. It can be appraise as a simple method to examine the soil swelling actions in the field. [8] For the swelling properties assessment, an oedometer frame and conventional oedometric cell were used. The specimen was compressed straight into the oedometric ring (6 to 35 mm in diameter and 20 mm in height). The preliminary top of the specimens become around 17 mm. The compacted soil sample was located in a consolidation mobile between air-dry porous stones. A vertical strain intense the seating pressure is appeal to the specimen before placement of free water into the oedometer. The specimen is given entry to unfastened water. This might also bring about the make bigger, expand then contraction, contraction, or contraction then extend. The swelling strain (swell percent) experienced by means of the specimen upon soaking is recorded as a function of time. The rate of swell or settlement is calculated at the applied pressure after motion is negligible. The specimen is loaded after first swell has take place until its initial void ratio/height is acquired. [9]

III. METHODS OF CONTROLLING HEAVES

3.1 USING MICRO PILES AND GEOTEXTILES LAYERS

vertical swelling strain tends to thrust the footing upwards and to draw the micro piles upwards with appreciate to the encompassing sand which marshalling frictional resistance [10]. The magnitude of marshalling frictional resistance reduces with lateral distance apart from the interface and therefore may additional be sufficient for some minimum thickness of sand on every micro piles. In the second case, geotextiles of length 136 GSM and tensile power of 26 kN/m was arranged beneath the footing with ideal vertical

spacing, which behaves as reinforcement and force the soil beneath the footing; this forcing impact with the aid of geotextiles tends to intercept heaving of soil underneath the footing or substructure[7]

3.2 USING LIME MIXED GGBS COLUMN

3.2.1. MATERIALS USED

A. Soil

Black cotton soil became used for the study. Expansive nature of soil decided by way of accomplishing unfastened swell index test.

B. GGBS

This is off-white coloured material. Ground granulated blast-furnace slag (GGBS or GGBFS) is a *material* from iron and metallic-making from a blast furnace in water or steam to fabricate a glassy commodity this *is* then dried and get into a pleasant powder. [2]

C. Lime

The lime used in this paper is hydrated lime Ca (OH)2

3.2.2 MECHANISM

Work out the amount of air-dried soil, passing through 4.75 mm sieve, is mixed rigorously. Based on the natural water content inside the black cotton soil, measured amount of water is introduced to get 15% moisture content. A test tank of 40 cm diameter and 40 cm peak is grabbing. Sand layer of 1 cm thick has been placed at the lowest of the test tank. [2] An iron casing of length of 30 cm diameter and 50 cm peak is overlay with oil one and the different facet and compelled in to the test tank. The void between tank and casing is closed with sand. The blended and grow up black cotton soil is split into three nearly identical rates. Every part of the black cotton soil is compressed inside the space below of the casing and is compressed to nearly 5 cm thick.[11] The top of the compressed surface is scratched to possess bond in the centre of the layers and the entire thickness of four layers might be 20 cm. After the soil has been compressed the casing is extract slowly to preserve down the disturbance to the substructure. An open mild steel tube of 3.8 cm Diameter and 30 cm peak are compelled into the soil bed. The tube is turned for two rotations to shear the sample off at the lowest. [12]Then the tube is detached from the soil bed. The void generate by the mild metal tube is closed with the column material in 3 layers. Every layer compressed with tamping rod. A mild steel plate of 3 cm diameter is situated on the peak of the soil bed. For calculating the vertical displacement of bed a dial gauge is located on the peak of the steel plate. Set dial gauge analyzing to zero or take the first reading. Then water is delivered through the sand drain on every facet of the soil bed. When the water is offered to the black cotton soil bed, it starts absorbing the water consequences in growing in volume. Since the edges and bottom of the soil bed are showed boundaries the rising in extend results in rising in height of the soil bed which can be calculated in the dial gauge. Since the process of water by fascinating the black cotton soil bed is a conservative,[11] subsequently the dial gauge reading are to be noted with respect to time till the swelling rate was changed into reduced. The test turned into repeated with separate column material, variety of columns and more different spacing of two columns. [2]

IV. CONCLUSION

Based on review it can be conclude that

1. Heaves are occurred on soil due to raising the water content or decreasing the water table under the substructure.
2. There is large no of paper for detecting the heaves and less no of paper for controlling the heaves.
3. Yet to be concerned for the reduction of the heave with economical and organic property for the black cotton soil.

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Rubber Crumb and Wooden Chips A Sound Barrier in RCC Structure

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ABSTRACT

In this day and age, noise pollution is one of the hazards experienced by human beings. the commercial sector experience the peak level of noise pollution, hence building in commercial area experience a high level of noise pollution. to overcome such issues there are different alternative solutions available in the market. the alternative solution helps you achieve a certain amount of resistance to noise pollution. the alternative solution we are approaching is through producing acoustic sheets made from acoustic materials. the sound barrier sheets are prepared in dimension that the sheets can be introduced to outer walls of buildings. the material which is used for sheets are rubber crumbs and, these two material satisfy as an acoustic material, they also withstand the different atmospheric condition. rubber crumbs and , not only they serve as waste material but also they have acoustic property that fulfills the condition to prepare a sound barrier sheet. in terms of the provision in is 2526: 1862(Indian standard code of practice for acoustic design) the analysis is worked out on this basis. the amount of sound reduction approached by the sound barrier sheet will help in a commercial building to achieve that control over noise level. all these things considered, the sound barrier sheet will give an effective result for sound insulation. These sheets can also be introduced to the existing building structure. therefore, rubber crumbs and will approach resistance against sound. This approach provides almost elastic response on the structural members and limits the force accelerations sound acting on the structural elements of superstructure and hence to check the efficiency of sound proof structure

Keywords : Acoustic Design, Wooden Chips, Rubber Crumbs, Harder Rubber

I. INTRODUCTION

The noise control plays an important role in assuring acoustically pleasant environments []. One of the most important factors in noise reduction is represented by the materials used in different structures with soundproofing role. The use of composite materials based on rubber crumbs and wood chips or flacks for noise reduction have two major advantages, namely low production costs and efficient sound insulation. Knowing acoustical properties of these porous materials is useful for proper application in products such as sound barriers, walls, road surfaces. In order to protect the environment on one hand by recycling the residues from primary and secondary technological process and on the other hand by attenuate the noise from industry or urban traffic, different systems were developed based on recycling solid waste (wooden chips, rubber crumbs).Literature review relieved numerous studies regarding the sound transmission loss of different types of materials such polyester fibre, glass fibre and urethane foam.

In this paper the assessment of the acoustical properties of new composite structures based on

wood chips and rubber crumbs bonded together with chemical binders is presented.

II. Study of Material

We have understood properties of various materials having acoustic properties such as waste materials like wooden chips, rubber crumbs, wooden shavings, and fibre glass etc. We finalized rubber crumb and wooden chips as an acoustic material for our project because it is readily available in market and it is waste material and cheap alternative to fibre glass and other acoustic materials. Nowadays sound transmission by the use of vehicles is surging day by day the number of used tyres is also increasing which leads to a problem in disposing off. These used tyres of vehicles needs incineration for proper disposal. It requires immense energy and it is highly dangerous for our environment. So instead of disposing we can re-use it in other state like lumber and construction products, rubberized asphalt, insulation products, wheels of cart etc. It is also used in civil engineering to partially replace the aggregates in mortars and concrete. It is also used in the form of crumb or grain to prepare sound insulation sheets. It can provide us economical product for sound insulation.

Properties of Rubber crumbs:

Tensile strength-

Tensile strength is the amount of force needed to tear apart a rubber specimen until it breaks, it also known as ultimate tensile strength.

Resilience-

Resilience, also known as rebound, is the ability of rubber to return to its original size and shape following a temporary deformation, such as contact with a metal surface. Resilience is critical in dynamic seals that serve as a barrier between stationary and moving surfaces.

Abrasion Resistance-

Abrasion resistance is the resistance of rubber to abrasion by scraping or rubbing, Abrasion resistant rubber is used in industrial application.

Elongation-

Elongation is defined as the percentage increase ,or strain, in the original length of rubber sample with the application of a tensile force, or stress.Certain elastic tend to stretch more compared to others. Natural rubber for instance can stretch up to 700% prior to reaching its ultimate elongation, which causes it to break.

Tensile Modulus-

Tensile modulus is the stress or force required for producing a strain or an elongation percentage in a rubber sample. Harder rubber usually has a higher tensile modulus, making it more resilient, It is also more resistant to extrusion, which is a process for manufacturing stock materials used in custom fabrication.

It is elastic, because of this property a rubber band can be stretched to 9 to 10 times its original length and when the load is removed it regains its original length.

It is strong and tough, because of this property it can be put to use even under abnormal conditions.

It is highly impermeable to both water and air and therefore, it can be used to retain water as in rubber bottles, hoses etc.

It exhibits a great resistance to abrasion, tearing and cutting over a wide range of temperature from 7 to 115 degree celsius.

It is a bad conductor of heat.

By vulcanizing the rubber, its mechanical properties can be considerably improved.

Rubber insulation and other rubber products require shaping prior to vulcanisation because the vulcanised rubber cannot be shaped by mechanical pressing once it has acquired its characteristic plasticity.By vulcanising rubber in moulds, products of rather intricate shape can be obtained.

Properties of wooden chips:

Serviceability-

It is a feature of wood to divide into parts of wood under the action of forces machining of wood with the removal of chips is based on this feature-sawing ,milling ,turning, grinding and without removing materials-cutting materials on shears ,punching ,chopping or bundling of wood-wood for logs ,wood chips on the needle-shaped shaving ,a big chip on the micro-and fibrous.

The ability of wood to hold metal fasteners-is a feature ,explained by the wood elasticity.when hammering a nail fibres move apart partially, putting pressure on the lateral surface ,causing the mutual friction ,that keeps the nail in the wood.

Cleavability-

It is the ability of wood to break down along the grain during penetration a wedge-shaped body into it.

Fragility-

It is the ability of wood to break down suddenly without significantly shape changing under the action of mechanical forces.

Impact strength-is the ability of wood to absorb the work without breaking.

Sieve Analysis

We got the rubber crumbs of variable grain sizes. So, we sieved this mixture of various grain sizes to obtain crumbs of different sizes by passing the crumb through different sizes of sieves. By passing the crumb through the sieves we can get the grains of size 800micron, 1mm, 2mm, 3mm, 5mm, 6mm. We stored all sizes of grains separately for further process. As different sizes of grains possess different absorption coefficient.

III. EXPERIMENTAL SET UP

2.1. METHODS AND MATERIALS

The sound insulation which we want to address, is through providing rubber crumbs and wooden chips sheets. the dimension of the sheet is secured to be 1ft x 1ft as a standard size. the sheets are made of a proper balance of wooden chips and rubber crumbs however the width of the sheets is fluctuating since to learn the behavior of the sound reflection by the changed width of sheets.

To make a uniform sheet the wooden chips and rubber crumbs need to be mixed within a balanced proportion including the cooperation of binder and hardener. hardener and binder performs a crucial role in preparing a sheet. Binder which we are applying in this process is Epoxy Resin.

The mold of size 1ft x 1ft is prepared to hold the blend of wood chips and rubber crumbs mixture with the cooperation of binder and hardener. Epoxy resin helps to secure the rubber crumbs and wooden chips collectively and mold serves to achieve the shape of the sheet plus the width of one sheet. Hardener helps to achieve the solid shape within 25 minutes.

One of the widely used methods to determine the acoustic properties (absorption coefficient, impedance ratio, reflection coefficient) is the international standardized impedance tube method, the one we are directing is the same as that except we are performing in a wood box. The principle of this method is based on the measurement of the transfer function between two signals of microphones mounted inside the box.

In accordance with the measurement chain, an audio frequency ranger is located at a certain measurement, the amplifier is located and then at an appropriate length microphone is installed at the unit side of the box. the other unit is installed in such a way that the sheet sample is placed at equal distance from each side and then at the regular distanced microphone is placed and then the amplifier is installed. the box is constructed out of wood hence there is a chance that sound is reflected, due to this observation can be disturbed, therefore, the thickness of cotton is installed on every side of the wooden wall to give efficient results. When the box fed by frequency bands, a stationary plane wave is created and pressure measured with microphones can be decomposed into its incident and reflected components. First, the equipment without samples was equipped, to configure the microphones. This operation is necessary because of the phase and amplitude of the two microphones are not perfectly identical. In this sense the frequency response function is measured with the two microphones interchanged position. each sample of sheet is properly inserted into the wood box and then the measurements start. the wood box is of Box size - 5ft x3ft x 3ft, wherever the wooden sheet thickness is 6mm. The cotton that is placed around the sides of the sheet is 6 inches.

Materials Used-

A. Double Component Epoxy Resin-

1. Epoxy resin- 800ml
2. Hardner-200ml

Total cost=1200Rs/-

B. Rubber Crumb- 10kg
Cost=18Rs/- (Per Kg)
Grain Size- 850 micron – 6mm

C. Wooden Chips- 5kg
Cost=5-10Rs/- (Per Kg)

D. Cotton- 20kg
Cost=60Rs/- (Per Kg)

E. Wooden Plywood- 3 MR grade sheets
Cost=1300Rs/- (Per sheet) Thickness- 6mm.

1. Rubber crumb is a recycled rubber produced from used tires. We collect a waste rubber crumb from the rubber company according to our needs in different sizes.they rubber company collect waste tire and converted it into rubber crumb to reuse them. Rubber crumb has a good acoustic material and they have good thermal coefficient of expansion.
2. Wooden chips are small to medium sized of wood formed by cutting or chipping larger pieces of wood. We collected wooden chips from the shop of wooden chips according to our requirement.wood is a light material, that why it is a good acoustic material. Wood transfer sound in longitudinal direction than perpendicular wood structure easily reflect sound.
3. We used single component epoxy resin and hardener according to our requirement which is needed to make a thick sheet of rubber crumb and wooden chips the ¼ part of epoxy resin is taken as hardener.

IV. RESULTS AND DISCUSSION

According to IS code 2526-1862
Absorption coefficient is the ratio of sound energy absorbed to the incident sound energy on a material.

Sheet No.	Thickness of Sheet (cm)	Grain Size (mm)	Frequency (Hz)	Average Coefficient of Absorption	Remark
1.	6	850micron rubber crumb	2000-3000	0.54	1. Rubber Crumb individually proves to give efficient

					result over a sheet with combined rubber crumb and wooden chips. 2. Size of rubber crumb and wooden chips is directly proportional to coefficient of frequency absorption.
2.	6	850 micron Rubber Crumb + 2mm wooden chips	2000-3000	0.6	
3.	6	1mm Rubber Crumb	2000-3000	0.59	
4.	6	1mm Rubber Crumb + 3mm wooden chips	2000-3000	0.66	
5.	8	850micron rubber crumb	2000-3000	0.50	Thickness of Sheet is responsible for coefficient of frequency absorption. More the thickness, more will be the frequency absorption coefficient.
6.	8	850 micron Rubber Crumb + 2mm wooden chips	2000-3000	0.57	
7.	8	1mm Rubber Crumb	2000-3000	0.56	
8.	8	1mm Rubber Crumb + 3mm wooden chips	2000-3000	0.62	
9.	8	2mm rubber crumb	2000-3000	0.62	1. Finer grain size of rubber crumb cause the sound to insulate within the small voids available between each grain, thus causing more frequency absorption

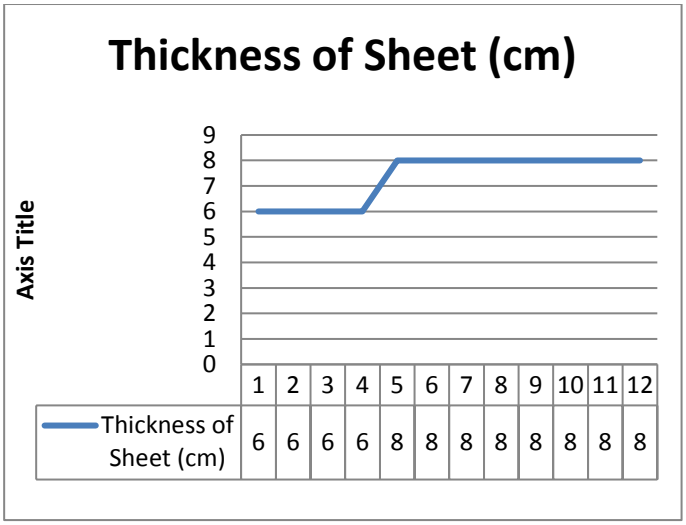
					n.
10.	8	4mm rubber crumb	2000-3000	0.73	
11.	8	2mm Rubber Crumb + 5mm wooden chips	2000-3000	0.75	
12	8	4mm Rubber Crumb + 5mm wooden chips	2000-3000	0.82	

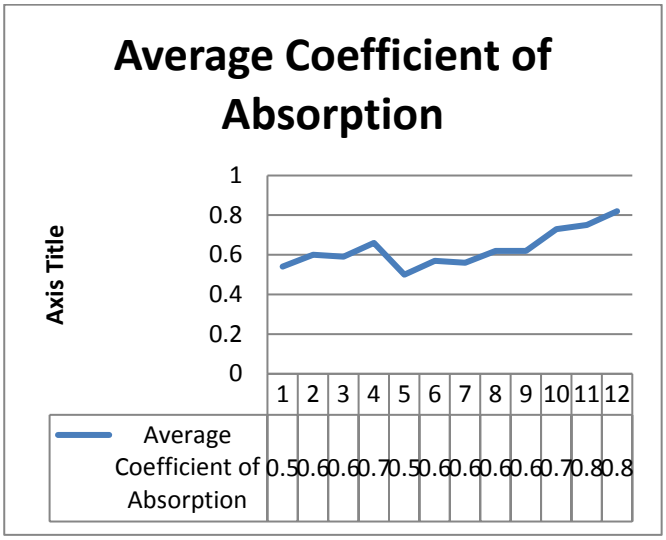
Table No 1. Coefficient of absorption calculation with respect to different frequencies and thickness.

In table grain size :
Small=0mm-2mm Diameter
Medium=2mm-4mm Diameter

According to the different coefficient of absorption calculated, we came to know that the different thickness sheets with different proportion grain size sheet gives different coefficient of absorption.

The best sheet which is economical to use is of 8.5 cm of small grain size as it give required insulation so there's no need to.





V. CONCLUSION

The experimental investigation aimed to determine the acoustical properties of new materials obtained by waste rubber crumbs and wood residues. These materials were designed for assuring a good acoustic and thermal insulation. The composition of binder Epoxy resin had a great influence upon the acoustical properties of the samples (absorption coefficient, impedance ratio, reflection coefficient). Concerning the sound absorption coefficient, both the sheets offer a very good sound absorption at high frequencies, the fact that recommends the materials for sound insulation application.

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Shelter for You

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ABSTRACT

The product "SHELTER FOR YOU" provides an accessible platform where owners and customers can exchange data or facts effectually and economically. The product "SHELTER FOR YOU" employs a new strategy that facilitates easy management of rental rooms. This product will help people specially the students to find their best place to stay according to their choice while they are away for studies from their houses. The main aim of the product "SHELTER FOR YOU" is to provide an easy platform for owners and students to rent their places and to find best place for them. In this the owner will have the authority to change the availability of the room and user will only have to login and find their stay place. This product will also provide an updated information of the local areas room availability.

Keywords : Owners, Rooms, Platform, Authority, Website

I. INTRODUCTION

The website "SHELTER FOR YOU" simplify work for the owner and the users so that work can be efficient and effective. Also, it will help the people who are new to a place to find a perfect place for them. This provides an easy platform for owners and people to rent their places and to find best place for then. This has a section which is for the owners of the rental rooms where they can give information about their available room here by filling a form of their terms and conditions as well as of their cost criteria. The view section will have only a view to the details of the room availability with the owner's terms and conditions and their contact details. The users who are compatible with the terms and condition and their cost criteria can do booking here and get their rooms. The room availability section will do change according to their requirement fulfilment. This website will provide a best place for the people to be free from all the problems faced while getting to a new place because it is the place where they will visit and will get appropriate place to stay in simple steps. This will keep an update on all the local areas room availability. This product can be used for finding - Best suited Hostels, Flats, PG's, Niceties of the availability.

II. MATERIAL AND METHOD

The problems that we encountered while researching for the project was that there are websites like Zostel, Hosteldunia, Airbnb which provides hotel rooms and flats, but this thing does not suit the people as they have to face many problems coming from far places and not getting a perfect stay place. They face problem like not getting the perfect location, the cost problems and For resolving all this problems the

"Shelter For You" website is being proposed which will help students to find their best stay according to their comfort.

The website "SHELTER FOR YOU" consist of three modules namely User Interaction panel, Admin panel and Database.

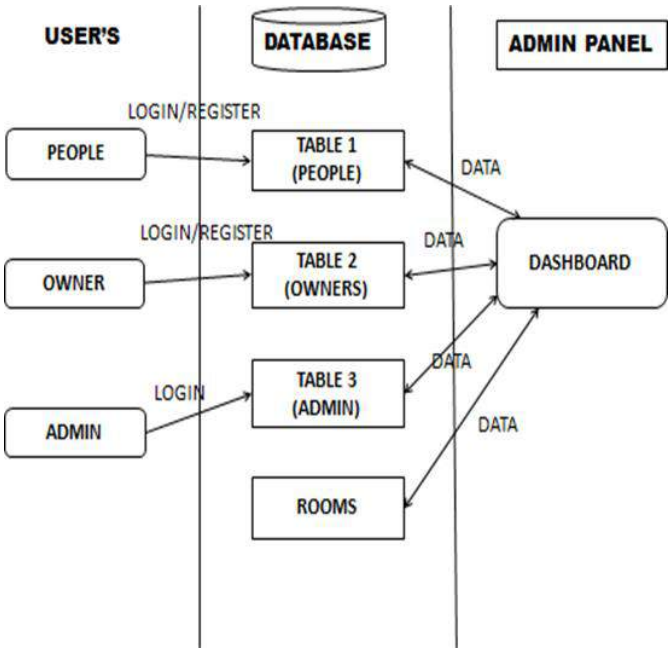

Fig 1 : System Architecture

Module 1 (User Interaction panel)

This module is the frontend which consist of different pages like blog page, signup, registration details, about details, home page, which will be displayed to the users through which the user will start interacting with the website.

Module 2 (Admin panel)

This module will deal with all the data transmission and is the link between the user's and the owners. Admin will have access to this page and can perform various operation like add, delete, edit to the users information if necessary.

Module 3 (Database)

The database module is the backend which consist of different tables like login, registrations, and details of room availability of different owners. The searching technique which is going to be used is the linear search. The sorting technique going to be used is the selection sort.

a. ADVANTAGES.

- ✓ It helps to find a good stay place for people.
- ✓ Provides a place for owner to rent their rooms.
- ✓ Simple GUI that is understandable to all users.
- ✓ Easy to understand.
- ✓ Compatible for all the latest systems.

III. RESULT AND DISCUSSION

The Main Form design is the proposed system's Home Page.

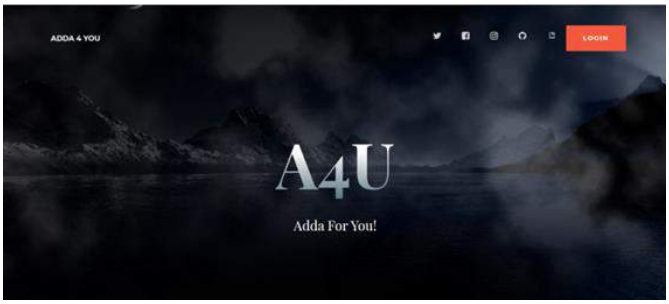

Fig 2 (a): Home Page of proposed system

The home page shows all the basics of the task which the user wants to perform it can be searching for rooms or renting details of the room.

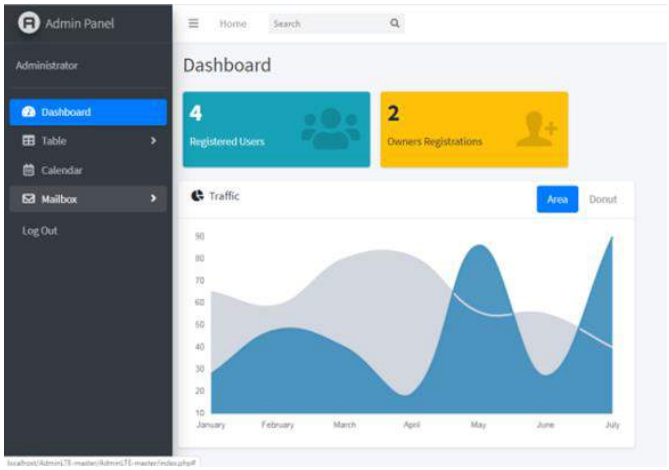

Fig 2 (b): Dashboard

The Dashboard will show all the details of registered users, owners and rooms. It will display all the details including the traffic generated, task scheduled, the number of users and the number of owners.

IV. CONCLUSION

The website "Shelter For You" will help students who are trying to get settled in a new places, who want less stress of finding the rooms for their stay by providing them with their perfect stay place easily. This product will provide an updated information of the local area rooms availability, as it has a section which is for the owners of the rental rooms where they can give information about their available room by filling a form of their terms and conditions as well as of their cost criteria.

Hence, the proposed system provides an user-friendly interface and an updated information.

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Image Forgery Detection For Smart Healthcare

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ABSTRACT

Image tampering is a digital art which need understanding of image properties and good visual creativity.one tampers images for various reasons either to enjoy fun of digital work creating incredible photos or to produce false evidence this process introduce a new unsupervised distribution-free tamper detection method in medical image images based on scale-invariant feature transform (SIFT) key points and region information. Adaptively, this algorithm segments the host image into non - overlapping and irregular blocks, the feature points are extracted from each block, and the block features are matched with one another to locate the labelled feature points. It has become necessary to check the authenticity and the integrity of the image by using modern and digital techniques, which contribute to analysis and understanding of the images' content, and then make sure of their integrity. There are many types of image forgery, the most important and popular type is called copy move forgery, which uses the same image in the process of forgery.

Keywords : SIFT, human inspection, DCT transformation, SLIC, SLICO

I. INTRODUCTION

The number of doctored photographs circulated each day has far exceeded the amount that human inspection can handle, therefore bringing automated content integrity verification into picture. Besides fast verification processes, automated algorithms also complement human inspection for manipulations that cannot be perceptibly detected by the human eye. Several problems can be defined at different levels: image level binary decision, tampering operation identification, and suspicious area localization and manipulation explanation. We discuss these topics in the following subsections. Note the list is by no means an exhaustive one. There are many new ways in which images may be tampered with. However, the top-down framework of problem formulation involving multiple levels of decision is general. We will present a comprehensive study utilizing novel ideas arising from different levels. At the image level, a critical question frequently asked is whether an image is authentic (hence trustworthy) or doctored (and cannot be trusted). A lot of times such global decisions suffice and no extra detailed information is necessary. Once the authenticity of a candidate image is determined, information such as the type of tampering, quality of tampering or specific tampered areas may not be important.

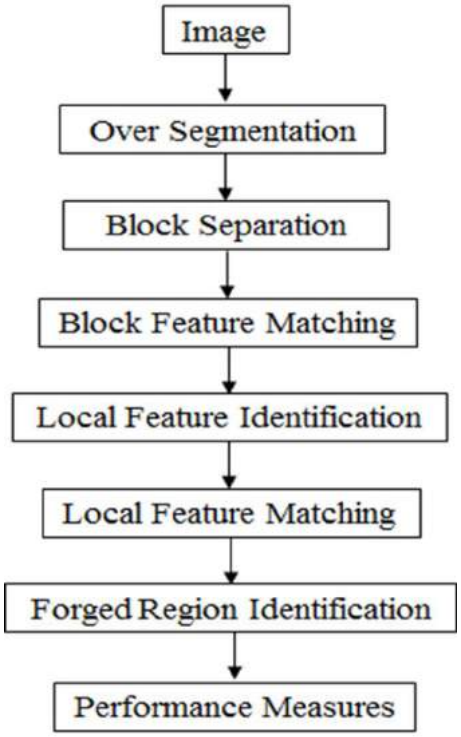
II. METHODS AND MATERIAL

In this process, we propose a framework to improve the performance of forgery localization via integrating tampering possibility maps. In the framework, we first select and improve two existing forensic approaches, i.e., statistical feature based

detector and copy-move forgery detector, and then adjust their results to obtain tampering possibility maps. After investigating the properties of possibility maps and comparing various fusion schemes, we finally propose a simple yet very effective strategy to integrate the tampering possibility maps to obtain the final localization results. The process of forgery detection in images is employed based on the feature point based and block based matching process. The block size of the images were calculated based on the input image's DCT transformation. The images were over segmented with the help of Simple Linear Iterative Clustering (SLIC) algorithm. The SLIC algorithm segments the images based on the block size determined using DCT transformation. SLIC uses the same compactness parameter (chosen by user) for all super pixels in the image. If the image is smooth in certain regions but highly textured in others, SLIC produces smooth regular-sized super pixels in the smooth regions and highly irregular super pixels in the textured regions. So, it become tricky choosing the right parameter for each image. SLICO adaptively chooses the compactness parameter for each super pixel differently. This generates regular shaped super pixels in both textured and non-textured regions alike. The improvement comes with hardly any compromise on the computational efficiency - SLICO continues to be as fast as SLIC. K regularly spaced cluster centers were sampled and they were moved to seed locations corresponding to the lowest gradient position in a 3 × 3 neighborhood. This is done to avoid placing them at an edge and to reduce the chances of choosing a noisy pixel. Each pixel in the image is associated with the nearest cluster center whose search area overlaps this pixel. After all the pixels are associated with the nearest cluster center, a new center is computed as the average labxy vector of all the pixels belonging to the cluster. The derivative of the images is calculated. The calculated values gives the changes

DIAGRAMS:

Flow diagram



In the color and the gray scale values of the image which indicates the informations in the image. values are selected from the given set of values based on the gradient calculation and max value and max intensity value calculation. Finally the calculated values are padded with the image pixels and their corresponding ids were obtained and then the values are saved as the main orientation points. The LFP were matched inorder to identify the forges refions in the images. The performance of the process is measured with the help of performance metrics like Precision, Recall value estimated.

III. MODULE DESCRIPTION

Input Image

An image is a rectangular array of values (pixels). Each pixel represents the measurement of some

property of a scene measured over a finite area. but we usually measure either the average brightness (one value) or the bright nesses of the image filtered through red, green and blue filters (three values). The values are normally represented by an eight bit integer, giving a range of 256 levels of brightness. A line is either a dark line or a light line The basic MATLAB data structure is the *array*, an ordered set of real or complex elements. An array is naturally suited to the representation of *images*, real-valued, ordered sets of color or intensity data.

Preprocessing:

Image Resize:

When scaling a raster graphics image, a new image with a higher or lower number of pixels must be generated. Image resizing is necessary when you need to increase or decrease the total number of pixels, whereas remapping can occur when you are correcting for lens distortion or rotating an image. Image resizing is necessary when you need to increase or decrease the total number of pixels, whereas remapping can occur when you are correcting for lens distortion or rotating an image.

Feature Extraction

Block feature extraction process is employed for the calculation of the similarity between the features extracted from the block regions based on Scale Invariant Feature Transform (SIFT) process. The process identifies the key points from the images. The key points extracted from the blocks were matches based on distance calculated. The derivative of the images is calculated. The calculated values gives the changes in the color and the gray scale values of the image which indicates the informations in the image. The detection and description of local image features can help in object recognition. The SIFT features are local and based on the appearance of the object at particular interest points, and are invariant to image scale and rotation.

SLIC Segmentation

The images were over segmented with the help of Simple Linear Iterative Clustering (SLIC) algorithm. The SLIC algorithm segments the images based on the block size determined using DCT transformation.

1: Initialize cluster centers Ck = [lk, ak, bk, xk, yk]T by sampling pixels at regular grid steps S.

2: Perturb cluster centers in an n × n neighborhood, to the lowest gradient position.

3: repeat

4: for each cluster center Ck do

5: Assign the best matching pixels from a 2S × 2S square neighborhood around

the cluster center according to the distance measure.

6: end for

7: Compute new cluster centers and residual error E {L1 distance between previous

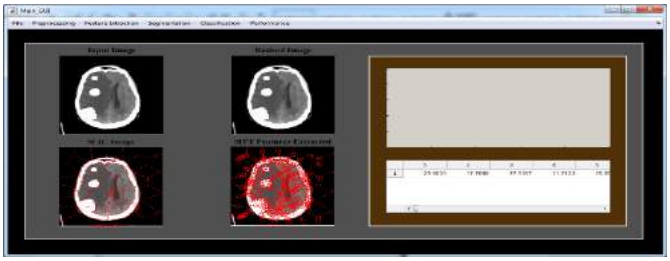
centers and recomputed centers}

8: until E ≤ threshold

9: Enforce connectivity

IV. RESULTS AND DISCUSSION

Here we detect the forensic in the photography. For the detection we extract SIFT features from the images. . The process can be further improved with the help of the application of different algorithms for the segmentation of the images. In the proposed approach the number of blocks in the images were calculated based on the input image



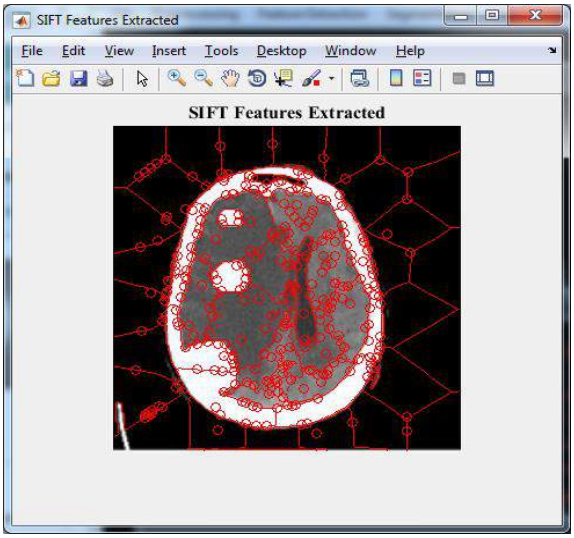


Fig 1:SIFT feature Extracted

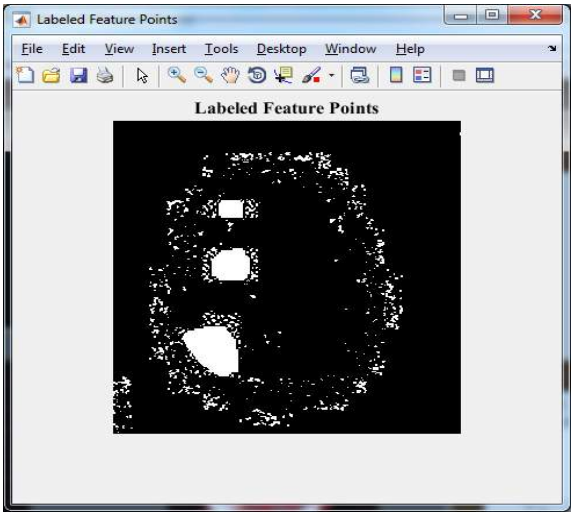


FIG 2:Labelled features points

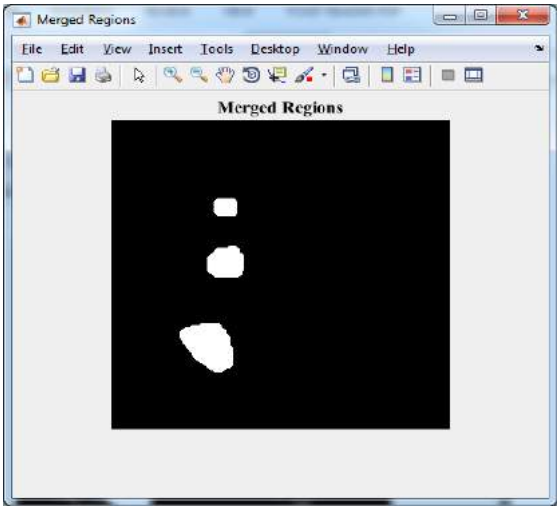


FIG 3:Merged Regions

FIG 4:Detected forged region

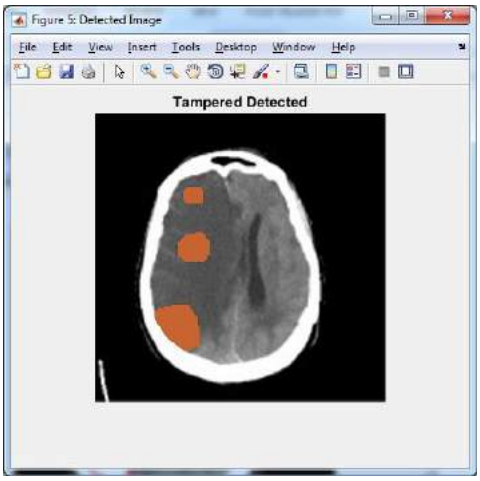
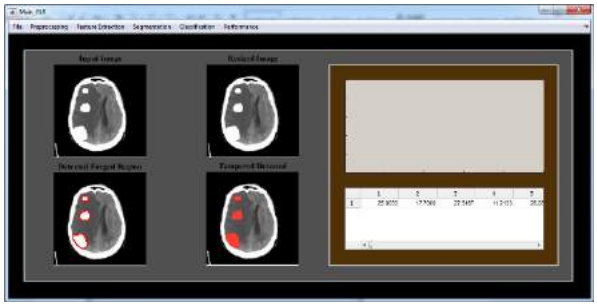


FIG 5:Tempered Detected



V. CONCLUSION

The input images were over segmented based on the SLIC algorithm. Our method provides the better results than the existing system. we detect the forensic in the photography. For the detection we extract SIFT features from the images

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Energy Generation Through Bio-Gas

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ABSTRACT

Energy is essential for human development. Without any basic energy supply, people cannot cook food, lighting homes, or keep essential medication cooled. In recent years man's dependency on energy has increased rapidly mainly due to the rise within the living standards and use of advance technologies, in order that non-renewable fuel reserves being exhausted and there are issues related to their GHG (Green House Gas) emissions such as, carbon monoxide (CO), carbon dioxide (CO2), and methane (CH4), it has become essential to look forward the utilization of renewable or inexhaustible fuels to reduce the difficulty on our non-renewable fuels and for resolving the matter of emissions. Per capita energy consumption of India is declining with increasing its population, which has direct impact on economy. Biogas technology seems promising to achieve sustainable energy yields without damaging the environment. Waste management, manure creation, health care and employment foundation are the advantages of biogas system. Use of biogas assures renewable energy supply and balance of greenhouse gases. India is traditionally using biogas since while but there's got to improve the technology, applications and deployment strategies. Biogas derived from organic waste materials may be a promising alternative and renewable gaseous fuel for combustion (IC) engines and will substitute for conventional fossil fuels. The availability of electricity from renewable energy sources can provide basic energy services for promote local economic growth. The aims of this project is to generate power with the help of IC engine which runs on bio-waste such as animal dungs, vegetable waste, biomass etc

Keywords : Green House Gas, Carbon Monoxide, Carbon Dioxide, Methane, Biogas Technology

I. INTRODUCTION

Due to the increasing energy demand day by day within the numerous field like that trade, transportation, lighting, change of state etc .so that fuel resources inevitably necessitate for the simplest potential utilization of exhaustible fuel and non-renewable energy resources. nearly actually during this century, it's believed that rock oil merchandise and petroleum can become terribly restricted and expensive to seek out and manufacture. in step with the DOE our country foreign Brobdingnagian quantity of crude oils from gulf countries and costs area unit terribly fluctuant, hence, the general public interests area unit increasing within the field of varied various fuels (methanol, ethanol, biogas etc.) and biogas is one amongst the a lot of vital on the maarket sources to fulfil the energy demand. Biogas is just created by the method of anaerobic digestion or fermentation of perishable materials like biomass, manure, inexperienced waste (plants), municipal waste, house waste, crops and stuff. Biogas can even be cleansed and upgraded to fossil fuel standards and becomes bio paraffin (CH4).

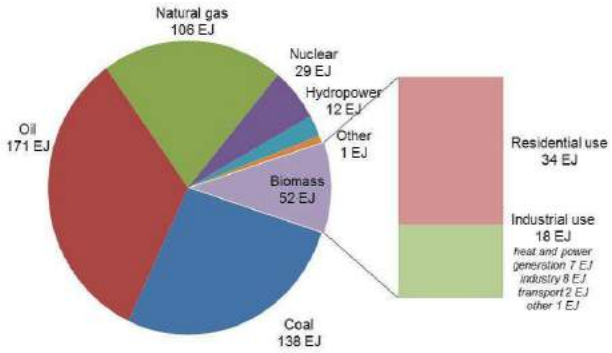

Figure: 1.1. Energy Generation from Different

What is Biogas?

Biogas is that the mixture of gases created by the breakdown of organic matter within the absence of chemical element (anaerobically), primarily consisting of methane series and CO2. Biogas is often created from raw materials like agricultural waste, manure, municipal waste, material, sewage, inexperienced waste or garbage. Biogas could be a renewable energy supply. In India, it's additionally called "Gobar Gas".

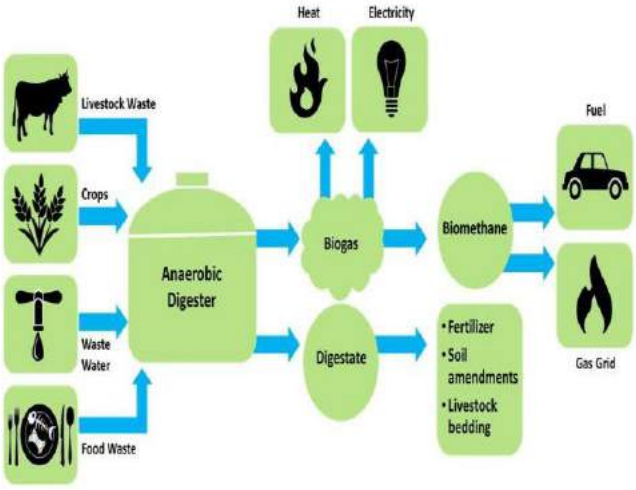

Figure: 1.2. Life cycle of Biogas production.

Biogas is one in every of the necessary renewable energy sources of the age and it offers the multiple benefits:

1. it's environmentally friendly and its combustion doesn't. Increase net quantity of greenhouse emission among the atmosphere.
2. it's created from waste biomass materials and thence ensures the most availableness.
3. It facilitates an improved approach of waste disposal together with a provision of energy provides.
4. It possesses the potential to exchange a considerable quantity of fossil fuels throughout the globe.
5. It provides a fashionable bio-fertilizer for agricultural lands, replace the utilization of chemical fertilizers for cultivation it can forestall deforestation particularly in developing countries.

Physical properties		Biogas components				Biogas ($60\% CH_4$; $40\% CO_2$)
		CH_4	CO_2	H_2	H_2S	
volume fraction	%	55-70	27-44	1	3	100
calorific value	MJ/m^3	35,8	-	10,8	22,3	21,5
flash-point	°C	650-750	-	583	-	650-750
critical pressure	Mpa	4,7	7,5	1,3	89	7,5-8,9
critical temperature	°C	-82,5	31	-	100	-82,5
normal density	g/cm^3	0,72	1,98	0,09	1,54	1,2
critical density	g/cm^3	162	468	31	349	320
density ratio of air density	[-]	0,55	2,5	0,07	1,2	0,83

Table: 1.1 Physical Properties of Biogas

II. METHODS AND MATERIAL

The tests and analysis of engine performance characteristics, i.e., brake power (BP), brake thermal potency (BTE), brake specific fuel consumption (BSFC) and exhaust emission of biogas fuelled combustion engine are meted out. it's desired that the performance characteristics of biogas-fuelled engine should be studied for a large modification of engine speed and cargo. Then the results area unit compared with operation of the traditional gas fuels. Thus, the most objectives of this study area unit to judge the performance characteristics of biogas fuelled. I.C engine. For gas and biogas consumption by the engine,

all the parameters are recorded at completely different load on the engine. Moreover, time for fuel consumption by the engine is additionally noted to calculate the precise fuel consumption beneath varied conditions. to cut back the result of dispersion within the information, every set of experiment is recurrent by range of times

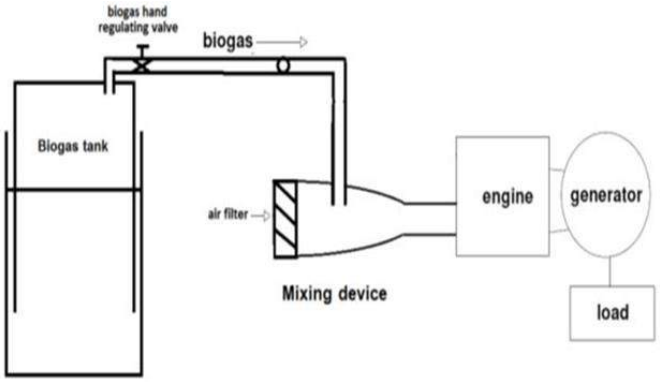

Figure: 2.1 Line Diagram of Proposed Biogas Plant

From these readings, the brake power, brake specific fuel consumption, brake thermal potency and exhaust emission area unit calculated...so as to judge the comparative performance characteristics of. I.C engine exploitation gas and biogas, the experiments are conducted by varied the load over a variety

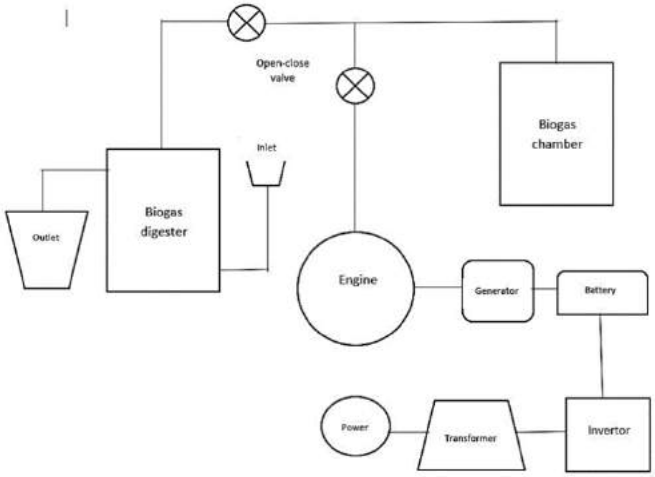

Figure: 3.2.1 Experimental Set-Up

III. Component Details

Anaerobic Digester :- Anaerobic digestion is that the method by that organic matter like animal or garbage is counteracted to supply biogas and biofertiliser. This method happens within the absence of gas in a very sealed, oxygen-free tank known as associate degree anaerobic steriliser .

It is 200litre industrial plastic barrels having one water with hooper for feeding stuff. One outlet for suspension and one outlet on prime facet of plastic barrels for grouping biogas.

Gas Storage Tank :- A biogas tank is usually a cylindrical formed unit made from a top quality tubes of torus-shaped balloons made up of associate water-repellent material, like soft, elastic caoutchouc, to stop air leak. Here a four wheeler tyre tube used as a gas collector.

Internal Combustion Engine :- An internal combustion engine (ICE) could be a engine within which the combustion of a fuel happens with associate degree oxidant (usually air) {in a|during a|in associate degree exceedingly|in a very} combustion chamber that's an integral a part of the operating fluid flow circuit. In an indoor combustion engine, the growth of the high-temperature and aggressive gases made by combustion applies direct force to some part of the engine..

The force is applied generally to pistons, rotary engine blades, rotor or a nozzle

Pressure Gauge:- A pressure gage may be a fluid intensity activity device. Pressure gauges area unit needed for the set-up and standardization of fluid power machines, and area unit indispensable in troubleshooting them. while not pressure gauges, fluid power systems would be each unpredictable and unreliable. Gauges facilitate to confirm there are not any leaks or pressure changes that might have an effect on the operative condition of the mechanism.

Brass Ball Valve:- The valve could be a full bore quarter flip valve for Associate in Nursing on/off application. It may be manual or automatic (electric or pneumatic).

the variability of seats and body materials permits it to reply to multiple applications within the business.

Brass Hose Nozzle:- A hose is a flexible hollow tube designed to carry fluids from one location to another. Hoses are also sometimes called pipes (the word pipe usually refers to a rigid tube, whereas a hose is usually a flexible one), or more generally tubing. The shape of a hose is usually cylindrical (having a circular cross section).

Brass Tee Joint:- Pipe Tee may be a variety of pipe fitting that is T-shaped having 2 shops, at 90° to the affiliation to the most line. it's a brief piece of pipe with a lateral outlet. Pipe Tee is employed to attach pipelines with a pipe at a right angle with the road. Pipe Tees area unit wide used as pipe fittings.

Geared Motor*:-* A gearmotor could be a homogenized and compact unit consisting of a gear unit and a motor. In electrical drive having 250W,13.7A,24V DC Power,2650rpm, it's additionally invariably an electrical motor.

IV. CALCULATION

PART: A

1. Total production of Biogas : 15 x 2 = 30 cubic meter.
2. Total gas production in cft. = 30 x 35.314 = 1059.42 cubic feet.
3. Dung that can be obtained from a single healthy Cow/buffalo= 15 Kgs.
4. Biogas that can be generated from each Kg of dung = 1.3cubic feet. Therefore no. of cattle required = (1059.42/15/1.3)= 55
5. Biogas required to run the above mentioned engine for 6hrs everyday = 15 x 5 x 6 = 450 cubic feet .The remaining biogas (1059.42-450 = 609.42 cubic feet) used to run the kiln/dryer, which in turn is used to bake the raw areca nut.
6. 1 cu. M of biogas can be replaced by 0.620 l of Kerosene (using standard replacement tables).
7. Saving in kerosene per day when biogas is use dinstead = 609.42/35.314x0.620 = 10.7l

PART:B

Payback period calculations

- ✓ Cost of Biogas plant setup = Rs. 30,000
- ✓ Cost of generator and related accessories = Rs. 20,000
- ✓ Total cost of set up = Rs 50,000.
- ✓ No. of units of electricity generated by generator set = 4.5 x 6 x 0.8 = 21.6 units Saving in the cost of electricity per day @ Rs. 3.5 per day= 21.6x3.5 = Rs. 75.6
- ✓ 5.Saving in the cost of Kerosene per day @ Rs. 5 per liter =10.7x5 = Rs. 53.5
- ✓ Income from bio manure per day from the biogas plant =Rs. 90
- ✓ Cost incurred in diesel consumption per day = 4x20 = Rs. 80
- ✓ Total payback period days = 50,000/(75.6+53.55+90-80) = 360 days = 1 year approx.

V. RESULTS AND CONCLUSION

A lot of prime quality sensible information and knowledge may be deduced from the elaborate and long term watching of a full scale analysis biogas plant. The study verified that long run measurements ar required to grasp the electrical power production and consumption of a biogas plant. as compared to recent literature, this study provides deeper insight into the electrical power consumption of specific shopper units by conjointly considering the biological parameters, like input materials and fermenter substrate characteristics. Over the year, the information showed a far better demand of power throughout the great and comfy summer months, as additional recooling of thermal power of the CHP unit is needed compared to winter times. A amendment within the offer of substrates mechanically affects the electrical power output of the CHP unit, however doesn't have an impression on auxiliary electrical energy demand. The bacterium react to changes of substrate offer, however a transpare. The weekly analysis of the zymosis substrate in each digesters showed most VFA results were below the detection limit and solely a number of among the vary of tolerance. further calculations of the input substrate degradability for the coverage amount verified a degradation rate on top of seventieth. Hence, each results make sure a awfully high edibility and stable and safe zymosis conditions for each digesters. A comparison of the electrical energy production and consumption for the complete BGP in 2010 and 2011 showed solely slight variations between the years. the electrical power consumption of the CHP is on the average 194 kWh/day and represents four.6% of the electrical power generated per day (during the amount lined by the study).

However, in method the number of consumption of energy will hardly be reduced. One improvement methodology is to extend the number of thermal power provided to the district heating plant of the farm and herewith cut back the operative length of emergency cooling pumps and fans. Moreover, the sort of the heating pumps might be turned into high energy potency pumps. the rise of energy potency, particularly of the agitation units, proves to be the most important challenge for plant operators. In follow, from a good vary of accessible mischief-maker sorts totally different combos ar put in within the digesters. this can be to avoid sinking and floating layers, for warmth and nutrient distribution and to modify gas carry at high DM contents. The challenge is to make sure an even digestate, though fibrous input substrates on one hand (with a bent to create floating layers), and fluids on the opposite hand got to be homogenized whereas the whole emulsion is subject to thixotropic conditions.

In this study, the biogas could be a renewable fuel which may be utilized in dual-fuel mode within the IC engine associate degree |with none} modification to an engine. additionally to straightforward convenience, it's renewable and low-cost. The biogas will build an honest substitute for IC Engine fuel. At equal power output state of affairs, the twin fuel engine performance is compared thereto of baseline case. during this found out, IC engine performance through an experiment investigated and therefore the following conclusions is also drawn:

Fig1. Energy generation through biogas (setup)

1) the employment of biogas in diesel engines, as in grouping fleets, besides reducing the consumption of IC Engine utilized in more or less twenty fifth, that finally ends up inflicting economic and environmental profit for the place within which it's used.
2) The existence of dioxide within the biogas reduced the burning rate, and thereby, deficient combustion that augmented the BSEC and exhaust gas temperature. yet as this, the longer pilot ignition delay and high self-ignition temperature of biogas helped delaying the twin fuel combustion method and offers to the additional enlargement stroke (end stroke). jointly of these factors ar to blame for down the thermal potency.
3) The Brake Thermal potency is cut because the share of biogas augmented as compared to standard fuel. this is often thanks to lower energy contents in IC Engine fuel with biogas.
4) it's examining that twin fuel mode want higher fuel energy (due to their poor combustion of fuel-air mixture and lower hot value) for manufacturing same quantity of shaft output compared to its diesel mode.

VI. Acknowledgements

We would like to thank our guide for all the guidance and knowledge provided during this project work. Apart from we would also thank our guide for the extended support during research paper writing.

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Review on Engine Reconditioning

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ABSTRACT

Engine Reconditioning is the maintenance of a used engine to enhance its performance, efficiency and hopefully extend its lifespan. Typically, the task of reconditioning in a used engine would be performed by a trained professional as the engine is the most important element of any car, truck or even motor boat and requires special equipment. Often reconditioned engines are cost-effective alternative in buying another car, however it's important to investigate the services of a good mechanic who is used to working with reconditioned engines. It can involve a number of services – from a major engine rebuild to a service involving line boring, crack repairs or even replacing engine parts like spark plugs, and carburetors While some car-owners rely on manuals and guides to engage, most engine reconditioning requires the work of an experienced professional with specialties in the reconditioning of engines, trained staff and a workshop devoted to engine maintenance. The task of engine reconditioning is an important one, for the lifespan of the car and the safety of the occupants.

Keywords : Engine Reconditioning, Line Honing And Boring, Crankshaft

I. INTRODUCTION

Engine reconditioning is the process in which the engine is completely stripped down, inspected and micro-metered within OEM tolerance. Each and every parameter is thoroughly checked due to which the problem may arise in the engine.

After inspection everything is put into a hot acid tank &/or chemical cleaning process, not just to remove dirt and grime, but to also make sure all oil and water ways are clean and free from debris so as to avoid the problems which can be faced while doing the repairing work. This is especially important if the engine components have been badly damaged due to something like an oil pump failure, as small bits of metal referred to as fine chips or filings of stone are left in the engine, further damage could occur. After cleaning all the separate components, they are taken to respective stations where they are reconditioned.

The block is re-bored or re-honed and the crankshaft is polished, with new pistons and new bearings being ordered to suit. The cylinder head is pressure tested, with the valves faced and valve seats again made to cut, any of the valves which are burnt or showing signs of extreme heat are replaced in order to avoid the bigger mechanical failure. Valve guides are also inspected for wear and replaced where necessary. After all gaskets surfaces and components are spotlessly clean, it is all then re-assembled using new gaskets, oil seals and oil pump.

Challenges in today's market environments: a continuing tendency towards reduction of product development times and shortened product lifecycles. All these modifications require the machine to be out of production during a certain period of time, including some previous preparation, reconditioning work, commissioning, verification and final validation before taking it back into production. When a firm quote for engine reconditioning, they may or may not be including the steps outlined above. Often, a firm will present a price without even seeing the engine in question and it's difficult to switch vendors once the engine has been disassembled. If a company finds itself in need of this work, it's critical to get a complete understanding of what is and what is not included in a quote in order to ensure that the work is done efficiently, effectively, and at the optimal price point.

The crankshaft will normally be reground, and the cylinder head will receive new valves and springs. Whether our needs are for individual component machining, balancing or engine assembly, the processes are done professionally to satisfy our needs.

II. METHODS

1.1 Project description

The objective of our project is to reduce the time taken into performing the operations on the repairing of the crankshaft.

The most common problems occur when the big ends wear down and the engine produces a loud knocking sound. Any significant wear in this area of the engine can be catastrophic, and should be repaired immediately. In most cases the crankshaft can be machined back to working condition. Material is removed from the shaft in the grinding process and replacement, oversize bearings are installed to compensate for its new diameter. The finale inspection is carried out using magnaflux and black light to detect hidden cracks as some cracks can't be seen by the naked eye.

2.2 Housing Bore

- In general terms, the value of oil clearance = housing diameter minus bearing wall thickness x2 minus journal diameter.
- The bearing housing diameter should provide reliable hydrodynamic lubrication within the whole range of tolerance, to tight a clearance (low diameter) may cause overheating of oil.

Figure 2: Housing Bore

- Too high a clearance will increase oil leakage, lower oil pressure and may produce knocking.
- A firmly tightened bearing has uniform contact with the housing surface, which fulfills the following functions.
- Housing diameter affects two characteristics of engine bearing operation: oil clearance and bearing press fit in the housing bore.

2.3 Problems observed

- Problems can arise in the lubricant delivery system, if lubricant return holes in the housing's

seal area are blocked, the pumping action caused by certain types of seals causes oil to leak.

- These problems include out-of-round and undersized housings, oversized housings, and housings enlarged by wear.
- Contact seals may also be excessively tight, leading to a build-up of heat.

2.4 Housing bores

- Diameters within tolerance
- Round with 0.003”

2.5 Crankshaft Grinding

- In this the crankshaft setup is made and the grinding wheel is well dressed with specified radius.

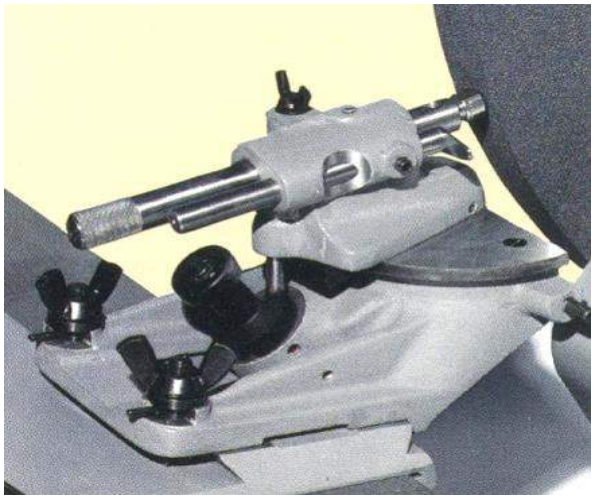

Figure 1: Crankshaft grinding

- Crankshaft is fitted to 1/2 the stroke length
- Other journals are indexed
- Mains are ground on centre of rotation
- Positioning is done from seal surface or gear/sprocket surface.

2.6 Crankshaft solutions

- Diameter within tolerance
- Round within 0.0005”
- Straight within 1/2 of oil clearance
- Surface finish 10Ra or better

III. CONCLUSION

Reconditioned engines are used engines that have had modifications. This includes replacing parts, re-engineering or re-working to make a new engine. They can operate almost like new and are held to hefty standards, making them a safe and desirable option. Engine reconditioning can involve a number of different services, depending on the damage to the existing engine. This could be anything between a major engine rebuild through to a service. Such services include rod resizing, line boring, repairs, crack repairs or even replacing engine parts like alternators, spark plugs, pumps and carburetors.

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A Review - Design of Citrus Fruits Cleaning and Grading Machine

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ABSTRACT

In India the cultivation of citrus fruits is estimated around 924 thousand hectors area and the production is around 8607.7 thousand metric tons. As citrus fruits is produced on a large scale there arises a need of cleaning and grading of fruits in order to intensify the commercial value of the product. In India, the grading and cleaning of citrus fruit is carried out manually. Manual cleaning and grading consumes lot of time and also require lot of labour work. As per World Trade Organization (WTO) it is mandatory to sell high quality clean and graded products. So farmers are in search of a machine which can be economical, portable and easy to use; this will eliminate labour shortage and will save time and money. Cleaning is carried out by placing a set of cylindrical rollers in series; All this rollers are rotating in same direction. Rollers are made up of nylon and Polypropylene brushes. These brushes are used to remove dirt, dust and foreign material present on the citrus fruit. At another side of the machine a simple grading system having a tapered shaft is arranged which will separate down the fruits based on the size after cleaning and polishing. Size variations in citrus fruits provide a base for grading them into different categories.

Keywords : Citrus Fruits, Cleaning, Grading, Economic, Portable, Farmers.

I. INTRODUCTION

In India, agriculture is the main occupation and around 70% of the population is directly or indirectly engaged into this field. Beyond the conventional agriculture of fruits new technologies in horticulture have been recognized for changing the economic status of the farmers. In India horticulture contributes 12% and thus, and the importance of horticulture may not be ignored. The production of fruits at present is estimated around 96 million tonnes. In India, citrus fruit is produced in 0.62 million hector area with total production of 4.79 million tonnes. Citrus fruit industry in India is the third largest fruit industry of the country. India contributes 4% of the world's total orange production. Since there is a huge demand of citrus fruits in the market we are designing a machine which will clean and grade the fruits without any artificial or harmful cleaning agent and without any human involvement.

Cleaning and grading of these fruits is considered very important as it can fetch higher price to the grower. This mthod will improve the packaging, handling and other pro-harvest operations. Cleaning operation is basically done in order to remove dust, dirt and foreign particles. The process of grading is basically segregating the fruits based on their size. Both the operations requires lot of time and manpower so, in order to minimize the time and energy we have designed a machine which can do cleaning, polishing and grading all in one single unit.

The machine is mainly related to agro sector where majority of farmers have to deal with the work of

cleaning, polishing and grading of the fruits. The cleaning operation is carried out in this machine by placing a set of cylindrical rollers in series, the rotation of this rollers are in same direction. The material selected for cleaning is nylon and polypropylene brushes, these brushes help in removing the dirt, dust and foreign particles. The next process which machine will perform is of polishing, where every manufacturer are making a machine which uses wax as the polishing agent, but here considering the health of people we are not using the artificial polishing agent. So for polishing we are introducing micro-fibre rollers which will help in getting the texture to the fruits. The final operation is of grading in which citrus according to their sizes are graded into different section. To perform this operation we have designed a tapered shaft which rotates at a certain speed. The design of the grading unit involves a tilted tray where sections are provided where the fruits after passing over the rollers collect on tray which is tilted at a certain angle, the tray passes the fruits over a shaft which is continuous in action those shafts are mounted over a frame. The fruits passing through the shaft will pass on further towards the collecting tray.

II. LITERATURE SURVEY

[1] The Paper Presented By J.L. Blogkbur'ger Published In The Year 1893. He has worked on orange or fruit cleaning machine, the objective of his invention is to provide a machine which will thoroughly clean and polish fruits or oranges and prepare them in excellent condition for the market at a minimum expenses of time and labor. His invention comprises a hemi-spherical brush having its bristles arranged pointing toward a common centre to form a concave brushing surface. The entire assemblies mounted on a frame for supporting purpose.

[2] The Paper Presented By Thomas S. Carswell, Kirkwood, Monsanto Chemical Company Published In The Year 1934. This invention is related to cleaning of fruits and vegetables, more importantly this invention is related to removal of spray residues from fruits and vegetables. The cleaning of fruits and vegetables is done by applying the dilute aqeuos solution of an inorganic acid containing a small portion of alkali metal salt of a compound obtainable by reacting a sulphuric acid with the reaction product of an aliphatic alcohol and a di-phenyl compound.

[3] The Paper Presented By (1) Howard.C.Lisle, (2) James.W.Morse, Publication Of USA. They were worked on" Fruits and vegetables cleaning machine " on May 25 1953 In which they was proposed to design a fruits and vegetable cleaning machine, incorporating fruits and vegetable polishing facility with this machine. This invention relates to a machine which uses a series of brush for the purpose of cleaning and polishing the fruits and vegetables. The apparatus of this application comprises it is also an object of the invention to provide a series of rollers arranged on a slighting a machine that will have means for reducing the 5-cline over which the fruit or vegetable is running at full capacity of the roller brushes. Mostly the number of steps and activities are intellectual and organizational rather than physical. Few organizations define and follow the precise development processes, where as the other organisation may not even be able to describe the processes.

[4] The Paper Presented By ERNEST H. WIEGAND In The Year 1930. The invention stated in this paper is related to fruit graders which has specific reference to novel methods and apparatus. The fruits such as oranges, prunes, lemons, etc are separated into quality grades by floatation according to their density and maturity. In this invention he has used solutions of

greater density than water for separating fruits into their respective quality and grades. The solution used are sucrose, glucose, laevulose, maltose, sodium chloride etc. The fresh fruits will float on the surface of the solution whereas the ripped fruits sink at the bottom. This machine consists of a tank in series, containing solutions of greater density than the density of the water/aqua.

[5] The Paper Presented By W.W. Jacobs Dated 17.1901 They were design a Cleaning and grading machine for oranges of various sizes maybe thoroughly brushed and cleaned afterwards graded accordingly and delivered into separate hopper or bins provided for their reception. During the design of this machine they had taken into consideration that it should be more efficient than the manual operation and should minimise the difficulty existing in the conventional one. The rail is arranged to collect the oranges which pass through the way or passage between the guard brushes, another rail is arranged to carry away the oranges which are removed by hand from the wheel and are placed on the periphery of the wheel against the rail. If there is a case of breakage and removal of waste, there is a loss of man power, thus a tremendous modification is required in this area of design which increase the advancement of the technology.

[6] The Paper is Presented By Alfred Ayer In 1890. It states that important object in grading the oranges is to secure the exact lying of standard boxes with oranges of either size delivered by the machine. This end is not reached by the use of machines that grade by weight or that passes the fruit through long slots, for weight and size do not vary together, and a large orange, will pass through a narrow slot and for analogous reasons, but when the fruit is graded by passing through circular openings and the desired result is obtained with the greatest certainty and the box gets filled.

III. CONCLUSION

Hence by referring these papers we have concluded that:

The Cleaning, polishing and grading operations can be done by a single unit without any involvement of human. Machine should also prevent health hazards. Any chemical or polishing agents should not be used. The construction of machine should be compact and portable in order to minimize the floor area. Machine should require Low maintenance and easy mechanism. This machine must be completely automatic so as to save time, money and manpower. Affordable machine should be provided to a farmer. The machine should be simple and easy to handle.

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Generating Energy from Omnidirectional Winds

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ABSTRACT

With the depletion of fossil fuel energy, renewable energy has become the most popular field of research interest. Wind turbines are considered as one of the most commonly used energy sources (turbo-machines) for power generation. Therefore it has been increasingly investigated. In this, we are presenting a design of vertical axis wind turbines which can respond to wind coming from any direction.

Keywords : Wind Turbine, Typhoon Turbine, Omnidirectional Winds

I. INTRODUCTION

In this proposal, we are presenting a design of wind turbines for the generation of clean and renewable forms of energy. Its production has no direct carbon emission or air pollution against the environment; moreover, it does not consume water for generations, seeking lower maintenance costs. The energy generation carried out by this wind turbine is explained below:-

II. DESIGN

This vertical axis wind turbine can respond to wind coming from any direction (omnidirectional wind). In vertical axis design, the curved blades on top of the turbine rotate to generate a Magnus effect, which then starts the rotation of the entire system. Its shape is like an egg-beater, having 3 curved blades attached to the central rod.

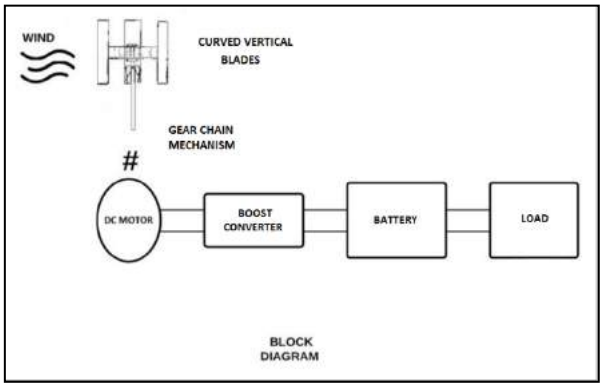
A G.I. pipe is used for coupling of bearing and gear. Gear chain mechanism is used to couple the turbine and the motor. The timing chain is used to increase rotational speed from a low-speed turbine to a higher speed dc motor. A permanent magnet moving coil motor is used. It is a dc motor which has permanent magnets on the rotor. A timing chain is used for the transmission system. A 0-48V dc, 0-3A dc boost converter is used to step up the dc voltage obtained from the motor. Further, a lead-acid battery is used to store the dc voltage obtained from the boost converter.

III. WORKING

A vertical metal post is placed at a certain height when the motor is welded to the top of the column. The motor shaft is connected to the Y-shaped frame with the help of the timing chain, at the end of each arm of the frame to which the blades are attached. These curved blades are connected in such a fashion as to move in one direction only. It responds to wind incoming from all directions to move the turbine

more efficiently. The speed of the turbine is matched with the speed of the dc motor with the help of chain mechanism. The motor shaft begins to rotate and the generated power is transferred to the boost converter, which steps up the voltage from its input to its output. Thus, the output of the boost converter, which is stepped up DC voltage, is transmitted to the lead-acid battery to store the energy harvested by the wind. Further, it can be used to supply various loads.

IV. BLOCK DIAGRAM



V. MODEL DESCRIPTION

SR. NO.	COMPONENTS	HEIGHT	THICKNESS	WIDTH	RADIUS	WEIGHT
1.	Central Rod	60 inches	2.5 mm	-	30 mm	4.3 kg
2.	PVC Frame with Acrylic Blade	24 inches	3 mm	1 inch	2 inches	310 gm
3.	Metal Sheet (Base)	24 inches	5 mm	17.5 inches	-	9.6 kg
4.	Tetra pod (4 legs)	16 inches *4	4 mm	-	-	246*4 gm

- PMMC Motor- 24V, 100W
- Gearbox (Gear ratio= 6:1)
- Timing chain (used for transmission system)
- Boost converter- 0-48V dc, 0-3A dc
- Expected Load- 1 LED Bulb

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VI. CONCLUSION

A. We aim to generate electricity in a normal/low wind area. The design of the blades will help them to move in any direction, hence making it efficient to generate a satisfactory amount of energy.

B. We can implement this design of vertical axis wind turbines at every possible place and generate electricity while contributing to the reduction of CO2 production.

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Online Application of Automatic Time-Table Generator and Classroom Seating Arrangement

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ABSTRACT

Professional colleges have different streams of courses and each has its own structure of syllabus which contains diverse subjects. In these colleges, faculties are teaching different subjects in different semesters and also within same semester faculties are handling two different subjects. The major challenge is that the time table required to schedule according to the faculty provided time slots where timetables are prepared in such a way that faculty timings do not overlap. In this project, we develop the application of Time Table which can be automatically generating time table according faculty available time slots. The system will ensure that the time of faculties will not clash in classroom or for any other coordinating matter. This system gives efficient time table generated according to professional college requirement. Setting arrangements are the crucial topic when considered about the relationship between the students and teachers.

Keywords: Colleges, Time Table, Faculty, Courses, System, Classroom Seating, Matrix Crossover, Relationship between Students, Fitness rates of all Students.

I. INTRODUCTION

Generating a time table is serious and meticulous task there is no room for errors. It has to be made perfectly accurate because if any errors are present in time table it can really mess up with entire organization's schedule. The project that we have made enables one to create a time table with dead eye accuracy. Our algorithm will ensure that no two timetables will collide each other thereby messing up people's time. This automatic generated timetable application will reduce the complexity of manually creating a timetable. Timetabling problems may be solve by wide variety of methods inherited from operation study such as graph coloring, local search measures such as tabs search, simulated annealing, genetic algorithms or from backtracking based constraint fulfillment handling. In this work, timetable problem is formulated as a constraint fulfillment problem and we proposed a realistic timetable algorithm which is capable of taking care of both hard and soft constraints. It is a complete time table solution for Colleges which will enable them to create timetables without much challenge digitally rather than manually constructing the time table. It is large and highly constrained, but above all the problem differs greatly for various colleges and learning institutions.

Classroom seating arrangements is done by using a Genetic Algorithm. By using optimization to the Classroom Seating Arrangements it will carried out between two students in the case where one student is sitting left hand side or right hand side of the other student.

II. METHODS

2.1 Evolutionary Algorithm

EA (Evolutionary algorithm) is used to solve a large limitations based university timetable issues. In their approach Heuristics and context-based reasoning methods are utilized for achieving realistic timetables in minimum time. A combinatorial optimization problem developed to solve the university timetabling problem where a set of measures has tube planed into time periods and established into suitable rooms. Manually generated timetables is maintained, it is universal problem due to lack of suitable methods implemented.

2.2 Genetic Algorithm

A genetic algorithm to determine classroom seating arrangements In order to determine the optimal classroom seating arrangements, a genetic algorithm is applied on the basis of the questionnaire results and the analysis of the observation of behaviors between students. Major problem here is of determining the optimal classroom seating arrangements is a kind of combinatorial optimization problem, and it is well known that it is difficult to solve the problem.

III. RESULT AND DISCUSSION

This is the First page of our project in consists of 2 parts i.e The first is for "Classroom Seating" and the other is for Time Table Generation. Classroom Seating consist of 2 columns i.e No. of Students and Column. User need to enter the total No. of Students as well as the total No. of Columns in a Class to make an Examination Seating Arrangement.

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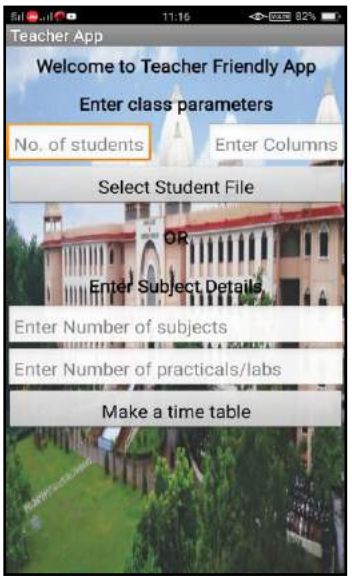

Figure 1 : User Interface Page

For Time Table the User need to enter No. of Subjects as well as No. of Practical to Generate the Time table.

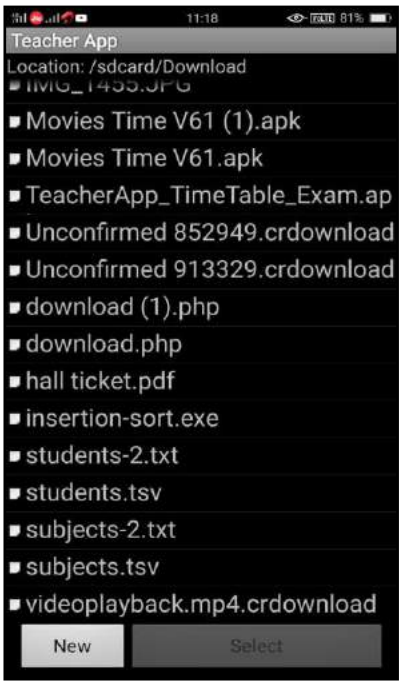

Figure 2: File Page

This is the second page of the project which consist of all types of file. After Entering the total no. of

Subjects and Practical, user need to select. Subject file to get the output.

Figure 3 : Output Page

Last but not the least is the Output page. As soon as user select the Subject file and click to the Next button the Time table is Generated and it contain no block lectures and no one subject in a single day.

IV. CONCLUSION

As we are about to conclude our project, the system can be considered a useful system since it helps the lecturer to improve their process of preparing the timetable. We compare our project that is the Classroom Seating Arrangement with traditional one that is determined by using student ID numbers or intentions of the students and the homeroom teacher.

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Home Appliances Controller using Internet of Things

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ABSTRACT

Internet of is the platform where appliances are connected to the software sensors and other equipment. The devices are allow to transfer the data over the network and also can communicate with each other. The method is incorporated in our home to make the appliances automated and easily usable. The Home Appliances controller is the source of current task performed inside the house and this home appliances controller can be developed easily now a day's, because of powerful computational devices and wireless devices to provide user friendly and cost fairly home automation system. In Home Appliances Controller using IoT different technologies like Wi-Fi, Bluetooth are used for communication, and different devices like smart phone, tablet and laptop used for controlling various appliances. Some of the currently available systems provide a view of the house from a web application; but this can cause trouble to the user. Because user must access the web each time he/she wishes to view the status of the home appliances. Therefore, the motivation behind the development of this system is to let people know about these technologies, and make the system as simple as possible for an ordinary person to understand. We are going to mobile application for controlling the home appliances form any remote location using internet of things.

Keywords : MOSFET, IOT, WI-FI, TTL, IC, CMOS, IDE, SQL.

I. INTRODUCTION

Today, there is large demand of remote or automated systems so that people can reduced their work. The Internet of Things is using set of services to many domains. Home automation represents the Smart work of any work. According to research the number of people is using now a day automated appliances for better work and time management. This modern technology i.e. Home Appliances controller is become very useful of the handicapped people. It is very useful to the user control and handle all appliance that are connected to the system. This project focuses on a system that provides feature of home appliances control relying on internet of things to operate easily, in addition tho that is includes, the user friendly android application to controller all the appliances. The user can make use this application to control switching on of button form adored app for lights fan curtains, switch, and speed controller for the fan. The user can assess this system completely form the anywhere using Internet. This devices that connected in to the home must have internet connectivity. As per our survey there is exist many system that can control come appliances but not using android phone other system. But In this system home appliances can

be monitored and controlled locally via the embedded system board, or remotely through a smartphone from anywhere in the world using Internet.

Our system can access devices using internet as well as the Bluetooth. This application will provide an interface between users and the actual appliances which user wishes to control. This proposed system is adjust to control the speed variation and control the speed of appliances using Bluetooth signal and through Wi-Fi using android application.

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II. METHOD AND MATERIAL

2.1 System Architecture

Our project is associated with the two part hardware and the software part. In this architecture fig.2.1 is showing the system how it will going to be work. We are going to used cardboard to making our experimental setup that contain kits, power supply and devices. This devices control by the mobile application that is design in the android application making software. The architecture of system give a brief Idea of operation home appliances controller using IoT.

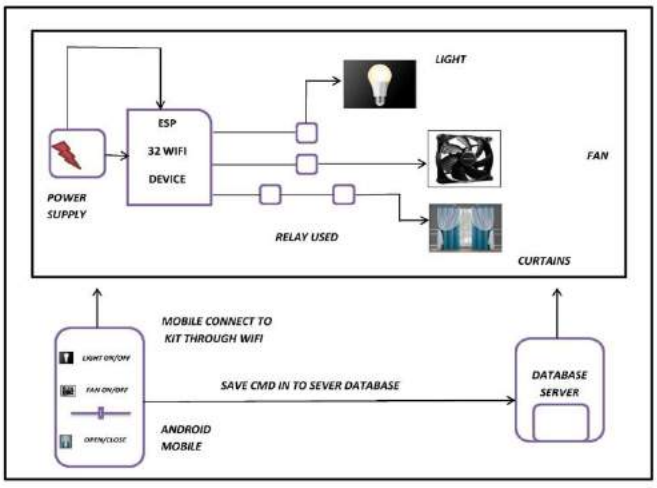

Fig. 2.1 System Architecture

We used for to use four different appliances such as fan, light and curtains which are operated remotely using Wi-Fi and through an application installed on android. For the connection, we will use the ESP32, it is an open-source electronics platform based on easy-to-use hardware and software. These appliances are connected through ESP32 with its digital input/output ESP32 is a series of low-cost, low-power system on chip microcontrollers with integrated Wi-Fi and dual-mode Bluetooth which is use for communication. We will use relays for ON/OFF operation and use Google firebase for storing data. Relays are nothing but the switches that open and close circuits electromechanically or electronically.

So we will firstly connect our hardware component to each other i.e. connection of ESP32 and all device and relays for ON/OFF. For the driving the relays we used the ULN2003 IC that is relay diver IC with connected between the relay and the ESP32 device. For the control fan we used MOSFET because we have given a speed controller seek bar in to the android application. We have given an ON/OFF buttons for the light and fan and a speed adjustment bar for fan for controlling the speed of fan. For curtains, we have one button for ON/OFF. This all hardware component is connect to the power supply we used a Google firebase database server for storing our data and command for controlling our system. The Google firebase database server is a cloud-hosted No SQL database that lets you store and sync data between your users in real-time. We developed an application through android studio which is the official IDE (Integrated Development Environment) or tool (layman terms) for developing application exclusively for Android platform. Our app contain a user friendly interface such that user can easily use and access the feature of system. Application have different buttons for different functions. It have ON/OFF button for each module, and a speed

adjustment bar for controlling the speed of fan. And our app is also going to notify that if the fan is on or off or curtain is closed or open. Our Google firebase database server is connected to hardware component as well as our software i.e. application.

When user open application, user will see user interface for controlling his appliances. When user will press a button for turning on the light, it will send a command to database and save it in the database. Each button has different command according to programming function. When command saves in the database, server will check the command. The command is form in (0) and (1), if the command is (0), no operation will perform. If the command is (1), then the specific operation will perform. The server will give the command to the relay for switch ON and OFF the component that is connected to device. All the operation is perform by this way.

The main advantage of our system is that we can operate our home appliances from anywhere where internet is active. This will help for saving energy, money as well as time. This system also helps handicapped and aged people that will enable them to control home appliances and alert them in critical situations.

III. Hardware Description

3.1 ESP32

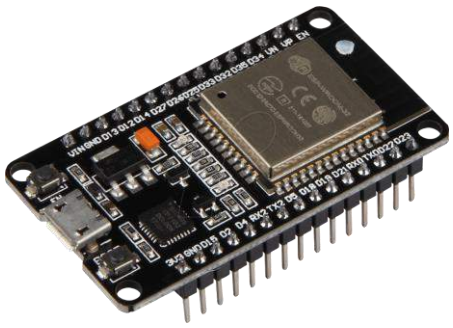

Fig: 3.1 ESP 32 Device

The above fig.3.1 ESP32 is a low-cost system-on-chip series created by ESP 32 Systems. It is an improvement on the popular ESP32 that is widely used in IoT projects. The ESP32 has both Wi-Fi and Bluetooth capabilities, which make it an all-rounded chip for the development of IoT projects and embedded systems in general. ESP32 is highly integrated with built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power management modules. Engineered for mobile devices, wearable electronics, and IoT applications, ESP32 achieves ultra-low power consumption through power saving features including fine resolution clock gating, multiple power modes, and dynamic power scaling.[11]

3.2 ULN2003

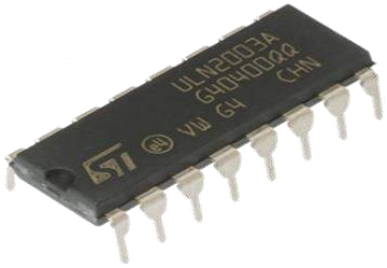

Fig: 3.2 ULN2003 Device

Above fig. 3.2 is basically a relay driver IC and it is a Darlington array having high voltages and high currents as well. It is made up of seven open collector Darlington pairs having common emitter which shows ULN2003 has a capability of handling seven different relays at a time. A single Darlington pair consists of two bipolar transistors and it operates on the current range of 500mA to 600mA ULN2003 operates on 5V and TTL (Transistor Logic) and CMOS (Complementary Metal Oxide Semi-Conductor). Its pin configuration is designed so that the input pins are at the left side of the IC whereas the output pins of it are on right side in front of the corresponding input pin. This IC has a very wide range of

applications. They are commonly used as relay drivers in order to drive different kinds of loads.

ULN2003 Pin out :

ULN2003 has 16 pins in total out of which there are:

- 7 Input pins (Pin # 1 to Pin # 7)
- 7 Output pins (Pin # 10 to Pin # 16)
- 1 Ground pin (Pin # 8)
- 1 COM pin (Pin # 9)

3.3 MOSFET

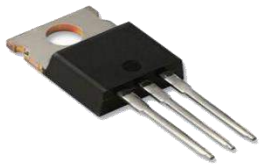

Fig: 3.3 MOSFET Device

The above fig. 3.3 is MOSFET (Metal Oxide Semiconductor Field Effect Transistor) transistor is a semiconductor device which is widely used for switching and amplifying electronic signals in the electronic devices. The MOSFET is a core of integrated circuit and it can be designed and fabricated in a single chip because of these very small sizes. The body of the MOSFET is frequently connected to the source terminal so making it a three terminal device like field effect transistor. The MOSFET is very far the most common transistor and can be used in both analog and digital circuits. [11]

3.4 RELAY

Fig: 3.4 Relay Driver Device

Above fig.3.4 are Relays nothing but the switches that open and close circuits electromechanically or electronically. Relay is connected to the ESP32 and its output is connected to the home appliances in a sequence as (i) light (ii) fan (iii) curtains. Relay takes low current and voltage and triggers the switch which is connected to a high voltage. 4 input pins of relay are connected to ESP32 which takes 5V supply from it and can trigger up to 10A, 250V supply. [5]

IV. EXPERIMENTAL SETUP RESULT

4.1 Hardware Setup

The following fig: 4.1 is the hardware experimental setup of project. It contain cardboard having all devices with electronic component.

Fig: 4.1 Experimental Hardware Setup

4.2 Software Experimental Setup

The following fig: 4.2 is the software experimental setup of project. It contain one mobile android application having login pages for user and one dashboard for controlling the appliances form that application. For each component different module is present in the application. It's having ON/OFF button for each component and Speed control bar for Fan. [10]

Fig: 4.2 Experimental Software Setup

V. CONCLUSION

Home automation and IOT is widely accepting technology across the world. Our goal is to provide useful system to the world. Using mobile the Presence of each and every module has been reasoned out and placed very carefully. Hence the contributing to the best working unit for automation of electrical devices has been designed perfectly. Secondly, using highly advanced device like ESP32, Relay modules, other devices with the help of growing technology, the project has been successfully implemented with a great idea. Thus the project has been successfully designed and tested.

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Intelligent Recommendation Engine for HIPaaS (Human Intelligence Platform as a Service) Repositories

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ABSTRACT

The "Intelligent Recommendation Engine for HIPaaS repositories" facilitates a platform to connect people and share knowledge. It improves customer relationship by providing a platform for organizations of all sizes. One can find, connect and collaborate with colleagues globally and on-demand. This enables sharing one's own top skills while bringing into use the top skills of other employees in pursuit of achieving global profile and reputation. Main focus is to leverage the feedbacks, reviews and ratings that one gets from across the globe and build the efficient system to best serve the purpose of knowledge sharing. An Intelligent recommendation engine takes the data that user provides, ratings or search history. Based on that data, a user profile is generated to make suggestions to the user.

Keywords : Recommendation Engine, Recommendation system, Machine Learning

I. INTRODUCTION

Intelligence can be defined as a general mental ability for reasoning, problem-solving, analysis and learning. Due to its general nature, intelligence integrates cognitive functions such as perception, attention, memory, language, or planning. Human Intelligence is the capability of brain to learn from past experience, adaptation to new situations, handling of abstract ideas and the ability to change his/her own environment using the gained knowledge. Whereas Artificial Intelligence is the simulation of Human Intelligence by the machines.

Recommender system is a program that recommends the most suitable products or services to users by predicting a user's interest in an item or product or service. The prediction and recommendation is based on the related information about the items, the users and the interactions between items and users.

Recommender systems usually make use of either or both collaborative filtering and content-based filtering. This model is then used to predict items that are in the interest of the user.

"Intelligent Recommendation Engine for HIPaaS (Human Intelligence Platform as a Service) repositories" is the recommendation system that gives a common platform to both learners and instructors. Learner can benefit out of it the courses or the technology that best suits and serves their area. As an instructor or a teacher, one can showcase its area of excellence and expertise. The user can log into their accounts where they will get the relevant personalised product or service recommendations from the designed system. It mainly works on the ratings given by previous users and area of interest of the learner.

II. METHODS AND MATERIAL

Recommendation system gain information about the user and uses different methods to predict what user needs and recommend items according to this analysis. The techniques used are:

- Content-based recommendations
- Collaborative recommendations
- Hybrid Approaches

Content-based recommendations: Content-based recommendation approaches utilize a series of discrete, pre-tagged properties and characteristics of an item to recommend additional items with similar properties. The basic operation performed by a this system consists of matching the user's basic data like age, gender, location and the rated item list on the site with the similar items having common specifications, in order to recommend new items as per the user's interest.

Collaborative recommendation: This approach builds a model from a user's past behaviour like items previously purchased or selected and/or numerical ratings given to those items as well as similar decisions made by other users. This is called collaborative filtering. By doing so the system gives most accurate results. Collaborative filtering algorithms also can be divided into two categories: Collaborative Filtering (CF) algorithms based on rating prediction where it predicts the actual rating for an item that a user has not rated yet and then ranks the items according to the predicted ratings.

The second category is Personalized Ranking (PR) algorithms based on ranking prediction.

Hybrid Approaches: In a hybrid approach, two techniques such as content-based and collaborative filtering are merged to get the best advantage [9]. Hybrid approaches have multi-methods [3] out of which we have used Average Weighted approach for total rating.

The rating algorithm also known as *weighted algorithm* has a complex formula that calculates the weighted average of total ratings given by the learners. The formula is designed such that ratings from learners have the maximum influence on the overall ratings of the course. The algorithm is also updated regularly to detect spam patterns and identify fake ratings.

III. RESULTS AND DISCUSSION

Numerous courses are available for e-learning which are taught by different faculties around the globe. Finding the desired course along with the best tutor is difficult due to it.
The recommendation system provides the solution by recommending the users with personalized online services to handle the increasing online information overload problem and improve customer relationship management. Also according to the rating given by the previous users, a course is recommended to the user.

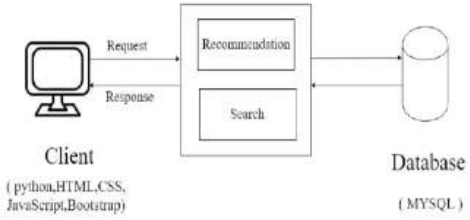

Figure: System Architecture of HIPaaS

IV. CONCLUSION

The "Intelligent Recommendation Engine for HIPaaS repositories" recommends the items based on users

area of interest and the ratings given by previous users. It is time saving and efficient platform for knowledge sharing.

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Experimentation on Heat-Electricity Module from Domestic Cooking System

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ABSTRACT

Heat energy is one of the most known forms of energy. It is an efficient form of energy that possesses a lot of conversion potential into various another forms. Converted heat energy can be used for various applications. There exist some systems that release waste energy in the form of heat, which further could be utilized for useful applications. Conversion of heat into electrical energy is proving one of the efficient methods of electricity generation. TEG is the device that acts as a direct conversion medium of heat energy into electrical energy. This device is extremely reliable, safe, simple, compact and eco- friendly. The main aim of this paper is to implement the use of TEG for conversion of waste heat obtained from domestic cooking system into electrical energy and then utilizing or storing this electrical energy for various applications. This paper describes various experimentation undertaken during the hardware implementation of heat-electricity module.

Keywords : Thermoelectric generator (TEG), Conducting metal, Coolant, Copper, Ethylene Glycol.

I. INTRODUCTION

In domestic cooking gas system, the flame generated from burning of LPG is provided to utensils for the purpose of cooking of food. During cooking this flame also tends to heat surrounding space or objects. This heat which is not been used for heating the utensils is nothing but waste heat energy. Utilization of this waste heat from domestic cooking system can prove as an area of potential of electricity generation. By recovering this waste heat and then converting it into electrical energy, this waste heat could be utilized for some purposeful applications rather than letting it go waste.

In electrical engineering there are many phenomena which include generation of electricity based on heat and temperature difference. One of the components which works on this effect is Thermoelectric generator (TEG). When temperature difference is provided on the two sides of TEG, potential difference is created at its terminals. When flame passes through the gas stove burner, burner is heated and surrounding surface too. This heat is then extracted by the metal which acts as a heating surface for one side of TEG. Another side of TEG is provided cooling through a cooling material placed inside a container.

Thus, various experiments were done to finalize the size, shape and material of the conducting metal. Also, experimentations were done for selection of coolant which can provide more temperature difference to the TEG surface. In this paper detailed information about various components and materials of heat-electricity module is provided.

II. THERMOELECTRIC GENERATOR

A thermoelectric generator (TEG), is also called a Seebeck generator, is a solid-state device that converts heat flux (temperature differences) directly into electrical energy through a phenomenon called the Seebeck effect.

Seebeck effect is a phenomenon in which when the two different electrical conductors or semiconductors are kept at different temperatures, the system results in the creation of electrical potential. These two dissimilar conductors are called as thermocouple. Figure below shows the Peltier plate or TEG module.

Figure 1 : Thermoelectric Generator Module

III. HEAT EXTRACTION

A. Selection of heat extracting metal:

For the purpose of heat extraction, the main consideration for selection of metal was its thermal conductivity. Therefore, search for different metals and their properties was done.

TABLE I

Thermal Conductivity of Different Metals

Sr. no	Material	Thermal conductivity (w/m K)
1	Silver	406
2	Copper	385
3	Gold	314
4	Aluminium	205
5	Brass	109
6	Iron	79.5

From the above data it was inferred that copper and aluminium could be the metals which can be taken into consideration for the intended use.

B. Finalization of selected metals:

Firstly, aluminium was preferred due to its lower cost and adequate thermal conductivity. But with the experimentation it was found that it took longer time to capture and transfer the heat with the further disadvantage of forming an amorphous scale on its surface when heated below its melting point with longer duration of time.

Then further experimentation was done with copper metal which was having better conductivity than aluminium. Also, it was observed to be more competent for longer use. Although, the cost of copper is quite higher than aluminium, its better properties compensates for its cost.

IV. COOLANT

For providing cooling to one side of TEG, experimentations were done on different types of coolant. These coolants are as follows:

1. Water
2. Oil
3. Ethylene glycol
4. Ethylene glycol mixed with water

By using these coolants following results were obtained:

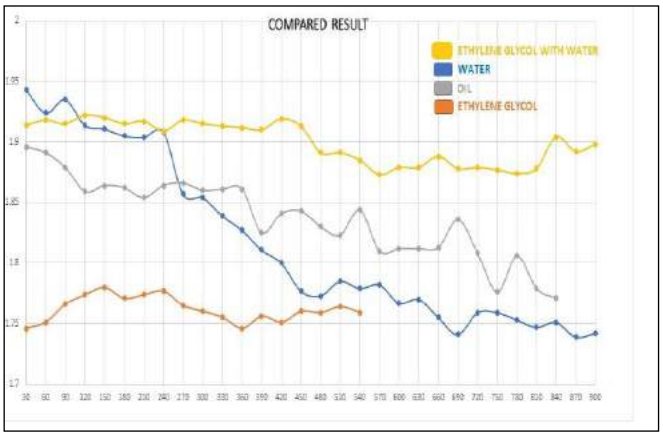

Figure 2 : Graphical representation for coolants (voltage vs time)

- As observed from the above graph, water gave maximum output at the starting but with the increase in time the output started decreasing.
- Oil gave less output than water at starting but was constant for some time then started decreasing.
- Ethylene glycol gave very less output for short duration of time than other coolants.
- The best results were obtained from ethylene glycol mixed with water (in the proportion 1:1).

It gave similar output like oil at starting and was constant throughout the time. From the observations, ethylene glycol mixed with water was found to be best coolant and was selected for the purpose of cooling.

V. MODEL DESCRIPTION

After selection of copper as heating metal and ethylene glycol mixed with water as a coolant further proceeding towards designing and fabrication is to be done.

A. Shape of conducting metal:

In order to extract heat indirectly from the burner, the top portion of the metal was so designed in a circular shape, so that it gets fit around the burner and an extra flat fin was brazed to this circular portion for mounting of TEG. Because of this brazed joint the conducting metal was not sufficiently heated even though gas stove was kept on for ample amount of time. Because of single fin two number of TEGs could be mounted on the mentioned model design.

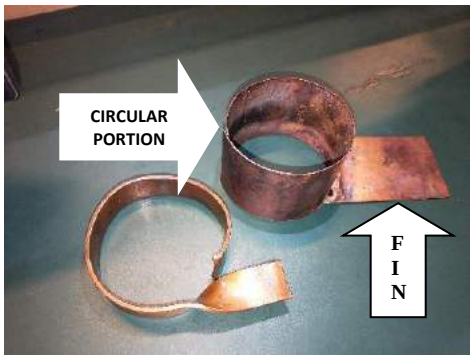

Figure 3 : Initial design of conducting metal

B. Modified Shape:

Due to some cons of previously discussed model the design was modified to have no joints. Instead, the ejection of fins was made by simply bending them at a right angle to the circular shape. In order to obtain more amount of voltage a greater number of TEGs have to be placed and to make this possible, numbers of fins is increased in this modified model.

Figure 4 : modified design of conducting metal

C. Shape of coolant container:

After provision of heating to the bottom of TEGs, now it's time to provide cooling to another side of TEGs.

For this purpose, a coolant container is chosen such that it should provide proper flat surface to the TEGs top. Also, it should contain ample volume of coolant liquid.

As per the above considerations a circular container with inlet and outlet provisions is to be designed which can facilitate changing of coolant after considerable amount of time.

VI. CONCLUSION

In this paper hardware implementation of Heat-Electricity module from domestic cooking gas system for generation of electrical energy is presented. The detailed designing aspects of conducting metal, coolant container and selection of coolant has been discussed.

After mounting of this complete assembly, the output voltage of 0.5 volts by a single TEG was obtained. Further the amount of output voltage can be increased by increasing the number of TEGs.

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Design and Analysis of Vertical Axis Wind Turbine for Household Application

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ABSTRACT

In recent years, there have been an exponential growth in the use of small scale green energy technology. This further emphasizes the need of innovation in this field especially for small scale application. Wind energy is the most effective way of harnessing renewable energy. Two types of wind turbine are used viz. vertical axis wind turbine VAWT and horizontal axis wind turbine HAWT. Among these two vertical axis wind turbine finds its suitability in small scale application. In this work a detailed study of vertical axis wind turbine with savonius rotor is investigated in order to obtain the optimal characteristic. The designed savonius wind rotor assembly was developed on CAD software. Computerized fluid dynamics CFD of the interaction between flow of air and blades were developed through FEM. A result of CFD shows the velocity and pressure distribution of the profile blades, also to find coefficient of drag shows flow of air over the blades profile which makes the rotor efficient. Structural and dynamic analysis is performed to calculate the value of deformation of blades. Multistage generator is designed with permanent magnet on either side of plate to increase electrical power output with the same size of rotor.

Keywords : Renewable Energy, VAWT, Savonius Rotor, Multistage Generator, Permanent Magnet

I. INTRODUCTION

The high energy demand in the world causes new interest in different energy areas. Instead of fossil fuel or non renewable energy sources, human realized the necessity of renewable energies to cleanse the world. In recent era, research and development activities in the field of renewable energy especially wind and solar, have been considerably increased due to worldwide energy crisis and high global emission. Wind is inexhaustible energy source available all around the world. In fact onshore energy is extremely large and of course not entirely usable as the wind might be too slow or too fast for practical application. Some of the location are also very remote and very far from consumption hub , making the energy transportation not economically viable. Although HAWT generates more power compared to VAWT but it needs yaw control mechanism. Deployment of VAWT on rooftop building is more suitable for generation of electricity. VAWT with small capacity makes them ideal for light load application also suitable for low wind speed condition.

There are two types of forces that cause the wind turbine to rotate i.e drag force and lift force.

Drag force has same direction as the fluid flow and lift force is perpendicular to the direction of wind flow.

Savonius turbine makes use of drag force to push the blades to generate torque. The working of wind turbine are based on Betz law which states that there is a maximum power that can be extracted from flow of air.Betz proved that no turbine can extract all the speed out of the flowing wind and the wind will always have a flow after passing through the turbine. Factors affecting wind turbine are

A. Power curve- It is a plot that describes the performance of a wind turbine at different wind speed. It shows the electrical energy power output vs wind speed, and gives an idea about minimum and maximum wind speed for a wind turbine
B. TSR- It is the ratio of speed of tip of blade to the speed of wind. I t determines whether a turbine desined on the basis of impulse drag or lift.
C. Turbulence- This presents a major challenge for wind turbine as it makes the generation profile inconsistent and decrease the lifetime of turbine blades because of the mechanical stresses. The random and sudden change in wind speed and direction poses many problems on turbine component.

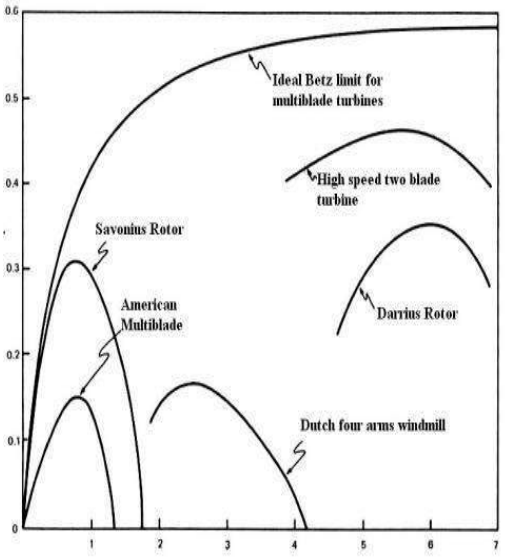

Fig.1- Ratio of TSR vs Power coefficient

II. DESIGN

A. Design of turbine rotor

Calculate power to be generated by monthly electricity
Consumption i.e 340 unit=340 kwh/month.

Average yearly consumption of electricity is
340*12=4080kwh/year =4080/24*365=465.75w/h

Electricity required per hour in an house is 465.75
The electricity to be produced through wind turbine is at least 10% of rated power= 10%*Pr=0.1*465.75=46.575w/h

Considering power losses P=46.75+5=51.75W,
As 5W is mechanical losses when power transferred.

Therefore turbine will be designed to generate 51.75W power. Due to multistage generator, power generation will double. Hence, the turbine will produce 100W approximately without increasing the size of rotor.

P=Power required or mechanical power
Cp=Power coefficient=0.3, from ratio of Cp vs TSR
P=Density of air=1.225kg/m3
V=velocity of air=6 to 14 m/s
P=Pr=51.75W

Power required is given by the equation,

P=0.5*Cp*p*A*V2
V=9m/s
51.75=0.3*0.5*1.225*729*A

A=0.376 m^2

Now varying the diameter of blade from 0.4 to 1m to get different values of area, but for compact design and also for household application diameter of rotor =0.4 m, Material of the blade should be light weight like aluminium With 4 rotor to accept air through all direction.

A=D*h

Where h is height of rotor

A=D*h

0.376=0.4*h

h=0.83 m

TSR=0.7 TO 0.8

$TSR=V_{tip}/V_{wind}$

Vtip=TSR*Vwind

=0.7*9=6.3 m/s

Angular velocity of rotor=w=Vtip/Rrotor=15.75 rad/sec

Torque=power/w=3.89 Nm

B. Design of generator

Generator is the main component for power output of turbine. The permanent magnet rotor consist of two component one is rotor which is rotating with the vertical shaft and second one is stator which is fixed. The cylindrical shape neodymium magnet are placed on both component of permanent magnet rotor with specific angle with the help of star wiring configuration. Neodymium magnet are the powerful earth magnet. The repulsive force of the magnet are very strong. Two stages of permanent magnet rotor on either side of plates are formed to increase the power output with same size of rotor. This rotor are helpful to rotate with low wind speed.

Magnet specification

Type – Ceramic magnet (brushless permanent)

Shape – Disk magnet (Circular cross section)

Total number of magnets= 48(24 on stator + 24 on rotor)

Size - Diameter= 50 mm

Width = 8 mm

Coil specification

Coil shape – Trapezoidal

Total number of coils = 24(12 on each stator)

Number of turns for each coil = 50

Copper wire – Thin

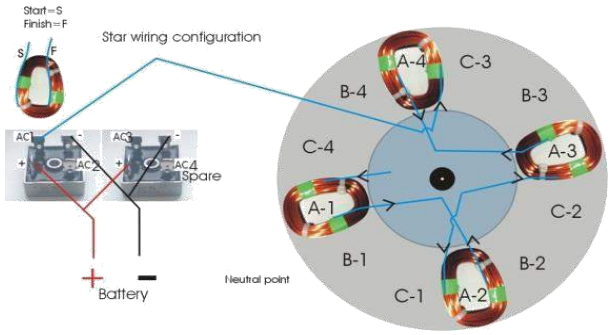

Fig.2.-Circuit diagram of 4 coils single phase

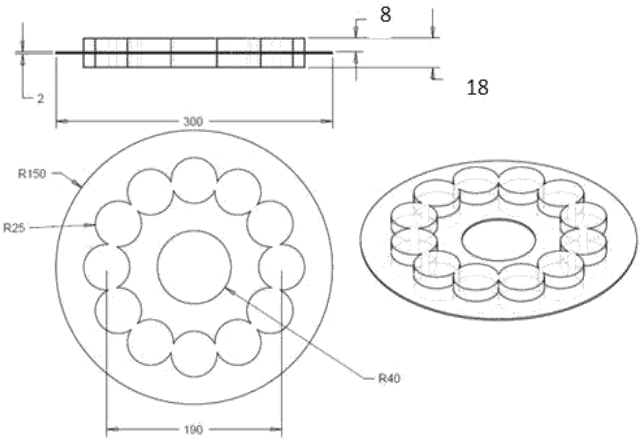

Fig.3. Disk of generator with magnet on periphery

C. Design of shaft and bearings-

Design of shaft and design of bearing should be designed on the basis of torque, calculating internal and external diameter of shaft and increasing diameter 4 to 5 times, as it carries weight of blade, and assembly thereby providing rigidity to shaft. Therefore shaft is designed for this purpose by

considering weight criterion and its strength. Two number of ball bearing found more suitable for this application because of light radial load and it is also an anti-friction bearing. By calculating diameter of shaft through torsion equation i.e d=50mm, bearing is selected for this size of diameter, Bearing No. 6010, Bore No. 10 series 60

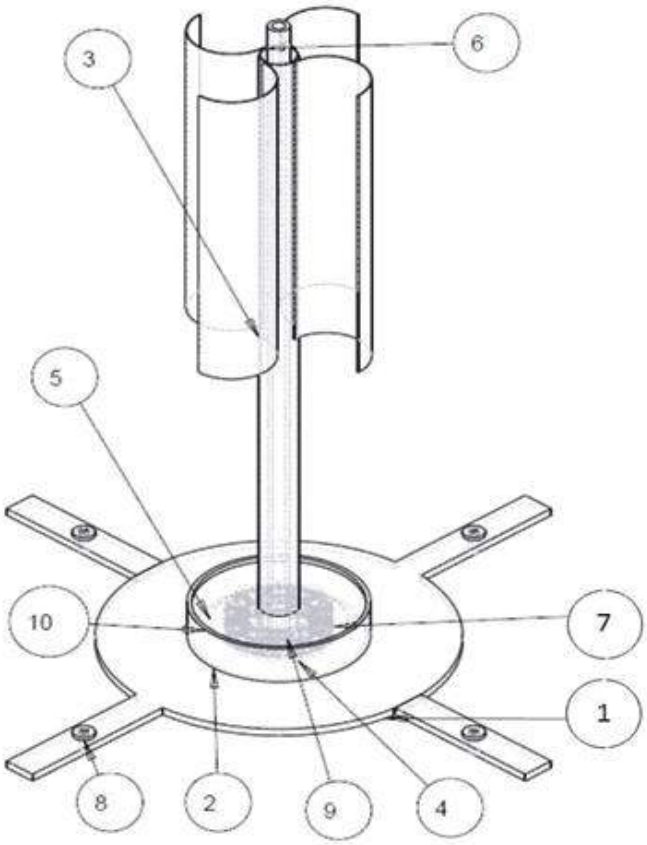

Fig.4.Wiremesh drawing of VAWT

TABLE : 1Nomenclature of VAWT parts

Index No.	Part	Quantity
1	Base	1
2	Cover	1
3	Blades	4
4	Magnets	48
5	Top disk	1
6	Shaft	1
7	Mid disk	1
8	Nuts	4
9	Pipe	1
10	Coils	24

III. ANALYSIS

CFD is used to analysis and solve the problems related to fluid flow by numerical approximation. Here it is first used to determine the coefficient of drag to determine forces acting on rotor called drag force. CFD is also used to study parameters like pressure and velocity of wind flow on blade.

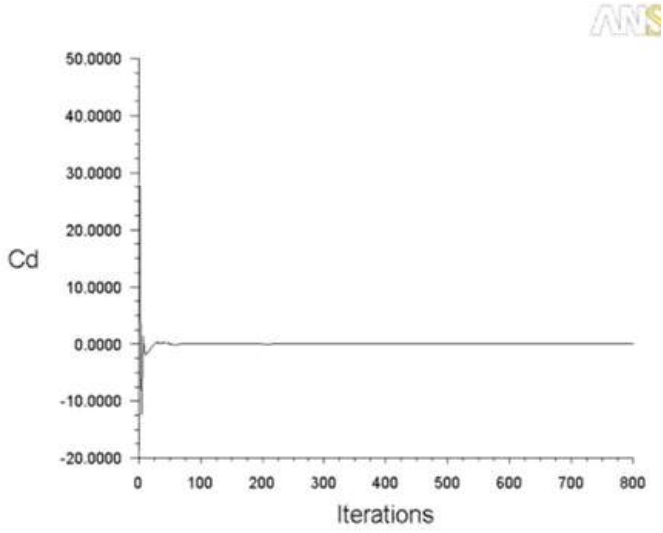

Fig.5: Graph of co-efficient of drag

Cd=3.75 (maximum value observed in above graph)

Drag force=F_D =0.5*p*A*V^2*C_d=68.92 N

Dynamic load=Fe=(XFr+YFa)Ks*Ko*Kp*Kr

Where Fr=68 N, X=1, Y=0, Ks=1, Ko=0.5,

Kp=1, Kr=1.4

Fe=47.75 N

A. Structural analysis- A static structural analysis determines the displacement stresses, strain and forces in structure or component caused by loads that do not induce significant inertia and damping effect. In this loads and the structures response are assume to vary slowly w.r.t time. Types of loading that can be applied in static analysis include externally applied forces, pressure , temperature etc.

To get the result for behavior of the model under predefined condition, the force of 68.72N is applied on rotor and checked the model for various physical quantities.

Dynamic analysis is done to determines the effect of varying loads on structure i.e from 47.75 to 68.72 N.

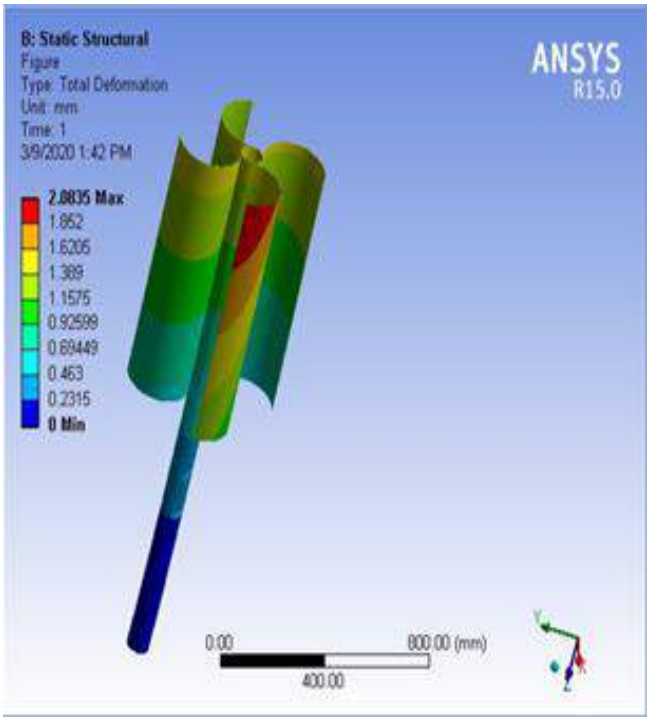

Fig. 7. Total deformation under static loading

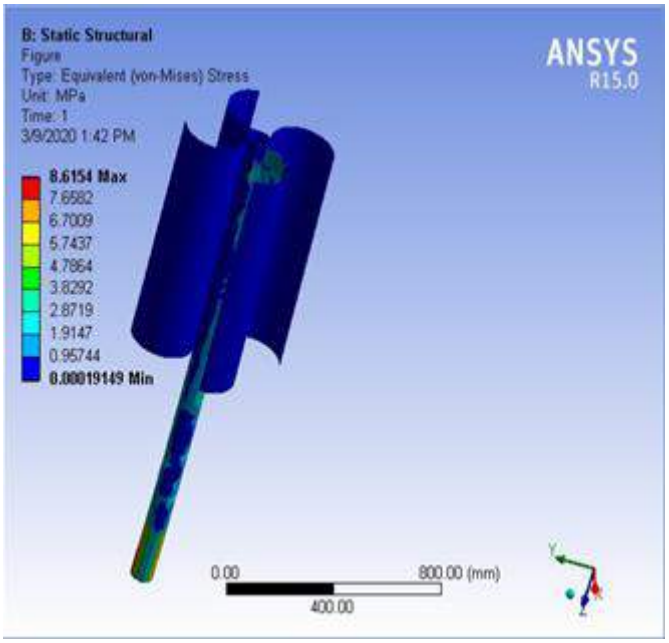

Fig.8. Equivalent stress under static loading

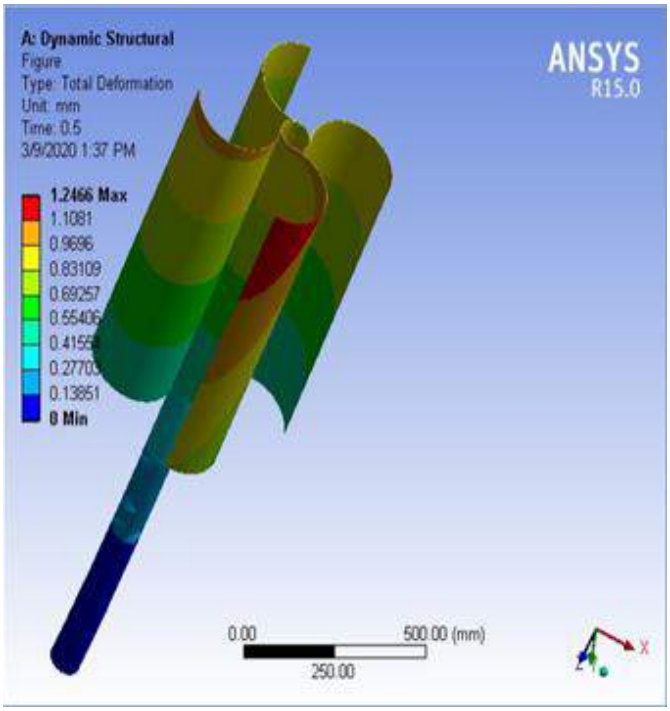

Fig.9. Total deformation under dynamic loading

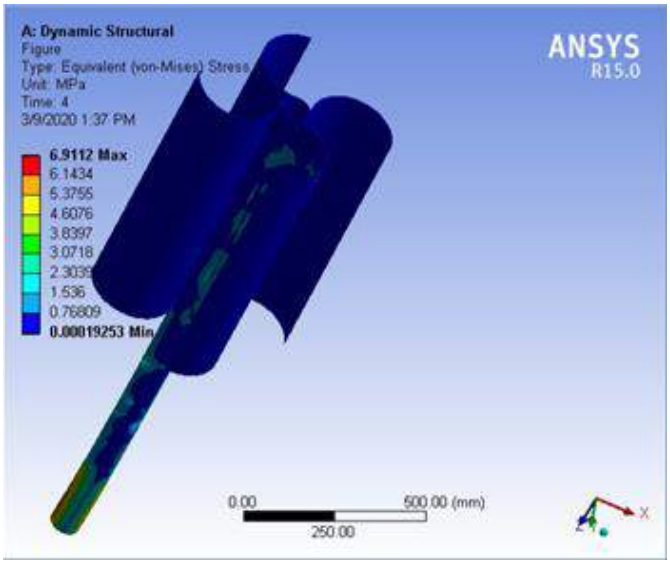

Fig.10. Equivalent stress under dynamic loading

IV. RESULT AND DISCUSSION

The result obtained were up to expectation. There is increase in efficiency due to permanent magnet rotor which reduces the torque required to rotate the rotor blade and also reduce the friction losses during rotation. This Savonious turbine system with permanent magnet rotor gives better results. For instance, they are able to rotate with wind speed at 2.0 m/s. Also, they can operate in winds up to 20 m/s. It helps to increase power generation by 20% and decrease maintenance costs by 50% as compared to other vertical axis wind turbines.This model is checked on the various parameter for the maximum stresses and maximum deformation all parameter are under control, therefore material aluminium is selected for blade as it is light weight.

The maximum and minimum deformation as well as equivalent stress bare given as below table.

Static analysis

Range	Total Deformation	Equivalent stress
Maximum	2.0835 mm	8.6154 Mpa
Minimum	0 mm	0.00019149 Mpa

Dynamic analysis

Range	Total Deformation	Equivalent Von Mises stress
Maximum	1.2466 mm	6.9112 Mpa
Minimum	0 mm	0.0001925 Mpa

V. CONCLUSION

The result obtain in this project which will benefit the future development of modern VAWT. This turbine will helps to increase the power production in the field of renewable energy. The effective fabrication of this VAWT which helps to minimize the friction losses during the rotation of rotor blades. The newly designed blades are simple, strong and light in construction. It has ability to capture wind from any direction and can withstand any weather condition. A main advantage of this savonious VAWT is that its cost is limited and it can easily affordable for commercial power generation. Considering the all-weather point of view the material used which are noncorrosive. Air gap between coil and magnet is very important parameter it affect the power output.

VI. FUTURE SCOPE

The efficiency can be increased by precise fabrication of prototype and also by proper design of the blades. By increasing the generator capacity and large savonious unit with increased number of generators units which will achieve large power generation with optimized cost. Two or more stage of generator will help to increase power output. Number of blade should decrease by one or two to provide maximum surface area along the wind. Slight increase in height of VAWT can gives some better result to get maximum benefits of increased in velocity of air.

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Reduction of Moisture Content of Moulding Sand in Pit Moulding through French Drain

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ABSTRACT

This paper gives the idea about application of French Drain in C.P foundry. It faces several problems like surface finish, quality of sand, shrinkage, blow holes but the major issue was the rising level of ground water during rainy season, due to which the workers could not make mould cavity in pit. In C.P foundry, pit moulding is done and for that they need to dig the ground surface 1ft below the ground surface but since the ground water level increases during rainy season it is difficult to perform the intended work, so we proposed French drain with the help of which we can reduce the ground water level.

Keywords : French Drain, Pit Moulding, Ground Water Level.

I. INTRODUCTION

Condition of C.P foundry during rainy season is very devastating because the work (pit moulding) is stalled until the ground level water goes below 3ft. and they face huge loss of production during that time. So in order to prevent the loss, they started using mud pump to remove the water from ground. This costs them large electricity bills and leads to extra loss and wastage of time as well. We observed the condition and came up with the idea of French drain. A French drain is used to remove water from ground surface. it is a pit line with gravel. Gravitaionl force is used to make these linings work. they are built sloped down from the area from which water is to be drawn. excess water from surface can be passed through drain and directed outside. it is used to prevent the ground water from damaging the house or structure. it can also be installed around garden. drains are built under the surface of ground and are not visible from view. It is used for extracting extra water from ground surface. we can understand the idea behind French drain and how it works. imagine shallow drainage system. It is a simple way to keep the area dry and it is great foundation for design of waterproof basement. high level of moisture in ground area can crack or damage the work area. for a firm owner it is important to keep the work area dry.

II. METHODOLOGY

We first dug a trench, & laid in the filter fabric, Then put in the perforated pipe with the holes point down with the sleeve on it. Then laid some gravel onto that pipe and then overlapped the fabric and put more gravels on top.

Step1:
Ground marked for underground utilities. Lay out and dig the trench. about 18'' wide and 36'' deep to

start. Depth adjustments for proper slope will be made later.

Step2:

Set the proper slope on the trench 1/8" per ft. is ideal. In our case, We only had 4 inches of fall from the back starting of drain to end (open space) which is 200 ft. it was enough.

Step3:

Put down layer of silt fabric. This fabric will wrap around pipe and gravel. Leave the top open and then lay the base layer of gravel on which the pipe will rest maintaining the proper slope.

Step4:

Installed the corrugated pipe and covered it with gravel.

Step5:

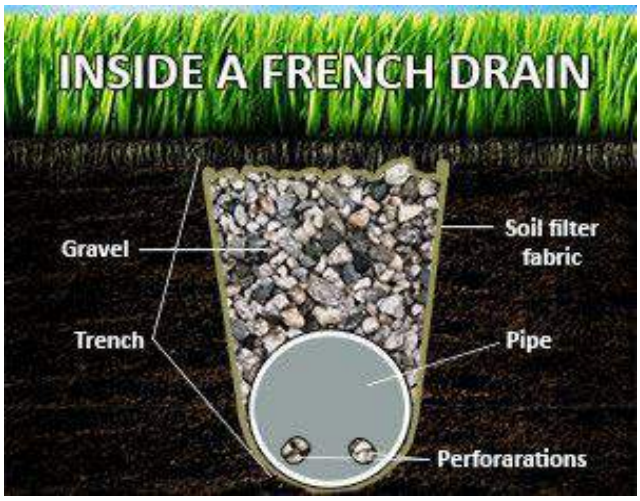
Fold the silt fabric over the pipe and gravel and cover with more gravel.

Step6:

Installed a clean out at the end of each pipe section opposite the drain end of the pipe. The clean out will allow air into the pipe so water can flow and allows access for cleaning when necessary.

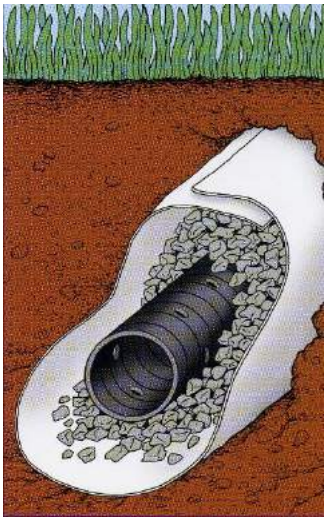
It is basically a gradually increasing depth of long drain which takes the ground water to desired place and away from the work area. The drain system has perforated pipes inside it. The pipes have small holes on them, so that water from ground can enter into the pipe. But along with water some soil, clay or mud can also enter the holes and block the holes of the pipe. To prevent the blocking of holes we need to surround the pipe with filter fabric mat, this mat is a special type of mat. Only water can pass through this and no any other clay or mud particles. The third material is the gravels of medium size. Here we can save the cost of gravels by using the slag material from the foundry itself.

III. MATERIALS



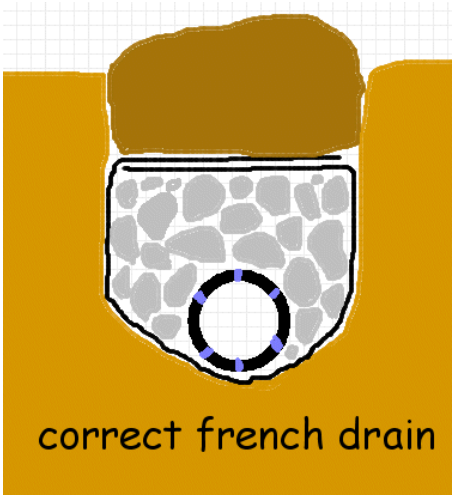
Soil Filter Fabric

During construction of a typical “French Drain”, maintaining the separation of coarse, granular backfill material such as gravel, and the native soils like sand, clay or topsoil, is of utmost importance to assure proper soil permeability and to assuring the long-term performance of the drainage system. Soil Separator is also commonly used during the construction of septic weeping beds. We are using wired mat to reduce cost.



Pipe:

Pipe we are using corrugated plastic pipe, It is ideal for storm sewer systems, such as underground retention/detention systems as it has the structural strength and watertight joint systems to control runoff quantity and rates of release. And it is also durable upto 100 years.



Drain Sleeve:

Drain-Sleeve filter fabrics are specifically designed to cover perforated pipes that are being used in underground drainage systems to prevent fine silts and sandy soils from entering into and eventually clogging the drain tile.

Gravels:

French drain gravel should be washed three quarter inch minimum and as large as 1 ½ " crushed stone. The upper 12 inches above the pipe shall be filled with native soil, to avoid having crushed stone over the perforated pipe that could damage the pipe. We are using Slag coming out from Cupola Furnace instead of Pea gravels, Rock, etc.

In figure: Slag (waste output from Cupola Furnace which we are using in place of gravels)

IV. ANALYSIS

Expenditures	Quantity	Cost (in INR)	Duration	Total Cost (in INR)
Excavator with expenses	1	5000/ day	2 days	10000
Soil Filter Fabric	(40x2.5) meter	400/ (1 x 2.5) Sq.m	-	16000
Corrugated Pipe	50 meter x 1ft dia	100/meter	-	5000
Drain Sleeve	(40x1) meter	150/ (1x1) Sq.m	-	6000
Labour	2	350/day	7 days	4900
Total:				**41900 Rs.**

V. RESULT

We suggest them French Drain for the problem of ground water level. By implementing this method, they can do castings in rainy seasons too. As per their records they do the production of around 360 tons per 4 months.

It means that 33% of their production will increase as casting is also being continue in rainy season and it will cost them only 41900Rs.

VI. CONCLUSION

Rise in ground water level is major issue which costs loss of production of 360 tons per 4 months and to prevent this loss from high ground water level, It is mandatory to remove the ground water level. There are some solutions like using mud pump to remove water from ground surface but it consumes more electric energy. There is another solution which is 'French drain'. This French drain system is a simple system which does not require electric power or heavy mechanical devices. And to prevent the loss of production of 360 tons, We introduced this 'French drain' system to C.P. foundry.

VII. ACKNOWLEDGEMENT

This research paper is made possible through the help and support from everyone. It would not have been possible without the exceptional support of our guide Prof. Huzaifa Fidvi.

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Advance Solar Panel Maintenance System

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ABSTRACT

Energy is one of the major issues that the world is facing in India, the supply of energy has been one of the major problems for both urban and rural households. About 60% to 70% of the energy demand of the country is met by fuel wood and agriculture residues. Solar energy is a renewable source of energy, which has a great potential and it is radiated by the sun. Renewable energy is important to replace the using of electric energy generated by petroleum. Solar power has become a source of renewable energy and solar energy application should be enhanced. The solar PV modules are generally employed in dusty environments which are the case tropical countries like India. The dust gets accumulated on the front surface of the module and blocks the incident light from the sun. It reduces the power generation capacity of the module. The power output reduces as much as by 50% if the module is not cleaned for a month. The cleaning system has been designed cleans the module by controlling the Arduino programming. To remove the dust in the PV modules to improving the power efficiency.

Keywords : Rolling brush, Arduino board, DC Gear motor, Gear, wheels.

I. INTRODUCTION

The sun emits energy at an extremely large rate hence there is abundant availability of solar energy in the nature. If all solar energy could be converted into usable forms, it would be more enough to supply the world's energy demand. However, this is not possible because of conditions in the atmosphere such as effect of clouds, dust and temperature. Solar energy can be converted to more usable energy forms through solar panel. There is unprecedented interest in renewable energy, particularly solar energy, which provides electricity without giving rise to any carbon dioxide emission. Of the many alternatives, photovoltaic method of extracting power from solar energy have been considered has promising toward meeting the continuously increasing demand for energy . The efficiency of solar panel is limited due natural conditions so it is very much essential to take care of parameters like dust, humidity and temperature. In this regard the work has been taken up to study the efficiency of solar panel with and without dust collected on it. The developed project includes design and to implementation of microcontroller based dust cleaning system. The main aim of the project is provide automatic dust cleaning mechanism for solar panel.

Traditionally cleaning system was done manually. The manual cleaning has disadvantages like risk of staff accidents and damage of the panels, movement difficulties, poor maintenance etc. The automatic dust cleaning system of solar panels has taken to overcome the difficulties arise in the traditional cleaning and also produces an effective, non-abrasive cleaning and avoids the irregularities in the productivity due to the deposition of dust . The studies carried out to evaluate the efficiency of solar panel for dust collected on it for one day, one week and a month. The efficiency of solar panel also calculated after cleaning the surface for one day, one week and a month. And finally comparing both the efficiencies it is proved that solar panel efficiency increases considerably. Thus the developed model enhances the solar panel performance. However, firstly, because of the small size and the strong

CLEANING METHODS FOR PV PANEL'S:-

1. Natural Removal Of Dust :-

The natural powers are employed to remove the dusts, such as wind power, gravitation and the scour of the rainwater. The effect of this method is not very well. It is seen that the solar cell array can be turned to vertical or oblique position to remove the dusts easily when early morning, late evening, night and a rainy day. However, the rotation of the large solar cell array is very difficult.

2. Mechanical removal of dust:-

The mechanical methods remove the dusts by brushing, blowing, Vibrating and ultrasonic driving. The brushing methods clean the solar cell with something like the broom or brush that were driven by the machine was designed just like windscreen wiper

3. Electrostatic removal of dust :-

If there are a high potential on the surface of the solar panels, the charged and uncharged dusts will be attract to the panels because of the electrostatic forces. Then, the dust particles will be charged by the solar panels finally, so they have the same electric charge and the electrostatic forces between them are repulsion. At last, the dust particles will float away the solar panels. However, this strategy cannot be used in PV system, because of the effecting of the rain on earth.

OBJECTIVE:-

- To clean the solar panel effectively.
- To make the system automated using Arduino.
- To avoid the manual work.
- To avoid dust associated problems on solar panels.

Component:-

1. Mild steel frame.
2. Aluminium channel.
3. Aluminium L frames.
4. Running lengths (Rack).
5. Gear wheels.
6. Rubber wheels.
7. DC gear motors.
8. Rolling brush.
9. Arduino board.
10. Driver boards.

Block Diagram:-

Fig (a) Block diagram of the system

WORKING PRINCIPLE:-

In accordance with the dimensions of the flat plate panel the solar panel cleaning system consists of brush driven by DC motors and actions of brushes is controlled by signal generated by Arduino. The frame carrying this cleaning brush is moved along the length of the solar panel in vertical direction of

11ft and vice-versa, which results in mopping action on the solar panel cleaning the panels. This frame is also consists of DC motors which will produced the rotational motion which is converted into linear motion through rack system. This action is also controlled by signal generated by Arduino. The shifting of frame from one solar panel array to another solar panel array is also carried out using gear motors. The frame is shifted in horizontal direction of 9ft cleaning 3 sets of solar panel arrays. All this cleaning actions will consume a time of 300sec for mopping action for both movements of cleaning system in horizontal direction and vertical directions. Once one array of the solar panel is cleaned, it moves to another array and hence the cleaning process gets repeats.

II. ADVANTAGES

- Cost of production is low
- No need to purchase heavy machinery
- Reduces threat to human life
- Manual assistance is not required
- Working principle is quiet easy.
- Portable.
- Autonomous self-cleaning mechanism that can be attached to solar panels and operated without human operation.
- It is easy to construct, low cost and low maintenance.

III. FUTURE WORK

- In this project there is a great scope to modify it in different ways like increasing its operation by using surface vacuum cleaners and spray of waters.
- This can be modified by sensors.
- In this project electric supply has been used through power supply, this can be modified by using solar panel for power supply.
- Silicon brushes can be used where it gives max life of cleaning.
- Arduino programs can be replaced by better and variety of micro-controllers.
- It can also be controlled by using remote controllers for necessary cleaning actions.
- Rack system can be replaced by belt drives.

IV. CONCLUSION

- Existing automated cleaners mainly focus on large arrays and in general are unsuitable for installing on smaller arrays namely residential roofs. For those with limited space this means that a smaller array only needs to be installed, hence our idea serves as a huge advantage for those smaller sites.
- Our system can be installed for roof top solar panels.
- The solar panel cleaning system was first designed taking into consideration the design parameters. Our model was tested and the following observations were made
- The rack and pinion mechanism work as it was designed to do.
- The linear actuator system worked very nicely and was able to achieve the required design parameter.
- The cleaning action of the brush was good but it failed to scrub the dust which was sticky in nature.
- The sticky dust needs to be remove using hard brush or through mopping action. So as we know prevention is better than curing as a result the cleaning action prevents the primary accumulating surface dust on the solar panel before it becomes to sticky to remove.

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Accident Safety in Foggy Region by Using PLC

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ABSTRACT

According to the Ministry of Road Transport, in 2018, 1,51,417 road crashes recorded due to unfavourable weather conditions, especially fog, killing 28,533 people. Dense fog was also recorded in Bihar, Uttar Pradesh, West Bengal. Work presented in this paper focuses on developing a prototype hardware for prevention of accidents in foggy region using PLC automation. Ladder logic is developed to count number of vehicles passing through the foggy region and maintaining safe distance by providing alarming signals under abnormal whether conditions by using sensors. This methodology will be helpful for maintaining safe distance between the consecutive vehicles and to provide safe way overtaking the vehicles.

Keywords : Prevention of Accidents In Foggy Region, Plc Automation, Prototype Hardware

I. INTRODUCTION

In this changing era of technologies which is been evolving day by day and getting more convenient to people, corresponding to it there are several climatic changes which always occurs in our environment. Technologies can't change climatic condition or weather condition. One of these hostile substitutes in environments is fog. Weather has massive and momentous effect on the roadway atmosphere. Technologies can't be castoff to halt the manifestation of the fog but with the assistance technologies it can avoid their hostile effects happening on our civilization.

It has stood high while then it was understood that road accidents are instantaneous consequences of the collective effects of behavioural, environmental factors. Safety peril is formed as vehicle management becomes difficult due to low perceptibility and reduction in road friction, as a result of weather conditions. Weather conditions like snow, mist, fog, etc. makes it difficult for drivers to run their vehicles cautiously, severely rise travel times, and significantly lessen roadway capacity.

About 85% of the accident related deaths happen in the most productive age group of 18-60. Road accidents deaths not only cause bitter trauma to the family of the victim but they also result in huge economic wound to the Nation. As per the Report on Road accidents in India 2018, the accident related deaths in India in 2018 were 1,51,417, especially fog killing 28,533 people.

In India on 2017-11-08 a video has gone viral on social media appealing to show a shocking smash on the Yamuna Expressway. The video displays the pile-up in action with more and more cars ramming into each other even as people stand on the side-lines

watching. Accidents are not a rarity on the expressway, on which cars can effortlessly travel at 200 kmph.

Vehicle speed tends to be high on straight roads in open areas which corroborates the high percentage of road accidents, persons killed and injured (varying in the range of 62-66%) on these roads in both 2017 & 2018. The largest increase in the number of accidents, those killed and those injured also took place in the Curved Road, Bridges and Straight road category.

Also, with the unfavourable atmospheric condition like fog risk gets multiplied, so an early warning system is been developed to get rid form fatal crashes. In this system a prototype from prevention of accidents in foggy region is being developed.

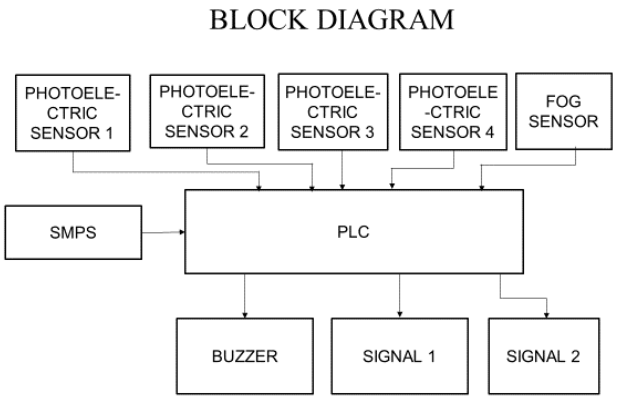
NECESSITY

- To eliminate accidents in foggy region.
- To control traffic in foggy region.
- To alert any hostile condition in foggy region.

OBEJCTIVE

To develop a safe transportation system during fog.

BLOCK DIAGRAM



II. WORKING

In this system four photoelectric sensors are been used to observe the arriving and departing of vehicle. The fog sensor is been used to detect the presence of fog in the atmosphere. Here two counters are been used first counter will count up the incoming vehicle another counter which is been at the departing end will count down the departing vehicle, counter comparator is used in the PLC so that we will uninterruptedly compare both of counters. In the mid region where dense fog is present and visibility is insignificant so to sense the motion of vehicle a motion sensor is also mounted to give single to PLC, if any vehicle is still in the foggy region the buzzer will go high and arriving vehicle will get alert. Signals are used at the entrance to indicate if it is red then

vehicle is inside the foggy region and if it is green then vehicle is not present in the foggy region.

III. RESULT

An intelligent road safety system is being designed and developed to prevent accidents in foggy region. The system can be easily implemented in real life condition. As the system is been developed

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Design and Implementation of QoS for Underwater Communication

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ABSTRACT

Underwater wireless communication is the wireless communication in which Acoustic signal (waves) carry digital information through an underwater channel. Electromagnetic waves are not used as they propagate over short distances. Over past decade Heavy cables were used to establish a high speed communication between remote end and the surface. To overcome such difficulties, underwater wireless communication has come into existence. The increasing exploitation of natural resources under water, particularly in the sea, has ignited the development of many technological advances in the domains of environmental monitoring, oil and gas exploration.

Keywords : Acoustic, Electromagnetic, Ignited, Exploitation, Monitoring

I. INTRODUCTION

Underwater wireless communication present new and distinct challenges when compared to wired and wireless communication through the atmosphere, requiring sophisticated communication devices to achieve relatively low transmission rates, even over short distances. The aim of this paper is to survey the main features inherent to each underwater wireless communication technology.

Under water, several phenomena may influence communication , such as salt concentration, pressure, temperature, amount of light, winds and their effects on waves. The easiest technological way to communicate with a robot is through a physical connection, such as a copper or fiber optic tether. Though this allows for efficient and high speed communication, a tether provide many operational challenges when dealing with mobile robot, limiting the range and maneuverability of the vehicle, as well as requiring an often cumbersome tether management system. Since humans are limited in their ability to work underwater ,remotely operated vehicles(ROV) and autonomous underwater vehicles(AUV) have been in service to perform underwater tasks, such as collecting data and retrieving items. Operation of these vehicles is challenging, but as oil resources are found further off shore, ROV and AUV are required to go deeper and stay deployed longer in order to perform critical tasks.

Underwater Wireless Communication

What is Underwater wireless communication?

Underwater acoustic communication is a technique of sending and receiving messages below water. There are several ways of employing such communication but the most common is by using hydrophones. Compared to terrestrial communication, underwater

has low data rates because it uses acoustic waves instead of electromagnetic waves.

RF Communication

For frequency ranges employed by mobile services, TV, radio and satellite communication, the seawater is highly conductive, thus seriously affecting the propagation of electromagnetic waves. As a result ,it is not easy to establish communication links for distances beyond 10 m in the ocean in both very and ultra high frequency range,or even in high frequency.

Another characteristics of underwater RF signal is that they can travel through several paths: the signal can cross the water air boundry and can propagate through the seabed.

Working

We are developing a system which can be used to send the data wirelessly underwater.

Our system consist of transmitter section which will be having keypad to enter the data, Arduino Uno (Controller) to execute different operations , LCD to display what

we are going to send and light source to transmit data . At the other end we are having Receiver section which will be having Photodiode to receive signals from light , Arduino Uno again to execute operations and LCD to display the data received. Initially data will be entered by using keypad and Arduino will receive that data and that Data will be first displayed on LCD to confirm the data. After displaying the data Arduino will send the data using light source. The data transmitted from the light source will be received by photodiode and it will be given to Arduino . Arduino will receive the data and will display the same on LCD.

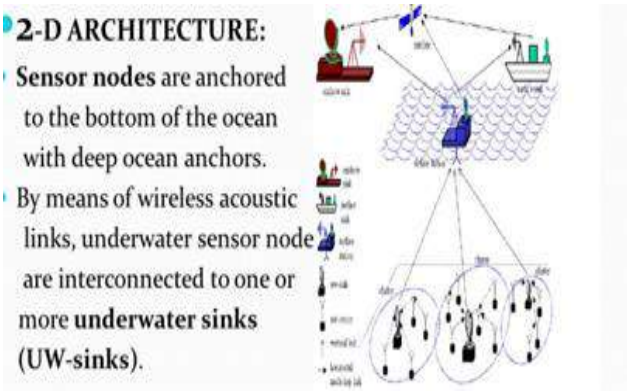

Fig 1. 2D Architecture

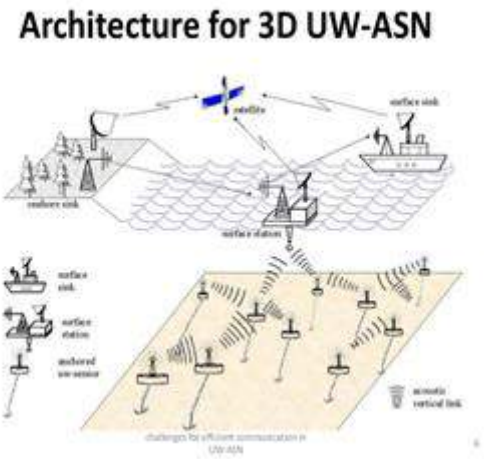

Fig 2. 3D Architecture

Quick Start Guide To
Express PCB

There are two parts to ExpressPCB, our CAD software and our board manufacturing service. Our CAD software includes ExpressSCH for drawing schematics and ExpressPCB for designing circuit boards.

1.We recommend that you begin by drawing a schematic using ExpressSCH

2. Next, use the Express PCB program to lay out your PC board. If you link your schematic to ExpressPCB, it will guide you through the wiring process.

3. When your layout is complete, determine the exact cost to have boards made with the Compute Board Cost command.
4. To order the boards, enter your name, address and billing information into ExpressPCB and press the Send button within the Order Boards Via The Internet dialog box.
5. In a few business days (typically 2 or 3) an overnight courier will deliver your PC boards.

Designing a PCB

ExpressPCB is a very easy to use Windows application for laying out printed circuit boards. While not required, we suggest that you draw a schematic for your circuit using the ExpressSCH program. By linking your schematic, ExpressPCB will guide you by
highlighting the pins that should be connected together with traces.

Beginning a New Layout

1.Begin a new layout by running ExpressPCB . If you are designing a four-layer board, select Board properties from the Layout menu and check the 4-Layer option.
2. In the main window, the yellow rectangle defines the perimeter of the PC board. Set the size of your board by moving three of its four corners (the upper left corner is fixed at 0,0). Move the corners by dragging them with the mouse, or by double-clicking them and entering coordinates. Additional corners can be added to the perimeter to change its shape (see ExpressPCB: Changing the Board Perimeter).
3. Select the size of the Default via. In some cases as you place traces, ExpressPCB inserts via (plated-through holes) when a trace changes between the upper and lower layers. When inserted, these via pads are always visible. Set the Default via in the Board properties dialog box.
4. If you have drawn a schematic of your circuit using ExpressSCH, link theschematic file to your circuit board layout using the Link schematic to PCB command found under the File menu.
5. Finally, give your board a name by selecting Save As from the File menu.

Zooming and Panning

The easiest way to move around your layout is with the scroll wheel on the mouse. Turning the wheel zooms in and out. Pressing the wheel and dragging the mouse pans.

IC 7805

IC 7805 is a series of 78XX voltage regulators. It's a standard, from the name the last two digits 05 denotes the amount of voltage that it regulates. Hence a 7805 would regulate 5v and 7806 would regulate 6V and so on.

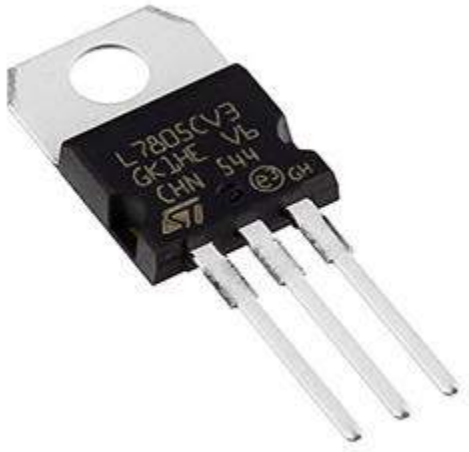

Fig 3. Regulator IC

Three-Terminal Positive Voltage Regulator Ic

II. FEATURES

- Output Current In Excess Of 1a;
- No External Components Required;
- Internal Short Circuit Current Limiting;
- Internal Thermal Overload Protection;
- Output Transistor Safe-Area Compensation;
- Output Voltage Offered In 4% Tolerance

Factors affecting acoustic communication

- Path loss : Due to attenuation and geometric spreading
- Noise : Man-made noise and ambient noise (due to hydrodynamics)
- Multipath propagation
- High propagation delay
- Doppler frequency spread

Wired under water is not feasible in all situation as shown below-:

- Temporary experiment
- Breaking of wires
- Significant cost of deployment
- Experiment over long distances

To cope up with above situation ,we require underwater wireless communication.

III. Advantages

1. Can be used to provide early warning of tsunamis generated by undersea earthquakes
2. It avoid privacy leakage
3. Pollution monitoring

IV. Limitations

1. Battery power is limited and usually batteries can not be recharge easily .
2. The available bandwidth is limited .
3. Underwater sensors are prone to failure because of fouling ,corrosion .etc
4. Highly affected by environment and natural factors such as heterogeneities of the water column ,variation of sound velocity versus deapths , temperature and salinity , multiple and random sea reflection and significant scattering by fish and bubble clouds.

V. Result and Discussion

Despite much development in this area of underwater wireless communication, there is still an immense scope for such research as major part of ocean and bottom yet remain unexploded. The main objective is to overcome the present limitation and implementation advance technology for oceanographic research.

VI. Future Work

By the further research the mobile underwater communication could be implemented. The problem of channel variability already present the application with a stationary transmitter and receiver becomes the major issues of mobile underwater communication. By making the time synchronization the UWA channel and also by the motion induced pulse compression/dilation the mobile underwater communication can be taken.

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Hybrid Cascaded Multi-Level Converter Based on STATCOM

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ABSTRACT

In this century the expansion of power systems and electronic devices has been grown at a very fast rate. The most noticeable topic for an electrical engineer is Power Quality in recent years. Power quality problem is an occurrence manifested as a nonstandard voltage, current or frequency that results in a failure or desperation of end-user equipment, sensitive loads, etc. Now at present, a wide range of very flexible controllers, which capitalize on newly available power electronics components and electrical also are emerging for custom power applications and use high-level transmission line and we use high efficiency and good result. Among these, the static compensator is used in the present work. The quick response time to do that work of the Static Compensator (STATCOM) makes it an efficient solution for improving power quality and increases the efficiency of the transmission in systems. STATCOM can use different types of controllers. The device considers in this work is Static Synchronous Compensator (STATCOM) with static linear and static non- linear load and get less amount of losses.

Keywords : Static Synchronous Compensator, STATCOM, High-Level Transmission

I. INTRODUCTION

The introduction of electrical energy in the 19th century, there have been significant technological developments and the modern-day electric power systems have been built. These systems have grown in complexity and nowadays they are the result of a vast network of transmission interconnections, multiple types of generation resources and loads. Due to these technological advancements and many other scientific achievements, in the last century, the quality of life for most people has increased significantly. However, the rapid growth of the population, the development of industry, the increase of generation sources at the load and the networks underlying unpredictability, are starting to strain the power generation systems. This means that the added load demands, growth of interconnections, economic restrictions and factors such as global warming that is a leading concern in the scientific field and is slowly starting to pressure governments to turn to renewable energy systems as a means of replacing old and cheap energy productions methods that produce a significant amount of greenhouse gas are starting to create balancing issues in the delivery systems.

Imbalances in the voltage profile along the electric network are one of the biggest challenges for system operators. Therefore if the voltage and reactive power are not controlled, then the difference in voltage between the generation source and the load can lead to voltage instabilities or even voltage collapse. A solution using Flexible AC Transmission Systems (FACTS) can overcome some of these issues. This solution is extremely important in overcoming

limitations in the static and dynamic transmission capabilities of electrical networks.

The aim of this project is that dissertation is to propose and evaluate a power electronics-based system that is able to guarantee a stable voltage profile in the HV/MV grid for the transmissible power along the power lines to be increased, using reactive shunt compensation, allowing for system operators to have better use and get a low amount losses of line capacity without needing to build new lines and new generation sources which are a costly endeavour and represent a mid to long term strategy. It is important to acknowledge that the use of FACTS will not solve all the existing problems, which means that although extending the line's capacity can bring benefits sometimes it is necessary to build new lines or upgrade current and voltage capabilities of existing lines and corridors

II. WORKING

Synchronous Generators Synchronous generators can generate power and absorb reactive power depending on the excitation. When overexcited they supply reactive power and inject the power in the transmission line when under excited they absorb reactive power. The capability continuously supply are absorbing reactive power is, however, limited by field current, armature current, and end-region heating limits synchronous generators are normally equipped with automatic voltage regulators that continually adjust excitation so as to control the armature voltage.

Transmission line

Transformers

Transformers always absorb reactive power regardless of their loading; at no load, the shunt magnetizing reactance effects predominate; and at full load, the series leakage inductance effects predominate.

Loads

Loads normally absorb reactive power and supply to the load. A typical load bus supplied by a power system is composed of a large number of devices. The composition changes depending on the day, season and weather conditions. The composed characteristics are normally such that a load bus absorbs reactive power. Both the active power and reactive power of the composite loads vary as a function of voltage magnitude. Loads at low-lagging power factors cause excessive voltage drops in the transmission network and are uneconomical to supply. Industrial consumers are normally charged for reactive power as well as active power; this gives them an incentive to improve the load power factory using shunt capacitors.

Compensating devices are usually added to supply or absorb reactive power and thereby control the reactive power balance in the desired manner. In what follows, we will discuss the characteristics of these devices and the principles of application and use in the transmission line.

Reactive Power Compensation

VAR compensation is defined as the management of reactive power to improve the performance of ac power systems and voltage stability. The concept of VAR compensation embraces a wide and diverse field of both system and customer problems, especially related to power quality issues since most of the power quality problems can be attenuate or solved with adequate control of reactive power.

III. CONCLUSION

In this work, the investigation on the role of STATCOM based on hybrid cascaded multi-level converter is carried out to improve the power quality in networks with static linear and nonlinear loads. Test system is analyzed and results are presented in the previous chapter. The results give the satisfactory applications of STATCOM based on hybrid cascaded multi-level converter in the networks under different conditions and it can be concluded that STATCOM based on hybrid cascaded multi-level converter effectively improves the power quality in networks.

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Automation of Lights in College Classroom and Lab using Google Assistant

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ABSTRACT

Automation has seen a rapid increase in its application areas not just restricting its use to industries or high scale applications but also extended its scope to a wider area like using homes, schools, colleges, offices etc. this proposed work deals with controlling of electrical devices using Google Assistant which is a free application for android mobile users. As the world has seen a great rise in number of android users, it led to our motivation of designing a system module which can allow mobile users to control electrical devices switching mechanism. Modern homes are getting more perspicacious with the advancements in engineering and technology. Physical operation of wall switches placed in different corners of the house is not convenient especially for the elderly and physically incapacitated members present in the domicile. World's population is senescent, considering the incrementing percentage of older persons virtually in every nation of the world as a result of advanced health care technologies. A Habitation Automation System (HAS) uses sundry sensors and components for controlling and monitoring the domicile environment. Several papers on Home Automation System have utilized Verbalization apperception, Bluetooth, GSM, DTMF and a number of other ways of operation of the system. In this paper we present a Automation System using Google Assistant where controlling can be done by utilizing the concept of to drive a number of Electrical Appliances (EAs) by interfacing with a relay driver.

Keywords : Google Assistant, automation, relay , GSM, DTMF, Electrical Appliances

I. INTRODUCTION

Human-machine interaction (HMI) has become, the more authentic in day-to-day life due to the, we have received tremendous amendment in the technology, but still power consumption is one of the immensely colossal issue all over the world. As per report, the Information and Communication Technologies (ICT) alone utilizes 4.7% of the world's electricity, which may liable to be incremented to 10% as per report [3]. India, share about the 17% of the world population has constrained energy resources and apportion roughly 0.6%, 0.4% and 7%, for world gas, oil and coal reserves respectively [4]. However, in India, the electricity consumption due to ICT utilization has incremented from 24 TWh to 31 TWh in the last five years. This has resulted in electricity consumption of roughly 6.5% in 2015 [7].Thus, preserving of the potency is the main concern, which is the rudimental aim of this project. To preserve the puissance consumption, we have proposed a novel approach, energy efficient home automation system utilizing IoT.

II. Literature Review

Intellective home automation systems

As demand for electricity is incrementing day-by-day, consequently, perspicacious abode is the upcoming

area of research to provide the remote access for controlling the domicile appliance utilizing IoT [10]. IoT predicated application has additionally provided the boom for old aged people and the person having some scarcely incapacitation [11], . This sanctions the utilizer to control the home automation contrivance such as fan, bulb etc., without even making any physical connection. Research conducted on home automation system is reported in [9]. Most of the antecedent system predicated on these techniques is either predicated on DTMF or Bluetooth system. The rudimentary quandary with DTMF predicated home automation require dedicated PSTN channel for communication between main supply units and controlling contrivance. On the other hand, Bluetooth is utilizable for short range communication that requires the operating appliance in their range. Home automation utilizing MQTT is presented in [28] for sending/receiving data from the sensor. For this Raspberry pi is utilized as a gateway for accessing the data from the sensor which are habituated to quantify the temperature and sultriness of the room. Another home automation system is presented in [11] which are predicated on Raspberry pi and utilizer can control their domicile appliance utilizing the web-predicated interface. In home automation utilizing mobile is reported in which system is designed utilizing ZigBee. IoT has provided the applications to turn non-perspicacious contrivance into perspicacious contrivance, which sanction users to access these contrivances through the Internet. It converts the habitation into astute home and provides a more robust method of controlling the home appliance. Additionally, the security can be integrated with the avail of installed camera in the abode, which can be traced through the Internet. Thus, utilizer can monitor their domicile and can turn ON/OFF their appliances which will definitely going to preserve both the electricity and electric bills.

III. PROPOSED WORK

The proposed work aims to remove the complexities and disadvantages associated to previous works in automation and intend to design a better suited module for implementation in college lab and classroom which can help to ease out the task of teachers and students. It is also helpful for implementation at homes and offices.

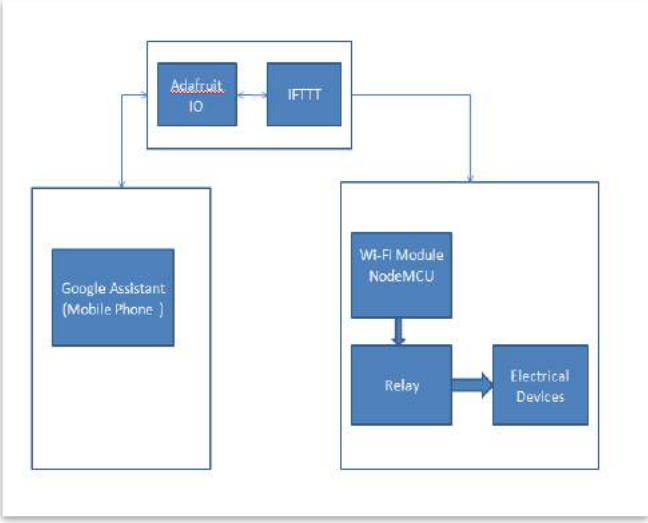

Fig 1. Block diagram of system

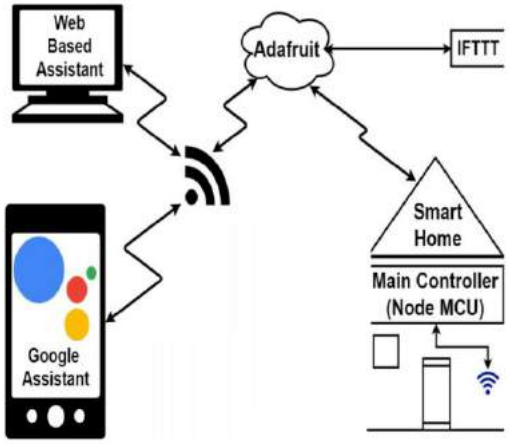

Fig 2. basic diagram of system

The project is divided into three sections i) User control section, ii) Programming and logic interfacing section, iii) Hardware Module for controlling section.

i) User Control section

Google Assistant should be installed in user's android mobile. It is a free application that can be installed from playstore. It takes input commands from user in form of voice which helps to remove out the task of typing or clicking. It is very helpful for senior citizens and physically challenged people also.

Fig 3. Logo of Google Assistant

ii) Programming and logic interfacing section

a. Adafrui io : It is an open source platform which enables to provide an interfacing platform between google assistant voice based commands and IFTTT logic. As it is a third part service, we need to make an account with same email-id as that of google account

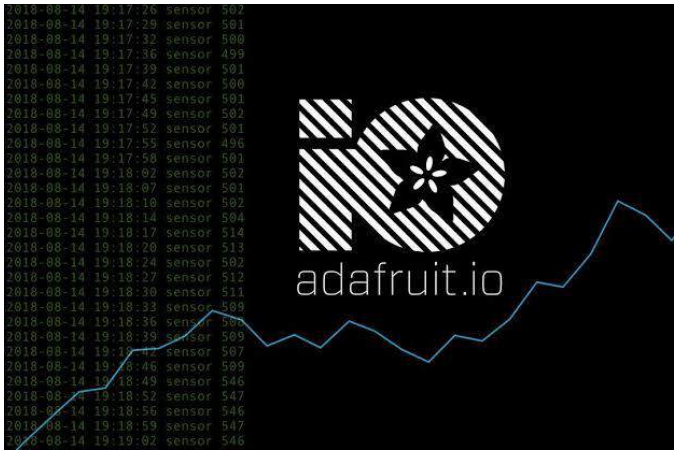

Fig 4. Adafruit logo

b. IFTTT

It is a logic generation third part service which helps to annotate the voice commands and configure with Adafruit io to switch on and off through dashboard.

Fig 5. IFTTT logo

iii) Hardware Module for controlling section.

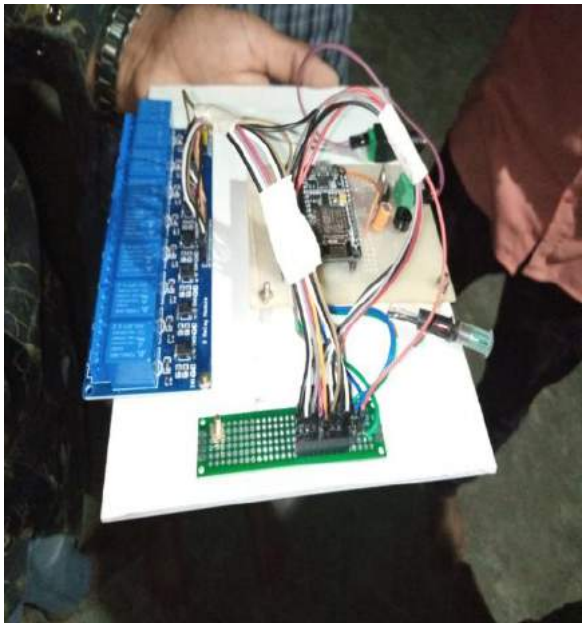

Fig 6. Designed Hardware Module

a. NodeMCU

Controller used is nodemcu which has built-in wifi module to connect with the Google Assistant commands and provide switching commands as output to the relay module.

Fig 7. NodeMcu

b. Relay Module

It is a electromechanical device which senses input signal and then does the work of switching.

Fig 8 - channel relay module

c. Power Supply

Nodemcu is powered by an adaptor which helps to power up the entire circuit

d. Load

The load which has to be switched ON/ OFF has to be connected with the relay using common, NO, NC terminals. In this project 8 channel relay is used which represents 8 loads can be connected with this module.

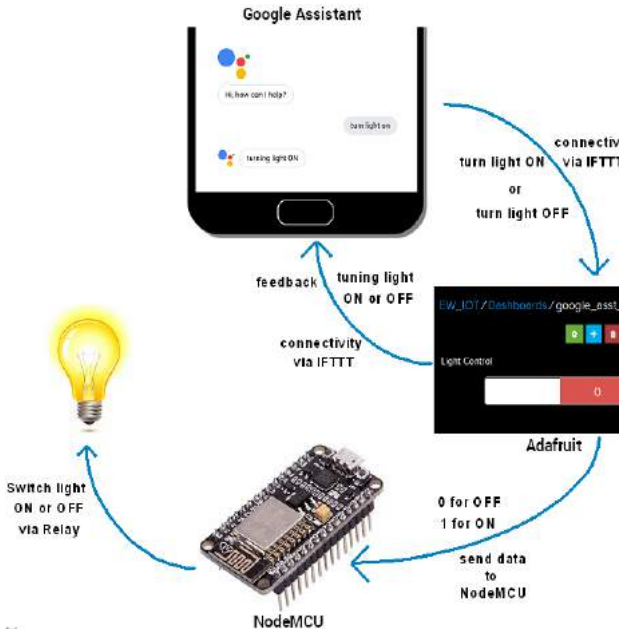

Fig 9. Hardware Module with load connected

IV. CONCLUSION

The system designed here facilitates the automation process which helps to switch on and off the devices connected to it. The project designed here has a practical implementation in college rooms and lab which does not confine its applications. This module can be used in offices, schools, homes and the best part of project is that it can be used from an part of the world and at an moment of time. Also the hardware module is economically feasible.

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Causes, Repair and Preventions of Cracks

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ABSTRACT

Cracks are the detrimental element of any building, hence detailed inspection is needed to ensure the safety and serviceability of the building. Now there are many types of cracks and their corresponding repairs, measures and methods to fix them. This review presents some information regarding causes, repair and prevention of cracks. Cracks in concrete cannot be prevented entirely but can be controlled by using various methods and techniques most of which hide the cracks and fix them to some extent if they are minor cracks, however if the cracks are major, there may be some big underlying problems with the structure below the ground level and/or with the soil surrounding the foundation which requires immediate solutions in order to avoid any mishaps.

Keywords: Soil, Cracks, Causes, Prevention, Remedies, Repair

I. INTRODUCTION

Concrete is the major component which is being used in every stage of construction and it may result in something damage or defects during its service life. There are some damages that cannot be completely prevented, cracks are one of them.Building component develops cracks whenever stress in that component exceeds its strength[11].They have to be taken into account while designing the plan with proper countermeasures to repair them when they occur. Almost all the structures develop cracks and hence they need to be maintained both internally and externally from cracks causing sources. Despite proper treatment, cracks eventually occur, for such cases some remedies are needed to prevent formation of cracks depending upon the size, shape,location, behaviour and other characteristics of cracks[6].Cracks in many buildings are an undesirable and uncontrollable feature. Some cracks result from wear and tear, while others are linked to deterioration in construction or design. Some of the causes of cracks in buildings are soil expansion and contraction, soil consolidation, vibration, wind, snow loading, overloading and impacts in structure[2].

II. CLASSIFICATION OF CRACKS

Cracks are classified into two categories:

A) Structural cracks:The most common causes of cracking are ground movement(beneath foundation) cause by shrinkage,vibration and on. Cracks are formed due to faulty design, poor construction, swallo soil and poor bearing capacity of soil.This may endangered safety of building[3].Examples of

structural cracks are the cracks in beam, column, slabs etc.

B) Non-Structural cracks:They are caused by change in moisture content and thermal movement.Non-Structural cracks are formed due to the induced stresses in building components and internal forces developed due to variation in moisture content, temperature variation, crazing etc[5].These type of cracks are generally vary from 1 to 3 mm in size. Examples of Non-Structural cracks are cracks on parapet wall, drive-way etc.

Types of cracks occuring in beams are: Flexural, Shear flexural, Torsional, Tension, Disturbance cracks

Types of cracks occuring in columns are: Horizontal, Diagonal, Corrosion/Bond cracks.

Types of cracks occuring in slabs are: Flexural, Shrinkage, Top flexural cracks.

Other types of Non-structural cracks developed are due to temperature changes, gas and liquids penetrating, excess moisture. Following are some types of Non-Structural Cracks.

III. TYPES OF CRACKS

The magnitude of cracks can be characterized by its dimension and direction.They can be horizontal, vertical, diagonal and random in shape.

A) According to shape

1) Horizontal crack:- Horizontal crack runs in zigzag pattern which is at 45-degree angle.The zigzag pattern may form due to water damage and soil pressure[4]. These type of crack occurs at the centre or at top most portion of the wall. Such cracks need immediate attention to prevent further damage.

2) Vertical Crack:-These type of crack occurs near the junction of wall and ceiling indicating settlement of foundation.It runs in same direction as dry wall.

3) Stair step crack:-These type of crack appearance of flight of stairs and runs in both vertical and horizontal direction.They are usually found in unfinished basement [3]..

B) According to size:

1) Thin crack:- These type of cracks are less than 1mm in width and does not require any action to repair it. They are also known as hairline cracks[5].

2) Medium crack:-These type of crack are 1 to 2mm in width and can easily treated by using normal remedies.Also known as fine crack.

3) Wide crack:These cracks are more than 2mm in width and can be marked by suitable linings.

IV. CAUSES

Cracks are caused due to separation of concrete materials fracturing,so it is essential to prevent formation of cracks within specific time[1].It is also caused due to deterioration of concrete and corrosion of reinforcement provided[3]. Major causes that lead to cracking are as follows:

Moisture Variation
Settlement of foundation
Temperature variation
Vegetation
Creep formation

A) Moisture Variation:-Building materials have pores in their burnt clay bricks, mortar, some stones etc.These materials expand on absorbing moisture and contract or shrink on drying depending upon the atmospheric conditions.Theseactions are cyclic in nature and are caused due to variation in the pore water pressure[3]. Water table play important role in formation of cracks.The various causes of initial shrinkage are:

Content
Aggregates
Use of accelerators
Curing
Presence of excessive fines
Humidity

B) settlement of foundation:-

Settlement of building built on made-up soil may occur when water due to heavy rains or floods enters into the foundation . These settlement is basically due to the excessive load of water acting on foundation.Such settlements are generally not uniform and cause cracking in the structure. [1]These may due to the following reasons:

Unequal bearing pressure under different components of the structure.

Bearing pressure on soil being in excess of safe bearing strength of the soi.

factor of safety in the design of foundation

Local variation in the nature of supporting soil

C) Temperature variation: Most of the concrete materials expand when they are heated, and contract when they are cooled. The expansion and contraction with changes in temperature occur regardless of the structure's cross-sectional area[8]. It is one of the most patent cause of cracking in buildings which needs to be cured intime. Magnitude of settlement, however, varies for different materials depending on their molecular structure and other properties. Factors affecting the thermal movement are:

Color and Surface Characteristics

Thermal Conductivity

Provision of an Insulating or Protective Layer.

Internally Generated Heat

D) Vegetation: Availability of vegetation near the walls can cause cracks in the wall due to expansion of roots growing across and under the foundation. Tree roots spread on all the sides above the ground creating an obstruction in the structure[3]as shown in fig(a)

Fig. (a)

E) Corrosion: Corrosion is basically an electrochemical reaction. Small anode and cathodes are created and flow of ions corrode the bars.Reinforcement corrosion is basically due to the corrosive environment that is due to the influence of chloride ions and other materials such as ferric and ferrous oxidation of steel[6].Corrosion cracks in concrete structure are developed along the line of reinforcements. Fig.(b) shows magnitude of cracks caused due to corrosion.

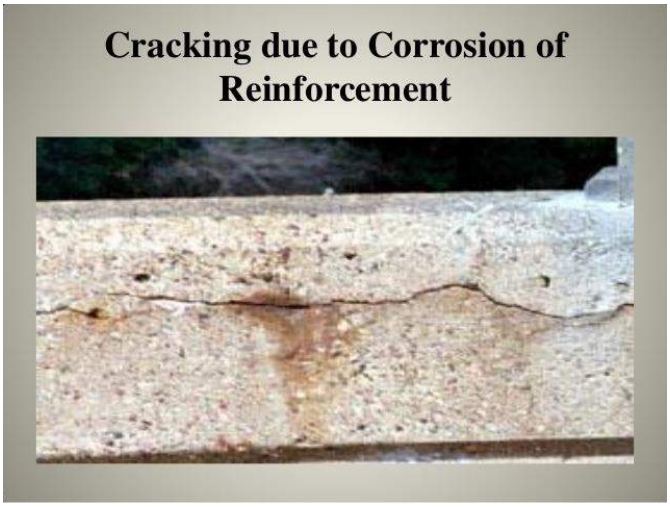

Fig.(b)

There are two types of corrosion :

1)Crevice corrosion

2)Pitting corrosion

V. REPAIRS

a) Epoxy injection is a method of repairing non-moving cracks in walls, slabs, columns and piers. The epoxy is injected and letting it dry[1].The technique generally consists of providing entry and venting ports at close intervals along the cracks, sealing the crack on exposed surfaces, and injecting the epoxy under pressure.

b) Gravity filling involves low viscosity monomers and resins used to seal cracks with a width of 0.001 to 0.08 inch.

d) Stitching is done to provide a permanent structural repair solution for masonary and cracked wall reinforcements, done by drilling the holes on both sides of the cracks, cleaning them and anchoring the legs of the staples in the holes with a non-shrink grout[1].

e) Hairline cracks can just be re-plastered or repainted to fix them and make them disappear.

f) Routing and sealing is a method in which the crack is made wider on the surface, then the groove is filled with a flexible sealant, this is common and easier than the procedures, training required for epoxy injection, and can be done on vertical and curved surface[1].

VI. OBSERVATION

Fig.(c) shows old house compound wall

Fig.(c)

Width:-1 to 2 mm
Type:- Wide(non structural)
Shape:-horizontal
Cause:-settlement of foundation

Fig.(d)

Width:-2 to 3mm
Type :- non structural crack
Shape:-vertical
Cause:- improper mixing of materials
Fig.(e)

Fig.(e)

Width:-1 to2mm
Type:-non structural
Shape:- zigzag pattern
Cause:-settlement of foundation

VII. PREVENTIONS

a) By creating slip joints under the RCC slabs on walls cracks by elastic deformation can be prevented.
b) Slabs should be provided with thermal insulation. Joints should be made such as expansion, slip, control joints to prevent cracks from thermal movement.
c) Concrete should be of good quality. Use richer mix of cement concrete 1:1.5:3 to prevent cracks.
d) In mixing of cement concrete or cement mortar, Use minimum quantity of water, as per water cement ratio.
e) Do not use excessive cement in the mortar mix. Because as a general rule, the richer the mix is, the greater is the shrinkage.
f) The design of foundation should be based on sound engineering principles.
g) To prevent cracking problem due to corrosion in reinforcement, it is necessary to specify concrete of richer mix.
f)Joints should be construed like construction joints , expansion joints and slip joints.It should be planned at the time of design and be construed carefully.

VIII. CONCLUSION

Cracks may occur due to several reasons as discussed above. The formation of cracks cannot be completely eliminated nor completely stopped but several measures can be undertaken to prevent their consequences[3].Several prevention factors should be taken care of during actual construction process itself.Cracks can also be cured by using self healing phenomenon such as using bacterial concrete where it coverts calcium lactate to calcium carbonate which results in crack healing[6]. Through this research we come to a conclusion that there are various methods to repair cracks when they form, but there is no sure way to prevent cracks before they form or even during their formation. By observing several cracks and tendency of cracking we also concluded that not all type of cracks require same level of attention. Taking into consideration proper repair and maintenance, adequate construction materials, proper techniques, the potential causes of crack can be minimized to a large extent.

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Design of Hybrid Electric Vehicle

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ABSTRACT

A 'hybrid electric vehicle' is a vehicle that runs not only on batteries but also on an internal combustion engine that drives the wheels. It has great advantages over the previously used petrol engine that drives the power of petrol only. It also causes air pollution. The objective is to design a hybrid electric vehicle powered by both battery and petrol is to reduce air pollution. by a combination of petrol and electric makes the vehicle dynamic in nature. this gives advantages in fuel economy and environmental impact over conventional vehicles. Hybrid electric vehicles combine an electric BLDC motor, battery, and control system with an internal combustion engine to achieve better fuel economy and reduce toxic emissions. In a Hybrid electric vehicle, the battery alone provides power for low-speed driving conditions where internal combustion engines are less efficient. In long highways, or hill climbing the electric motor provides additional power to assist the engine. Due to this a smaller, more efficient engine to be used. Thus hybrid vehicle is the best option in an urban area with high traffic.

Keywords: Hybrid Electric Vehicle (HEV), Lithium-Ion Battery, Single Chain Arrangement.

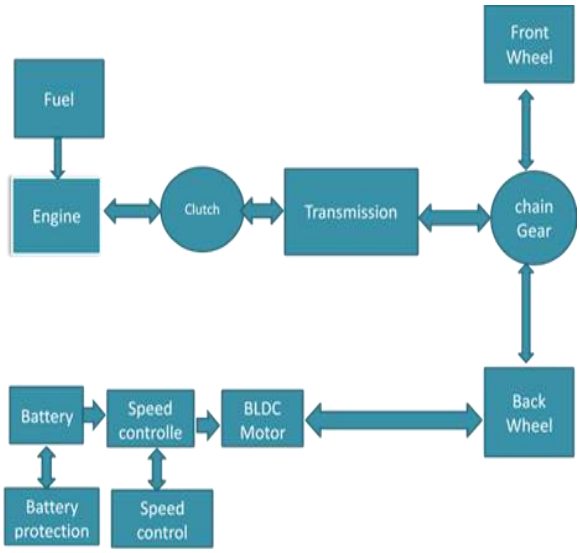
I. INTRODUCTION

One of the primary reasons for the introduction of Electric vehicles into the market is the concern over greenhouse gas emission and their contribution to global warming. National Electric Mobility Mission Plan (NEMMP) 2020. It aims to achieve the national fuel security by promoting Hybrid Electric vehicles in the country. To achieve this there's a target to realize 6-7 million sales of hybrid and electric vehicles within the year 2020. And thus, we can save 2.2-2.5 million tons of liquid fuel which will decrease 1.3-1.5 million-ton tons of carbon dioxide emission. Electric vehicles are powered by batteries that are contained with the vehicle and usually provide an adequate charge for the propulsion of the vehicle through city traffic. The batteries are mounted within the vehicle and are used to propel the motorcycle as an alternative to using an internal combustion engine. The efficiency of an electric vehicle is far greater than all other forms of propulsion currently in use. the electric vehicle is powered by electricity with a rechargeable battery, a BLDC motor, a controller that sends a signal to the motor from the driver's accelerator pedal, and a charging system. These parts of an electric vehicle replace the petrol engine, fuel tank, fuel line, and exhaust system in an existing bike. While the petrol engine is central to the operation of an existing vehicle, it is the rechargeable battery that is central to the operation of an electric vehicle. All-

electric vehicles recharge their batteries by plugging household electrical supply or by the special charging station. The components used in existing battery electric vehicles are motors, motor controller and lithium-ion batteries. Some of the sooner designs of electrical bikes included a way to charge the vehicle using the K.E. generated by the vehicle itself. Electric vehicles are being introduced on the market to completely eliminate the use of IC Engine and make use of the In-wheel motor system on rear wheels for small electric vehicles, the combination structure of each component. The key point of the In-Wheel motor system to be applied in small electric vehicles is the integration capability to meet the requirements such as wheel space, power performance, the strength of components. One drawback to electric bikes is that batteries must be recharged and there are limitations in the range that the battery may propel the motorcycle without recharging. One solution to this recharging problem is to install an alternator of a car to retrieve the unused rotational energy of the wheel to recharge the batteries while still in motion.

II. METHODS AND MATERIAL

BLOCK DIAGRAM



III. LISTS OF COMPONANT

A. Motor Controller
B. Lithium- ion battery
C. Battery charging kit
D. Yamaha crux
E. BLDC Motor

IV. DESIGN PROCEDURE

HYBRID BIKE The name itself depicts that it is urban areas with less pollution. To get this requirement we are doing some minor changes in the normal bike. The changes what we have made is we connect the motor and engine wheel with single chain arrangement. Something different from normal bike. In case of normal bike, it will operate in only one mode i.e., Gasoline mode but in case of hybrid bike it will operate in both Gasoline and electricity mode. Due to this advantage of running in the both the mode there will be less consumption of fuel then there will be a maximum reduction in the pollution.

Fig.I. YAMAHA CRUX (OLD)

Fig 2. Shows the BLDC motor arrangement. Here motor is provided with free wheel which is connected to engine and sprocket chain arrangement in back wheel with single chain arrangement. When bike run on fuel mode the motor freewheels run freely and hence there is no effect on motor. When bike runs on battery the freewheel and motor shaft are inter lock with each other

motor start rotating in that condition engine is in neutral position therefore there is no effect for our project we are procuring an ordinary engine bike of model YAMAH CRUX (OLD). The requirement what we are expecting is getting a speed of 40 KMPH in urban areas with less pollution. To get this requirement we are doing some minor changes in the normal bike. The changes what we have made is we connect the motor and engine wheel with single chain arrangement.

V. CONTROLER

The controller is fitted in the available free space of a normal bike battery. The controller connects the power source to the motor It controls the speed and optimizes energy conversion. Lithium-ion battery with the power ratings of 48v and 12 Ah is used in this project. The reason behind using this type of battery is getting high energy density and self-discharge with the low maintenance. The slot which we have chosen to place the battery is, in the available free space below the seat. The more greater energy density is one of the chief advantages of a Lithium-Ion battery or cell. The much higher power density offered by lithium-ion batteries is a great advantage. One issue with batteries and cells is that they lose their charge over time. This self-discharge can be a major issue. One advantage of lithium-ion cells is that their rate of self-discharge is much lower than that of other rechargeable cells such as NiCad and NiMH forms. Coming to the throttle operation, it is totally based on variable speed resistance. In detail, the speed will be regulated by using the resistance. The throttle placement in a hybrid bike is adjusted to the engine throttle and placed the electric speed throttle on the same handlebar. Due to this arrangement their will reduction in extra fitting of another handle bar. These are the minor changes we have made to fulfil our requirement for the HYBRID ELECTIC BIKE

VI. LITHIUM ION BATTERY

Lithium ion battery with the power ratings of 48v and 26 Ah is used in this project. Here we use old laptop cells for making the battery pack. To get required voltage and current we connect the battery into series and parallel combination. To get 26 amp current we connect 13 cells in parallel and for 48 volt we connect pack of 13 cells in series. Coming to the throttle operation, it is totally based on variable speed resistance. In detail, the speed will be regulated by using the resistance.

Fig 4. LITHIUM-ION BATTERY PACK

The throttle placement in hybrid bike is adjusted the engine throttle and placed the electric speed throttle on the same handle bar. Due to this arrangement their will reduction in extra fitting of another handle bar. These are the minor changes we have made to fulfil us requirement for the HYBRID ELECTIC BIKE

VII. CALCULATION

1 Drag force

2Average speed of vehicle = 40km/h fd= cd * ½ *P* (v*v) A cd= drag coefficient Fd = Drag force (N) cd = Drag coefficient

P = density of fluid (1.2kg/m3 for air) v = flow velocity (m/s) A = frontal area of body (m2)

A= 1.5m (Hight)*0.4m (Width)

A= 0.6m2 now,

Fd = 0.9*1/2*(1.2kg/m3) *(11.11*11.11) *(0.6m2)

= 39.99N

Fd = 40 N

2. Rolling Resistance

Fr = c*w

C = Rolling Resistance coefficient W = m * a c = 0.002 on concrete c = 0.004 on asphalt Fr = 0.004*190*9.81

Fr = 7.45 N

3. power required for motor

P=Fr * v/n

P= power

Ft= Total force n= Efficiency

P= (7.5+40) * 11.11/0.85

P= 530.32 w

4. Torque

Circumference = 2*3.14*(Radios)

= 2*3.14*0.25

= 1.57m

For one Revolution of wheel we will cover the distance of

1.57 m

For 40 km

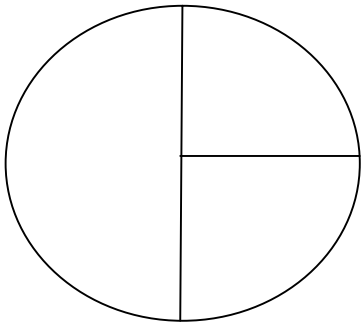
40(km/h) =40000 (km/s)

= 40000/60

= 666.6 (meter/minute)

Wheel RPM = 666.6/1.57

= 424.5 RPM



D= 0.5m

R= 0.25m

C= 2*3.14*r

Motor RPM = gear ratio * wheel RPM

= (Driven/Drive) * 424

= (21/9) * 424

Motor RPM = 1000 rpm

Torque = 9.5488*Power/speed= 9.5488*530/989 Torque= 5.48 N-M maximum Torque (0-40km) in 20 sec

By 1st equation of motion

V=u+at

V = final velocity (m/s) U= initial velocity (m/s) a= acceleration (m/s2)

T= time taken in (s)

V= u+at 11.11= 0+ (a*20) a = 0.55 m/s Force

F=M*a

= 190*0.55

= 104.5 N

Maximum Torque = F*r(radios)

= 190*0.25

= 26.125 N-M

Maximum torque= 26.125N-M

5. **Ampere hour (Ah) Required for Battery**

Battery voltage= 48 volt

Motor Wattage= 500 w

Discharging current = 500 / 48

= 10.11 Amp

6. Power consumption in one Hour 500w * 1 hr = 500whr

But Efficiency of Battery is 84% Therefore,

Power consumption in one hour = 500*1.16

= 580 whr

Now,

(Ah) required = 580/48

= 12.08 Ahr

7.Electricity Consumption for Charging Battery

Charging voltage = 54.6 volt

Charging current = 26 Ah

Power = 54.6*26

= 1419.6 w

Total Energy consume in 4 hours = 1419.6*4

= 5678.4 wh

One unit of electricity = 1000 wh

Total unit consumption = 5678.4/1000

= 5.67 unit

Cost of charging = 5.67* 7

= 39.75 Rs

VIII. CONCLUSION

- using concept of hybrid electric vehicle result in better efficiency and also save lot of fuel in today's fuel deficit world.
- A hybrid gives a solution to all the problem in some extends.
- One can surly concluded that this concept will follow with even better efficiency and conversion rate

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Plant Species Detection Using CNN Deployed on Android App

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ABSTRACT

There are hundreds of kinds of trees in the natural ecosystem, and it can be very difficult to distinguish between them. Botanists those who study plants however, are able to identify the type of tree at a glance by using the characteristics of a leaf. Plant identification is not exclusively the job of botanists and plant ecologists. It is required or useful for large parts of society, from professionals (such as landscape architects, foresters, farmers, conservationists, and biologists) to the general public (like Eco tourists, hikers, and nature lovers). But the identification of plants by conventional means is difficult, time consuming, and frustrating for novices. Machine learning is used to automatically classify leaf types. Currently, relevant technologies, such as digital cameras, mobile devices, and remote access to databases, are ubiquitously available, accompanied by significant advances in image processing and pattern recognition. The idea of automated species identification is approaching reality. Deep learning is itself a self-learning technique used on large amounts of data, and recent developments in hardware and big data have made them more practical. We propose a method to classify plants (their species, diseases, uses etc.) using the CNN model, which is often used when applying deep learning to image processing. Crop disease is a major threat to food security, but their rapid identification remains difficult in many parts of the world due to the lack of the necessary infrastructure. Disease detection involves the steps like image acquisition, image pre-processing, image segmentation, feature extraction and classification.

Keywords : Plant Detection, CNN, Machine learning, Artificial Intelligence, Image Processing.

I. INTRODUCTION

As the machine learning technology advances, sophisticated models have been proposed for automatic plant identification. Nowadays, many efforts have been conducted in extracting local characteristics of leaf, flower, or fruit. Crop disease is a major issue but their identification remains difficult. In the developing world, more than 80 percent of the agricultural production is generated by smallholder farmers, and reports of yield loss of more than 50% due to pests and diseases are common. Furthermore, the largest fraction of hungry people (50%) live in smallholder farming households, making smallholder farmers a group that's particularly vulnerable to pathogen-derived disruptions in food supply. As the machine learning technology advances, sophisticated models have been proposed for automatic plant identification. It is clear that identifying large number of plants is a complex process. Identifying plants requires information such as leaf shape, branch shape, shape of the whole plant, plant size, flower shape, flowering time and fruit. Most of the plant identification algorithm is based on Convolutional

Neural Network. It is a deep learning algorithm which can take an input image, assign importance to various aspects/objects in the image and be able to differentiate one from the other. In order to develop accurate image for the purpose of plant disease diagnosis, we need a large, verified data set of images of diseased and healthy plants. Training large neural network can be very time consuming, but the trained models can classify images very quickly, which also makes them suitable for consumer application and smartphones.

Many of the trees/plants are in tropical regions, and because only limited botanical research has been carried out in these areas, it is believed that there are many undiscovered species. It is clear that identifying large numbers of such trees is a complex process.
For ex. plums and apricots, these are very similar in shape, the shape of the leaf, tree, and even in the shape of the young fruit. To identify trees like these, considerable information is required, shape of the leaves, branch shape, shape and size of the tree/plant, flower shape, flowering time, and fruit.

II. Technology Used

2.1 Android Studio:

Android Studio is also defined as integrated development environment (IDE) for Android development application. Android Studio uses a emulator, Gradle-based build system, etc. to run the program. Android Developer include various testing and debugging. Versions of Android Studio are adaptable with some Apple, Windows and Linux operating systems. With run for Google Cloud Platform and Google app integration, Android Studio offers developers a well-stocked toolkit for creating Android apps or other projects, and has been an integral part of Android development since 2013.

2.2 .Net Programming Language:

The .Net framework is a s/w development form developed by Microsoft for running and service that it uses. The framework was creating an application, which would run on the Windows Platform. The first version of the .Net framework was released in the year 2002.The .Net framework can create both - Form-based and Web-based applications. Web services can be used to developed using .Net framework. It also supports various programming languages such as Visual Basic etc. So developers choose and select the language to develop the required application.

2.3 Java

Java is a broadly used programming language exactly designed for use in the distributed environment of the internet.[5] It is the most popular programming language for Android smartphone applications and is also among the most recommend for the development of edge devices and the IOT. Java is object-oriented. Java was designed to have aspect of the C++ programming language, but is simpler to use and enforces an object-oriented programming model.
Java can be used to create applications that may run on a single computer or be share out among servers and clients in a network. It can also be used to build a small application module for use as part of a web page.

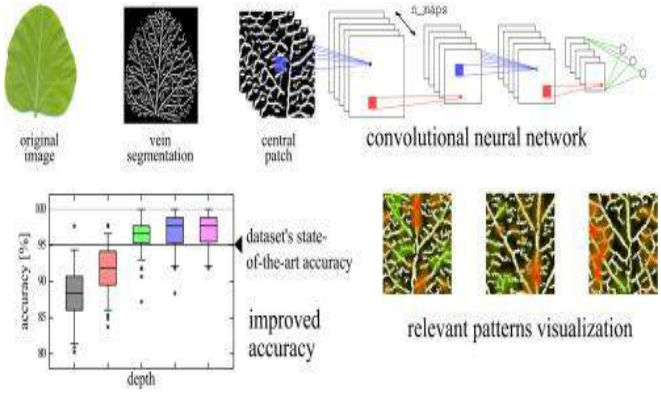
2.4 Firebase:

Firebase is a technology that allows you to create web applications without server-side programming, making development faster and easier. It supports Web, iOS, OS X and Android clients. Apps that use Firebase can use and control data without thinking about how data is stored and synchronized across different instances of the application in real-time. Working with Firebase from a developer's perspective is a wonderful benefit, as they are the core

technology of development. Firebase gives you service like analytics, databases, messaging and crash reporting so you can move quickly and focus on your users.

III. Problem Definition

Dataset Description: We analyze images of plant leaves, which have a spread of class labels assigned to them. Each class label is a crop-disease pair, and we make an attempt to predict the crop-disease pair given just the image of the plant leaf. Figure 1 shows one example each from every crop-disease pair from the PlantVillage dataset. In all the approaches described in this paper, we resize the images to 256 × 256 pixels, and we perform both the model optimization and predictions on these downscaled images.



3.1 Aims and Objectives:

The patient has no longer have to wait for the information to be passed on manually rather they can get information anywhere just by our application.
It will save time and make the patient process faster. Our project will help patient to find information for pathology location.

This application will be designed in a way which will make their work comfortable.

IV. Proposed System

In order to overcome all the above issue proposed system is to design and implementing the digital locker of all medical reports which may accessible through right channel of authentication and sharable with doctors. The following figure depicts the Digital Locker Landscape. Citizens, Issuers, Requestors and Digital Locker are the main components. Digital Locker links various issuer repositories using a set of APIs. The plan will be developed in the following modules described below.

Module 1 (creating user interface):

This module is a frontend that facilitates information for pathology to user of different categories which are represented using tabs, navigation bar etc.

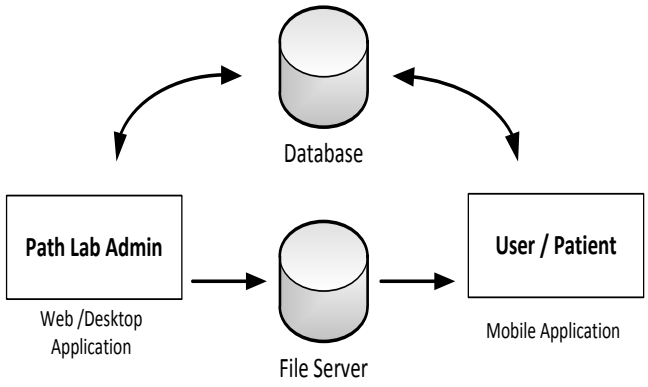


Figure 3 : Flow of Module1

Module 2 (link between pages and database):

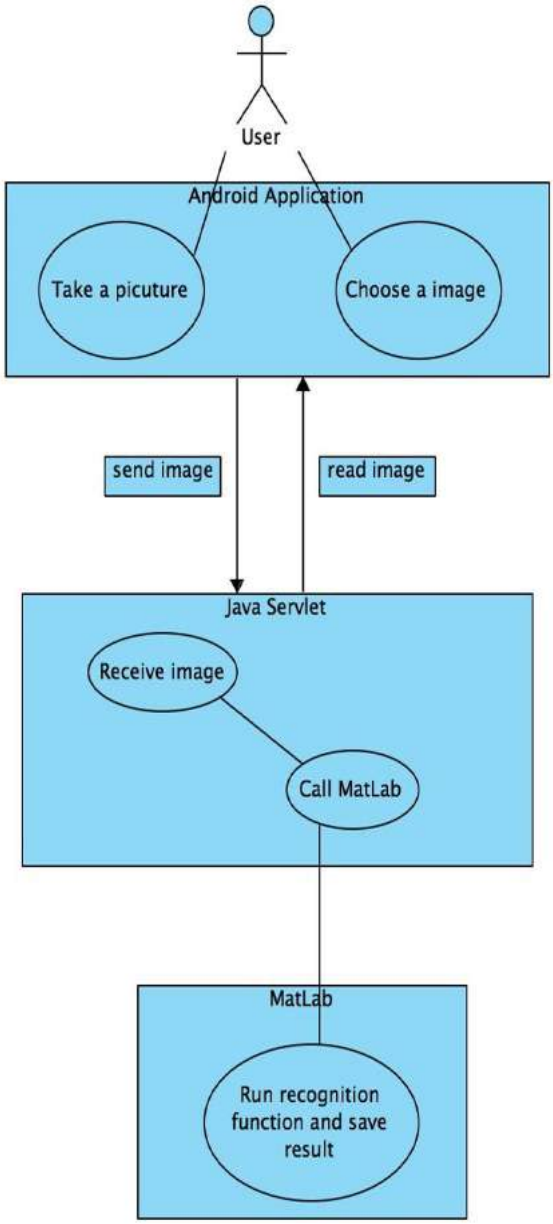
This module is the middle end where the link between all the pages and link between the tables and buttons will be established in the form of tables which show the details of patient who has get appointment online.

Module 3 (database creation):

This module is the backend where the database is developed for the project consisting of different tables for login, patient details etc.

5. Implementation Details

5.1 Diagram:



V. CONCLUSION

This system will be helpful to a large variety of peoples such as the farmers, Ayurveda doctors and public in general. Hence we propose this system to identify different plants, their species, uses, disease etc. using Artificial Intelligence and Convolution Neural Network deployed on an android application.

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Solar Based Sanitary Waste Dispenser

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ABSTRACT

Hygiene related to women is the most important thing that has to be properly taken care of. Disposal of sanitary waste had become a major issue for the society because the diseases causing bacteria brings threat to surrounding area in case of hygiene. Incomplete and inaccurate knowledge about menstruation is obstructing the path of menstrual hygiene management. Women use sanitary napkins in menstruation time and manage that harmful waste by disposing them in open, with domestic waste, burning in open which create soil and air pollution and sometimes they flush them in toilets which cause choking. Modern techniques like incineration can make a remarkable contribution to reduce the waste. For this a solar based sanitary waste dispenser has been proposed, which shredder's the waste in small pieces & burns the sanitary waste and convert it in ash. It is an ecofriendly incinerator as it is a solar energy based system and also reduces the effect of harmful gases coming out while burning the waste.

Keywords : Hygiene, Waste Dispenser

I. INTRODUCTION

The lack of proper waste management as compared to increasing waste generation can pose risks for health and environment. The wide growth of urbanization and industrialization is worsening the condition day by day. We are familiar with different types of waste like food, electronic, commercial, industrial, medical, etc. It is essential that each type of waste should be handled and get disposed separately. The waste managing body is facing critical consequences due to deficiency of facilities to treat and dispose the waste materials. Because of improper waste handling harmful waste can result to environmental and health problems. One of such harmful waste is sanitary (menstrual) waste. It's a crucial issue not only in India but also other countries too. The disposal techniques and the superstations regarding menstruation, it is the need to bring out a solution for managing this waste. Almost 90% of a sanitary napkin is made up of plastic. The thin top layer dry-weave top sheet is made of a plastic polymer polypropylene, since plastic is non- biodegradable material it takes a long time (years) to decompose when buried in soil. If it is burned openly it releases harmful dioxins and furan gases. Hence safe disposal of this sanitary waste is essential. To resolve this problem sanitary waste incinerator are being used. Incinerator is a safe scientific method for the disposal of sanitary waste which converts the waste into ash when burned at a certain level of temperature. In this process the fumes that generate while burning can be properly disposed in air after filtering it or reducing its harmfulness. These incinerators are used at a certain level of temperature and can be used in controlling the environment by taking the care that the gases that would release should not be harmful.

These incinerators can be installed in schools, industrial, institutional, community level.

II. CASE STUDY

In this paper we are giving the solution to dispose the sanitary napkins. but before we proposed this system we have searched about the present available methods for disposal, and we found that the proper disposal of sanitary waste is not available.
Presently available methods to dispose sanitary waste are:

- Incinerator
- Red dot bin
- Dumping yard
- Sanitary landfills

Incinerator:
Incinerator used as a burner, which is burn, the sanitary waste. Instant disposal of used napkins in a very fast and hygienic way. Incinerator is a electrical machine.

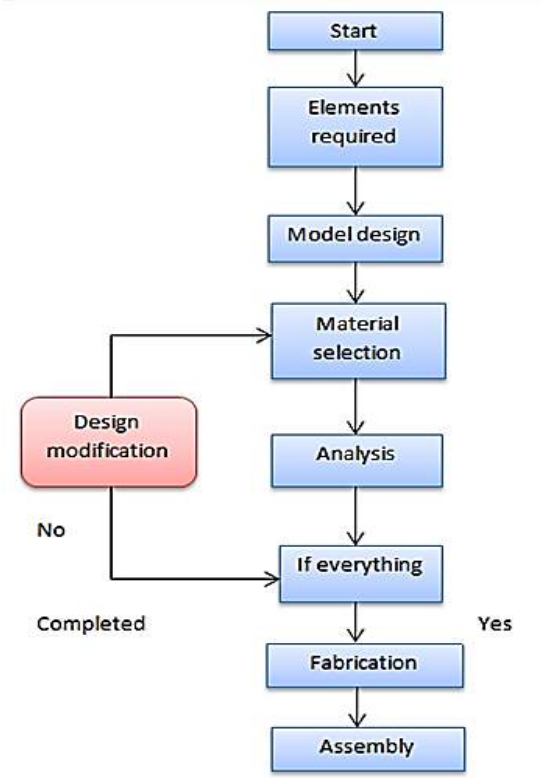
We have visited in NEERI. They developed "GREEN DISPO. It is an incinerator with improved technical design. It has improved combustion chamber as compared to other products used in market. It has less energy combustion .There is two combustion chamber in these device.

Red dot bin:
It is a campaign to dispose the sanitary waste. In this method the sanitary waste securely wrapped and marked with red dot and put into the waste container this method is required more time to segregate the waste.

Duping yard:
This is most commonly use method in everywhere. In this method the all type of waste are dump in open space. But due to the environmental reaction bacteria are takes place .this bacteria is very harmful to environment.

Sanitary landfills:
Sanitary landfills are the isolated sites. it is a pit in which the sanitary waste are filled. But it causes soil pollution, reduced the quality of soil and ground water pollution.

III. METHODOLOGY



Solar panel

Solar panel refers to a panel designed to absorb sun's rays as a source of energy for generating electricity or heating .It is also known as photovoltaic solar panels, solar modules, solar plates are made of silicon cells which convert sunlight into electricity .Solar panel is used to charge battery to run the dispenser .This work uses a 12V, 16W polycrystalline solar panel .Solar panel is made of semiconductors like silicon after the invention of the transistor. When sunlight falls, electrons in the solar panel start flowing towards positive and negative terminals and generate electricity. Solar panel comes with more advantage than disadvantage .Solar panels produce ecofriendly, clean and free energy for a span of 25 years, which is its greatest advantage.

Types of solar panels

The most commonly available solar cells are made from high-grade silicon that is treated with negatively and positively charged semi-conductors, phosphorous and boron .According to the crystalline structure, solar panels can be separated into the following types:

1. Mono/crystalline silicon panel

The silicon has a single and continuous crystal lattice structure with almost no defects or impurities. The principal advantage of mono/crystalline cells is their high efficiency, typically around 15 percent, although the manufacturing process required to produce mono/crystalline silicon is complicated, resulting in slightly higher costs than other technologies .Different manufacturing methods are used, depending largely upon the method of growing ,or pulling a perfect crystal that has a solid ,cylindrical shape .

2. Poly -or multi –crystalline silicon panel

Polycrystalline panels are produced using ingots of multi-crystalline silicon. They are cheaper to produce than mono-crystalline panels, due to simple manufacturing process. They tend to be slightly less efficient, however, with average efficiencies of around 12 percent.

3. Amorphous silicon panel

Amorphous silicon panels are composed of silicon atoms in a thin homogenous layer, rather than a crystal structure. Amorphous silicon is produced by deposition onto a substrate, rather than wafer sawing so the cells can be thinner .For this reason, amorphous silicon is also known as a thin film PV technology. However, the efficiency of amorphous panels is less than crystalline-based cells, with typical efficiencies of around 6 percent, but they require less material and cheaper to produce. The low cost makes them ideally suited for many applications where high efficiency is not required and low cost is important.

4. Dye-sensitised solar panel

Dye-sensitised solar panel technology is best considered as artificial photosynthesis .It performs well under indirect radiation, during cloud conditions, and when temporarily or permanently partially shaded. Efficiencies over time are still to be established but technically that could achieve around 10 percent or more, and they are very effective over a wide range of sunlight conditions.

Charge Controller

Charge controller is also known as charge regulator or battery regulator. It limits the rate at which electric current is added to or drawn from electric batteries.

Each time batteries were charged deep cycle with solar panels, it's necessary to use a charge controller in the circuit in order to protect the battery from overcharging or from over discharging. It protects from overcharging and overvoltage, which can reduce battery performance or lifespan and may a pose a safety risk. It suppresses deep discharging a battery or performs controlled discharges, depending on the battery technology. It may also monitor battery temperature to prevent overheating.

Battery

This battery is used to supply electric power to the dc motor to run the shredder and to heating coil .The battery contains one or more deep cycle batteries, connected in series and /or parallel depending on the voltage and the current capacity needed .The batteries store the power produced by the solar panels and discharge it when you need it.

Battery rating is 12V, 5Ah is used for the hardware module.

The different types of batteries

- Lead acid battery
-Nickel cadmium (NiCad) battery
-Nickel metal hydride (NiMH) battery
-Lithium ion battery
-Zinc-air battery

Here, we have used Lead acid Batteries.

Lead acid battery

The anode and cathode in a typical lead acid battery are made from lead and lead dioxide, and they are bridged by an electrolyte of a solution that is roughly one third sulphuric acid. As the battery discharges electricity, the chemical reaction gradually converts the two electrodes into lead sulfate. Recharging the battery partially reverses the conversion.

They have one of the lowest energy-to –weight and energy-to-volume battery designs in existence making them very big and heavy for the total amount of power they can put out. However, they aren't very good in roles that require a steady, low or middling supply of electricity over a long period of time. They also have long recharging times.

DC motor

The electric motor operated by dc current is called dc motor. Dc motor is used to drive the shredder .This work uses a 12V, 30 rpm motor. It converts DC electrical energy into mechanical energy. It works on the principle that when a current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move. It lays for its operation on the force which is known to exist on conductor carrying a current while situated in a magnetic field. The primary advantage of dc motor is the can develop constant torque over wide speed.

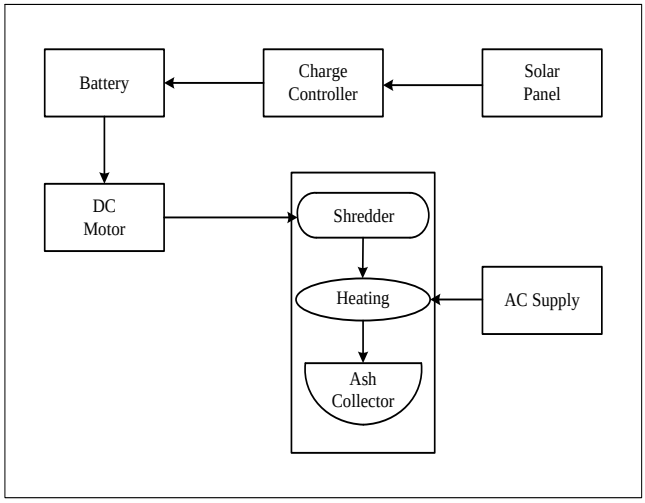
Types of dc motor

1. Shunt motor: Shunt motor in which the field winding is connected in parallel with the armature.
2. Series motor: series motor in which armature and field winding are connected in series
3. Compound motor: This type of motor has two field winding one of which is connected in parallel with the armature and other in series with it.

Heating coil

It is a heating element that converts electrical energy into heat through the mechanism of joule heating. The heating coil is used to burn the shredded sanitary napkin to convert it into ash form. This work uses 1200 watt heating coil. Electrical heating coils converts' electrical energy into heat as electric current through the element encounters resistance resulting in heating of the element. This process is independent of the direction of current .A coil is a heating element attached to the heating unit itself.

BLOCK DIAGRAM



WORKING

As this project is solar based, solar energy is the most important factor. Fig1 represents the flow of work. The sun rays will be absorbed by the solar panel this solar energy is stored in a battery. In between solar panel and the battery charge controller is connected which gives protection against overvoltage. The solar energy that is stored in a battery is then supplied to the solar based sanitary waste dispenser.

In fig 2 we can see the connection and the arrangement of components. Solar panel collects the solar energy and stores that energy in the battery in the form of electrical energy. Supply from battery is given to the solar based sanitary waste dispenser. Dispenser consists of three parts shredder, burner and ash collector. Connection from the battery is given to the motor which is connected in the shredder mechanism as well as to the burner. Shredder is the mechanism that cuts the raw waste into small particles. Waste that is converted into small particles falls on burner. A burner burns these particles completely and converts that waste particles into ash. This ash is then collected into the ash collector. We can reuse this ash as a fertilizer for plants. Connection from the battery is given to the motor which is connected in the shredder mechanism as well as to the burner.

ADVANTAGES AND DISADVANTAGES

Advantages:

- ✓ Effective burning of waste material
- ✓ Less power consumption
- ✓ Safe disposal of waste
- ✓ User-friendly

Disadvantages:

- ✓ Humming noise
- ✓ Size and weight of machine

IV. CONCLUSION

Disposal of sanitary waste has always been a hectic issue for people. Still there are some people who use traditional methods for disposal of sanitary waste. Commercial methods are introduced now to avoid inconvenience in safe disposal of this waste. People need to use this commercial method to avoid the harm to the environment due to improper disposal of waste.

Solar based sanitary waste dispenser is the unique system which uses solar energy and thus requires less energy compared to other commercial methods. Our project provides a hygienic way to destroy the napkin also it is portable. It also plays a role for the Swachh bharat abhiyan reducing the risk of diseases. This system can also combined with the vending machine to make a whole system as one unit.

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Design and Fabrication of Semi-Automatic Drainage Cleaner

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ABSTRACT

Controlling of wastes of water and water pollution must our primary purpose. A short description about the primary treatment which includes screening whereas secondary treatment involves activated sludge, trickling filters etc. and also to measure removal of the carbon in the waste water treatment processes can be done by TOC(Total organic carbon), BOD(Biochemical oxygen demand), and COD(Chemical oxygen demand) is also explained here. The method starts aggregation the sewerage wastes by victimization the arm and it throws back the waste into the box mounted behind the machine. This method has restricted human intervention within the method of clean up and successively reduces spreading of diseases to humans.Drainage systems and its role in sanitation related outbreaks are evident but still occluded once it has been installed. This current review evaluates if drainage system can cause infection and thus be of clinical concern. Improper management of drain line led to chronic diseases. To ensure adequate safe hygiene, this will help to clean drain line in superior manner that will help to maintain public hygiene.

Keywords : Mechanical Drainage System, Hygiene, Sewage, Chain Drive, Induction Motor

I. INTRODUCTION

Impurities gift in removal water will cause blockage of the system. The system are often cleansed time to time manually or such a system are often designed which will mechanically throw out wastage and can keep the water clean. This project is intended to stay clean the system and helps the sleek operating of the system. Drainage cleaning system would reduce the risk of various diseases spread due to accumulation of waste. Thus modified drainage cleaning system will clean up waste from surface to bottom of drain by grab floating as well as waste accumulate at bottom.

Decaying wastes attract household pests and result in urban areas becoming unhealthy, dirty and unsightly places to reside in. Moreover, it also causes damage to terrestrial organisms while also reducing the uses of the land for other more useful purposes. The drainage system can be cleaned time to time manually or such a system can be designed that will automatically throw out wastages and will keep the water clean.

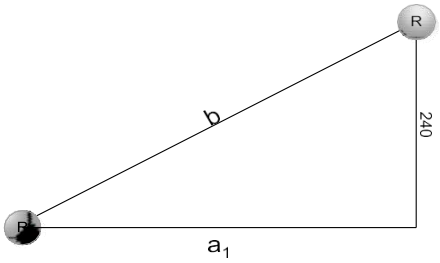

Fig. 1 Concept of Design

II. METHODS AND MATERIAL

A. Working principle

When motor runs the chain starts to circulate making teeth to lift up.the waste materials are lifted by teeth and are stored in waste storage tank. The lower shaft and wheel arrangement is placed for transporting the machine from one place to another. The upper shaft and wheel arrangement helped for moving the machine during cleaning process. Means this gutter and drain cleaner clean and move together for better cleaning.

Once one lifter completes one cycle from down upward direction, it takes all garbage material like waste bottles, plastics, tins, etc. and therefore the grid drops it on the collecting box fixed up at the rear. The gathering rate of garbage is continued. This device is placed across drainage in order that solely water flows through lower grid waste like bottles, plastics that are floating in drain are upraised by teeth of lifter that is connected to conveyor. This conveyor is connected to shafts driven by motor. Once motor runs the conveyor starts to flow into creating teeth to elevate. The waste materials are upraised by teeth and are stored in waste.

B. Objective

The major objectives of the proposed work are, Design of mechanical drainer, taking into account the various factors that might affect the functionality of the equipment. Fabrication of the model and Assembling of the model carried out, then process are studied and optimized for effective semi-automatic drainer for sewage water treatment for floating materials.

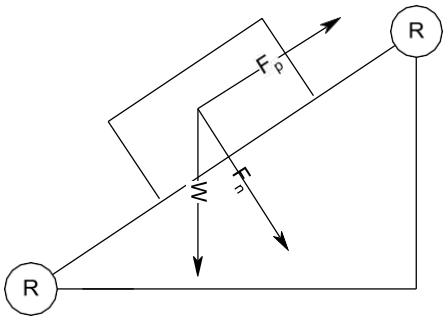

Fig. 2 Force diagram

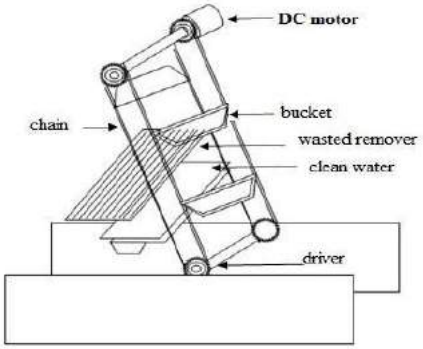

Fig. 3 Roller distance

C. Calculations

Assuming, (a) mass to be lifted = 5 kg and

(b) Self weight of bucket = 2 kg

Thus,

Total mass = 7 kg,

$\theta = 45^0$

If height of bar is selected as 200 cm and according to survey it was found that depth of drainage is 40 to 60 cm. Thus total height is 240 cm and 10 cm clearance provided so that bucket will not stuck to bottom of drainage.

Now from fig,

$\cos\theta = 240/b$ $\quad b = 340$ cm

$\text{Tan}\theta = 340/a$ $a = 240$ cm

Pulling forces,

(F_p) = mass× 9.81 ×=48.55 N {assume mass of bucket 7 kg}

Velocity,

v = 0.227 m/s {assume time t=15sec}

Acceleration,

$a = v/t = 0.0151\ m/s^2$

Resisting force,

F_r = mass x acceleration = 1.05 N

Torque required,

$T = F_p \times r = 165.104$ Nm

Power required to drive,

$P = 2NT\pi/60 = 2.08$ KW { N = 1200 RPM }

SR.No.	Description	Size/Qty
1	Mile steel	24 feet
2	Conveyor Belt	1 belt
3	12v DC Motor	One
4	Wheels	Four
5	12v 7.2Ah Battery	One

Table. 1 Materials Required

D. Fabrication of model

Basically during fabrication of the model the basement part is prepared by welding. Then the supporting rods are welded from the basement, the pillow block bearings are fixed to the supporting rod and the front part of the basement. Hollow cylindrical shafts are moving to the bearings and also chain drive are also moving to the shaft in order to fix the shafts the factor of safety of the chain is calculated. The lifters are fixed to the chain by gas welding at an equal distance from each. Wheel shaft arrangement at the basement port of the drain machine another wheel arrangement are also added at near about middle point of the wheel which make the machine able to move during the cleaning processes

III. RESULTS AND DISCUSSION

While conducting the experiment the parameters considered are uniform flow rate of water, depth of the channel is 1feet and height of the channel is 3feet, rate of disposal of waste is uniform, lifter speed and motor speed is constant. It regularly lifts the waste.

A. Advantages

1) These cleaners are easy cheapest way to fix drainage problems.
2) Reduction of labour oriented method of cleaning, thus upgrading dignity of labour.
3) Low-cost drain-off solution .
4) Efficient in handling.
5) Time saving, highly efficient.

B . Applications

1) Project to use this in efficient way to control the disposal of wastages and with regular filtration of wastages.
2) Cleaning and maintenance of sewer lines drains.
3) It is used in small and medium type of drainage.

C. Future scope

1) Possible to make it a fully automated system by the implementation of control algorithms.
2) It can be used with higher accuracy.
3) During the real time application, the size of the machine will be big so that more lifter pans can be fixed to the chain and a bigger motor can be used to increase performance and rate of collecting waste.
4) A sensor can be placed in the collecting box. As the collecting box becomes full, it gives an alert.

IV. CONCLUSION

The proposed system is providing solution over the total cleaning of drain line not only floating material but also waste accumulates at the bottom of drain. The drain waste water cleaner machine is designed and manufactured by using gear changing and shaft coupling principle. Drainage from industries is treated through this project to meet the national emission standards, with stable operation, low cost and good effect. Also irrigate plants, clean toilets, etc. The cleaner functioned move effectively during the heavier rains which had more volume of running water with garbage and high velocity. By this proposed system, the men power will be reduced. It will also helpful in future for growing economy of Municipal Corporation.

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Review on Experimental study of Torsional effect on flat plate use in Built-up Column

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ABSTRACT

This paper present the experimental research on torsional behavior of flat plate used as lacing in built-up column. However the experimental research is carried out mostly and it has been limited to flexural buckling of column. It is not considerable for torsion but torsional moment because torsional moment becomes significantly large when the earthquake forces are predominant. In most of the steel structures column are only subjected to bending and not to torsion but situation do arises where the demands of practical construction result in eccentrically applied load. This paper focus on a review of all such works done by authors on the torsional behavior of Built-up column.

Keywords : Built-up column, Torsion, Flexural buckling, Earthquake Forces

I. INTRODUCTION

Nowadays Built – up column section is widely used steel structural member. In steel construction Built-up column is used when the length of buckling is larger than the compression force. They are composed of two or more parallel main components interconnected by lacing or battens plates. The lacing and battens are flat plate provided in built-up column for connection. The purpose of providing lacing is to resist shear forces. Producing in column and also prevent buckling of column. Built – up column commonly used in industrial building to support crane girders and steel water tank and supporting roof structures. The columns are capable of attending a high compressive load with minimum and effective use of materials. In most of steel- formed structures or members they are only subjected to bending but situation do arises where torsional effect are significantly typically where demand of practical construction result in eccentrically applied load . So that it is important to analyze the torsional behavior of steel member section. Because if there is an earthquake steel damages and analyze of that damages steel structures has proven that torsional moment occurs because of eccentric beam column joints and has greatly decreased the shear capacity of column. The torsional moment becomes significantly large when earthquake occurs so that analysis of torsional behavior is required. In order to understand the more significant behavior of torsion in the built up section various literatures are illustrated below.

II. LITERATURE REVIEW

1. Fatimah DE 'nan, Musnira Mustar (2012)

In this paper the authors explain that on steel beam sections with triangular web openings. A triangular web profile steel part is a built-up section. It is made up of two beam connected to a web plate of triangular profile. An analysis is carried out to study the effect of openings in the triangular web profile beam. The buckling resistance moment for TRIWP without web opening has a higher resistance in comparison with TRIWP with web opening. The diameter of the opening increased from 40 mm to 80 mm the buckling resistance moment ($M_{b, Rd}$) of the beam has decreased. Its length of the beam also affects the buckling resistance moment. Various studies have proved that the buckling resistance moment is affected by size of opening, the web of beam and the length of beam. The diameter of opening strikes the lateral torsional buckling behaviour of TRIWP steel section. Section with bigger size of opening has least buckling resistance compared with the smaller one and yet there was a minute difference between the sections without opening and the one with smaller size of opening.

2. M. Fortan, O. Zhao and B. Rossi:

In this paper the authors explain that the lateral torsional bending behaviour of welded lean duplex stainless steel beams using the finite element (FE) method. According to the different experiments, precision of EN 1993-1-4 and of Taras & Greiner (2010) are obtained. An analysis is made for three design methods: EN 1993-1-4, with imperfection factor 0.76 and 0.49, and Taras & Greiner (2010) by investigational and mathematical results. The investigation results with imperfection factor 0.49 is best to design stainless steel beams and mathematical results showed it would lead to unsafe predictions for various sections up to 12 %. The current design rules with imperfection factor0.76 are secured for almost all results (max 2% at risk). In order to optimize this method for stainless steel and avoid unsecure predictions, enhancement should be made in imperfection factor and plateau length.

3. S. Prabhakaran, and S. Kalaiselvi (2018):

In this paper Author study about the load carrying capacity of cold formed steel column. The columns were connected by providing bolted connection and load is applied on the column by flexural and flexural tension buckling. By this study author understand that closed built-up column carries more load that of open built-up section and if increase the thickness of section load carrying capacity is also increased.

4 Ajeet Sharma, S. Senthil Selvan, S. Suresh babu & D. ELango (2016):

In this research work author explain about the flexural and torsional behaviour of cold formed steel channel section which is connected back to back and four specimen of built-up I section which are formed by using symmetrical channel section connected back to back by the help of bolts. The sizes of sections are 230mmx100mmx3mm. The paper summarizes the theoretical & experimental investigation on cold formed steel members. The analytical investigation is carried out by FEM using ANSYS 14.5 & theoretical study is done by using Two different IS code i.e. (IS 801-1975 & BS 5950-5:1998). Experimental investigation includes flexural and torsion test. The experimental results were found to be precise with analytical results.

Specimen (mm)	IS-801:1975 (mm)	BS-5950:1998 (mm)	Analytic (mm)	Test Results (mm)
230x100x2	0.639	0.610	0.68	
230x100x25x2	0.627	0.670	0.70	0.60
180x50x1.6	0.296	0.273	0.41	0.35
180x50x20x1.6	0.273	0.260	0.36	0.30

Comparison of deflection values:

5. Anumour Sujith (2016):

This paper state the experimental and numerical analysis of cold formed open and close built-up column section. The column were connected using bolted connection. For finite element modelling ABAQUS 6.10 software was used and compare the results. The mechanical & geotechnical properties of the outer steel tube considerably influence. The contribution of the inner steel tube to the columns torsion capacity considerably increased with decrease in concrete shell thickness. As compare to the individual contribution, the combination of materials enhances 20% of the columns torsion capacity.

6. Martin vild and mirosluv Bazer (2016):

This paper present the experimental and numerical research into the strengthen of steel column under load using welded plates. Author focus on the local buckling and torsional, flexural buckling of column. The sets of three column were tested and the results obtained from the experiments and numerical simulations compared.

Result: Welding causes shrinkage & torsional stress near the weld.

Table 1: Results of parametric study: load resistance $N_{b,R}$, deflection in the direction of axis z caused by the fillet weld at longer flange $W_{z,T}$ and at shorter flange $W_{z,I}$

Column	Temperature load	$N_{b,R}$ (kN)	$W_{z,T}$ (mm)	$W_{z,I}$ (mm)
D	0.67 x exp exp 1.33 x exp	134 138 140	6.3 8.5 10.3	
E	0.67 X exp Exp 1.33 x exp	420 399 387	6.3 8.5 10.	-7.2 -9.9 -12.2
F	0.67 X exp Exp 1.33 x exp	405 383 374	6.3 8.5 10.	-7.4 -10.5 -13.4

7. Vila Real, Catelli, Silva, Santigo, Piloto:

In this paper the authors describes the effects of residual stresses in the lateral – torsional buckling of steel I-beams at elevated temperature. According to this paper the Young's modules defoliates faster than the yield strength when the temperature raises and the stress –strain relationship at elevated temperature is not the same as the room temperature. It is shown that the buckling resistance of the beam is less sensitive to the residual stresses when temperature increases.

8. Powel Lorkowski, Bronislaw Gosowki (2017):

In this paper authors studied to evaluate the uniform torsion of the two-chord steel laced member's

equivalent 2nd moment of area. These members are mostly used as steel columns of framed buildings and as poles of railway traction network gates also. This kind of a columns allows the stiffness of uniform torsion to the investigate the critical loads of the spatial suitability. The experimental studied have been carried out on a single span members with rotation arrested at their ends and torque applied at the mid span. The between torque and angle of rotation of the considered cross section has been investigated.

Results: The more beneficial effect of equivalent 2nd moment of area of the uniform torsion is reached. If when the binding area executed of square bars. The member which is analysed by square tubes is @ 15% larger than the tube laced flat.

9. Belarbi and Suriya Prakash (2012):

In this paper RC bridges column could be subjected to combined flexural axial shear torsional load during earthquake. The seismic behaviour of circular and square column is significantly different under combined loading due to the transverse reinforcement configurations.

Result: The results for a column under bending pure torsion & shear & combined bending shear torsion were presented. If aspect ratio is increased so the bending & torsional strength is also increased.

10. Kumaran V., Sureshbabu S. (2016):

The purpose of this research work is to find out torsional behaviour of light gauge steel section. Cold form steel structures are used for multipurpose in construction industries, in these research work authors has been made an attempt in this study to check the torsional behaviour of cold form steel. In the last decades studies on the structural behaviour of cold formed steel beams are increasingly popular. The behaviour of light gauge channel section of load carrying capacity subjected to torsional buckling is studied. For a span of 1.25m a built-up cold formed steel beam has been adopted & it is verified with FEM analysis by using ABAQUS Software. Theoretical & experimental results comparison is presented y these research work authors understand that angle of twist obtained from theoretical investigation is 8.34% more than that of experimental values.

Sr. No.	Description	Twist (kNm)	Torque (rad/m)
1	Theoretical results	0.00085	15.5
2	Experimental	0.00075	14.4
3	Analytical results	0.00070	13.7

TABLE 1

Sr. No.	Tittle of Paper	Name of Author	Year of Publication	Focused Area
1.	The effect of web opening on lateral torsional behaviour of triangular web profile steel beam section	Fatimah DE ‘nan, Musnira mustar	2012	Focused on steel beam sections with triangular web openings. A triangular web profile steel part is a built-up section lateral torsional buckling.

2.	Lateral torsional buckling behaviour of welded lean duplex stainless steel I-section beams	M. Fortan ,o. Zhao and B. Rossi	2013	Focused on the lateral torsional bending behavior of welded lean duplex stainless steel beams using the finite element (FE) method.
3.	Experimental study on load carrying capacity of cold formed steel Built-up column	S.Prabhakaran, S. Kabiselvi	2018	The load carrying capacity of cold formed steel column. Flexural buckling of column.
4.	Experimental study on the Flexural – Torsional Behaviour of cold-formed steel channel section connected Back to Back	Ajeet sharma , Senthil selvan suresh babu and D.Elango	2016	Focused on the flexural and torsional behavior of cold formed steel channel section which is connected back to back and four specimen of built-up I section.
5.	Behaviour of hollow – cone Composite Column under loading	Sujith Anumolu	2016	Torsional behavior of hollow core FRP concrete steel column.
6.	Strengthening of steel columns under load: Torsional-Flexural Buckling	Martin vild and Miroslav Bazer	2016	The strengthen of steel column under load using welded plates. Focused on the local buckling and torsional, flexural buckling of column.
7.	The effect of Residual stresses in the lateral – Torsional Buckling of steel I-beam at elevated Temperature	Vila Real , R.Cazeli P.Piloto	2003	Focused on the effects of residual stresses in the lateral – torsional buckling of steel I-beams at elevated temperature
8.	Investigation on torsion of the two –chords single laced members	Pawel Lorkowski, Bronislaw Gosowki	2017	Focused on the uniform torsion of the two-chord steel laced member's equivalent 2nd moment of area
9.	Seismic Performance of circular RC columns subjected to axial force bending , and torsion with low and moderate shear"	Belarbi and Suriya Prakash	2010	RC bridges column could be subjected to combined flexural axial shear torsional load during earthquake.
10.	Experimental study on Torsional Behaviour of Lightgause steel sections"	Kumaran V. Sureshbabu.S	2016	Focused on the torsional behavior of cold form steel & light gauge steel section

III. CONCLUSION

- Based on the review of various papers it can be concluded that, when closed built-up column were used then it has been seen that it carries more load than the open built-up section.
- Finite element is a useful tool in the study of the lateral torsional buckling behaviour of section
- Torsional test on steel section indicates the importance of the end boundary conditions on the torsional response.

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Thermoelectric Effect Based Themerature Controlled Photovoltaic System

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ABSTRACT

An intermittent nature of Solar Power Generation gets affects the efficiency of overall performance of Photovoltaic system (PV), the many reasons behind of that such as temperature of the panel, accumulation of dirt on solar panel, weather, the angle of the relative radiation to the panel and solar radiation availability etc. The temperature increment is one of the most challenging factors, that affects the performance of Photovoltaic systems (PV)which causes significant degradation in the solar cell's power output. To overcome this issue, an approach towards increasing these cells' power output is to utilize a cooling method by using thermoelectric cooling in order to reduce the cells' temperature. A cooling model has been developed to determine how long it takes to cool down the PV panels to its normal operating temperature, i.e., 30°C, based on the proposed cooling system. In this proposed model work, a thermoelectric (TEC) module with a heat sink at the back is attached to the back side of Photovoltaic panel. The role of the TEC module is used to absorb the heat generated on the surface of the photovoltaic panel in order to increase the efficiency of the system and so its power capacity. The paper also contains a formulation of Photovoltaic thermoelectric module equations referring to cooling capacity, power output at different ambient temperature and together with the electrical model of the Photovoltaic power generator.

Keywords : Solar Energy, Photovoltaic Cells, Thermoelectric Cooling, Peltier Effect

I. INTRODUCTION

Electricity consumption has increased sharply over the last two decades, mainly due to a rapid economic development, an absence of energy conservation measures and other contributing factor like rapidly growing population. Solar energy can be a major source of power, though the energy density is low and the availability is not continuous. It is now possible to utilized the energy by using photovoltaic conversion system. Solar power is the conversion of sunlight into electricity directly using photovoltaics (PV). Solar energy is coming to the forefront, global warming and state awareness are leading to more intensive use of non-polluting energies, photovoltaic solar power is in the stern. The sale of photovoltaic panels has increased by 40% a year for 10 years. The solar panels have proved their reliability. The cost of production of solar cells has also decreased. Solar energy had a second boost during the energy and pollution crisis. When the price of oil rose dramatically, photovoltaic solar panels began to be used for the first time in homes. However, the low efficiency of these cells and their high capital costs have had negative impacts on their popularity. Therefore, possible improvements to these cells' performance are widely appealing. The performance of these cells is highly dependent on cell temperature. Furthermore, it is clear that the cell temperature has a close tie with the ambient temperature. Accordingly,

an innovative approach towards increasing these cells' efficiency is to utilize thermoelectric cooling in order to reduce the cells' temperature. Thermoelectric cooling can be described by the Peltier effect. This effect which occurs by heating or cooling one end of a circuit requires no operating fluids and therefore demands less maintenance and offers more reliability when compared to other cooling methods. Therefore, a combined TEC and PV design will be the subject of analyses. The combined TEC and PV system operates as a unit by converting the solar energy to electrical energy. The TEC module can either be supplied energy from an external source or utilize the energy converted by the PV module. In either case, the net power output remains the same. For this research, the latter was considered. An overall schematic block diagram of this system is presented in figure 1. The efficiency of the combined system can be influenced by various design and operation parameters. An operation parameter which can affect the performance of these systems is the windspeed. This effect can demonstrate negative or positive feedbacks on the system based on the operating conditions. Furthermore, design parameters such as the area can play a role in these combined systems' output. Moreover, the TEC current can change the efficiency of the system based on the operating conditions and an optimized amount can be calculated under certain circumstances.

In our project we are looking forward to optimize their efficiency in absorbing sun radiations. The methodology that will be used is using thermoelectric cooling (TEC) for cooling them down, to reduce the temperature at a certain degree inside the panel and therefore to work at its maximum efficiency. The challenge in this project is to solve the problem with thermoelectric cooling (TEC) used to cool down panels. This project is to develop a mathematical model responsible for detecting the temperature of the solar panel and being able to start the cooling once it exceeds the norms. But also, it does compute the appropriate time for the solar panel to be cooled down.

The project presents a solution focused on increasing efficiency of photovoltaic module by reducing losses due to warming photovoltaic cells. The solution consists in a thermoelectric effect cooling system applied to the back of photovoltaic module by using Peltier plates.

II. METHODS AND MATERIAL

1) BLOCK DIAGRAM

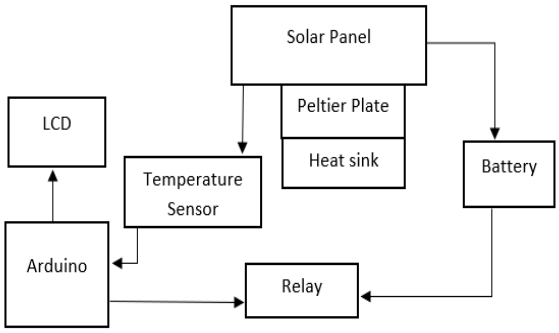

Fig. 1. Block Diagram of Proposed Model

The block diagram involves solar PV module with Peltier plates and heat sink attached at the back side of the Solar PV. The temperature sensor is connected to the Solar PV module. As the block diagram shown below we use temperature sensor and relay interface with Arduino and the status is shows on LCD. The sensor gives signal to Arduino which is programmed to get the temperature from the temperature sensor. Arduino controller is used to detect the temperature and to turn ON the relay if temperature exceeds above 30°C. If the temperature of solar PV module rises above 30°C then the Relay (which is in interface with Arduino) will turn ON by Arduino to flow the

current to the Peltier plates to decrease the temperature below 30°C of the PV module. The power supply is provided by the battery which gets its power directly from solar PV.

2) SOLAR CELL

Solar cell is the basic unit of solar energy generation system where electrical energy is extracted directly from light energy without any intermediate process. A solar cell is basically a semiconductor p-n junction device. It is formed by joining P-type and N-type semiconductor material. Movement of electrons to the p-side exposes positive ion cores in N-side, while movement of holes to the n-side exposes negative ion cores in the p-side. This results in an electric field at the junction and forming the depletion region. When sunlight falls on the solar cell, photons with energy greater than band gap of the semiconductor are absorbed by the cell and generate electron-hole pair. These e-h pairs migrate respectively to n- and p- side of the PN junction due to electrostatic force of the field across the junction. In this way a potential difference is established between two sides of the cell. A semiconductor p-n junction is in the middle of these two contacts like a battery. If these two sides are connected by an external circuit, current will start flowing from positive to negative terminal of the solar cell. This is basic working principle of a solar cell. For silicon, the band gap at room temperature is Eg = 1.1 eV and the diffusion potential are UD = 0.5 to 0.7 V. Construction of a Si solar cell is depicted in Fig.1.

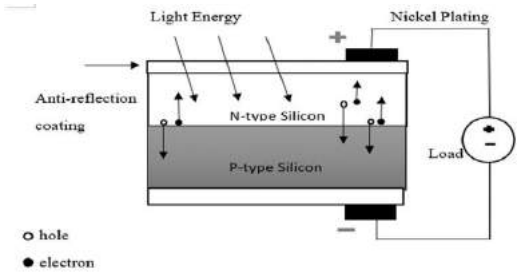

Fig. 2 : Construction of a solar cell

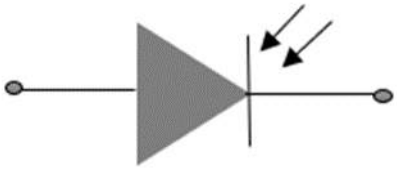

Fig. 3 : PV Cell Symbol

Solar Cell I-V Characteristics Curve diode in absence of light and in presence of light currents in the diode so that the diode law becomes:

$$I = I_0 \left[\exp\left(\frac{qV}{nkT}\right) - 1\right] - I_L$$

where I_0 = "dark saturation current"

q = electronic charge

V = applied voltage across the terminals of the diode

n = idealist factor

k = Boltzmann's constant

T = temperature

I_L = light generated current.

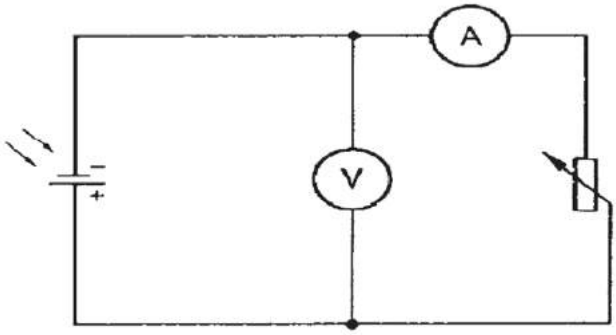

Fig. 4 : Circuit for V-I Characteristics of Solar Panel

A typical circuit for measuring I-V characteristics is shown in Fig.2. From this characteristic various parameter of the solar cell can be determined, such as short-circuit (I_{SC}), open-circuit voltage (V_{OC}) and the

efficiency. The rating of solar panel depends on these parameters.

The short-circuit current is the current through the solar cell when the voltage across the solar cell is zero (i.e., when the solar cell is short circuited) is due to the generation and collection of light-generated carriers. For an ideal solar cell at most moderate resistive loss mechanisms, the short-circuit current and the light-generated current are identical. Therefore, the short-circuit current is the largest current which may be drawn from the solar cell.
The open-circuit voltage, V_{OC} is the maximum voltage available from solar cell and this occurs at zero current. The open-circuit voltage corresponds to the amount of forward bias on the solar cell due to the bias of the solar cell junction with the light-generated current.

The efficiency is the most commonly used parameter to compare the performance of one solar cell to another. Efficiency is defined as the ratio of energy output from the solar cell to input energy from the sun. In addition to reflecting the performance of the solar cell itself, the efficiency depends on the spectrum and intensity of the incident sunlight and the temperature of the solar cell.

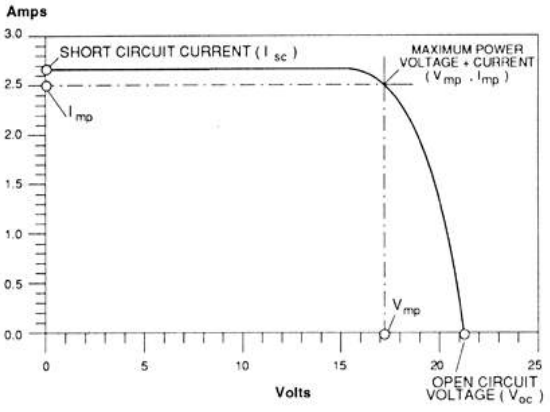

Fig. 5 : A typical I-V curve of a solar cell

3) PELTIER EFFECT

Thermoelectric coolers operate by the Peltier effect (which also goes by the more general name thermoelectric effect). The device has two sides, and when a DC electric current flows through the device, it brings heat from one side to the other, so that one side gets cooler while the other gets hotter. The "hot" side is attached to a heat sink so that it remains at ambient temperature, while the cool side goes below room temperature.

Two unique semiconductors, one n-type and one p-type, are used because they need to have different electron densities. The semiconductors are placed thermally in parallel to each other and electrically in series and then joined with a thermally conducting plate on each side. When a voltage is applied to the free ends of the two semiconductors there is a flow of DC current across the junction of the semiconductors causing a temperature difference. The side with the cooling plate absorbs heat which is then moved to the other side of the device where the heat sink is. Thermoelectric Coolers, also abbreviated to TECs are typically connected side by side and sandwiched between two ceramic plates. The cooling ability of the total unit is then proportional to the number of TECs in it.

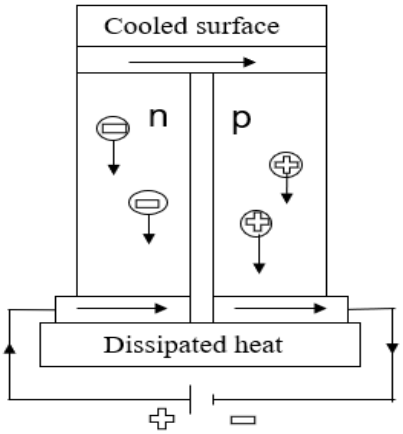

Fig. 6 : Peltier element schematic

Through the principle of Thermoelectric cooling (TEC) this research we'll be investigating through simulation, designing and experimenting on a prototype a system that will be used to; monitor the PV module's efficiency, temperature and effect of cooling down the PV modules using TEC. Thermoelectric devices mounted on the back of the PV modules will be controlled to assist in cooling down the PV module thereby reducing a decrease in the PV module's efficiency as a result of an increase in ambient temperature. A second (referent) panel is a panel without the modification which is used for comparison with modified panel, before and after the modification. That way, it can be directly shown that raise in electrical efficiency is a consequence of modification.

4) PHOTOVOLTIAC CELL MODULE

The PV cell model implemented in the calculations has a schematic as shown below. In this work, a thermoelectric module with a heat sink is considered to be attached to the back side of photovoltaic panel. The incoming irradiation from the top side crosses the glass and is absorbed by the PV cells. A percentage of the sunlight's energy is converted to electrical energy by the PV cells and the remainder is given back to the surroundings through convection and radiation.

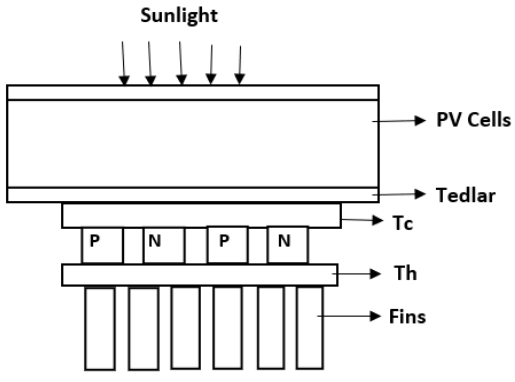

Fig. 6 : A schematic of hybrid PV cells combined with TEC modules

A TEC module is installed in the back of the model to reduce the cell temperature and increase the efficiency. As the TEC current increases, the cooling effect and also, the TEC's hot side temperature increase. In order to reach an adequate cooling for the TEC module, fins were installed as heat sinks in the back of the module to enhance the heat transfer to the ambient air.

The following equation can be represented to estimate the efficiency of PV cell with temperature variation

$$\eta=\eta_0[1-0.0045(Tcell-Tcell,ref)]$$

Where,

η_0 is the PV efficiency at reference conditions and $T_{(cell, ref)}$ is commonly assumed as 298 K. It is assumed that the power required to run the thermoelectric cooling module is provided by the photovoltaic panel itself. A TEC module can be defined by four characteristic parameters, namely, $Imax$, $Vmax$, $Qmax$ $\Delta Tmax$. The module parameters can be calculated by the following equations:

$$S_m = \frac{V_{max}}{T_a} \quad (1)$$

$$R_m = \frac{(T_a-\Delta T_{max})V_{max}}{T_a I_{max}} \quad (2)$$

$$K_m = \frac{(T_a-\Delta T_{max})V_{max}I_{max}}{2T_a\Delta T_{max}} \quad (3)$$

Where Sm, Rm and Km represent the TEC module's Seebeck coefficient, electrical resistance and thermal conductance respectively.

Q_c which is the total absorbed power at TEC's cold side can be calculated by:

$$Q_c = S_m I_c T_h - \frac{I^2 R_m}{2} - K_m \Delta T \quad (4)$$

Similarly, Q_h is the total amount of heat generated at the hot side:

$$Q_h = S_m I_c T_h + \frac{I^2 R_m}{2} - K_m \Delta T \quad (5)$$

ΔT represents the temperature difference between the hot and cold sides of the TEC module:

$$\Delta T = T_h - T_c \quad (6)$$

In order to calculate the temperature at the junction between the tedlar and the PV cells, the following equation is presented:

$$T_{tedlar} = T_c + Q_c R_{jc} \quad (7)$$

It is clear that the net power output of the combined system can be calculated by extracting the TEC power consumption from the PV cells power output:

Net output power = PV's generated power – TEC's power consumption

5) MODEL DEVELOPMENT

The model will be based on controlling the operation of the thermoelectric device to reduce the PV temperature when it tends to go beyond 30°C.

The model will also consist of two systems:

- A PV module only
- A PV module with a TEC and its associated control circuit.

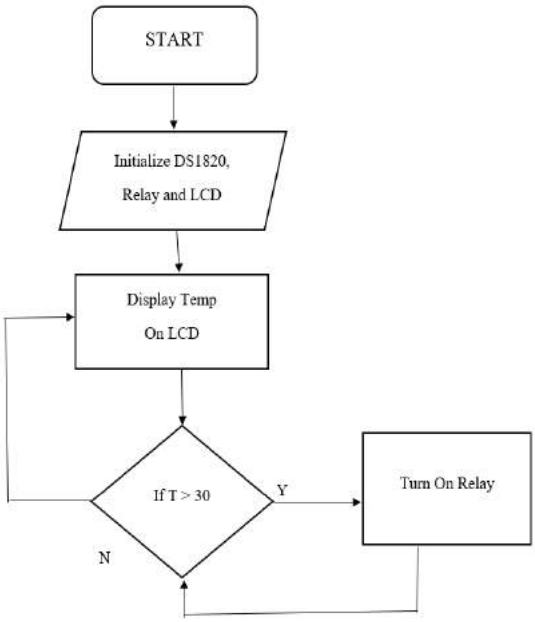

Fig. 7 : Flowchart of Maximizing PV module's power output through cooling by thermoelectric device

The differences between the net power outputs for each case were calculated in order to reach an accurate analysis. The TEC modelling and design parameter are

Parameter	Value	Unit
Vmax	15.4	Volts
Imax 6	Amps	
Area 494	mm	
Qmax	0.80	Watt

Next, the results will be presented and a comparison between cases with and without thermoelectric cooling will be conducted.

III. RESULTS AND DISCUSSION

It is observed that optimum thermoelectric cooling increases the efficiency and the effect of cooling is more realizable at higher irradiations. Furthermore, as the irradiation increases, the power generation is

also increasing while the efficiency of the PV cells is reduced due to excessive heating.

Table 1 : Selected power outputs at different ambient temperatures and irradiations

Temperature (Celsius)	Power Output with Cooling	Power Output without Cooling	Percentage Increase
26.85	2.75	2.66	3.26
36.85	2.55	2.46	3.24

Clearly, the performance of PV cells is gradually reduced as the cell temperature rises Furthermore, the ambient temperature affects the cell temperature greatly. The TEC consumes power from the PV cell in order to operate and cool the panel. However, this power consumption reduces the net power output. In order to optimize the net power output based on the efficiency increase and power consumption, in this research, the maximum net output power from the PV cell while under the effect of TEC has been calculated and its respective current was used for the rest of calculations.

IV. CONCLUSION

Research has proven that maintaining a photovoltaic panel's operating temperature at approximately 30°C can reduce a decrease in the efficiency of a photovoltaics' power output. At the time of writing this paper research for using TEC had been conducted through prototype and obtained data prove that a TEC can be a practicable active cooling alternative. It is only when a TEC is used that there isn't a need for a medium to extract heat from the photovoltaic panel. The prototype's research outcomes will be compared to that of a referent photovoltaic panel to conduct a cost analysis of the PV-TEC system.

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Design and Performance Analysis of Parabolic Dish Indoor Solar Cooker using Solar Thermal Simulator

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ABSTRACT

The present work in on indoor solar cooking application. The solar cooking can be classified as indoor and outdoor cooking. A parabolic dish indoor solar cooking system is proposed to design for cooking approximately 200 meals per day. The performance of the system is predicted using solar thermal simulator 2.0 and compared with theoretical analysis. The estimated energy requirement was found to be 42 kWh per day whereas in preliminary design analysis a 12 Sq.m dish collector is selected which would generates about 57.6 kWh of energy per day. The simulation predicts 61.1 kWh of energy output per day. Assuming 7 hours of system running with an operating pressure of 2 bar.

Keywords : Solar Energy, Indoor Solar Cooking, Simulator.

I. INTRODUCTION

The depletion of non-renewable energy resources and increasing energy consumption is a severe concern. In many developing countries cooking sector is considered as the vital energy consuming sector as majority of the population rely on the traditional methods of cooking such as coal and wood, which are unreliable, inefficient and a source of pollution [1-4]. To meet this growing demand, the alternative sustainable energy resources must be focussed. Solar energy is one such energy resource which constitutes the abundant renewable energy supply on the earth and in most of the locations, the available potential is much larger than its present consumption. Cooking is a daily household activity which consumes more than 40 % of the total energy consumption of the country [5-8]. The utilization of solar application not only satisfy the growing energy demand but also a preventive measure to global warming. Solar cooking application would be most suitable to institutional and community cooking such as college, schools, canteen, jails and hospitals where energy requirements is in bulk. The solar cooking may be classified as indoor and outdoor solar cooking. In this paper the design and performance analysis of parabolic dish indoor solar cooker is presented. System is designed for 200 meals per day. The system performance is simulated using solar thermal simulator 2.0 software developed by Indian institute of technology Bombay.

II. SYSTEM DESIGN

The system is designed based on the energy requirements for cooking 200 meals per day .The indoor solar cooking system consist of a parabolic dish collector which concentrates the solar radiation

on to a helical tube receiver which is located at focus of parabolic dish in which water is heated to a high temperature and stored in a insulated hot water accumulator and then to is supplied to cooking vessel when required. The parabola coordinates was obtained from parabola calculator which is an open source software shown in Figure 1. The initial specification was obtained by parabolic equation.

$$X^2 = 4fY \quad (1),$$

Where f is the focus, X & Y are the co-ordinates.

The aperture area estimation is given by

$$A_a = \frac{\pi {D_a}^2}{4} \quad (2)$$

Where A_a is aperture area, D_a is aperture diameter. The height of the parabolic dish, h, is defined as the maximum distance from the vertex to a line drawn across its aperture. In terms of focal length and aperture diameter, the height of the dish is given by

$$h = \frac{{D_a}^2}{16f} \quad (3)$$

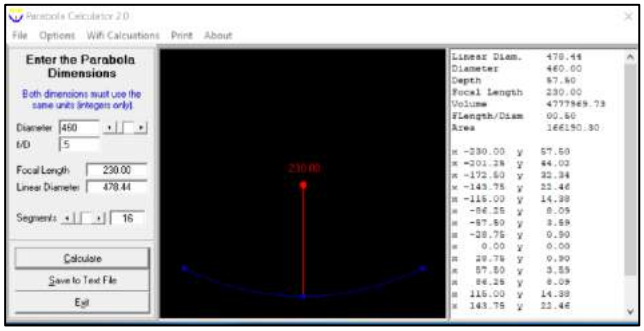

Figure.1 Parabola dimensions obtained using Parabola calculator 2.0.

According to the design calculation the solar cooking system consist of single dish collector which would be built in 10 segments.

III.PERFORMANCE ANALYSIS

The system performance is predicted using solar thermal simulator developed by Indian Institute of Technology Bombay (IITB). The solar thermal simulator solves energy and mass balance equations for user defined plant configurations [2].The simulation scheme is shown in Figure 2.

The heat gain by collector Q_{gain} and efficiency of collector $\eta_{collector}$ is given by

$$\eta_{collector} = A - B\left(\frac{T_m - T_a}{DNI.Cos\theta}\right) - C.\left(\frac{(T_m - T_a)^2}{DNI.Cos\theta}\right) \quad (4)$$

$$Q_{gain} = m_{in}(h_{out} - h_{in}) = \eta_{collector}\, DNI.Cos\theta.A_p \quad (5)$$

Where, DNI =Direct normal irradiance (W/m2), A = optical efficiency, B = first order loss co-efficient based on aperture area (W/m2-K), C = second order loss co-efficient based on aperture area (W/m2-K2), m = mass flow rate (kg/s), h = enthalpy (J/kg).The simulation is carried out by considering ASHRAE. The thermal performance prediction is carried out for Nagpur location 21°N79°E

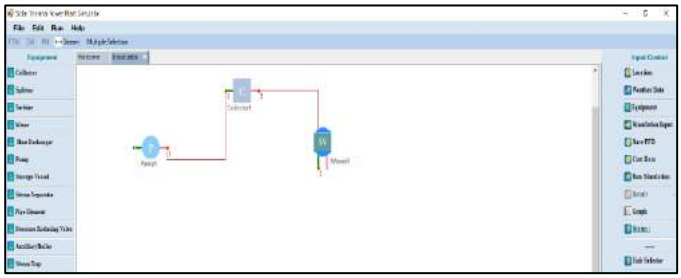

Figure 2: Simulation performance of the system.

The direct normal irradiance (DNI) for a day is shown in. Figure 3.

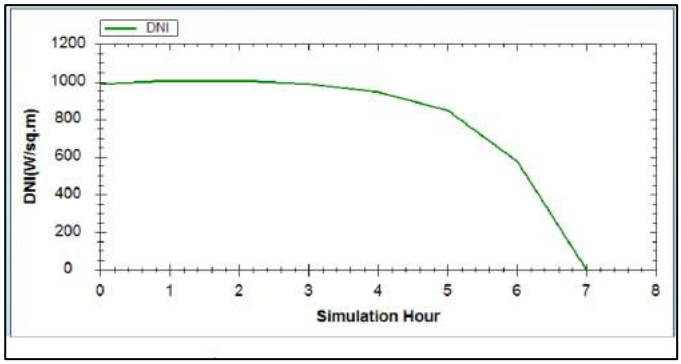

Figure 3: DNI at the location of the system

IV.RESULTS AND DISCUSSIONS

The simulation results and theoretical analysis is compared.

Theoretical analysis

Estimation of energy required for cooking 200 meals per day was found to be approximately 42 kWh. The energy generated by the collector is calculated using the mathematical relations, Assuming Direct normal irradiance (DNI) =700 W/m2. Sunshine hour=7 hours and collector efficiency =60%. The aperture area (A_a) of collector was found to be 11.77 m 2 in the preliminary design analysis.

Collector energy =DNI x Aa x sunshine hours

=700 x 12 x 7 =57673Wh=57.673 kWh.

The estimated required energy for cooking 200 meals per day was found to be 42 kWh whereas the available energy at the dish collector is 57.673 kWh per day.

V. Simulation Results

The indoor solar cooking system is proposed for 200 meals per day. The system performance is simulated for a year using solar thermal simulator which would be compared to experimental trials.Figure.4 shows outlet temperature for a day and Figure.5 shows the energy gained by dish collector for a respective day.

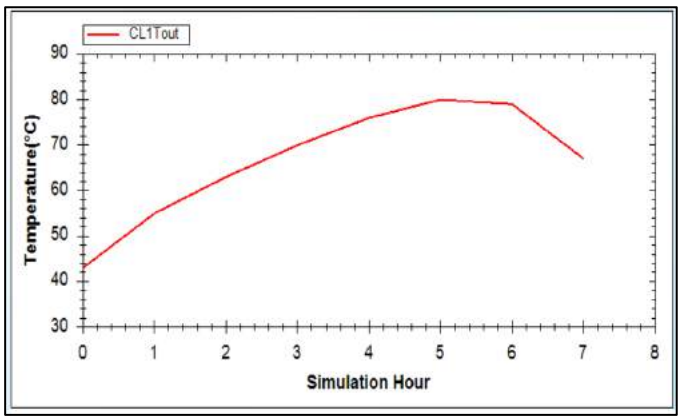

Figure 4: Simulation performance of the system.

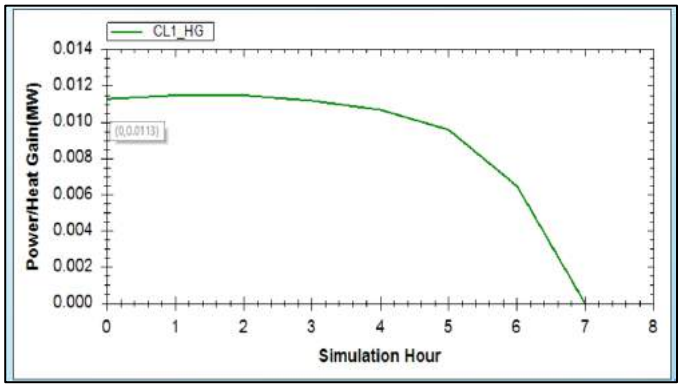

Figure 5: Simulation performance of the system.

VI.CONCLUSION

The indoor solar cooking system is proposed for institutional cooking to cook approximately 200 meals per day. The preliminary design analysis is based on the estimated energy requirement of 42 kWh per day. The 12 Sq.m dish collector theoretically would generate about 57.6 kWh of energy per day whereas 61.2 kWh per day of energy was obtained by simulation. Further it is planned to fabricate the system on the site of installation and compare the system performance with simulation for round the year.

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Induction Motor Modelling or De-coupling of Parameters Using MATLAB

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ABSTRACT

Any changes made in the stator or rotor parameters of the induction motor can result in changes in other parameters also due to its inherent coupling effect of construction. For example; both torque and flux are the function of voltage or current and frequency. Which means that increase in torque will result in decrease in the flux, i.e. change due to one parameter affecting the other is not preferable. This paper presents the decoupling of parameters which is also known as "MODELLING OF INDUCTION MOTOR". Parameters can be controlled separately using Induction Motor Modelling.

Keywords : Induction Motor De-Coupling, Q-Axis Current, D-Axis Current, Park's Transformation, Simulation.

I. INTRODUCTION

Since it is used in almost every industry. Hence, enhancing its working characteristic will prove to be very advantageous. Due to de-coupling effect the variables of the Induction Motor becomes independent which were earlier dependent due to coupling effect. By de-coupling of various parameters of Induction Motor like current or voltage, frequency, output torque, speed can be controlled. Therefore, by modelling of Induction motor (i.e. de-coupling of Induction Motor) helps to control the above parameters independently which will help in providing the desired results in the output.

II. Induction Motor Modelling

Parks Transformation Matrix is the method used to convert three-phase supply of Induction Motor into two-phase supply that is three-phases of Induction Motor (a, b, c) to two-phases (d & q). The supply current is in the stationary reference frame. Hence, after the conversion from three-phase to two-phase, the two axis currents is also in stationary reference frame. It is made into rotating reference frame by adding unit vectors to the equation [1], [2].

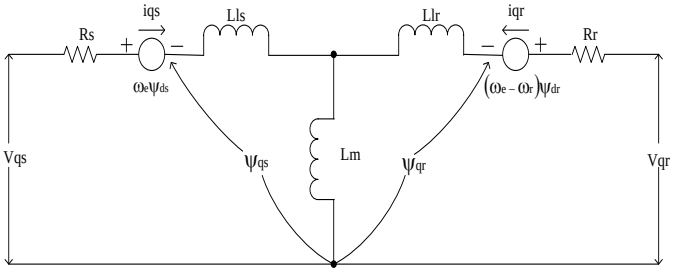

Fig. 1. Equivalent (q-axis) circuit of induction motor

$$\Psi qs = \frac{Fqs}{\omega b}$$

$$\Psi qr = \frac{Fqr}{\omega b}$$

$$\psi ds = \frac{Fds}{\omega b}$$

$$\psi dr = \frac{Fdr}{\omega b}$$

$$Lls = Ls - Lm$$

The flux linkages and mutual inductance of induction motor are represented above.

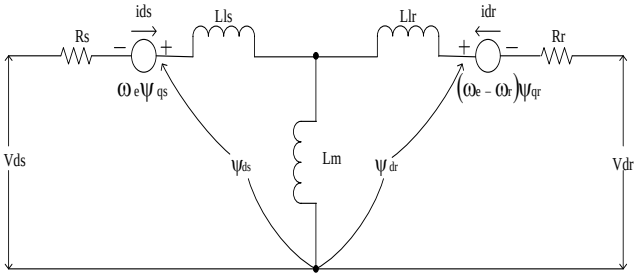

Fig. 2. Equivalent circuit (d-axis) of induction motor

Park's Transformation matrix in Simulink:-

$$\begin{bmatrix} V_{an} \\ V_{bn} \\ V_{cn} \end{bmatrix} = \begin{bmatrix} +\frac{2}{3} & -\frac{1}{3} & -\frac{1}{3} \\ -\frac{1}{3} & +\frac{2}{3} & -\frac{1}{3} \\ -\frac{1}{3} & -\frac{1}{3} & +\frac{2}{3} \end{bmatrix} \begin{bmatrix} V_{a0} \\ V_{b0} \\ V_{c0} \end{bmatrix}$$

The above matrix is in simplest form therefore implementation of the same cannot be done. To convert the d-q axis in synchronously rotating reference frame unit vectors is needed.

$$\begin{bmatrix} V^s qs \\ V^s ds \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & -\frac{1}{\sqrt{3}} & \frac{1}{\sqrt{3}} \end{bmatrix} \begin{bmatrix} V_{an} \\ V_{bn} \\ V_{cn} \end{bmatrix}$$

$$Vqs = V^s qs.\cos\theta_e - V^s ds.\sin\theta_e$$

$$Vds = V^s qs.\sin\theta_e + V^s ds.\cos\theta_e$$

To convert the two phases (d and q) in synchronously rotating reference frame the above matrix is used in MATLAB to get d and q axis voltage with the help of unit vectors, cosθ and sinθ [5].

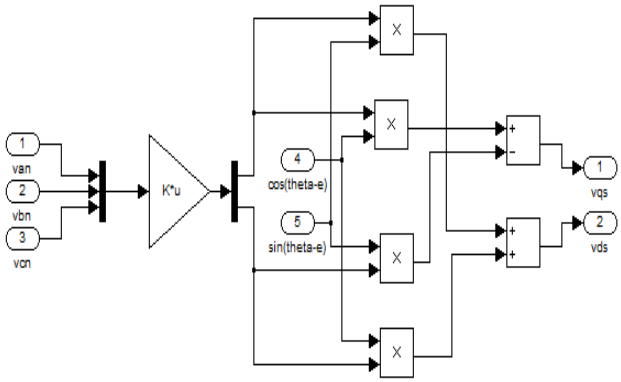

Fig. 3. Implementation of Park's Transformation in Simulink

Equations in the form of flux linkages:-

$$\frac{dFqs}{dt} = \omega b\left[Vqs - \frac{\omega e}{\omega b}Fds + \frac{Rs}{Xls}(Fmq + Fqs)\right]$$

$$\frac{dFds}{dt} = \omega b\left[Vds + \frac{\omega e}{\omega b}Fqs + \frac{Rs}{Xls}(Fmd + Fds)\right]$$

$$\frac{dFqr}{dt} = \omega b\left[Vqr - \frac{(\omega e - \omega r)}{\omega b}Fdr + \frac{Rr}{Xlr}(Fmq - Fqr)\right]$$

$$\frac{dFdr}{dt} = \omega b\left[Vdr + \frac{(\omega e - \omega r)}{\omega b}Fqr + \frac{Rr}{Xlr}(Fmd - Fdr)\right]$$

Mutual Flux linkages are calculated as given below:-

$$Fmq = Xml\left[\frac{Fqs}{Xls} + \frac{Fqr}{Xlr}\right]$$

$$Fmd = Xml\left[\frac{Fds}{Xls} + \frac{Fdr}{Xlr}\right]$$

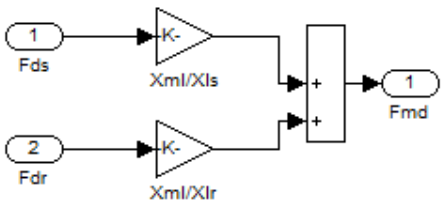

Fig. 4. Simulation implementation of mutual flux

Putting these equations we get

$$\frac{dFqs}{dt} = \omega b\left[Vqs - \frac{\omega e}{\omega b}Fds + \frac{Rs}{Xls}\left(\frac{Xml}{Xlr}Fqr + \left(\frac{Xml}{Xls} - 1\right)Fqs\right)\right]$$

$$\frac{dFds}{dt} = \omega b\left[Vds + \frac{\omega e}{\omega b}Fqs + \frac{Rs}{Xls}\left(\frac{Xml}{Xlr}Fdr + \left(\frac{Xml}{Xls} - 1\right)Fds\right)\right]$$

$$\frac{dFqr}{dt} = \omega b\left[-\frac{(\omega e - \omega r)}{\omega b}Fdr + \frac{Rr}{Xlr}\left(\frac{Xml}{Xls}Fqs + \left(\frac{Xml}{Xlr} - 1\right)Fqr\right)\right]$$

$$\frac{dFdr}{dt} = \omega b\left[\frac{(\omega e - \omega r)}{\omega b}Fqr + \frac{Rr}{Xlr}\left(\frac{Xml}{Xls}Fds + \left(\frac{Xml}{Xlr} - 1\right)Fdr\right)\right]$$

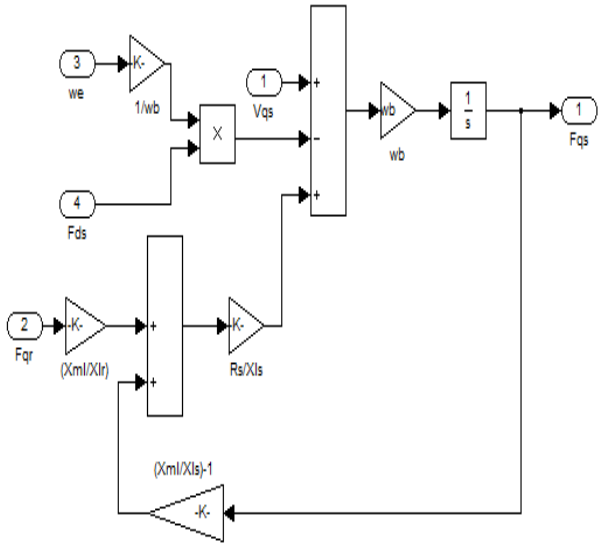

Fig. 5. Simulation implementation of flux equation

Similarly, remaining flux equations can be implemented.

Once, the flux linkages are known, d-axis and q-axis currents can be calculated as given below

$$iqs = \frac{1}{Xls}[Fqs - Fmq]$$

$$ids = \frac{1}{Xls}[Fds - Fmd]$$

$$iqr = \frac{1}{Xlr}[Fqr - Fmq]$$

$$idr = \frac{1}{Xlr}[Fdr - Fmd]$$

Where,

d - direct axis

q - quadrature axis
s - stator variable
r - rotor variable
F - flux linkages
Vqs, Vds - q and d-axis votages
Vqr, Vdr - q and d-axis voltages
Fmq and Fmd - q and d-axis magnetizing flux linkages
Xls – stator leakage reactance
Xlr – rotor leakage reactance

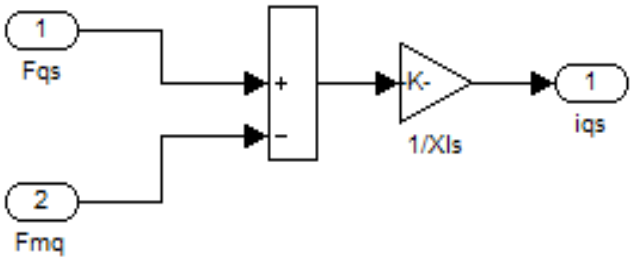

Fig. 6. Simulation implementation of q-axis current equation

Finally the torque can be computed as:-

$$Te = \frac{3}{2}\frac{P}{2}\left(\frac{1}{\omega b}Fds.iqs - Fqs.ids\right)$$

Where, Te is electromagnetic torque
Tl - load torque
ωe – stator angular electrical frequency
ωb – motor angular electrical base frequency
ωr – rotor angular electrical speed

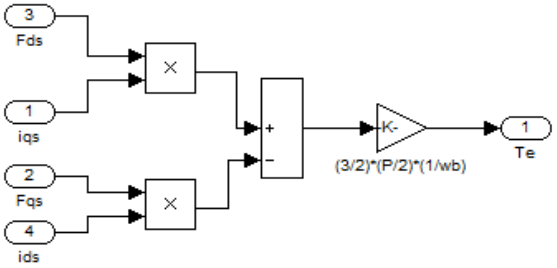

Fig. 7. Simulation implementation of torque equation

The speed calculation is calculated as given below:-

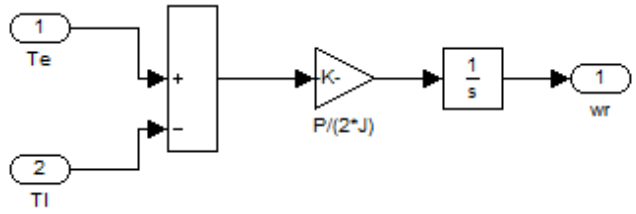

Fig. 8. Simulation implementation of speed equation

III. SIMULATION DIAGRAM

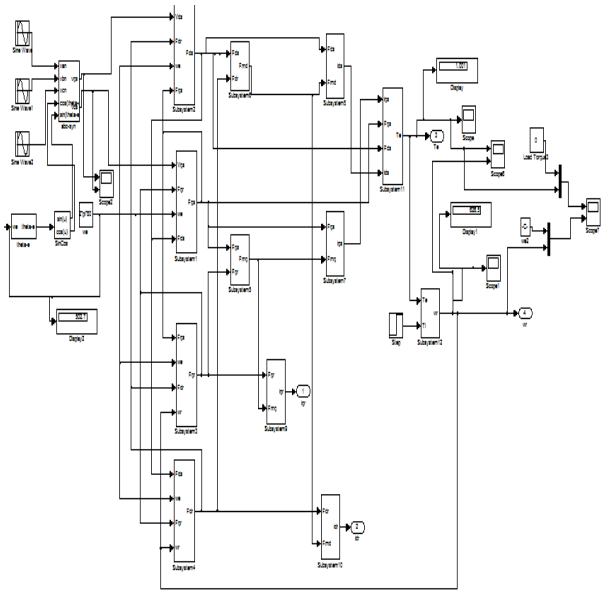

Fig. 9. Simulation diagram of induction motor Modelling

The three-phase supply i.e. va, vb and vc is converted into two-phase supply i.e. vqs and vds by Park's Transformation. Self- flux linkages are found depending upon these voltages which further helps in obtaining mutual flux linkages. These mutual flux linkages help in calculating the two-phase currents, iqs and ids. These two currents provide final torque Te i.e. electromagnetic torque.

Here the current 'ids' is aligned in the direction of flux and the current 'iqs' is aligned in the direction of torque. Because of sluggish response of flux, it is kept constant. Hence, current iqs is controlled to control the output torque (Te). This is the key benefit of Induction Motor Modelling which gives de-coupling effect of parameters and also these parameters can be independently controlled.

IV. SIMULATION RESULTS

The electromagnetic torque and the load torque are shown in the figure below. The load torque is given as step input which acts as a variable load torque.

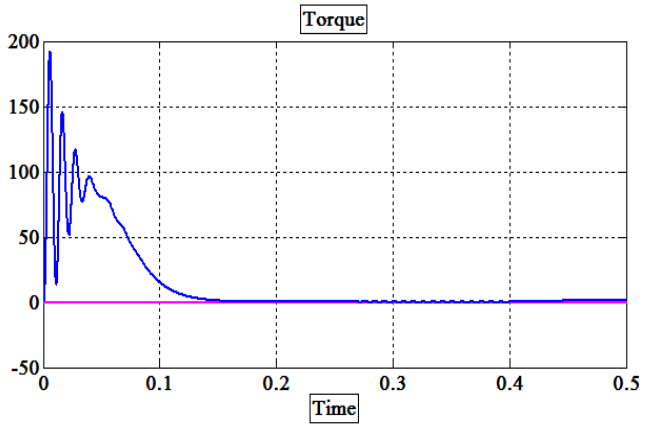

Fig. 10. Simulation results of electromagnetic torque matching the load torque

Here, after the initial transients the electromagnetic torque is matching the load torque. Therefore, Induction Motor Modelling facilitates independent control over the parameters to get the desired outputs. Also, for better and independent control of parameters, any additional control technique can be applied to the input side of induction motor after the Induction Motor Modelling is done [9], [10]

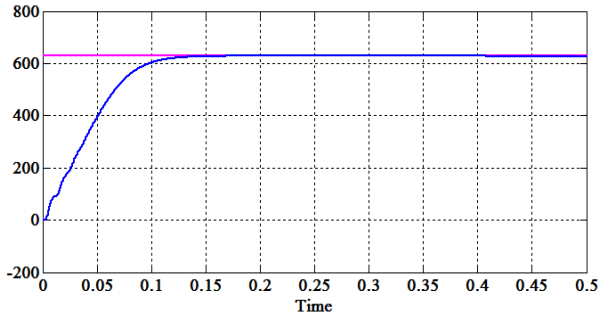

Fig. 11. Simulation result of speed of induction motor

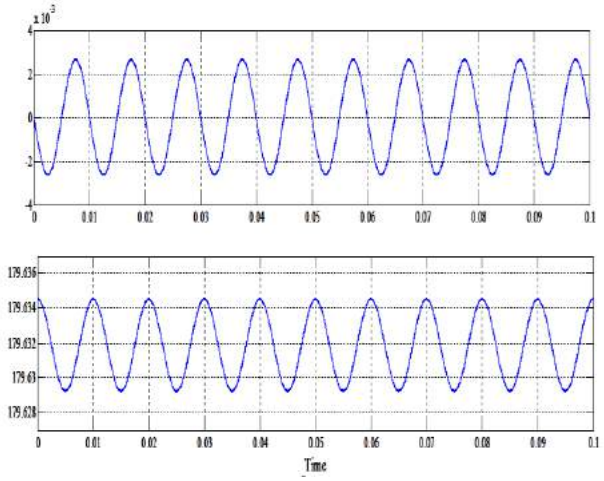

Fig. 12. Simulation results of Park's Transformation matrix, i.e. d-q axis currents which are 90° apart

V. CONCLUSION

Induction Motor Modelling has the benefit of de-coupling the parameters which in turn gives us the advantage of independent control over the parameters. Also, considering Induction Motor Modelling as the base technique, any advance control technique can be applied to Induction Motor Modelling to reinforce the performance of induction motor.

In this modelling, we find d-axis and q-axis currents (i.e. direct-axis and quadrature-axis currents), which are 90° apart from each other. Current 'id' lies in the direction of flux and current 'iq' lies in the direction of torque. Therefore the variables or parameters are easily available for control which was not possible without this technique. Hence, inter-dependent variables become independent parameters because of which change of one parameter does not affect the other parameters.

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Cash Back by Plastic Based Recycling Machine

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ABSTRACT

Aiming at the problem of on-site plastic bottles recycling & reuse of waste, the system is supposed to be developed on the basis of "ATMEGA328P",as a main controller,"ATMEGA328P",not only control the mechanical system of the collection to recover & collect plastics bottles but also communicates with rewards / cash back system through wireless / GSM Sim800 network.

The experimental proto type tests result shows post used bottles of plastic & other plastic of any thickness to be collected in the setup , which are also convenient to the consumer for getting the reward code / cash back by entering the users "Mobile No" , further this code will be transfer to the users mobile no with the help of SMS.

The collection of plastic bottles is mainly leads to reduce the pollution which is occurring due to the plastic material as it is the " non degradable ", material harmful to soil fertility & also water drains & choke the pipe lines , choking is one of the major issue which is caused by drainage of plastic.

In this way the model " cash back by plastic waste " is beneficial to the society .Overall attracting towards the interesting rewards / promo codes the people will encouraged by this that not be waste his / her waste , & generate proper benefit by this waste .

This collected scrap plastic will be further transfer for the recycling process , by which new products of plastics may be manufactured by the tie up company .In this way the plastic recycling chain will be going on continue without harming to the Environmental health.

Keywords : ATmega328p ,GSM module , maicrocontroller , sensor.

I. INTRODUCTION

This project is about to collect all the harmful one time use plastic which was supposed to be dump at dumping yard by the people, instead of that our project is giving reward to the user who will drop the plastic bottle and other thickness of plastic in the machine. Overall our aim is to collect all the plastic by this way to attract people to use this machine, which will lead to reduce plastic dumping waste and to reduce chemical explosion and further authority will recycling it and new life for plastic will be there.

Plastic recycling process machine is already present in market, so our main focus on the things that how we attract the attention of maximum people toward the machine so that maximum people use this machine to make our country free from pollution caused from plastic which is the maximum problem of today's life. People have environmental conscious will throw waste plastic bottles into trash, otherwise throw away, thus caused environmental pollution. Therefore, in order to reduce plastic bottles environmental pollution, encourage peoples to make good use of renewable resource, and for the benefit of society.

Therefore, in order to reduce environmental pollution, renewable resources usage, and development of dedicated intelligent recovery is necessary. This project uses ATmega16 embedded controllers, sensors and other electrical components to control the collector mechanical system for collecting the plastic bottles; certain incentives were given to peoples as a reward also submitted via wireless network. Recycling box developed reduces the environmental pollution caused by plastic bottles, encourages people to recycle plastic bottles, this will play an active role for construction of conservation oriented society.

II. ESE of use

Block Diagram

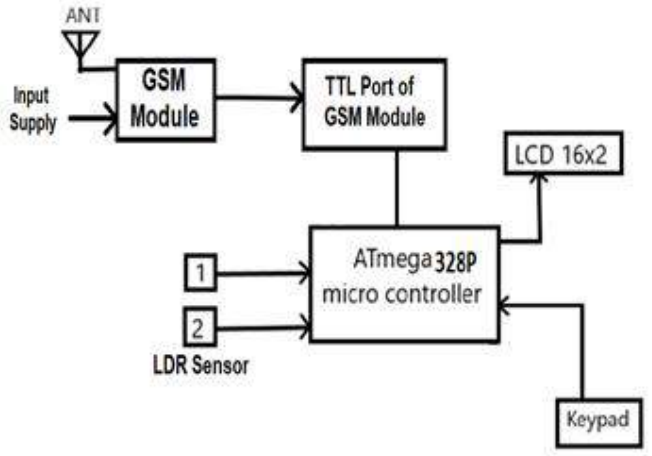

Fig. 1

The above figure Shows the block diagram of Cash Back By Plastic Based Recycling Machine which shows the basic function of our project. There are six blocks which are connected with IC ATmega328p and there working are as follow. The main block which is ATmega328p micro controller from which all the sections are connected. For sensing the plastic bottles and polythene LDR sensor 1 and 2 are use respectively. LCD 16*2 is use to show the mobile number and all instructions for user. Keypad is used to enter the mobile number of user. GSM module is use to connect mobile phone of user with our machine. IC 7805 which is regulator IC use to regulate the supply to our main IC which is ATmega328p micro controller.

2.1: Methodology:

Main function of this machine is when customer insert the scrap bottle in the machine, it sense the bottle and then after that bottle are stored in the colleting container.

After the successful insertion of bottle it is the responsibility of customer to put their contact information from keypad into machine. After this process with the help of GSM Module it sent the reward code on customer mobile number as discount offers. This reward code can be used by customers in any travel agencies and get discount. To reduce the "waste of plastic" back down to its usable size. Our main objective is to collect all the one time use plastic waste. Reduce pollution contamination of soil occurring due to harmful plastic waste.Due to rewards frailties in the form of discount many people should attracted towards this machine to use it.

III. Architectural Model

The explanation of architecture module is as follows :

- In this system we are using microcontroller ATmega328p By using supply input is given to the microcontroller. Here we are using two sensor one is IR infra red and second one is LDR light dependent resistor.
- The working range of LDR sensor is up to 0.7 to 0.9. Generally the frequency is normal to the range.

- By using IC 7085 which is a voltage regulator IC maintains the o/p vtg at constant value and will provide 5 volt regulated power supply .
- The output is in the form of 5Volt DC is given to main IC which is having total 28pins.
- GSM module and LCD is used in the architecture for user input and to display the entered bottle.

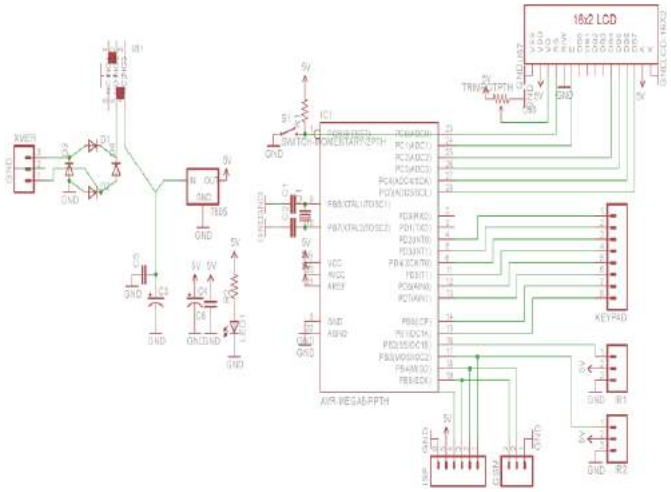

Fig.2 circuit daigram

IV. CONCLUSION

Plastic bottle recycling box is a creative design production based on microcontroller system. Application of embedding technology to waste treatment, not only broaden the technology's application field, but also enhanced the technical level of waste treatment, more over meet people's curiosity for new things, thus achieved the purpose of waste recycling. The experimental result shows the good effect of collector recycling and plastic treatment. Moreover, the recycling box improves the user's participation, autonomy and interesting through onboard reward interactive interface, significantly reduces labor cost through the integration of network information auto management. Recycling box with incentive mechanism, enhanced the refuse classification thinking, reinforced environmental protect awareness, provide a new idea for recycling waste and design corresponding innovation product. So we conclude that this machine will be use to reduce the bulk of plastic from the environment.

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Recycle Nation

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ABSTRACT

In today's world waste management is a major issue to handle, many applications are trying to resolve this by using different techniques. The proposed application will work as an intermediate platform between the users and waste management organizations. The users can be an individual, industry, organisations, college, schools, etc. This application is introduced in order to help people to manage the waste in best possible ways and find out the scope for improvement in the management of waste for the welfare of the society. It helps people to dispose of the waste, recycle the damaged products and get the replacements, sell and donate the waste such as e-waste or plastic wastes, transform the useless things in the useful ones.

Keywords : E-Waste, Recycle, Waste Disposal, Waste Management

I. INTRODUCTION

India produces vast amount of waste as compared to other countries. This is because increasing population rate day by day. The increase in population results in increase of needs which further results in more development. According to the Solid Waste Management Analysis of India [1], the fast urbanisation in all over the country has led to an immense production of waste and garbage. India generates 62 million tonnes of waste every year, of which less than 60% of waste is collected and around 15% is processed. But this estimation doesn't include every remote area.

By scientific analysis [2], there's no waste as such in the world. Almost all the components of solid waste have some potential if it is converted or treated in a scientific manner. Hence it can be defined that solid waste as "organic or inorganic waste materials produced out of household or commercial activities, that have lost the value."

The disposal of bio waste [3] and domestic waste have also been a chaos in regions with no garbage dumping yards and collection process. India is one of the countries producing large amount of waste because of the residents too. The empty plots are full of domestic waste because there are no dumping wells in the region. The rivers, lakes and sea shores are unclean with lots of plastic or other discarded wastes floating in the surface.

Due to urbanisation [4], there are great amount of industries in India today. These industrial waste and E-wastes [5] with no proper disposal has led to very hazardous chemical production which in indirect way is too much harmful for people to live today.

By keeping all these issues in mind, an application is proposed to make surrounding clean in only few clicks. The application will help to reduce every kinds of wastes whether bio wastes, domestic waste, plastic waste, electronic wastes as well as industrial wastes.

This application will be helpful in following ways:

- Work as an intermediate between users and waste management organizations.
- To dispose and dump the domestic wastes with a proper procedure.
- To recycle the plastic or e-wastes such as the unused or broken products and appliances.
- To create the best things out of wastes which are too good to dispose off or can be used for various other purposes.

II. LITERATURE REVIEW

In today's world having clean environment is one of the basic needs that every human being would like to have. There are apps available on e-waste and other waste management.

Considering the applications, the following are based on waste management:

- ECS e-Waste: Focuses only on e-waste
  ECS e-waste mobile App is a platform providing convenience for e-waste disposal and was introduced in 2017. It is for citizens, Institutions, Organizations, Departments, etc. conveniently getting Quotes for the material, finding e-waste collection points, Finding Drop-off bins and Requesting e-waste pickup.
- Erase e-Waste: Focuses on recycling
  Erase e-waste app brings recycling to user's doorstep and was introduced in 2017. Payment is entertained at pickup or donated to charity chosen. It uses user location to track their place, and picks up e-waste.

  These app either focuses on one or the other things. So, the people have to install a number of apps for waste management and it is the major disadvantage.

III. PROPOSED SYSTEM

The proposed application will be an intermediate between the users and the organizations without the interference of multiple people in between.

The proposed application provides the following features which makes the app beneficial as compared to others. The organizations linked can send the vendors to collect the waste at home, institutions, industries, etc. according to a deal. This application makes it easy to sell the e-waste products easily without wandering to different number of shops to check for reasonable rate.

This application includes the following five modules:

Module 1: Login

The login will be needed for users and organizations as well. The login will be possible through their google accounts or mobile number.

Module 2: Organization feed

This module will include the field where the organization's details are entered regarding its locations, contact details, types of wastes it accepts, waste it recycles, etc.

Module 3: Interaction portal

This module will provide a user to actually deal with the waste interacting with the organizations and fill the details whichever required to manage their waste as per requirement. The user may trade the waste to dispose, recycle, sell, donate, etc.

Module 4: Events and News

This module will notify the events organized by linked organizations such as fun events, motivational events and Survey or Cleanliness as Swachhata Abhiyan. This section will also include the feeds and news related to the organizations.

Module 5: Categories of wastes and Information

This module will provide the information regarding categories of wastes. It also includes the government guidelines and measures taken to manage the waste.

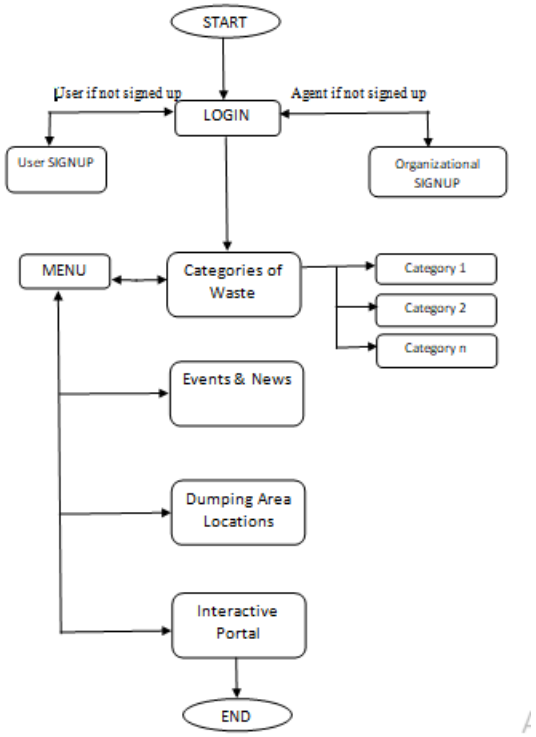

Fig. Flowchart of Recycle Nation

IV. CONCLUSION

As the conclusion to this research, the researchers realize that it is indeed to the community and to the people who lives in that particular area if they'll have a clean place and proper waste disposal; it will make a difference if you are living in a clean place which has a good sanitation. It will also benefit the people to avoid different type of diseases if the place is clean as there is a saying that "Health is wealth".

Therefore, this application will provide easy communication with the customer and the organisation. It will also help the customer to get details about the events held by the organisation and also provide information about the waste.

V. ACKNOWLEDGEMENT

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Solar Charge Controller with variable output

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ABSTRACT

A charge controller of a charge regulator limits the rate at which electric current is added to it drawn from electric batteries. It prevents overcharging the battery and protect against over voltage, which can reduce battery performance of lifespan and pose a safety risk. It may also prevent completely drainage ("deep discharging ") a battery, or perform controlled discharges, depending on the battery technology, to protect battery life. The terms "charge controller "or "charge regulator" May refer to either a stand-alone device, or to control circuitry integrated within a battery pack, battery powered device, or battery charger. When the electricity is needed during night or periods with little sunlight, the energy is taken back from the grid. In isolated systems, the excess electricity is usually stored in batteries during the day and batteries are used to power the appliances in times when panels do not produce enough energy.

Keywords : Controller, Solar Panel, Battery, Voltage Regulation Unit.

I. INTRODUCTION

Solar energy is a promising system of energy for the near future. An efficient smart design of solar charge controller is an economically workable and technically endurable system. The specifications of a solar charge controller are determined by the type of load and storage device (battery) used in the system. According to IDCOL (Infrastructure Development Company Limited) SHS (Solar Home System) program standards for Solar charge controller, LVD stands for low voltage disconnect. Whenever the battery voltage drops below 11.6 V, it is recommended that the solar charge controller must disconnect the load to prevent deep discharge and ensure depth of discharge (DOD) to maintain at 70%. Why do we need solar charge controller? Most of the people do not know about the importance of solar charge controller hence either they install a local solar charge controller or they directly connect solar panel to the battery. If you connect 12V DC load and 12V battery to a 12 V solar panel, you might think what's the point of solar charge controller? A 12V solar panel can have a maximum voltage of 17.5V or more. If you charge your batteries with high voltage of solar panel, then your battery will start to overcharge. Due to constant overcharging, the internal temperature of the battery will increase. Due to this the water which is present in the battery starts to dry up and after sometime, the batteries are completely damaged. Not just this, the 12V DC load like DC fan, LED bulb or DC TV that are connected to the solar panel, due to high or low voltage, can get damaged easily. Again, we consider the damage due to connecting solar panels directly to the battery. Remember voltage always flows from higher potential to the lower potential. Therefore, in this condition the voltage from the batteries flows in the reverse direction to the solar panel. Due to this the charged battery starts to discharge solar charge

controller stops this reverse flow in one direction. This means that the voltage should flow from solar panels to the battery. Solar charge controller protects the battery and DC load from these problems. A solar charge the battery with a constant voltage and constant current. Due to this battery life increases. Along with this, DC load also runs safely.

Solar panel: Solar panels are fast becoming a very appealing Solar Power option, which could end up being magnificently favorable to the environment. The process of coverting sunlight to electrical energy is one that has improved unimpressively over the last few decades, and is now better systematic than ever. The silicon and the conductors in the panel convert the sunlight into direct current (DC) electricity which then flow into the inverter. Surplus electricity that is not used by you can be sustained back to the grid. When the consumers Solar panels fabricate less power than what is required by the consumer at home, they can always buy electricity from utility.

Types of Solar Panels:

The different types of solar panel are as follows:

1. Crystalline Silicon
a) Mono crystalline solar panel
b) Poly crystalline solar panel
2. String Ribbon Solar Cells
3. Thin Film Solar Panel
4. Building Integrated Photo voltaic

Types	Efficiency	Life time (in yrs)
1. Crystalline		
a) Mono crystalline	19-22%	30-35
b) Polycrystalline	14-16%	25-30
2. String Ribbon Solar Cells	7-8 %	-
3.Thin Film Solar Panel	10- 12 %	_
4.Building Integrated Photo voltaic	14- 16%	_

Mostly we use the mono crystalline Solar Panel because; it has high efficiency i.e. 19-22% to consume the Energy. The Mono crystalline solar panel is made up of from pure silicon i.e. it is 90-99% of pure. Therefore its life time is also more than others solar panels. The life time of mono crystalline solar panel is 30-35 years. It is also used in winter season because, it has high efficiency. The range of solar panel is depending on the amount of energy we use for purification unit.

Example: For finding the rating of solar panel we use the simple formula,

Suppose the rating of battery is 150AH

Then,

150*2 = 300W

Then, we use the rating of 300W for solar panel.

To charge the battery of 150AH out of 15%

Then,

15÷100*150AH = 22.5A

15% electric current is sufficient to charge the battery. Therefore, the 300W of solar panel is sufficient to charge the battery of 150AH.

Load: As we are working on the topic with variable output, it means that the output should be variable. For calculation point of view, we are assuming a room where two light bulbs, one fan and a TV are present. Suppose we want to run following electrical equipment:

- CFL - 15W - 2nos for 8 hrs
- Fan - 40W - 1nos for 10 hrs
- TV - 100W - 1nos for 2 hrs

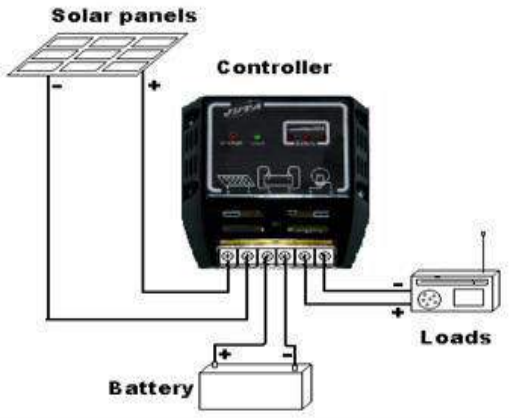
Electrical load will be,
CFL = 2*15*8 = 240Watthour
Fan = 1*40*10 = 400Watthour
TV = 1*100*2 = 200Watthour
Total load = 240+400+200 = 840Watthour

Effective solar energy available for 6hrs in a day solar panel wattage required load,
= 840/60 = 140Watt
Consider, solar panel efficiency as 90%
Solar panel wattage required,
= 140*100/90 = 155.55W
Inverter and wire losses (90% efficiency), = 155.55*100/90 = 172.83W
Here we can use two solar panels of 100W, 12V or one solar panel of 200W, 12V
Maximum load of all equipment = 30+40+100 = 170W
Inverter selection = 200W, 12V or 500W, 12V

Now come to battery,
Total watt-hour storage required = 840Watthour
Battery capacity = 840/12 = 70AH
Battery can discharge up-to 80% level
Hence Battery Capacity = 70*100/80 = 87.5AH

DC to AC loss (inverter and wire loss) 90% = 87.5*100/90 = 97.22AH
Standard battery available above this capacity will be 100AH

Block diagram:



II. PROPOSED SYSTEM

The proposed system is implemented by developing two systems which operate independently of each other.

1) Charge Controller System
2) Analog System
   a) Sensing unit
   b) Signal Conditioning unit
   c) Voltage Regulation unit

1) Charge controller unit

If the battery voltage exceeds the reference limit, the voltage control mode is employed to prevent overcharging of the battery. The operating point of the panel is changed accordingly to obtain a constant output voltage at the battery terminals. The rate at which the battery continues to absorb charge of the current through the battery gradually slows down because the voltage is maintained constant. A voltage band is used to prevent shuttling between the two modes. Charge controllers also monitor battery temperature to prevent overheating. Some charge controller systems also display data; transmit data to remote displays, and data logging to track electric flow over time.

2) Analog System:

All the physical quantities to be sensed are analog in nature. The proposed system requires an accurate sensing and signal conditioning system to realize the physical quantities and to achieve proper control of the entire system. In order to build an independent system, the power supplies for the system components have been derived from panels of the battery thus requiring a voltage regulation unit.

a) Sensing unit

The sensing unit is used to convert the physically available voltage and current variables to appropriate signals which can be processed. The panel and battery voltages are sensed using operational amplifier circuits. The presence of power in utility mains is monitored using power sensing circuit.

b) Signal Conditioning Unit

The current output from the battery has extraneous frequency components due to introduction of power electronic devices, thus requiring a filter circuit to obtain a smooth signal which can be process easily.

c) Voltage Regulation unit

Since the system does not require an external power supply which is an inherent advantage of the system, linear and switching voltage regulators are used.

III. OBSERVATIONS RESULT

- After proper connection of the solar panel and battery leads to their respective terminals on the solar charge controller, the power and undercharging LED's turn ON to indicate battery charging.
- After 12 hours and 20 min of charge the optimum charge LED turns ON indicating full charge and undercharge LED turn OFF indicating that no more current is getting to battery. Generally, the circuit performed satisfactorily.

IV. CONCLUSION

This work has produced a low cost, reliable and functional solar charge controller, using locally sourced and available components. The product worked satisfactorily and can be used in a solar home system to solve problems of power supply in India as well as other countries.

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E-Copy : Automated Printing System

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ABSTRACT

"E-Copy: Automated Printing System" is a mobile application which can be used on any device having a web browser and access to the internet. The web-application focuses on developing a platform which can be accessed easily without any technical computer knowledge. As we all know every college students need a printout. In our college whenever a printout is required, students has to wait for the print to get out of the crowd for too long. And sometimes even after standing in a crowd, work does not work. And sometimes students have a lot of time waste to take out printouts. So "E-COPY" provides a platform to overcome these activities. In this project we are developing mobile application for printout the any file or documents and Xerox.

Keywords : Automated Printing, E-Printing, E-copy, Online Printing, Xerox.

I. INTRODUCTION

In this project, we create a mobile application for printing that can be very time efficient for students. Initially, our project will allow the any user to registered and use this useful application. We have provided our solution to thousands of educational institutions. Admin need to login with their valid login credentials first in order to access the web application. Admin can view or delete a registered user. System allows admin to view printing job list and approve or disapprove printing job. User can login into the system and perform task such as upload document for printing, and send printing request, view printing jobs, printing status. A person at release station prints the desired requested document. Application handles load balancing on every printer on the network. Then the admin will print it and tell the user that your print is ready and then the user go and take his print.

Goals and Objective

- To provide a mobile application for printing the documents by the stationary.
- To reduce clerical work, as most of the things will accomplished automatically with the help of application software.
- To minimize time for processing of various tasks during printing.

II. LITERATURE SURVEY

SmartPrint can manages all the printers in an office building, and it provides friendly service for the users who know nothing about the printers. SmartPrint can also automatically choose printers for the office staffs. We propose and implement two printer allocation methods, one aims to improve the experience of the user with short print job, and the other is a multiple attributes decision algorithm which considers all

factors including spatial information that impact the user experiences. Through experiments we validate the methods, and prove that SmartPrint achieves high user satisfaction from collected real data [1].

The data related to automation was collected with the help of survey conducted in 15 printing organizations situated at Delhi NCR and Baddi (Himachal Pradesh) region. The data was collected with help of questionnaire consisting of 9 Questions. Results indicated that in prepress the DI (Direct Imaging) presses can be the future. Drip-off, spot UV(Ultra Violet) effects job, UV double cotter machines, PDCS(Palomar distant cluster survey) automatic density measuring system, latest rotary machines, ACME folders and gluers and photopolymer plate for online spot UV are another few automation techniques which can play a big role in sheet-fed offset printing industry market[2].

The prototyping desktop printer can be manipulated with ease to print out various patterns on the selected papers as desired under control of the computer software. Particularly, paper with advantages of flexibility, low-cost and recyclability was investigated as a highly suitable substrate material for printing electronics. This may lead to the concept of Printed-Circuits-on-Paper PCP).The present work paved the way for a low cost and easygoing method in directly printing paper electronics. There currently lacks of a way to directly write out electronics, just like printing pictures on paper by an office printer [3].

This paper describes a method to distinguish documents produced by laser printers, inkjet printers, and electrostatic copiers, three commonly used document creation devices. The proposed approach can distinguish between documents produced by these sources based on features extracted from the characters in the documents. Hence, it can also be used to detect tampered documents produced by a mixture of these sources. We analyze the characteristics associated with laser/inkjet printers and electrostatic copiers and determine the signatures created by the different physical and technical processes involved in each type of printing. Based on the analysis of these signatures, we computed the features of noise energy, contour roughness, and average gradient. To the best of our knowledge, this is the first work to distinguish documents produced by laser printer, inkjet printer, and copier based on features extracted from individual characters in the documents. Experimental results show that this method has an average accuracy of 90% and works with JPEG compression [4].

III. PROPOSED WORK

The “E-Copy: Automated Printing System” Will briefly describe the daily task in Xerox center it may be credit and Debit. It also helps to Manages all the credit-related activities in day to day life. This system will provide a simple, secure, automatic solution to that the stationary owner. With the help of this system stationary owners can run their own business in a good manner and security free.

In this E-Copy automated printing System. It has a login section first. This login section user and admin are used. The new user needs to register first then can use the system. Every admin will get a unique id and password. The admin can register with the help of unique id and password then it will go to their respective profiles, where have the various tabs to their responsibilities. Each and every section can verify by the admin even the user registration also. There are two modules they are Admin, User.

The intent of our project is that the as of now, no automated system is present for stationary for the

college. This is the first of its kind. Our project will be a simple android application that will be user friendly in terms of usage for the students. We are planning to achieve this by developing a printing cost that will completely online paying by the user.

A. Login and Registration Module

This module allows admin, and user to sign in by using a mobile number and password. Admin of the system is already registered; hence admin does not need to register. Also, user are not allowed to register on their own. With the help of the registration module, we can enter the system and see the different responsibilities.

B. Data entering and Document Upload

This module allows admin and user upload document, pdf file etc.

C.Payment Gateway module

This module allows admin to accept online payment and print of purchased customer.

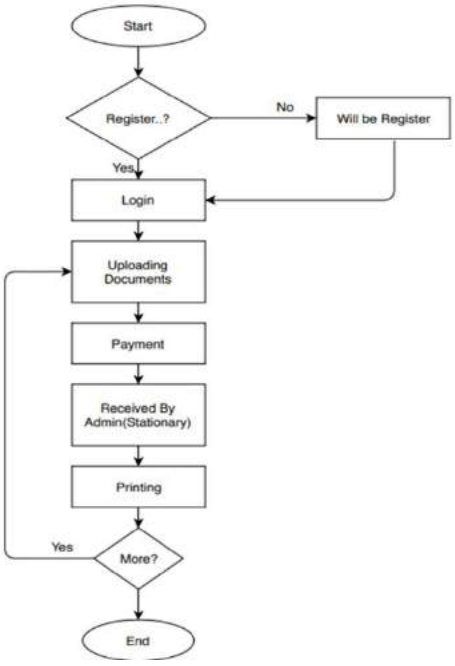

Fig. (a) Flowchart

III. CONCLUSION

The E-copy System helps in building an application for printing the documents via submitting online. It also focuses on time saving and reduce clerical work. It also has the facility to do the payments via online payment options.

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Improvement of Power Quality in Distribution System Using DPFC (Distributed Power Flow Controller)

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ABSTRACT

A new component within the flexible ac-transmission system (FACTS) family, called distributed power-flow controller (DPFC). The DPFC is derived from the unified power-flow controller (UPFC). The DPFC can be considered as a UPFC with an eliminated common dc link. The active power exchange between the shunt and series converters, which is through the common dc link in the UPFC, is now through the transmission lines at the third-harmonic frequency. The DPFC employs the distributed FACTS (D-FACTS) concept, which is to use multiple small-size single-phase converters instead of the one large-size three-phase series converter in the UPFC. The large number of series converters provides redundancy, thereby increasing the system reliability. As the D-FACTS converters are single-phase and floating with respect to the ground, there is no high-voltage isolation required between the phases. Accordingly, the cost of the DPFC system is lower than the UPFC. The DPFC has the same control capability as the UPFC, which comprises the adjustment of the line impedance, the transmission angle, and the bus voltage. The principle and analysis of the DPFC are presented in this paper and the corresponding experimental results that are carried out on a scaled prototype are also shown.

Keywords : DPFC, Sag, Swell, Harmonics, Convertors

I. INTRODUCTION

In modern power systems, there is a great demand to control the power flow actively .Power flow controlling devices (PFCDs) are required for such purpose, because the power flow over the lines is the nature result of the impedance of each line. Due to the control capabilities of different types of PFCDs, the trend is that mechanical PFCDs are gradually being replaced by Power Electronics (PE) PFCDs. Among all PE PFCDs, the Unified Power Flow Controller (UPFC) is the most versatile device. However, the UPFC is not widely applied in utility grids, because the cost of such device is much higher than the rest of PFCDs and the reliability is relatively low due to its complexity. The objective of this thesis is to develop a new PFCD that offers the same control capability as the UPFC, at a reduced cost and with an increased reliability. The new device, so-called Distributed Power Flow Controller (DPFC), is invented and presented in this thesis. The DPFC is a further development of the UPFC.

The DPFC eliminates the common DC link within the UPFC, to enable the independent operation of the shunt and the series converter. The D-FACTS concept is employed in the design of the series converter. Multiple low-rating single-phase converters replace the high-rating three-phase series converter, which greatly reduces the cost and

increases the reliability. The active power that used to exchange through the common DC link in the UPFC, is now transferred through the transmission line at the 3rd harmonic frequency. The DPFC has been modeled in a rotating dq-frame. Based on this model, the basic control of the DPFC is developed. The basic control stabilizes the level of the capacitor DC voltage of each converter and ensures that the converters inject the voltages into the network according to the command from the central control. The shunt converter injects a constant current at the 3rd harmonic frequency, while its DC voltage is stabilized by the fundamental frequency component. For the series converter, the reference of the output voltage at the fundamental frequency is obtained from the central controller and the DC voltage level is maintained by the 3rd harmonic component.

II. UNIFIED POWER FLOW CONTROLLER (UPFC)

A Unified Power Flow Controller (or UPFC) is an electrical device for providing fast-acting reactive power compensation on high-voltage electricity transmission networks. It uses a pair of three-phase controllable bridges to produce current that is injected into a transmission line using a series transformer. The controller can control active and reactive power flows in a transmission line. The UPFC uses solid state devices, which provide functional flexibility, generally not attainable by conventional thyristor controlled systems. The UPFC is a combination of a static synchronous compensator (STATCOM) and a static synchronous series compensator (SSSC) coupled via a common DC voltage link.

The components of UPFC handle the voltages and currents with high rating; therefore, the total cost of the system is high. Due to common dc-link interconnection, a failure that happens atone converter will influence the whole system. To achieve the required reliability for power system, bypass circuit and redundant backups are needed, which on other hand increase the cost. Accordingly, the UPFC has not been commercially used, even though, it has the most advanced control capabilities.

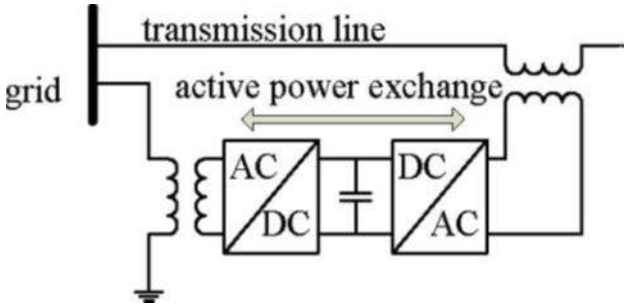

Fig. 1 Simplified representation of a UPFC

III. DISTRIBUTED POWER FLOW CONTROLLER (DPFC)

Distributed Power Flow Controller is an alternative device to established UPFC which has same control capability as that of UPFC. This can be implemented with low cost and high reliability. Converters used in this project will convert DPFC single phase which works for both active and reactive of both negative and zero unbalanced currents.

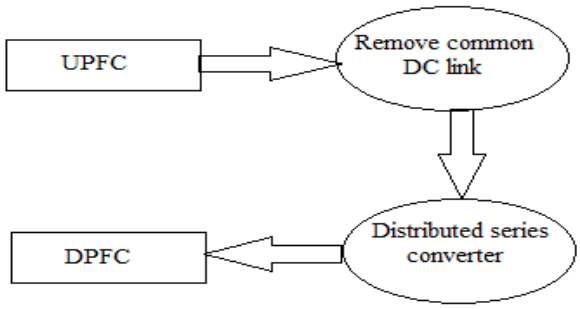

Fig. 2 Flowchart of UPFC converted to DPFC

Two approaches are applied to the UPFC to increase the reliability and to reduce the cost; they are as follows. First, eliminating the common dc link of the UPFC and second distributing the series converter, as shown in Fig. 2. By combining these two approaches, the new FACTS device—DPFC is achieved. The DPFC consists of one shunt and several series-connected converters. The shunt converter is similar as a STATCOM, while the series converter employs the D-FACTS concept, which is to use multiple single-phase converters instead of one large rated

converter. Each converter within the DPFC is independent and has its own dc capacitor to provide the required dc voltage. The configuration of the DPFC is shown in Fig. 2. As shown, besides the key components, namely the shunt and series converters, the DPFC also requires a high-pass filter that is shunt connected at the other side of the transmission line, and two Y–Δ transformers at each side of the line. The reason for these extra components will be explained later. The unique control capability of the UPFC is given by the back-to-back connection between the shunt and series converters, which allows the active power to exchange freely. To ensure that the DPFC have the same control capability as the UPFC, a method that allows the exchange of active power between converters with eliminated dc link is the prerequisite.

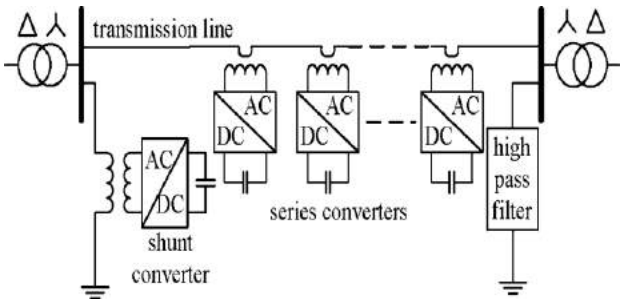

Fig. 3 DPFC Configuration

A. Eliminate DC Link

Within the DPFC, there is a common connection between the ac terminals of the shunt and the series converters, which is the transmission line. Therefore, it is possible to exchange the active power through the ac terminals of the converters. The method is based on the power theory of non sinusoidal components. According to the Fourier analysis, a non sinusoidal voltage and current can be expressed by the sum of sinusoidal functions in different frequencies with different amplitudes. The active power resulting from this non sinusoidal voltage and current is defined as the mean value of the product of voltage and current. Since the integrals of all the cross product of terms with different frequencies are zero, the active power can be expressed by

$$P = ViIi \cos \varphi i \quad (1)$$

where Vi and Ii are the voltage and current at the ith harmonic frequency, respectively, and φi is the corresponding angle between the voltage and current. Equation (1) describes that the active power at different frequencies is isolated from each other and the voltage or current in one frequency has no influence on the active power at other frequencies. The independency of the active power at different frequencies gives the possibility that a converter without power source can generate active power at one frequency and absorb this power from other frequencies.

By applying this method to the DPFC, the shunt converter can absorb active power from the grid at the fundamental frequency and inject the current back into the grid at a harmonic frequency. This harmonic current will flow through the transmission line. According to the amount of required active power at the fundamental frequency, the DPFC series converters generate a voltage at the harmonic frequency, thereby absorbing the active power from harmonic components. Assuming a lossless converter, the active power generated at fundamental frequency is equal to the power absorbed from the harmonic frequency. For a better understanding, Fig. 4 indicates how the active power exchanges between the shunt and the series converters in the DPFC system.

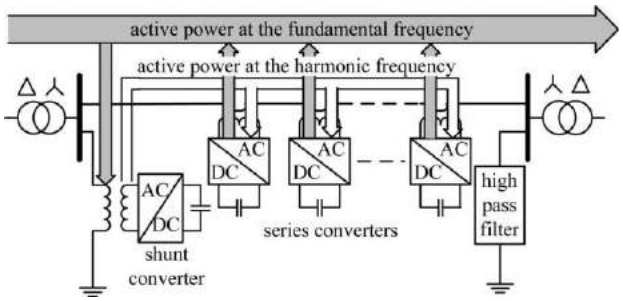

Fig. 4 Active power exchange between DPFC Converters

B. Distributed Series Converter

The D-FACTS is a solution for the series-connected FACTS, which can dramatically reduce the total cost and increase the reliability of the series FACTS device. The idea of the D-FACTS is to use a large number of controllers with low rating instead of one large rated controller. The small controller is a single-phase converter attached to transmission lines by a single-turn transformer. The converters are hanging on the line so that no costly high-voltage isolation is required. The single-turn transformer uses the transmission line as the secondary winding, inserting controllable impedance into the line directly. Each D-FACTS module is self-powered from the line and controlled remotely by wireless or power-line communication (see Fig. 7). The structure of the D-FACTS results in low cost and high reliability. As D-FACTS units are single-phase devices floating on lines, high-voltage isolations between phases are avoided. The unit can easily be applied at any transmission-voltage level, because it does not require supporting phase-ground isolation. The power and voltage rating of each unit is relatively small. Further, the units are clamped on transmission lines, and therefore, no land is required. The redundancy of the D-FACTS provides an uninterrupted operation during a single module failure, thereby giving a much higher reliability than other FACTS devices.

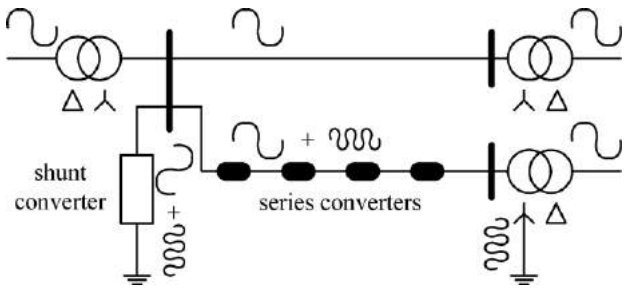

Fig. 5 Distributed Series Converters

C. DPFC Advantages

The DPFC can be considered as a UPFC that employs the DFACTS concept and the concept of exchanging power through harmonic. Therefore, the DPFC inherits all the advantages of the UPFC and the D-FACTS, which are as follows.

1) High control capability: The DPFC can simultaneously control all the parameters of the power system: the line impedance, the transmission angle, and the bus voltage. The elimination of the common dc link enables separated installation of the DPFC converters. The shunt and series converters can be placed at the most effectively location. Due to the high control capability, the DPFC can also be used to improve the power quality and system stability, such as low-frequency power oscillation damping [8], voltage sag restoration, or balancing asymmetry.

2) High reliability: The redundancy of the series converter gives an improved reliability. In addition, the shunt and series converters are independent, and the failure at one place will not influence the other converters. When a failure occurs in the series converter, the converter will be short-circuited by bypass protection, thereby having little influence to the network. In the case of the shunt converter failure, the shunt converter will trip and the series converter will stop providing active compensation and will act as the D-FACTS controller [9].

3) Low cost: There is no phase-to-phase voltage isolation required by the series converter. Also, the power rating of each converter is small and can be easily produced in series production lines. However, as the DPFC injects extra current at the third harmonic frequency into the transmission line, additional losses in the transmission line and transformer should be aware of.

D. DPFC Control

To control multiple converters, a DPFC consists of three types of controllers: central control, shunt control and series control, as shown in Figure 6.

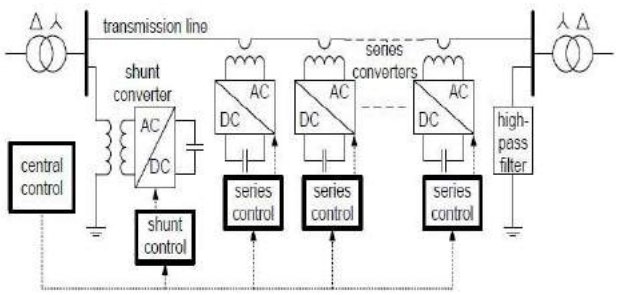

Fig. 6 DPFC control block diagram

The shunt and series control are localized controllers and are responsible for maintaining their own converters parameters. The central control takes care of the DPFC functions at the power system level. The function of each controller is listed:

a) Central control

The central control generates the reference signals for both the shunt and series converters of the DPFC. Its control function depends on the specifics of the DPFC application at the power system level, such as power flow control, low frequency power oscillation damping and balancing of asymmetrical components. According to the system requirements, the central control gives corresponding voltage reference signals for the series converters and reactive current signal for the shunt converter. All the reference signals generated by the central control concern the fundamental frequency components.

b) Series control

Each series converter has its own series control. The controller is used to maintain the capacitor DC voltage of its own converter, by using 3rd harmonic frequency components, in addition to generating series voltage at the fundamental frequency as required by the central control.

c) Shunt control

The objective of the shunt control is to inject a constant 3rd harmonic current into the line to supply active power for the series converters. At the same time, it maintains the capacitor DC voltage of the shunt converter at a constant value by absorbing active power from the grid at the fundamental frequency and injecting the required reactive current at the fundamental frequency into the grid.

IV. SIMULATION & RESULT

In this section for showing better performance of DPFC is considered. This system is three phase. During the disturbance in distribution system sag and swell is occurred in the system depends on the voltage.

The disturbance is occurred at t=0.2s to t=0.4s & at t=0.6s to t=0.8s. The DPFC is used to injecting the voltage when sag and swell is occurred.

a) Before installing DPFC

The system considered with voltage sag & voltage swell created using three phase programmable source. The harmonic are introduced by connecting non-linear load with source voltage as 415V, frequency 50Hz.

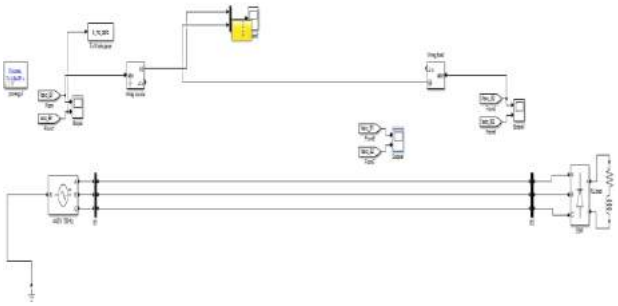

Fig. 7 Simulink model without DPFC system

When disturbance is created in distribution system depends on the voltage variation sag and swell is occurred at the system.

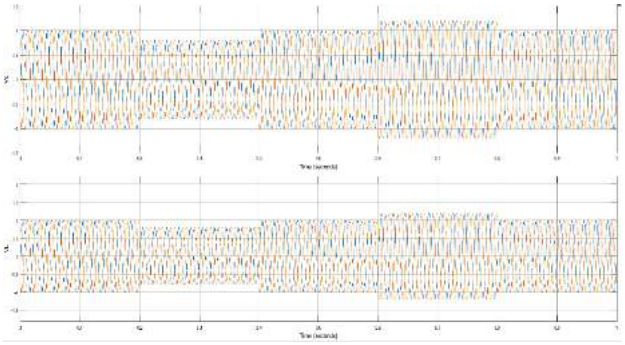

Fig. 8 Source and load voltage with sag and swell

The sag and swell created is showing in fig. 8 and fig. 9. The voltage sag is create at time t=0.2s to t=0.4s and the voltage swell is create at time t=0.6s to t=0.8s.

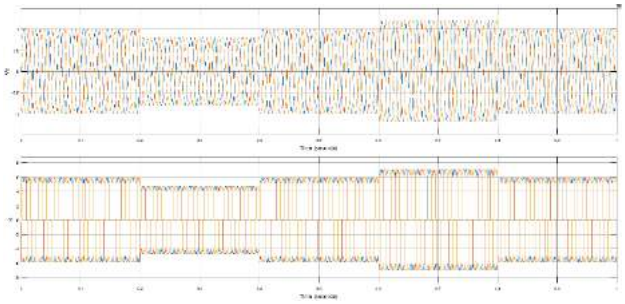

Fig. 9 Voltage source and current source with sag, swell and harmonic distortion

The complete simulation time is 1 sec, sag is created from 0.2s to 0.4s and swell is created from 0.6s to 0.8s.

The three phase voltages of source and load can be seen with sag, swell and distortion in waveform of fig.9.

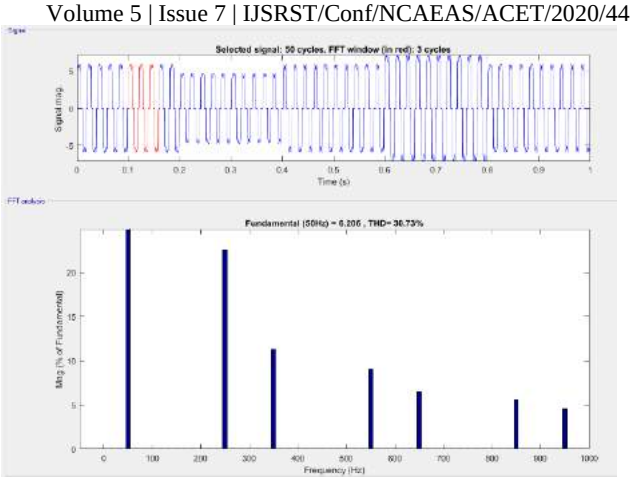

Fig.10 Representation of Total Harmonic Distortion without DPFC

The THD of source current is recorded at 30.73% without DPFC connected in the system.

b) After installing DPFC

The DPFC will be installed at the time voltage is injected to distribution system. The voltage sag and swell will be reduced using DPFC controller. So maintained system performance and also reliability can be improved using DPFC.

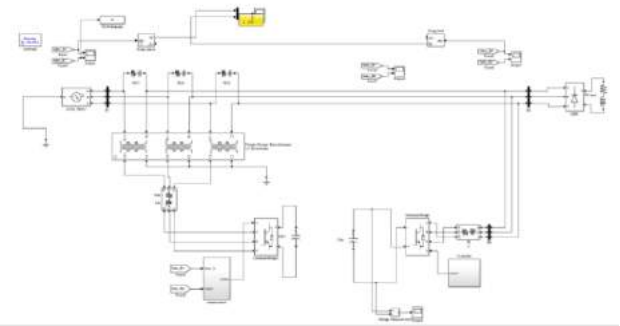

Fig.11 Simulink model with DPFC

The sag and swell will be cleared using DPFC control as shown in Fig.11.

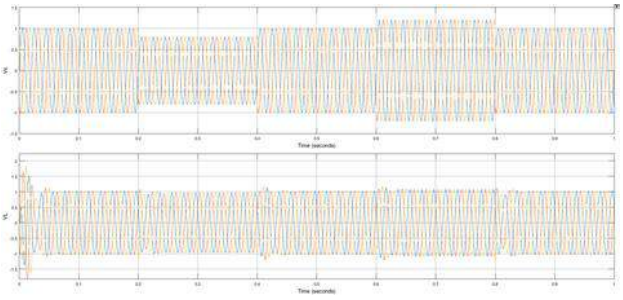

Fig. 12 Source and load voltage with eliminated sag and swell

The sag, swell and distortion is occurred during the time period of t=0.2s to t=0.4s and t=0.6s to t=0.8s respectively, so this can be cleared by using DPFC controller by injecting voltage as 415V, frequency 50Hz, load resistance 100ohm, inductance 5mh.At the time swell voltage will be increased.

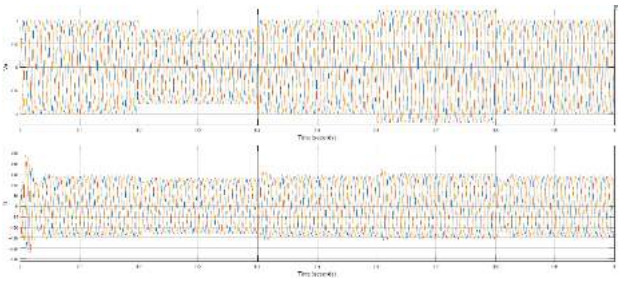

Fig.13 Source current with eliminated harmonic distortion

The sag, swell and harmonic distortion will be cleared using DPFC controller to injecting voltage. So using DPFC control sag, swell and distortion will be eliminated and also reliability can be maintained.

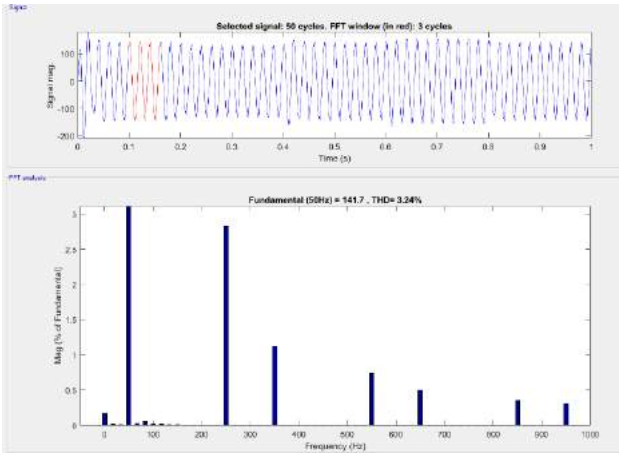

Fig. 14 Representation of Total Harmonic Distortion with DPFC

The total harmonic distortion is recorded as 3.24% with DPFC connected in the system.

V. CONCLUSION

The series converter of the DPFC employs the DFACTS concept, which uses multiple small single-phase converters instead of one large-size converter. It is proved that the shunt and series converters in the DPFC can exchange active power at the third-harmonic frequency, and the series converters are able to inject controllable active and reactive power at the fundamental frequency. The DPFC is also used to improving power quality problems such as sag, swell and harmonic distortion. The reliability of the DPFC is greatly increased because of the redundancy of the series converters. The total cost of the DPFC is also much lower than the UPFC, because no high-voltage isolation is required at the series converter part and the rating of the components of is low.

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Implementation of Plastic Waste Recycling Based Reward Generation System

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ABSTRACT

There is increase in rate of plastic waste in all over the world .so this is our concern to reduce the pollution cause due to plastic waste, because plastic is non-biodegradable material. Therefore number of researchers and industries are focusing on how to reduce this waste Aiming at the problems of on-site plastic bottles recycling and the reuse of waste, the automatic recycling system was developed on the basis of ATmega328p micro-controller. As the main controller, ATmega328p not only controls the mechanical system of the collector to recover and break plastic bottles, but also communicates with and rewards the user by the automatic rewards system through the wireless network. The experimental results shows that post treated fragments of plastic bottles are small which are easy to transport. Advantage of this is, the recovery operation is easy and the interface of non machine interaction is friendly which is easy to expand functions. The new recovery recovers and smashes the plastic bottles through technical system, and communicates with users through automatically reward system and reward the latter.

Keywords : ATmega328p, Mechanical System, Micro-Controller, Polyethylene Terephthalate

I. INTRODUCTION

In many cities people use huge amount of plastic waste which leads to the increase in pollution. India is a populous country, where a huge amount of water bottles where consumed everyday, especially in densely populated areas. In the cities flourishing areas, randomly discarded plastic bottles can be seen everywhere. India generates nearly 26000 tonnes of plastic waste everyday. During monsoon plastic bottles at dump accumulates water and a breeding ground for mosquitoes. Besides the stench, the site posses a major health hazards for the areas residents, exposing them to the mosquito-prone diseases.

PET (Polyethylene Terephthalate) of plastic bottle is also a raw material of polyester staple fibre and filament yarn. The recycled plastic waste can be made into fibers by doing simple treatments and then it can be easily converted into clothes. Environmentally aware people will put waste plastic bottles into trash, no such conscious people through plastic bottles away, thus causing environment pollution. Therefor in order to reduce environmental pollution, renewable resources usage, and development of dedicated intelligent recovery is necessary. This paper uses ARM family embedded sensors, controllers, relays and other electrical components to control the collector mechanical system for crushing the plastic bottles; certain incentives were given to people who get back those bottles, and the reward also submitted via wireless network to a remote server to be handled. Recycling box developed reduces the environmental pollution caused by plastic bottles, encourages people to recycle plastic bottle, facilitates the transport of

waste plastic bottles and play an active role for construction of conservation oriented society.

II. BLOCK DIAGRAM

The transformer is connected to the bridge rectifier which converts AC supply into DC supply. Now the DC supply goes to 7805 in which convert the given variable voltage into constant 5V DC supply and the remaining voltage get stored into the capacitor. The 5V supply is given to the ATMega328p microcontroller. In the microcontroller two sensors are connected IR1 and IR2. One for keypad sensing purpose and another for GSM tracking system

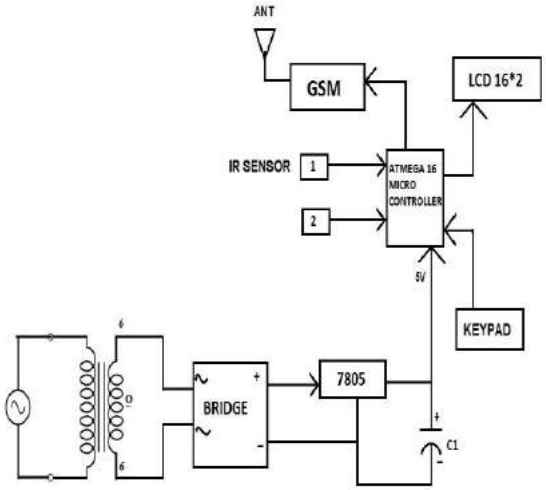
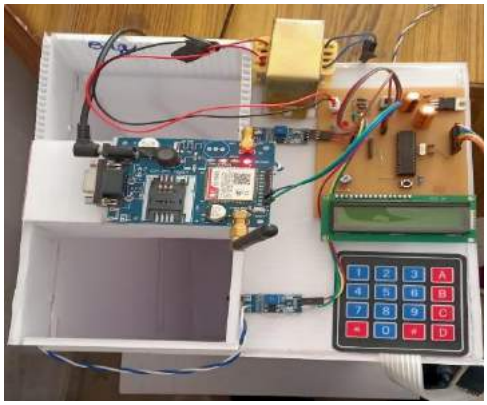


Fig 1. Block diagram of plastic waste recycling based reward generation system

III. MODEL IMAGE



IV. METHADOLOGY

1.Take the print of PCB on glossy paper.
2.Take copper plate and copy that design on it.
3.Now dip that copper plate in etching solution and shake it for
15-20 minutes.
4.Now, take out that copper plate and clean it with isopropyl
alcohol.
5.Drill the plate accordingly and solder the components.

V. LITERATURE SURVEY

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VI. PROBLEM FORMULATION

Existing System

There is huge amount of increase in use of plastic bottles in country like India. Because plastic is a non-biodegradable substance. The increase in use of plastic bottles, it causes harm to environment and living beings too.

Proposed System

To overcome this problem of increasing plastic waste we proposed a recycling based plastic waste reward generation system. In these people will get reward if they dispose the plastic bottles in this bin.

VII. PROBLEM OBJECTIVE

Due to overuse of plastic in environment, the pollution is increasing because plastic is a non-degradable material. Pollution is increasing day by day because of this problem the plastic waste management is necessary. The main objectives of these

- To reduce the use of plastic and beneficial management of plastic.
- To establish eco-friendly plastic waste disposal solution.
- Promoting recycling of plastic.

VIII. RESULT AND CONCLUSION

Thus we have successfully made the bin in which plastic bags and bottles can be recycled and the reward can be generated. It not only broaden the technology's application field, but also enhance the technical level of waste treatment, moreover meet people's curiosity for new things, thus achieved the purpose of waste recycling. The result shows the good effect of collector recycling and plastic bottle treatment. After on-site disposal, the plastic particles are very small, which is either good for transport or facilitate following reuse of plastic. Moreover the recycling box Improves the users participation, autonomy and interesting through on board reward interactive interface, significantly reduce labour cost through the integration of network information auto management.

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Hybrid Power Generation and monitoring system using IoT

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ABSTRACT

The power of demand is always going to increase as today's technology is dependent on power. Thus it is very important to always look for Power Source with maximum gain. Using the Internet of Things(IoT) Technology for supervising Hybrid power generation can greatly enhance the performance, monitoring and maintenance of the plant. As there is advancement of technologies the cost of renewable energy is globally going down thus encouraging large scale solar plant installations. Sophisticated systems for automation of the power plant monitoring this massive scale of solar and wind system deployment requires as majority of them are installed in inaccessible locations and thus it is sometime unable to be monitored from a dedicated location. Primary objective of project is based on implementation of new cost effective methodology based on IoT to remotely monitoring a hybrid power plant for performance evaluation. This will make possible for preventive maintenance, fault detection of the plant in addition to real time monitoring.

Keywords : Hybrid power generation, Monitoring, Internet Of Things, ATmega 16C.

I. INTRODUCTION

Hybrid(Solar and wind) power plants need to be monitored so that we can obtain optimum power output. This will provide efficient power output from power plants while monitoring for faulty solar panels, technical faults in wind turbine, connections, and dust accumulated on panels lowering output and other such issues affecting solar performance and wind turbine performance. This project provide the automated IoT based Hybrid power monitoring. We use ATmega 16 controller based system to monitor solar panel parameters and wind turbine(vertical axis) parameters. Our system constantly monitors the power output to IOT system over the internet. IoT Thingspeak is use to transmit Hybrid(solar and wind) power parameters over the internet to IoT Thingspeak server. This makes easy to remotely monitor the Hybrid power plants and ensures best power output.

II. LITERATURE SURVEY

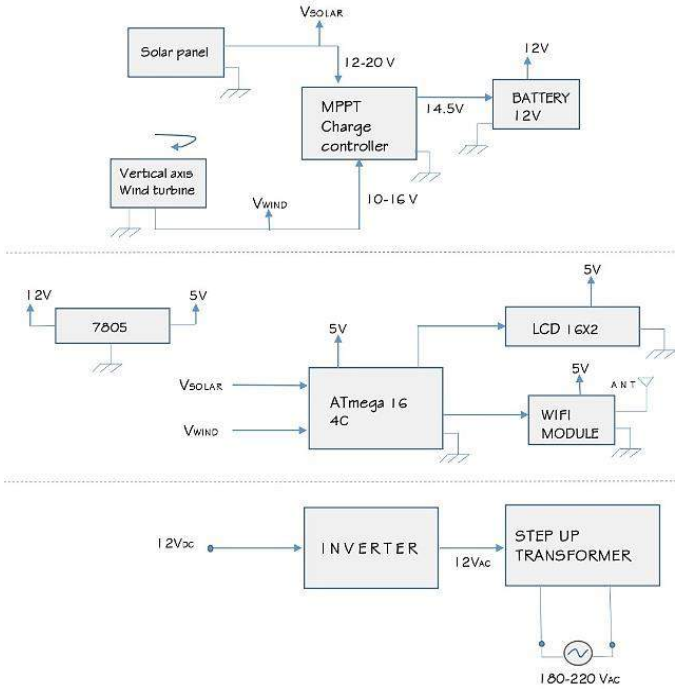
[1] Development of an online monitoring and control system for distributed Renewable Energy Sources (RES) based on Android platform. This method utilizes the Bluetooth interface of Android Tablet of Mobile phone, as a communication link for data exchange with digital hardware of power Conditioning Unit.

[2] Introduction to an instant monitoring infrastructure of renewable energy generation system that is constituted with a wind turbine on current and voltage measurements of each renewable source .The related values are measured with the developed sensing circuits and processed by 18F4450 microcontroller of Microchip. The processed

parameters are then transmitted to personal computer (PC) over universal series bus (USB) to be saved in database and to observe the system instantly. The Coded visual interface of monitoring software can manage the saved data to analyse daily, weekly and monthly values of each measurement separately

[3] Goto, Yoshihiro, explained about an integrated system that manages and remotely monitors telecommunication power plants has been developed and has started operations. The system is used to operate and maintainmore than 200,000 telecommunication power plants which includes devices such as rectifiers, inverters, UPS's and air-conditioning plants installed in about 8000 buildings. Feature of the system are to integrate the management and remote monitoring functions into single system and improved user interfaces which uses information and communication technology

III. PROPOSED SYSTEM



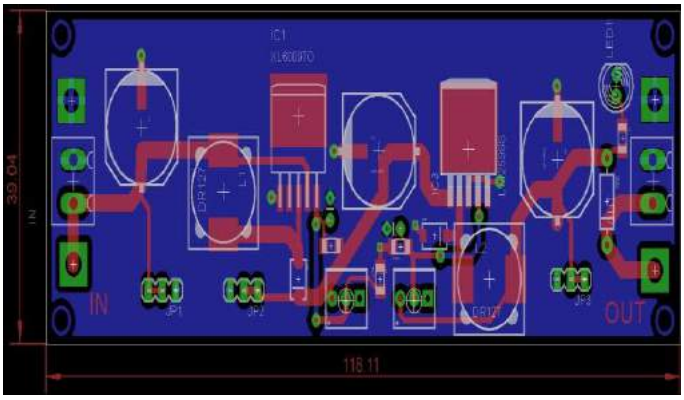
3.1 COMPONENTS:

A) ATmega 16:

ATmega 16 comes with low power consumption and high noise immunity. ATmega 16 bridges the gap between Hybrid power plant system and IoT.

B) MPPT CHARGE CONTROLLER:

The major principle of MPPT (Maximum power point tracking) is to extract the maximum available power from PV module by making them operate at the most efficient voltage (maximum power point) o/p of both source is fed to MPPT charge controller then following o/p is fed to battery.



C) Wi-Fi module (ESP8266):

All the calculated data by ATmega 16-P is further processed by Wi-Fi Module in order to store on IoT (Internet of Things) Server or Cloud. In order to analyse this data on daily, weekly and monthly basis we are using popular IoT platform Thingspeak.

D) Liquid Crystal display (LCD):

LCD is used for displaying voltage generated by solar panels and wind turbine and any defect in Solar panels and wind turbine.

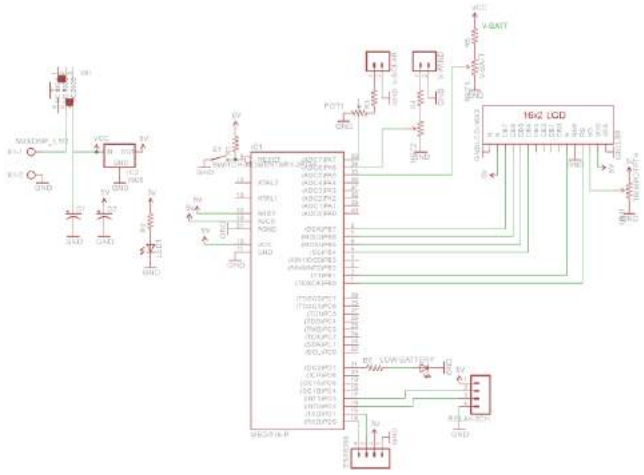
E) INVERTER:

As output from battery is direct current it get converted into alternating current using inverter.

F) STEP UP TRANSFORMER:

Output from inverter is only 12Vac so to boost the voltage we use 'step up transformer' to convert it upto 220v.

Schematic Diagram



IV. EXPECTED RESULT

As this system keeps continues track of hybrid power plant ,the daily weekly and monthly analysis becomes easy and efficient also with the help of this analysis it is possible to detect any fault occurred within power plant as the generated power may show some inconsistency in data of hybrid power plant.

V. CONCLUSION

By taking continuous track of Hybrid power plant it is possible to detect any malfunction occurred within power plant as the generated power may show some inconsistency in data of solar or wind turbine power plant.

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Hybrid Powered Vending Cart

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ABSTRACT

A 'Hybrid Powered Vending Cart' has been designed and developed in accord with citing two major concerns of our society, better livelihood and good health. Basically, in urban societies, better livelihood comes from good incomes, which collaterally comes from adequate employability rate or provisions of employment. Similarly, good health is a product of consuming edible good food and this most of the good food comes from good vegetables & fruits. But, when we try to gross such vegetables & fruits, it's quite difficult to fetch them because both vegetables & fruits tend to get musty and inedible very quickly as soon as they get cut. Thus, to overcome this difficulty we have a developed this unique mobile street vending cart with an installed working refrigerator. This arrangement will not only help to keep vegetables fresh for at least 2 to 3 days, but also, it will benefit the vendor's health, lessening the exhaustion by notably reducing the human efforts required in providing mobility to the vending cart. The vendor can easily travel, across, in and around the city for selling vegetables and fruits.

Keywords : Hybrid Powered Vending Cart (HPVC), Reverse tricycle vending cart, refrigeration system, BLDC Hub Motor, Lead-acid batteries, Solar panel.

I. INTRODUCTION

There is a rapid increase in the migration of people from rural areas to urban areas, incited by accelerating urbanization and industrialization, in search of adequate employability, better livelihood and upgraded living standards. But, the urban centres and their provisions are insufficient to provide employment to the entire incoming workforce, thus, the unemployed have to find other opportunities of settlement in the informal sector. Within this informal sector, the street vendors sell their goods in the competitive market.

A number of these urban poor are involved in street vending in poor living conditions due to less income. Street hawkers, are often described from an economic, cultural and legal perspective, are those people who offer goods or services for sale in public places, primarily streets and pavements. Street hawking is a phenomenon present globally and the most notable aspect of the informal sector. These street hawkers are those who are incapable to procure regular jobs in the lucrative formal sector due to incompatibility in the job requirements due to their lower education and skills qualifications. They are solving their livelihood problems with their own measures of monetary resources. They are the prime facilitation channel for many types of day to day use goods and

utilities like household gadgets, toys, stationery, newspapers, and magazines, perishable items, fruits, vegetables, milk, readymade garments, shoes and so on.

II. LITERATURE SURVEY

As per the study of street vending by Mr. Sharit Bhowmik [1] in seven cities from Mumbai, Ahmedabad, Kolkata, Imphal, Patna, Bhubaneswar and Bangalore. It stated the problems of street vendors in urban areas. It identifies some common traits of street vending in all the seven cities. The daily income (profit) of the street vendors ranged from Rs. 50-100 for males and Rs. 35-40 for females. They were constantly troubled by the municipal authorities and the police. The situation of street vending in Patna was worst where bribery rate was very high. The working condition of the many street hawkers is very pathetic and most of them are compelled to live a very hard life due to poverty. They worked for more than 10 hours a day to earn an adequate income.

Jonathan Shapiro Anjaria [2] studied the life of street vendors in Mumbai. It was revealed that in the central areas of Mumbai, many former mill workers and their families have been compelled to pursue street hawking. Many street hawkers were migrants from various rural areas. It was because of ease of market entry and the limited requirement of initial capital, they have entered street vending. It was also because of lack of other employment opportunities, individuals have taken up street vending. Many hawkers make a regular payment to the police and the BMC in the form of money or assets.

As per the study by Sonawane, S.T. [3] on street vendors of Bangalore based on 80 street vendors from Lalgagh, Avenue Road, MG Road, Brigade road, Maleeshwaram, Tannery road, Ulsoor lake and CMH road. The study revealed that most of the street vendors belonged to Karnataka. And very few were migrants from Tamil Nadu, Bihar, Andhra pradesh.

Pradesh, Uttar Pradesh and West Bengal. The study also revealed that 40% of the respondents knew at least 2 languages, 56% were from family size with below 5 members, 49% travelled to
their work place by bus, 72% spent more than 8 hours at work and many suffered because of increasing pollution in the city. All the street vendors paid bribe regularly.

Testing of vegetables such as tomatoes, potatoes, and leafy vegetables, oranges, grapes, carrot, radish, beet, banana, cauliflower have been carried out and their shelf life was increased consedirably.

3.Design of solar powered reverse tricycle vending cart with refrigerator

Solar powered reverse tricycle vending cart with refrigerator is basically a three wheeler cycle rickshaw has been modified to accommodate working fridge.

The tricycle is redesigned to take into consideration of load of vegetables and cooling system inbuilt in the fridge to avoid any chance of the failure possible. It has been redesigned by taking into consideration following points.

1. Mechanical design
2. Utilisation of space
3. Total power requirement.

III. SELECTION OF THE COMPONENTS

The different components used are listed below:

1) BLDC Hub motor
2) Refrigerator

3) Solar Panels
4) Solar Charge Controller
5) Batteries
6) Step down transformer
7) Inverter
8) BLDC Hub Motor Controller
9) Ball Bearing (Pivot Joint)
10) Mild Steel Rods

1.BLDC Hub Motor

Almost every mechanical movement that we see around us is accomplished by an electric motor. Electric machines are a means of converting energy. Motors take electrical energy and produce mechanical energy. Motors are broadly classified into two types AC motors and DC motors. The AC motors operate on alternating current whereas the DC motors operate on the direct current. After doing the surveying on the DC motor we came to the conclusion that BLDC Hub motor is the best for our application. The selection motor should be proper such that it should able to generate the enough torque to move the vehicle in forward path. That is the reason we select the BLDC motor of 750 W capacity for our project. BLDC Hub motor is responsible for the mobility of the cart.

2. Refrigerator

A 115 v, 50 hz, 1.1 amp, 45 litres is mounted on the platform of the cart to provide the cooling storage for the vegetables or the food item those will be suppose to be sold by the vendors. The power consumption of the fridge is approximately

3. SOLAR PANEL- 2*20w, 1*40w

Solar panel works on the principal of photovoltaic (PV) effect. In general, the photovoltaic effect means the generation of a potential difference at the junction of two different materials in response to visible or other radiation. The whole field of solar energy conversion into electricity is therefore denoted as the “photovoltaic”. Photovoltaic literally means “light-electricity”, because “photo” is a stem from the Greek word “phos” meaning light and "Volt” is an abbreviation of Alessandro Volta’s (1745-1827) name who was a pioneer in the study of electricity. A popular and common term to refer to PV solar energy is solar electricity. The sun gives off radiated energy in the form of light photons which is converted into electrical energy by the solar panels. Solar panels are composed of silicon based semiconductors and when the radiation comes in contact with the silicon atoms, the photons are absorbed and the electrons are separated from the rest of the atoms. These free electrons are responsible for carrying and creating an electrical current. The electricity generated is most usually stored in batteries to be used later. These Solar Panels generally used for small off grid systems like Solar Lantern, Solar Mobile Charger, small Solar Battery Banks, Solar Garden Lights, Solar Street Lights Etc. Here is complete Detail, Size, Watt, Volt, Working.

Technical Specification and Cost of the 20w, 40w solar panel.

4. Solar Charge Controller

Solar power charge controller is used in various sectors. For instance, it can be used in solar home system, Hybrid systems, solar water pump system etc. In this, a solar panel convert’s sunlight energy into electrical energy through an electrochemical process also known as photovoltaic process. Energy is stored in the battery with the help of solar panel through a diode and a fuse. Energy stored in the battery can be used when there is no sunlight as during discharge, chemical energy is converted into electrical energy which in turn illuminates electrical appliances. Hence, it is needed to protect battery form overcharge, deep discharging mode while dc loads are used or in under

voltage as it is the main component in a solar power charge controller.

For our application we select PV solar charge controller as it is designed for use with all types of 12V photovoltaic panels/systems and different types of 12V batteries, such as wet or sealed lead acid, lead calcium and lead antimony battery.

5. Batteries

An electrochemical power source or battery is a device which enables the energy liberated in a chemical reaction to be converted directly into electricity. Batteries fulfill two main functions, they are portable sources of electric power and they are used to store the electrical energy. 4 batteries of 12v each are connected in series to fulfil the need of motor of 48v. As the motor is of 750 w, it draws power from the batteries.

6. Step down transformer

A step down transformer of 230v/115v, 3 amp is needed for the stepping down of the voltage so as to supply it to the fridge for the operation.

7. Inverter

An inverter of 12v/ 230v is needed to boost the voltage so as to further could be supplied to the transformer for the refrigerator operation.

8. BLDC Hub Motor Controller

A 12 volt solar charger is surprisingly easy to build and will help you save money, reduce pollution and reduce dependence on foreign oil. This article will talk about the different kinds of solar battery chargers, which type is best and even how to build your own 12 volt solar charger. The simplest battery charger is just a power supply that sends electricity of the correct voltage to a battery. You can connect battery to the power supply until the battery is fully charged and then disconnect it. For a 12 volt battery, you can plug it into a 15-18 volt power supply and then, when it is fully charged, disconnect it. Unfortunately, though there is nothing to prevent you from overcharging the battery using such a simple system. Charger controller to make sure that you don't overheat.

9. Ball Bearing (Pivot joint)

A bearing is a machine element which supports another moving machine element (known as journal). It permits a relative motion between the contact surfaces of the members, while carrying the load. Bearings are used to support large skyscrapers to allow them to move during earthquakes, and bearings enable the finest of watches to tick away happily. Without bearings, everything would grind to a halt, including people, whose joints are comprised of sliding contact bearings. There are two types of bearings, contact and noncontact. Contact-type bearings have mechanical contact between elements, and they include sliding, rolling, and flexural bearings. Mechanical contact means that stiffness normal to the direction of motion can be very high, but wear or fatigue can limit their life. Non-contact bearings include externally pressurized and hydrodynamic fluid-film (liquid, air, mixed phase) and magnetic bearings.

10. Mild Steel Rods

Carbon, other elements and inclusion within iron acts as hardening agents that prevent the movement of dislocations that naturally exist in the iron atom crystal lattices. Fig. 3.12 shows the schematic of Mild steel bars. Varying the amount of alloying elements, their form in the steel either as solute elements or precipitated phases, retards the movement of those dislocations that make iron so ductile and weak and so it controls qualities such as the hardness, ductility

and tensile strength of the resulting steel. But only by trading away ductility of which iron has an excess.

Solar Panel Capacity

The power required to charge the battery is given by the solar panel. Total power of solar panels required to drive the cart can be calculated as,

Total power of solar panels = [battery voltage × battery capacity × (1+ loss) × (1-state of charge)] /charge duration in hours (12)

Assume,

State of Charge= 0%

Losses= 25%

Charge duration in hours = 6 hours

Then, total power of solar panel

= [24×17.76 ×(1+0.25)×(1-0)] / 6

= 88.8 watts.

5.Performance Evaluation

Experiments were conducted on the HPVC for the no load condition & loaded condition.

Thermocouples copper constantans were mounted to measure temperature at various locations. The sling psychrometer is used to measure the wet bulb temperature.

Results indicate that the cooling chamber maintains the temperature of 18 -20 C throughout the day. The graph of temperature vs time of the day clearly indicates the above observation. This temperature is sufficient to maintain the freshness of vegetables. Thus the vendor can sell it at high prices.

IV. CONCLUSION

The traditional and conventional carts require tremendous human efforts to move and don't have cold storage facility, which causes great inconvenience to the vendors. These street vendors are the medium between the farmers and consumer who cannot afford to sell their goods in big markets. We can reduce unemployment if we can involve the mid-range people in this type of business as well. As the cost of cart is not very high but we can further reduce the cost if we go for mass production and government provide the subsidy. Government can provide different identification system to manage the vendors and to manage the business.

1) Refrigeration cooling systems have a very large potential to propitiate thermal comfort. Nowadays, refrigeration cooled storage system is increasingly being used for on-farm storage of fruits and vegetables. Refrigeration cooling system not only lowers the air temperature surrounding the vegetables and fruits, it also increases the moisture content of the air.

2) This street vending cart is developed for common vegetable and fruit vendors. The cost of the cart is very low relative to other conventional carts and affordable for the street vendors.

3) The fabrication of this street vending cart is very simple and no need of any special skills. The assembly and disassembly of cart is very simple, no external help is required.

4) The refrigeration system installed in the cart can regulate the temperature about 15-16 degrees than surroundings temperature, such that shelf life of vegetables also increases.

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Hybrid Energy Generation For Residential Society

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ABSTRACT

Renewable Energy is the energy that comes from natural resources such as sunlight, wind, rain, tides, waves and geothermal heat which are continually replenished. Hybrid power generation model mainly focuses on the renewable energy resources. Hybrid power system model is mainly to meet the increasing energy demand through nonconventional energy sources. In our proposed hybrid model Solar, Wind and tap water has been planned to use to generate electricity. This configuration allows the three sources to supply the load separately or simultaneously depending on the availability of energy resources. The objectives of the present study are to convert the solar, wind and tap water into electricity and to optimize the energy requirement using these nonconventional energy resources. It reduces the environmental pollution using clean or environmental friendly technology and creates awareness among people regarding renewable energy.

Keywords : Solar Panel, Hydro Generator, Wind Turbine, MPPT Charge controller, Relay Module, Wi-Fi module

I. INTRODUCTION

Renewable Energy is the energy that comes from natural sources such as sunlight, wind, rain, tides, waves and geothermal heat which are continually replenished. Hybrid power generation model mainly focus on the renewable energy sources. Hybrid power system model is mainly to meet the increasing energy demand through nonconventional energy sources. In our proposed hybrid model Solar, Wind and hydro has been planned to use to generate electricity.

This configuration allows the three sources to supply the load separately or simultaneously depending on the availability of energy sources.

Energy is one of the most fundamental elements of our Universe and vital for the progress of any nation. It is inevitability for survival and indispensable for development activities to promote education, health, transportation and infrastructure for attaining a reasonable standard of living and is also a critical factor for economic development and employment.

It is an ultimate factor responsible for development of agriculture and industrial in a country like India. Power consumption is steadily increasing for past few years. Power utilities in many countries around the world are diverting their attention towards more energy efficient and renewable electric power sources.

Generation of power through any *standalone* energy system cannot meet the requirements. So there is a need to correlate different types of energy systems to supply the economical and reliable power. Such generating system is known as '*Hybrid Power Systems*

II. METHODOLOGY

Block Diagram

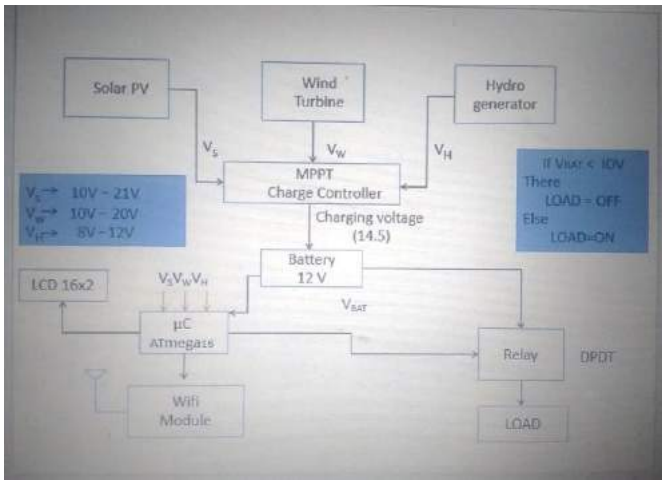

Figure 1. Block Diagram of Hybrid Energy Generation

A. Solar Panel

Solar panels are the medium to convert solar energy into the electrical energy. Solar power is converted into the electric power by a common principle called photo electric effect. Solar panels installed on the rooftops absorb Sun's light from the Sun. The silicon and the conductors in the panel convert the sun light into Direct Current electricity which then flow into the inverter. The inverter then convert DC to AC electrical power which you can used at your home.

Figure 2. Solar Panel

B. Hydroelectric Generator

The hydraulic turbine converts the energy of flowing water into mechanical energy. The hydroelectric generator convert this mechanical energy into electricity. The operation of a generator is based on the principles discovered by Faraday.

Figure 3. Hydroelectric Generator

C. Wind Turbine

Wind turbine is that system which extracts energy from wind by rotation of the blades of the wind turbine. Basically wind turbine has two types one is vertical and another is horizontal. As the wind speed increases power generation is also increases. The power generated from wind is not continuous its fluctuating. For obtain the non-fluctuating power we have to store in battery and then provide it to the load.

Figure 4. Wind Turbine.

D. MPPT Charge Controller

Maximum power point tracking (**MPPT**) is a technique used commonly with wind turbines and photovoltaic (PV) solar systems to maximize power extraction under all conditions. Although it primarily applies to solar power, the principle applies generally to sources with variable power: for example, optical power transmission and thermophotovoltaics. PV solar systems exist in many different configurations with regard to their relationship to inverter systems, external grids, battery banks, or other electrical loads. Regardless of the ultimate destination of the solar power, though, the central problem addressed by MPPT is that the efficiency of power transfer from the solar cell depends on both the amount of sunlight falling on the solar panels and the electrical characteristics of the load.

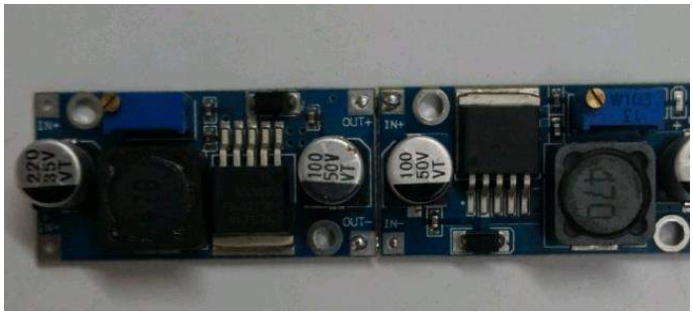

Figure 5. MPPT Charge controller

E. Wi-Fi Module

Wi-Fi technology may be used to provide local network **and** Internet access to devices that are within Wi-Fi range of one or more routers that are connected to the Internet. The coverage of one or more interconnected access point (*hotspots*) can extend from an area as small as a few rooms to as large as many square kilometers. Coverage in the larger area may require a group of access points with overlapping coverage. For example, public outdoor Wi-Fi technology has been used successfully in wireless mesh network in London. An international example is Fon.

Figure 6. Wi-Fi Module.

F. Relay module

The relay module is an electrically operated switch that allows you to turn on or off a circuit using voltage and/or current much higher than a microcontroller could handle. There is no connection between the low voltage circuit operated by the microcontroller and the high power circuit. The relay protects each circuit from each other. The each channel in the module has three connections named NC, COM, and NO. Depending on the input signal trigger mode, the jumper cap can be placed at high level effective mode which 'closes' the normally open (NO) switch at high level input and at low level effective mode which operates the same but at low level input.

Figure 7. Relay Module.

G. Microcontroller ATMega16

The ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC Architecture. By executing powerful instructions in a single clock cycle, the ATmega16 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

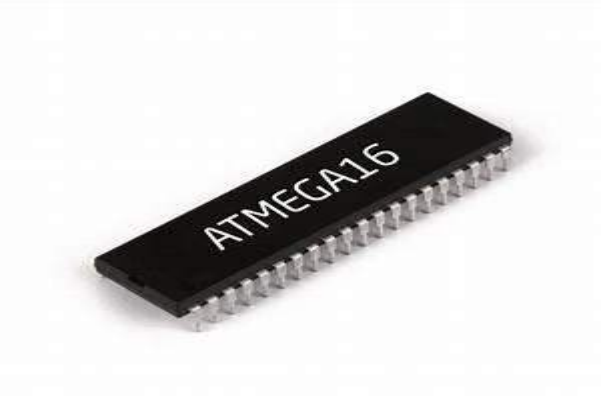

Figure 8. ATMega16

III. COMPONENTS USED

Following components are used for this complete system

- Transformer
- Inverter
- LCD Display
- Potentiometer
- Power MOSFET
- Battery
- Capacitors
- Resistor

IV. CONCLUSION

Hybrid power generation system is good and effective solution for power generation than conventional energy resources. It has greater efficiency. It can provide to remote places where government is Unable to reach. So that the power can be utilize where it generated so that it will reduce the transmission losses and cost. Cost reduction can be done by increasing the production of the equipment. People should motivate to use the non-conventional energy resources. It is highly safe for the environment as it doesn't produce any emission and harmful waste product like conventional energy Resources. It is cost effective solution for generation .It only need initial investment. It has also long life span. Over all it goods, reliable and affordable solution for electricity generation.

We study the various data about the wind, solar and hydro for generating the hybrid at small level that help to the decision makers to study the various factors in construct a hybrid Generation plant with a various minimum cost with highest generating capacity .The result shows by the experimental an theoretical data that has been able to Predict the energy generation through the Hybrid system. For future scope different time period has been used for calculating the power and efficiency. This method motivates the engineers to install small scale solar, wind, and hydro system. The government of India take a major decision towards the hybrid energy source.

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Review On Pile Types And Piles Used In Construction

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ABSTRACT

A pilefoundation is a civil engineering concept that is, at its most basic a structure that is supported by piles. It allows any type of structure to actually be supported by a layer or layers of soil. The pile concept helps create a good, solid foundation in different areas. The foundation cost for any structural systems can vary from 5% to 20% of the total construction cost of the structure while the number of piles required might exceed several thousands. Therefore it becomes necessary to design the best pile foundation according to the structure. Deep foundations are made when the safe bearing capacity of soils are not suitable for shallow foundation. Deep foundation types are; pile foundations, caissons and deep foot foundations. In this paper, the production forms and usage areas of the piles and piled foundations will be studied.

Keywords : Pile, Foundation, Concrete, Steel, Testing on piles, Analysis, Design

I. INTRODUCTION

The term foundation can be defined as the part of the structure which bears the weight of the structure as well as serve direct and indirect loads, and transmit them to the underlying soil or rock. A Pile foundation is a Deep foundation that transfer the loads deep below the surface up to a depth at which it can support the structure safely.[1]

1)

Piles are considered as a reliable and easily installable method that can be used to reinforced existing geotechnical structures like slopes, footing, etc. [6]

A Pile is a vertical structural element that is driven or drilled into the ground. It is provided over a shallow foundation for high-risers or skyscrapers. It is preferred when the soil is very weak and the budget is flexible enough to accommodate its construction.

II. WHEN TO PREFER PILE FOUNDATION

a) Load is heavy and uneven distribution

b) Soil has low SBC and expansive

c) Water is present in subsoil in large amounts and removing it is uneconomical in case of shallow foundation[1]

III. CLASSIFICATION OF PILES

2) Based on function:[1]

a) End bearing piles

b) Friction pile

c) Tension or Uplift pile

d) Anchor pile

e) Sheet pile

3) Based on material and composition:[1]
   a) Timber pile
   b) Concrete pile (Pre-cast and Cast-in-situ)
   c) Steel piles
   d) Composite piles

4) Based on effect of installation:
   a) Displacement pile
   b) Non-displacement pile[1]

A) End bearing pile:

These piles transfer the load from its bottom end which rest on a strong strata. Usually it rests at a transition layer of a weak and strong layer.

Even in situation where the soil or rock layer is weak, the pile does not buckle.[2]

Its capacity can be calculated by multiplying the area of the tip to the bearing capacity of the soil at the depth at which the pile rests.

B) Friction pile:

It transfers the load to the soil by the frictional force between the soil and the surface of the pile. Friction can be developed for the entire length of the pile or a specific length.

Its capacity is found by multiplying the surface area of the pile to the SBC.

The friction is to be evaluated at a reasonable factor of safety or change the diameter, depth, number of piles.

A friction pile is used in a situation where the soil is mainly soft clay and a stable strata is not available at ample depth.[2]

C) Tension pile:

It is use to resist uplift forces. These forces can be developed due to seismic activities, overturning moments, hydrostatic pressures etc. These forces may developed in the construction of large structures.

The country and their codes will specify the maximum or permissible displacement possible for the piles, the allowable loads can be calculated by adding a factor of safety to the computed load in the design of the pile for uplift pressure. It is analysed by following the Limiting Frictional Approach to evaluate the uplift resistance of the pile.

D) Anchor pile:

These are used to provide anchorage against horizontal pull. From sheet piling walls or other pulling forces. These resist uplift or inclined tensile forces in the surrounding soil. They also provide anchorage to react to cantilevered foundations. Allowance is to be made when anchoring into the rock for possible damage or shattering of rock or pile surface during driving.

E) Sheet pile:

It is mostly used to provide lateral support from loose soil, water flow etc used in cofferdams, trench sheeting etc. They are used to serve the following purposes : Retaining wall construction, protecting from river bank erosion, retain loose soil etc.

F) Timber pile:

They are placed under water level and last for about 30 years. They can be rectangular or circular of size or diameter of 12 to 16 inches, with the length about 20 times the top width. They can carry 15 to 20 tons, and can be strengthened by bolting fish plates to the site of the pile. They are easy to install, economical, removable but cannot be used as end bearing pile and special measures have to be taken to make them durable.

G) Concrete pile:

a) Pre-cast pile:

They are cast in a horizontal bed if rectangular or vertically if circular, usually reinforced with steel to avoid breakage or deformation while moving it from the cast bed to the location of foundation. They have to be cured for 21 to 28 days or as per specification. They provide high resistance to chemical and biological cracks, have high strength, and are durable

but difficult to move, needs special equipments to drive and avoid any damage.

b) Cast-in-situ piles:

It is constructed by boring the soil upto the desired depth pour freshly mixed concrete in it and letting it cure itself. It is constructed by driving a metallic shell in the ground and filling it with concrete, leaving or pulling out the shell while concrete is poured. The shells are lightweight and easy to handle, may be assembled on site, can be used to construct more piles but require sufficient place for storage, needs special supervision and quality control, the pile can fail in tension due to uplifting force if it is uncased and un-reinforced.

H) Steel piles:

These are either I-section or Hollow pipe filled with concrete with size 10 to 24 inches in diameter and 3/4th inches in thickness. They are used as end bearing piles.

They are easy to install, carry heavy loads, reach a greater depth and penetrate through the hard layer of soil but are prone to corrosion, made may deform while driving, and are comparatively expensive.

The life of steel piles under water and sand is short due to its ability to corrode. [7]

I)Composite pile:

These are made of two different materials driven one over the other to act together as a single pile.

Some of the combinations of composite piles are as follows:

i. A timber pile below a concrete pile
ii. A timber pile below steel pile.

The timber is placed below ground water due to its vulnerability to insect attack and decay above ground water level.

J) Micropiles: These are widely used in areas where large drilling rigs are inaccessible. These are usually used in underpinning works, reinforcement or extending existing structures stabilizing slopes etc. The bearing capacity of the micropiles depends on the method of installation and grout injection parameters. [9]

IV. TESTS ON PILE

1) Pile Load test
2) Dynamic Load testing
3) Pile Integrity Test

1) Pile Load Test:

Pile load is carried out according to Indian Standard IS: 2911 (PART 4) 2013. According to IS:2911, the safe load is taken as the least of:

a) 1/2 of the load at which the total settlement is 10% of the pile diameter, or
b) 2/3rd of the final load at which the total settlement is 12mm, or
c) 2/3rd of the final load which causes a net settlement (residual settlement after removal of load) of 6mm.[5]

2) Dynamic Load Test:

Dynamic Load Test is a method to assess a pile's bearing capacity by applying a dynamic load to the pile head (a falling mass) while recording acceleration and strain on the pile head. For steel or timber, the test can be done during the installation or after it. It also gives information about resistance distribution (shaft resistance and end bearing) and evaluates the shape and integrity of the foundation element. The obtained data is analysed using the Pile Driving Analyser (PDA). This test is also called as High-Strain Dynamic Test. [3]

3) Pile Integrity Test:

A pile integrity test is also called as low-strain dynamic test, sonic echo test, and low strain integrity test. It is one of the methods to assess the condition of piles or shafts, It is cost effective and does not take a

lot of time to perform. It uses Transient Dynamic Response (TDR) as it is a rapid way of assessing the continuity and integrity of concrete piled foundations. It measures pile length or depth for anomalies, pile head stiffness, pile shaft mobility which depends on pile section and concrete properties. This requires minimal preparations. [4]

a) Load Carrying Capacity of Cast-in-Situ Piles in Cohesive Soil is calculated by : $Q_u = Q_b + Q_f$

Q_u is UBC, Q_b is end bearing resistance and Q_f is skin friction resistance.

b) For the Cast-in-Situ Piles in Cohesionless soil, $Q_u = Q_b + Q_f$

Where Q_u is ultimate load applied on top of pile, Q_b is end bearing resistance at the base or tip of the pile toe and Q_f is skin friction resistance. [8]

V. CONCLUSION

Piles are often used because adequate bearing capacity cannot be found at shallow enough depths to support the structural loads. Piles get support from both end bearing and skin friction, piles can be used to support various loads depending on the conditions of soil, forces acting upon the pile.

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Solar Grass Cutter

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ABSTRACT

The design objective is to come up with a mover that is portable, durable, easy to operate and maintain. It also aims to design a self-powered mover of electrical source, a cordless electric lawnmower. The heart of the machine is a battery-powered dc electric motor. It comprises of a system of speed multiplication pulleys that drive the cutting blades and the charging unit comprising of a 12v battery and a lift mechanism meant to alter the height of cut. We use a solar panel to charge the battery. The grasscutter and vehicle motors are interfaced with an ATMEGA328 that controls the working of all the motors. Thus, the machine is considered highly efficient and is readily adaptable to different cutting conditions. This device will help in the building of an eco-friendly system. Throughout this paper, you will learn more about how we are going to complete this project and what various parts were used that replaced the physics power needed in moving the grass cutter.

Keywords : solar panel, battery, DC motor, ATMEGA328, sensor, blades.

I. INTRODUCTION

Nowadays pollution is a major issue for the whole world. Pollution is manmade and can be seen in own homes. In case gas-powered lawn movers due to the emission of gases it is responsible for pollution. Also, the cost of fuel is increasing hence it is not efficient. So, solar-powered grass cutters are introduced. Solar-powered grasscutter can be described as the application of solar energy to power an electric motor which in turn rotates a blade which does the moving of a lawn. Solar energy is renewable energy.

Grasscutter or lawn mowing with a standard motor-powered lawn mower is an inconvenience, and no one takes pleasure in it. Cutting grass cannot be easily accomplished by the elderly, younger, or disabled people. Motor powered push lawn mowers and riding lawn movers create noise pollution due to the loud engine, and local air pollution due to the combustion in the engine. Also, a motor-powered engine requires periodic maintenance such as changing the engine oil. Even though electric lawn mowers are environmentally friendly, they too can be an inconvenience. Along with motor-powered lawn movers, an electric lawn mower is corded, mowing could prove to be problematic and dangerous.The self-propelling electric remotes control grass cutter is a grass cutter that has remote control capability.

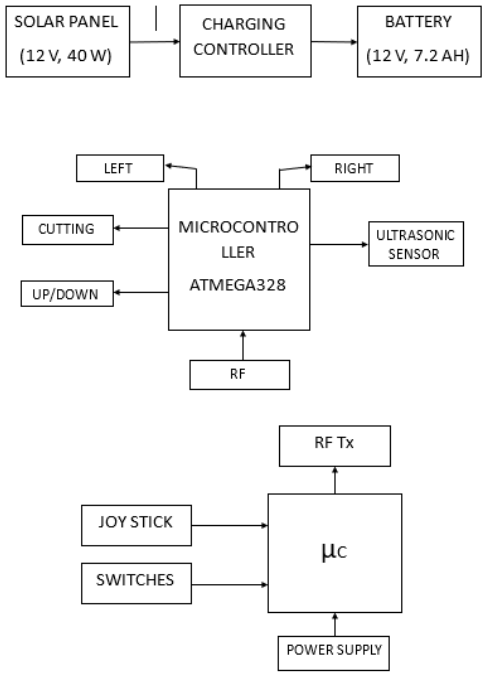
So automatic grass cutter using the rechargeable battery is economically helpful for the user. By using this automatic grass cutter, the user can cut the grass of the required area by giving input by using a joystick. Also, the height of grass can be specified by adjusting the height of the blades. The main objective

of this grass cutter is that the grass in the lawn must be move with lesseffort. Also, to cut the grass of a particular area as per user requirement. The sensors are the eyes of this grass cutter.

II. OBJECTIVE

The objective of the proposed work is to design and construct the solar grass cutter is a fully automatic grass cutting robotic vehicle powered by solar energy that also avoids obstacles without the need for any human interaction. The system uses 12v battery to power the vehicle movement motors as well as the grass cutter motor. We also use a solar panel to charge the battery so that there is no need for charging it externally. The grasscutter and vehicle motors are interfaced with ATMEGA328 that controls the working of all the motors.

III. BLOCK DIAGRAM



It is also interfaced to an ultrasonic sensor for object detection. The ATMEGA328 controller moves the vehicle motors in the forward direction in case no obstacle detected. On obstacle detection,the ultrasonic sensor monitors it and the controller and thus stops the grass cutter motor so as to avoid any damage to the object/human/animal. The controller then turns the robotic vehicle off until it gets clear of the object and then moves the grass cutter in a forward direction again.

WORKING PRINCIPLE

The working principle of solar grass cutter is it has a panel mounted in a particular arrangement at an in such a way that it can receive solar radiation with high intensity easily from the sun. These solar panels convert solar energy into electrical energy. This electrical energy is stored in batteries by using a solar charger. The main function of solar charger is to increase the current from the panel while batteries are charging, it also disconnects the solar panel from the batteries whey they are fully charged and also connect to the panel when the charging in batteries is low. The motor is connected to batteries through the connecting wires. Between these two mechanical circuit breaker switches is provided. It starts and stops the working of the motor. From this motor, the power transmits to the mechanism and this makes the blade slide on the fixed blade and this makes to cut the grass.

The designed solar grass cutter comprises of direct current (D.C.) motor, a rechargeable battery, a solar panel, a stainless-steel blade, and a control switch. Mowing is achieved by the D.C motor which provides the required torque needed to drive the stainless-steel blade which is directly coupled to the shaft of the D.C motor.

The solar grass cutter is operated by the switch on the board which closes the circuit and allows the flow of current to the motor which in turn drives the blade used for mowing. The battery recharges through the solar charging controller. Performance evaluation of the developed machine was carried out with different types of grasses.

COMPONENT USED

1. Solar panel
2. Battery
3. DC motor
4. Solar charger
5. Blades
6. Sensor

ADVANTAGE:

1. No fuel consumption.
2. The operating principle is simple.
3. Compact size and portable.
4. The non-skilled person can also operate this machine.
5. Easy to move from one place to another.
6. Noiseless operation.
7. No pollution.
8. No required of any external supply.

LIMITATION:

1. Difficult to operate in the rainy season.
2. Blade failure.

APPLICATION:

1. For playgrounds.
2. For the house garden.
3. For small farms.

IV. CONCLUSION

This solar grass cutter mover will meet the challenge of environmental production and the low cost of operation. Since there is no cost of fuelling. A solar grass cutter has been developed for the use of residences and establishments that have lawns where tractor drivenmover cannot be used. The machine's capacity is adequate for its purpose. The machine has proved to be a possible replacement for the gasoline-powered lawnmower. The proposed system will be cost-efficient with higher reliability.

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Review on Stabilization of Soil Using Polyacrylamide (PAM) Polymer and its Application in Civil Engineering

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ABSTRACT

The primary purpose of this study is to explore the utility of polyacrylamide (PAM) in geotechnical applications and to assess the impact of polyacrylamide on soil. Polymer which is employed for soil stabilization should be of low-cost and readily accessible. In soil stabilization, the poor quality of soil is converted into an important engineering material. The soil stabilization improves the strength of the soil, also increases its bearing capacity. The CBR test was conducted on two sample i.e. on untreated sample and PAM mixed soil sample. The outcome achieved are matched between two samples and the impact of polyacrylamide on soil index properties and desirability in construction of flexible pavement.

Keyword : Polyacrylamide (PAM), stabilisation, soil

I. INTRODUCTION

In this quaternary time, growing population has been an excellent problem for creatingresources available. thanks to which cities or town are expandingtheir areas where the land comprises low soil quality. Construction workcan't be administered in such sort of land. Therefore, it becomes necessaryto enhance the standard of soil. As per engineering aspect, method to enhance soil is termed as STABILISATION. In technical terms, the method of improving soil properties by various methods with a view that the improved soil can sustain the load of whole structure is SOIL STABILISATION. The aim of this project is to stabilize the soil by using Polyacrylamide (PAM). it's high relative molecular mass water soluble or swellable polymers formed from acrylamide or its derivatives. Polyacrylamide a non-ionic, water soluble, and biocompatible polymer which will be tailored to satisfy a broad range of applications. Increment the viscosity of water and encourages the flocculation of particles present in water.

II. OBJECTIVE

a) To increase the strength.
b) To study the various research done experimentally and practically.
c) To use the result obtained for stabilizing soil on selected site and preparing the flexible pavement.

III. LITERATURE REVIEW

Romel N. Georgees, Rayyan A Hassan, Robert P. Evans, Piratheepan Jegatheesan(1) In this project we found that polymeric-based additives have been used in the Stabilization of unsealed pavements as well as granular materials of select fills and sub grade for sealed pavements to enhance performance properties.

To design build and maintain infrastructures within the conservative funds available. This is additionally to balancing the increasing demand of high-performance roads on one hand, and therefore the refore the increasing social awareness of associated environmental impacts and the preservation of scarce natural resources on the other hand.

Polymeric-based additives have been used in the stabilization of un-sealed pavements as well as granular materials of select fills and sub-grade for sealed pavements to enhance performance properties. However only a few studies are administered to assess the feasibility of using PAM stabilized granular materials in pavement structural layers. The study reported here in is to evaluate the suitability of using PAM – treated granular materials that are currently use in wearing courses of unsealed pavements in sub base layers of sealed low volume road pavements. To achieve the aim of study, a laboratory experimental program was undertaken to assess the changes in stiffness and durability characteristics of pavement materials when treated with an off the shelf synthetic polyacrylamide-based stabilizing additives. The tests performed included repeated load tri axial test (RLT), capillary rise and abrasion tests. The outcomes of this will contribute to improving the knowledge regarding the behaviour of PAM-treated materials within a pavement structure and help promote the reliability of those sustainable materials for wider adoption by road authorities

V.STEVEN GREEN AND D.E. STOTT(2) The objective of this paper mainly focuses on presenting an summary of PAM use and application. It contains variety of the recent findings in PAM work and specialize in PAM use in furrow irrigation, rain-fed irrigation or sprinkler irrigation and disturbed lands including construction of buildings, roads etc. Soil degradation could also be a big problem throughout the earth. Use of soil amendments, including anionic polyacrylamide (PAM), is one of many options for shielding soil resources. Polyacrylamide are often utilized in furrow irrigation where it reduces erosion and runoff while improving soil and water quality and water-use and rain-fed agriculture and sprinkler irrigation, PAM is used to reduce surface sealing and crusting also as erosion polyacrylamide is additionally used to stabilize steep slopes in construction, highway cuts, and other disturbed soils. Polyacrylamide is extremely cost effective in furrow irrigation systems where it is often applied at low rates through the irrigation water. In construction applications, PAM reduces labor and materials costs. As a soil conditioner, PAM is another tool that efficiency. Polyacrylamide is often cost effective it is often used to manage our soil resources.

Soil physical properties greatly affect how the soil will function within the sector. For agricultural uses, soil with excellent infiltration and stable aggregation is imperative. As infiltration decreases, runoff and erosion increase, thus with high aggregate stability helps maintain adequate space for infiltration. Soil crusting, surface sealing and therefore the compaction can inhibit seedling emergence. Additionally, the impact of the rain and therefore the rapid wetting of the soil cause slaking, disrupting the integrity of the soil aggregate. Once the soil aggregate has dispersed into smaller particles, the small particles can clog the pore spaces of the soil matrix. When this happens, a thin hardened surface is degrading the soil.

Masoumeh mokhtari and masoud dehghani(3) The serious problem on structure is expansion of soil occurring in arid and semi-arid climate regions of the world. Such type of soils swells when given an access to water and shrink when they dry out. The number of attempts is being made to control the swell-shrink behavior of these soils. The swelling potential of the

expensive soil mainly depends upon the properties of soil and environmental factors and stress conditions. Some investigators studied the swelling characteristics of expansive soil after repeatedly wetting-drying cycles. Chen et al (1985), Chen and Ma (1987), Subba Rao and Satyadas (1987), Dif and Bluemel (1991) they carry out that when soils where subjected to full swell.

R.**D. Lentz & R.E. Sojka(4)** Furrow irrigation-induced erosion could also be a significant threat to sustainable irrigated agriculture globally. Those treatments that applied a minimum of 0.7 kg ha' PAM (mean 13kg ha-1) reduced furrow sediment loss 94% (range 80-99%) and increased net infiltration by 15% (range:-8.57%). Ones of the foremost effective treatments applied PAM applied PAM at 10g m-3 in irrigation inflows during furrows during the furrow advance period. The initial high load treatment was nearly twice as effective as continuous 0.25g in 3 PAM application on these soils when slopes were 1-2%. The initial high load treatment protected furrows with slopes ranging from 0.5 to 0.35%.

Use of more advance polyacrylamide (PAM) polymers was not initiated until the last decade. PAM formulations with a wider range of molecular weights charge types, and densities are now available for agricultural uses. They are more effective, less expansive and more convenient to use that early polymers (Wallace.A. and Wallace 1986). when applied to the soil surface as a solution, PAM is readily and irreversibly absorbed to soil particles hence, main effect occurs within 1-5cm depth (Mitchell 19860 and perhaps even closer. Most of the applied PAM is apparently bound to external surfaces of soil aggregates (Malik and Leyte 1991), physical properties of PAM-treated soils differ from their untreated countermarks.

M. Malik & J. letey(5) Adsorption isotherms were determined by batch technique for six trillium labeled polymers on three soils, one of which was pretreated to create a high exchangeable sodium percentage. Three anionic polyacrylamide compounds (gaur) had a higher positive charge (T-4141), a lower positive charge (CP-14), and negative charge. Adsorption of CP -14, 21J, and T-4246 was measured on Mont-morillontic clay extracted from one soil and a specimen sample of montomorillonite clay. Adsorption of a given polymer on the low ESP soils was not significantly different, but was significantly higher on high ESP soil. The adsorption isotherms were T-4141 21J >CP14 40J 22J> T-4246 and adsorption on sand was only little less than on soil. The adsorption on clay was CP-14 T-4246 22J. The data suggest that the PAM and gaur polymers studied do not penetrate the aggregates because adsorption was approximately the same for all soils for similar aggregates sizes. Molecular sizes. Molecular confirmation and electrostatic charge each significantly affected the adsorption isotherms SYNTHETIC POLYMERS have remarkable capabilities for stabilizing soils aggregates for precisely or during a mixing process (Gardner, 1972). The early research reviewed by Gardner generally involved applying the polymers as a dry powder, mixing, moistening the soil and tiling the soil to form desirable sized-aggregates. The treatment procedure was cumbersome, usually involved applying high concentration of polymers and, therefore was not economically feasible. Another approach is to apply soluble polymers with irrigation water to stabilize existing soil aggregate. Helilia and letey (1988), Ben hur and letey (1989) and en-hur et al (1989) found the solution concretra's 10 mg L of polymers was effective in maintaining high infiltration rate under laboratory rainfall stimulator conditions. The beneficial effects of polymer treatment were marginal in successive post-treatment rain events. Theng (1979)

reported that a fairly accurate prediction is possible about the mode of bonding and orientation of short chain organic molecules adsorbed to the clay soil. The more recent development of synthetic polymers with molecular weight of 10 to 15 million g mol-create additional variables to be studied.

IV. CONCLUSION

Based on the experimental investigations on stabilization of soil we conclude that the sub – base strength of the agricultural roads is increased by addition of PAM within the soil. By practically adopting this proportion of polymer within the soil within the construction of rural road techniques subsequent results are often obtained. thanks to this the development activity cost of the agricultural construction are going to be reduced with the increased life.

Hence, we conclude that the soil mixed with 0.02% by dry weight of the soil are often used as an honest subgrade stabilization agent, to reinforce the performance of the flexible pavement, which may be beneficial within the formation of rural roads.

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Conceptual Design of Mechanism for Wheel Driven Fertilizer Sprayer

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ABSTRACT

In agricultural sector generally farmer use traditional way, sprayer is carried on back for spraying fertilizer on crop. This becomes time consuming, costly and human fatigue is major concern, these problems can be subdues by using wheel driven fertilizer sprayer. It facilitates lesser human effort, uniform spread of the fertilizer, capable of spraying at the desired level, precision made nozzle tip for adjustable stream and capable of throwing foggy spray depending on requirement. In our project we use crank mechanism to convert rotary motion into reciprocating motion to operate the pump, thus the pesticide is spread through the nozzle. This work gives continuous flow of pesticide at required pressure and height. A special arrangement is implemented in this project to adjust the pressure as high or low.

Keywords : Agriculture Sector, Human Fatigue, Sprayer, Reciprocating Pump, Science And Technology.

I. INTRODUCTION

Most commonly farmers use the traditional way that is sprayer is carried on back and spraying of crop is done this becomes time consuming, costly and human fatigue is major concern. Present day in agriculture the sprayers play an important role in spraying pesticide. Although sprayers vary like motorized, hand operated. Spraying pesticide is an important process in farming. Now days, there are many types of pesticide sprayer already in market.

For the different types of pesticide sprayer there are have a different shape, sizes, method to carry it but the function are same. The current idea on sprayer in our project is to utilize effectively for reducing time of spraying, human efforts and cost of spraying.

The conventional sprayer having some difficulties such as it needs lot of effort to push the lever up and down in order to create the pressure to spray. Another difficulty of petrol sprayer is to need to purchase the fuel which increases the running cost of the sprayer; it produces more vibrations and noise that irritates the farmer and so he refuses to do

such work repeatedly. In order to overcome these difficulties, we proposed a wheel driven sprayer. It is a portable device and no need of any fuel to operate, which is easy to move and sprays the

Pesticide by moving the wheel. The mechanism involve in this sprayer is reciprocating pump, and nozzles which were connected at the front end of the spraying equipment. A special arrangement is implemented for adjusting the pressure as low and high with the help of adjusting the nut. Also, the weeding is done by this equipment. In Agricultural sector use of cheap and beneficial equipment for effective weeding and spraying for increase productivity which is very important for better contribution for India's GDP. We have to make economic machineries so that farmer can purchase it. Present scenario in agricultural field in India related

to sprayer is that farmers are using hand operated sprayer or motorized sprayer. According to idea in our project we are making a small agricultural reciprocating multi nozzle sprayer which is mechanically operated by a single -slider crank mechanism. One vertical arm is attached in front of cycle and one horizontal arm at top of the vertical arm. Nozzles are fitted to this arm so that it can spray pesticide both the sides. As more no of nozzle are there hence spraying is done rapidly and time and money is saved.

II. WORKING OF MECHANISM

In this project all the arrangement are mounted on the trail & is moved by the rotation of wheel. In these arrangements there is use of one wheel for moving the trail, by using the crank mechanism the rotary motion of wheel is converted into reciprocating motion with the help of chain drive mechanism. With the rotation of wheel, chain drive operates the crank mechanism and due to this arrangement the connecting rod moves upward and downward which reciprocate the piston and results in pressure rise in the tank which force the pesticide or liquid to come out and gets sprayed through the nozzles.

A. Details

Capacity of tank – 16 litre
Diameter of wheel – 508 mm
Stroke of pump – 108mm
Length of connecting rod – 490 mm
Radius of crank – 27 mm
Teeth's on sprocket – 44 no.
Teeth's on freewheel – 18 no.
Velocity ratio of chain drive – 2.4
No. of nozzles – 6 no.
Stroke at one revolution – 2.5
Volume delivered per stroke – 90917.11 mm^3
Length of ground sprayed per litre – 5317 mm

III. ADVANTAGES

- Multiple nozzles can be used.
- Wide area of spray can be covered.
- Required pressure can be built up.
- Less expensive in comparison to other sprayers.
- Electricity and fuel are not required
- It eliminates the detrimental effect of backpack sprayer on body.
- It consumes less time and saves money as compared with conventional spraying.
- Low maintenance, since it does not require any fuel or power.
- When not in use the sprayer tank can disconnected from wheel.
- The risk of back pain is reduced. This pump can be used for multiple crops. The model has provided with multiple nozzles, which has continuous spray over crop and this process takes less time than other sprayers for spaying.

Name of Component	Dimensions	Material	Quantity
Tank	16 litres	Plastic	1
Shaft	D-20mm, L-254mm	Mild Steel	2
Wheel	D-506mm	Rubber	1
Crank Plate	D-127mm	Mild Steel	1
Frame	38 mm	Mild Steel	1
Nozzle	PL D-5	Stainless Steel	6
Chain	4	Alloy Steel	1
Sprocket	18 teeth	Cast Iron	1
Pedestal Bearing	240 UCP (20mm)	Hardened Steel	4
Freewheel	18 teeth	Cast Iron	1

Figure 1.

Table 1.

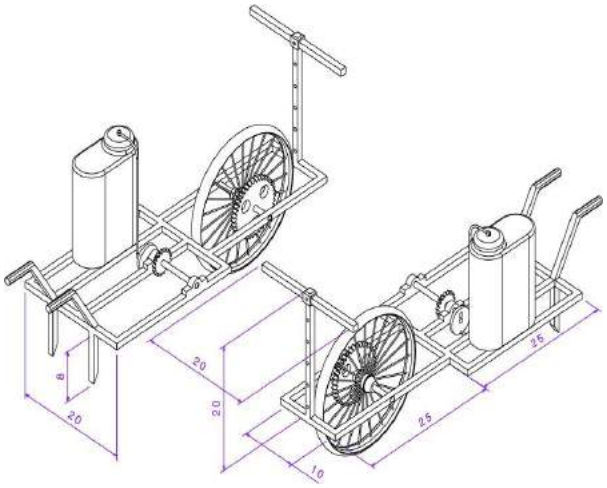

Figure 2.

IV. CONCLUSION

A proposed design of mechanism is suitable, efficient and time saving. The pressure developed in the tank is as per the requirement and thus has resulted in the optimum working pressure hence, this has significantly reduced the efforts to operate the sprayer. This alone pump can used for multiple crops.

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Labour Safety and Protection System Using Magnetic Handgloves

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ABSTRACT

This system is specially designed for the benefit of the workers. The cutter machine is very risky work as the workers always do their work near the high speed motors. By implement of this protection the worker can work securely under the working days as well as maintenance day. The power loss also can be reduced. Under the normal operating condition, the worker works on the machines. If any of the worker close very near to the machines and conveyors than the deactivated sensor get activated and stops rotation of motor and a the alarm circuit get activated to inform the other workers. And there is also a provision of activated sensor which is provided for activating machine again. The activated sensor can used for starting of if the machines are in deactivated mode. For stopping and avoiding the accidents situation this system is designed. The wireless circuit is the need of the time. But the more advancement in the technology the risk also goes on increasing for the safety and security purpose the circuit must be made safer so that the information or the property could be saved. This plays a very important role in protection of workers in the industries.

Keywords : Transformers, IR sensors, DC motor, activated and deactivated sensor.

I. INTRODUCTION

Due to rapid industrialization, industrial workers are exposed to several types of hazards and accidents. Every year lakhs of workers are injured due to mechanical, chemical, electrical and radiation hazards and it leads to partial or total disablement. So in recent years, greater attention is given to health and safety due to pressure from government, trade unions, labour laws and awareness of employers. The efficiency of workers depends to a great extends on the environment in which the work. Work environment consists of all the factors, which act and react on the body and mind of an employee. The primary aim is to create an environment, which ensures the greatest ease of work and removes all causes of worries. Occupational health and safety is a discipline with a broad scope involving many specialized fields.

The real-time monitoring system is useful for the primary safety measures. The recent advancements in wireless sensor network leads to advancements in wireless communications. The various sensors at the location sense the environment and provide the recent activities or condition of the underground coalmines [1]. 'Electrical safety in the workplace' refer to electrical safety for all workers and general safety for electrical workers. 'Falls, slips, and trips' caused between 28% and 33% of the injuries from 2011 to 2016 and 'Contact with object or equipment' was responsible for 25% to 34% of nonfatal electrician injuries. This paper gives the information that electricians are killed by exposure to electricity,

falls, transportation accidents, contact with objects or equipment, and violence and to reduce rates of such deaths higher numbers of electrician fatalities in recent years emphasize safety in all manner of works [2]. Most of the common magnetic sensing methods have been described and the underlying physical principles governing their operation have been highlighted. A varied set of applications that exploit specific characteristics of these sensors was also described. The future trends in magnetic sensors should be discussed from these same two perspectives—physics and applications [3]. The function of pickup unit is distinguishing the electricity system whether ready has breakdown, when the electricity system operate normally, this unit does not start, causes the protection not to work; when the electricity system breakdown, it causes the protection work immediately. The phase abrupt current and the phase-phase abrupt current's range of variation wider than that ordinary load's about 0.6 time [4]. Coal mine accidents will generally be divided into class 8 of gas, water disaster, roof, fire, transportation, electrical, blasting, and other incidents based on cause of the accident. In this paper, cluster analysis is used to discuss the number of coal mine accidents, the type of accident and casualties in areas of 25 provinces in recent years in order to find the provinces between the coal mine accident types of similarity [5].

II. METHODOLOGY

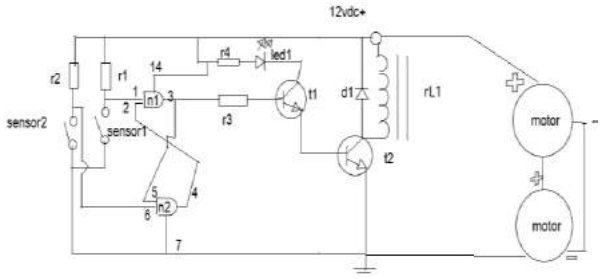

Fig 1. Wireless Magnetic Field Circuit for Hand Glows with Motors and Cutter

2.1 Bridge Rectifier

A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. This is a widely used configuration, both with individual diodes wired as shown and with single component bridges where the diode bridge is wired internally. In actuality, free electrons in a conductor nearly always flow from the negative to the positive pole. In the vast majority of applications, however, the actual direction of current flow is irrelevant. The 12v Ac supply is converted into the 12DC by this rectifier. It mainly consist of four diodes.

2.2 Filter

The simple capacitor filter is the most basic type of power supply filter. The application of the simple capacitor filter is very limited. It is sometimes used on extremely high-voltage, low-current power supplies for cathode ray and similar electron tubes, which require very little load current from the supply. The capacitor filter is also used where the power-supply ripple frequency is not critical; this frequency can be relatively high. The capacitor (C1) shown in figure 4-15 is a simple filter connected across the output of the rectifier in parallel with the load. The capacitor is act as filter for the each circuit. Due to use of this capacitor the ac components blocked and dc components are bypassed.

2.3 Reed Switch

A reed switch is an electromagnetic switch used to control the flow of electricity in a circuit. They are made from two or more ferrous reeds encased within a small glass tube-like envelope, which become magnetized and move together or separate when a magnetic field is moved towards the switch. The switch effectively works like a gate, or a bridge, in an electric circuit so when the two reeds are in contact,

electricity can flow around the circuit operating a device. Unlike mechanical switches they do not require something or someone to physically flick them on or off, they are controlled completely by invisible magnetic fields. Two types of reed switch are used for activation and deactivation of machines under fault and normal condition.

2.3 DC Brushed Motor

A geared DC Motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as RPM. The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable rotation. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. The rotation of the motor is reduced due to use of gear mechanism and the torque is also increased.

2.4 Transmitter and Receiver

Infrared Transmitter is a light emitting diode (LED) which emits infrared radiations. Hence, they are called IR LED's. Even though an IR LED looks like a normal LED, the radiation emitted by it is invisible to the human eye. There are different types of infrared transmitters depending on their wavelengths, output power and response time. A simple infrared transmitter can be constructed using an infrared LED, a current limiting resistor and a power supply

Infrared receivers are also called as infrared sensors as they detect the radiation from an IR transmitter. IR receivers come in the form of photodiodes and phototransistors. Infrared Photodiodes are different from normal photo diodes as they detect only infrared radiation. Different types of IR receivers exist based on the wavelength, voltage, package, etc. When used in an infrared transmitter – receiver combination, the wavelength of the receiver should match with that of the transmitter.

III. ACTUAL WORK

The power supply will be step down from 230volt ac to 9 volt dc and the on the dc source the receiver circuit will be attached to the cutter mechanism or say roller. The motor will be connected to the receiver circuit. Many times it happens while working the chances of getting an accident can happen so for avoiding whenever the workers hand or the body moves really very close in contact to the machine there might be chances of damages to the body parts so for protection this circuit is used. If the person comes in close contact of the sensor frequency really very close the frequency based circuit automatically will stop the machine and the machine, also will be stopped automatically only when the workers hand that means the person moves away from the receiver circuit the machine will start automatically only when the workers move on another sensor by first carefully seeing that the workers who was fall on the machine or fall near the machine has safely move away from the machine. And also the invisible rays circuit will detect the workers movement in the danger zone will alert the workers or the staff by producing the sound or siren when the invisible rays is interrupted by the workers body or hand near the danger zone. And the siren will be automatically off when the workers body has moved out of danger zone. So this circuit is helpful in all terms. This is a wireless circuits. Working area will be less than 1 inch.

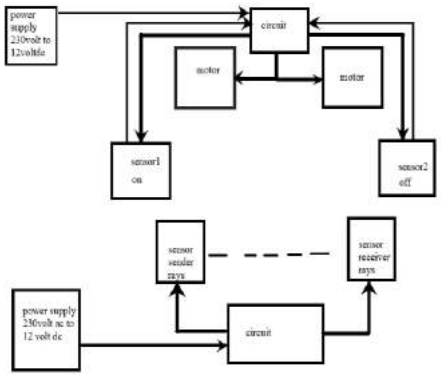

Fig 2. Block Diagram

IV. PRACTICAL RESULTS

The system get started by using the magnet and the reed switch. And when the worker who are working on the machine get protected when the worker hand slips. The alarm is also sounds the noise to alert other workers. The sensor deactivate motor when worker is near to the motor.

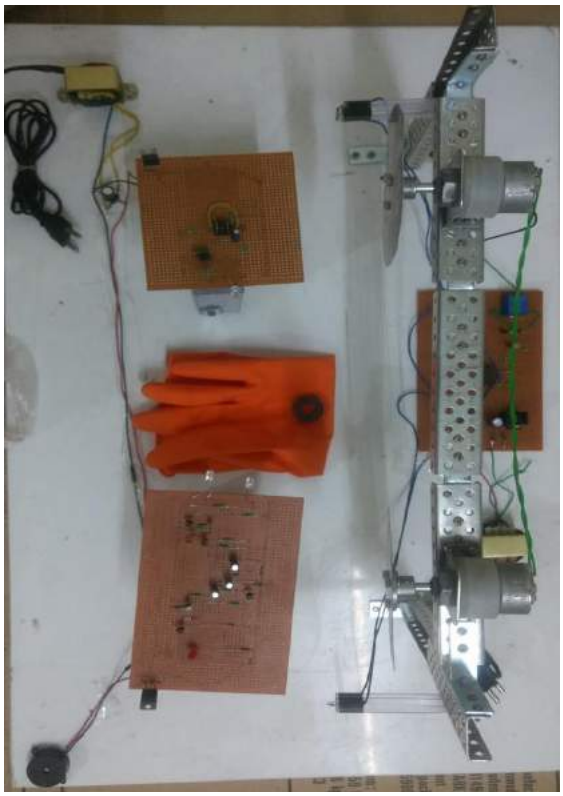

Fig. 3 Working Model

V. APPLIANCES

1. This system is specially designed for the benefit of the workers.
2. For stopping and avoiding the accidents situation this system is designed.
3. The protection and the safety of the workers these two norms are the most preferred norms in todays smooth and healthy working environment of the industry.

VI. ADVANTAGES

1. Wireless circuits.
2. Working on standard frequency and it is also an accident avoiding system.
3. The workers safety system can be made when they are working on the machine for high-speed cutter or motors.
4. Working on dc motor and gear system is also installed for the conveyor machine so that in case of switching off the cutter machine the blades will be stopped in fast moments.

VII. CONCLUSION

This system is use to provide a continuous power supply connected to the load from any of the four different sources i.e. solar, wind, mains and generator in automated mode in the absence of any source. The whole system is based on microcontroller Atmega16 which has low cost and efficient system. The particular components which has used give better maintenance and long period to the system.

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Performance of STATCOM Based on Hybrid Cascaded Multilevel Converter in Power System

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ABSTRACT

A novel static synchronous compensator (STATCOM) based on hybrid cascaded multi-level converter (HCMC) is presented in this study, i.e HCMC-STATCOM, which combines the advantages of the traditional two-level converter and cascaded H-bridge converter. However, the topology and control system are relatively complex. It is difficult to coordinate the two key parts in steady operation. This study firstly introduces topology and working principle of the HCMC-STATCOM. In order to achieve the coordinated control of two key parts, a control strategy is proposed to achieve the coordination and synchronization between the two parts of the HCMC-STATCOM. The HCMC-STATCOM simulation model is built by using MTLAB software.

Keywords : Two-Level Converter, Cascaded H-Bridge Converter HCMC-STATCOM, Control Strategy

I. INTRODUCTION

At present STATCOM (static synchronous compensator) is found with a multiple transformer and a multilevel converter. A multiple transformer structure requires the phase-shifting transformers, which result may be expensive, loss, large area. Multi-level converter structure contains the topology such as diode clamped converter, flying capacitor-clamp converter and cascaded H-bridge converter. Generally it has been found that the diode-clamped converter and flying capacitor-clamp converter use to avoid the disadvantages of the multiple transformer structure. If level increases, the result of which clamping diode will increase the number of floating capacitors and it is very difficult to the design the device. The cascaded H-bridge STATCOM has the advantages of low harmonic content and high efficiency. Although the high-voltage cascaded H-bridge STATCOM requires sub-modules and requires more large and bulky DC capacitors. This paper presents a hybrid cascaded multi-level converter (HCMC) type STATCOM called as HCMC-STATCOM. It has topology which consists of a two part wave-shaping circuit, which is a cascade of conventional two level converters and H-bridge sub-modules. Compared with the STATCOM with two levels, the HCMC-STATCOM with a wave-shaping circuit formed by cascading H-bridge sub-modules does not have any additional filter and due to which it greatly reduces the loss. HCMC-STATCOM does not need to use transformers to increase the device capacity and reduce the output voltage harmonics as compared to the STATCOM based on multiple transformer structure. the output AC voltage of HCMC-STATCOM is shared by the two level converters and wave-shaping circuit due to which it significantly reduce the number of sub-modules and DC capacitors. Hence, it can greatly reduce the size

of the device and cost. This paper based on the topology, working principle and coordinated control strategy of HCMC-STATCOM.

II. Circuit topology and working principle

2.1 Circuit topology

The topology of HCMC-STATCOM is shown in Fig. 1.

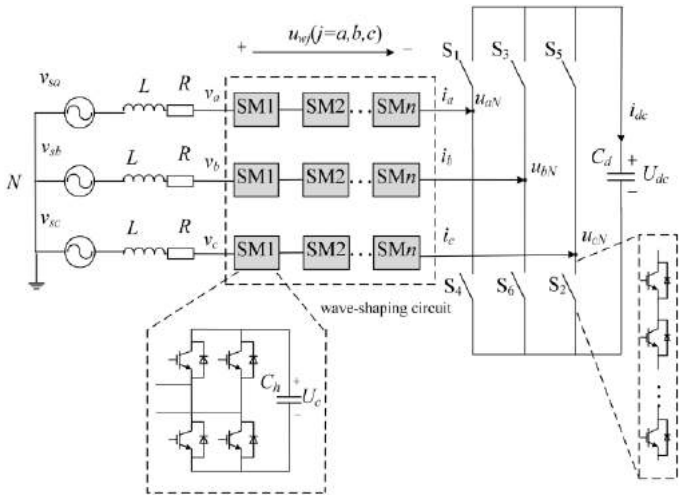


Fig. 1 Topology of the HCMC-STATCOM

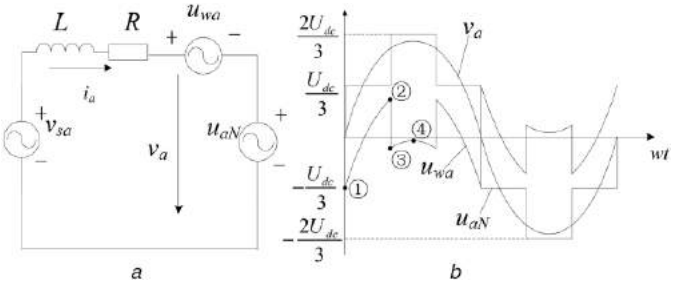
The topology consist of two parts first is a two-level converter with IGBT and an anti-parallel diode in series and second is a wave-shaping circuit cascaded with the H-bridge sub -module.

As shown in Fig. 1, vsa, vsb, vsc and ia, ib, ic shows three phase AC voltage and current; va, vb, vc denote three-phase output voltage of HCMC-STATCOM. L is inductance, R is equivalent resistance. vwa, vwb, vwc are the voltage of three-phase wave-shaping circuit. vaN, vbN andvcN used to represent AC phase voltage of two-level converter.Udc represents rated DC voltage of two-level converter, idc represents DC current of two-level converter,Cd represents capacitance of two-level converter,Ch represents Capacitance value of H-bridge sub-modules. Uc represents rated voltage of H-bridge sub-modules capacitor. Each phase wave shaping circuit having N H-bridge sub-modules in series and it is located in the AC side of the two-level converter. In normal Working each H-bridge sub-modules has three modes of operation positive input, negative input and cut off or may be called bypass respectively.

2.2 Working principle

HCMC-STATCOM is consider in steady operation then two-level converter wll turn on or turn off alternately in each bridge arm. The wave-shaping circuit input and cut-off cascade H-bridge sub modules used for making the output AC voltage approximation to the desired sinusoidal reference wave. In Fig. 2 shows the output voltage reference waveform of HCMC-STATCOM single-phase equivalent circuit and two-level converter, wave-shaping circuit and HCMCSTATCOM. in Fig. 2, the output AC voltage of HCMCSTATCOM having the two-level converter and the wave shaping circuit. Consider phase A as an example and it may conclude from Figs. 1 and 2 that the basic characteristics of HCMC-STATCOM are

Determined by (1)–(5):



$va(t) = Um\sin \omega t$ ..... (1)

$ia(t) = Im\sin(\omega t + \pi/2) = Im\cos \omega t$ .....(2)

$va(t) = uwa(t) + uaN(t)$ .....(3)

$uaN(t) = MaU\text{dc}$ .....(4)

$uwa(t)= \Sigma k = 1\ Gk(a)Uck(a)$ ……(5)

where *Um* and *Im* represents the HCMC-STATCOM export phase voltage and AC current respectively. ω gives angular frequency, *Ma* is used for the switching factor and it is calculated by the two-level converter switch signal , $Uck(a)(k = 1,2,\ldots,N)$ represents capacitance voltage of the *k* H-bridge sub-module in phase A wave-shaping circuit , $Gk(a)(k = 1,2,\ldots,N)$ is the switching function of the *k* H-bridge sub-modules in phase A wave-shaping circuit, with respective to its operating mode, positive inputs ($Gk(a) = 1$), negative inputs ($Gk(a) = -1$) and cut off ($Gk(a) = 0$).

III. Coordination control strategy

3.1 Control strategy of HCMC-STATCOM

Under the d*q* coordinate system, the mathematical model of HCMC-STATCOM AC side can be written as,

$$L\frac{\mathrm{d}}{\mathrm{d}t}\begin{bmatrix} i_d \\ i_q \end{bmatrix} = \begin{bmatrix} v_{sd} - v_d \\ v_{sq} - v_q \end{bmatrix} + \begin{bmatrix} -R & \omega L \\ -\omega L & -R \end{bmatrix}\begin{bmatrix} i_d \\ i_q \end{bmatrix}$$

where *id*, *iq* use to represent active and reactive current. *vsd* and *vsq* use to represent d*q*-axis component of AC system voltage. *vd*, *vq* use to represent d*q*axis component of HCMC-STATCOM output voltage. With respective mathematical model the active-reactive current feed forward decoupling control strategy is used. The control strategy of HCMC-STATCOM is shown in Fig. 3. The *id** and *iq** used to represent active and reactive current respectively. *vj** ($j = a,b,c$)

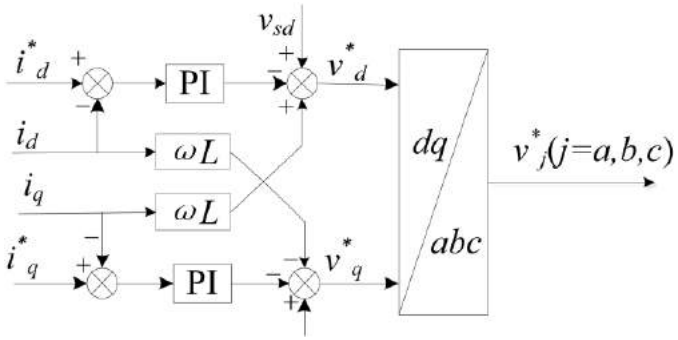


Fig. 3 *Control strategy of the HCMC-STATCOM*

3.2 Control strategy of two-level converter

For stabilizing the capacitor voltage of the two-level converter, the voltage outer loop control is used to compare the actual value of the DC side capacitor voltage with the set value and the active current reference value *id** is obtained through the proportional integral (PI) controller, as shown in Fig.4.

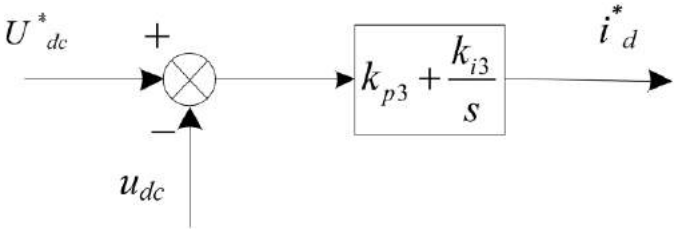


Fig. 4 Control strategy of the two-level converter

*U*dc is the actual DC voltage of two-level converter, and *U**dc is the reference value of DC voltage. The PI controller creates a phase difference between the HCMC-STATCOM output voltage and the AC system Voltage for compensating the active loss of the HCMC-STATCOM. So, stabilizing the capacitor voltage.

3.3 Control strategy of wave-shaping circuit

Wave-shaping circuit and its capacitor voltage stability control strategy are shown in following Fig. 5.

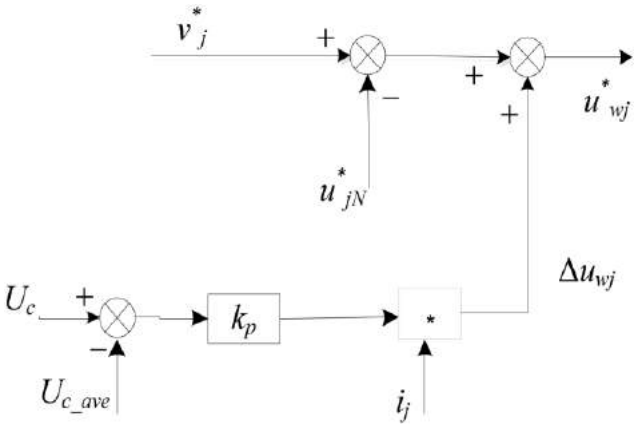


Fig. 5 *Control strategy of the wave-shaping circuit*

uwj^*, $ujN^*(j = a,b,c)$ represents the output reference voltage of wave-shaping circuit and two-level converter. Uc represents rated voltage of sub-module capacitor; Uc_ave denotes average of all sub-module capacitor voltages in three-phase wave shaping circuit. The output voltage uwj ($j = a, b, c$) of WSC(three phase wave shaping circuit) can be written as

$$uwj(t) = vj(t) - ujN(t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

From (7), the output reference voltage uwj^* of the wave-shaping circuit is calculated by the HCMC-STATCOM output reference voltage vj^* and the two-level converter output reference voltage ujN^*. When the two-level converter switch signal is calculated then the output line voltage depends simply on the converter itself and the output voltage is affected due to the voltage across the wave-shaping circuit. Therefore, the output voltage can be found by two-level converter ujN^*.

Uc_ave is the average of the capacitor voltages of all the submodules in the three-phase wave-shaping circuit, Uc_ave can be expressed as

$$U_{c\_ave} = \frac{1}{3N}\left(\sum_{k=1}^{N} U_{ck(a)} + \sum_{k=1}^{N} U_{ck(b)} + \sum_{k}^{N} U_{ck(c)}\right)$$

Instantaneous active power ΔPj which produced can be expressed as

$$\Delta Pj = \Delta uwj * ij = kpij\,2\,(Uc - Uc\_ave)$$

When $Uc > Uc$_ave then $\Delta Pj > 0$ so, the active power ΔPj flows into the wave-shaping circuit from the AC system to charge the capacitor voltage upto the rated value Uc. When $Uc < Uc$_ave then $\Delta Pj < 0$ so, the wave shaping circuit delivers the active power ΔPj to the AC system so that the capacitor voltage discharge drops to the rated value Uc. Hence, through the control strategy as shown in Fig. 5 the wave shaping wave shaping circuit sub-module capacitor is charged and discharged, and the capacitor voltage in the WSC can be kept stable.

3.4 Coordination control strategy between wave-shaping circuit and two-level converter

To ensure output AC voltage of HCMC-STATCOM is sine waveform with low distortion rate, there is need of twolevel converter and wave-shaping circuit coordinated with each other Two-level converter using square wave modulation strategy. The two-level converter output voltage ujN will change only when output voltage of HCMC-STATCOM vj is across zero. The shaping circuit output voltage uwj must be synchronized with the two-level converter output voltage ujN to obtain HCM-STATCOM output voltage vj smooth without mutation. When ujN decreases uwj should rise synchronously and if ujN increases uwj should decreases synchronously .Otherwise, the HCMC-STATCOM output voltage vj spikes which will affect the output voltage. Wave-shaping circuit calculates nearer level modulation strategy. Once is calculate the number of levels which should be in the output of three phases, the modulation controller obtained the sub-modules to put or removed according to the equalization control algorithm of the sub-modules. Nearer level modulation strategy (NLM) sub-module voltage-sharing control algorithm basically a control strategy

which works on the direction of current and voltage of submodule for selective switching control strategy. the two-level converter output voltage *ujN* instantly change the control signal generated at the same time in such away that wave-shaping circuit output voltage *uwj* synchronous the changes In order to prevent the HCMC-STATCOM output voltage *vj* spikes.

IV. MODEL AND SIMULATION

Three-phase 35 kV/ ± 50 Mvar HCMC-STATCOM system is simulated and verify its performance in the system.

1) The AC system voltage is 35 kV.
2) The rated reactive power is ±50 Mvar.
3) Inductance is 4.8 mH.
4) Resistance is 0.01 Ω.
5) The number of H-bridge modules per phase is N= 15.
6) The sub-module capacitance is 9783 μF.
7) Two-level converter DC voltage is 39.4 kV.
8) The capacitance is 126 μF.

The two-level circuit and the wave-shaping circuit adopt the square wave modulation and the NLM strategy. The simulation waveform is shown.

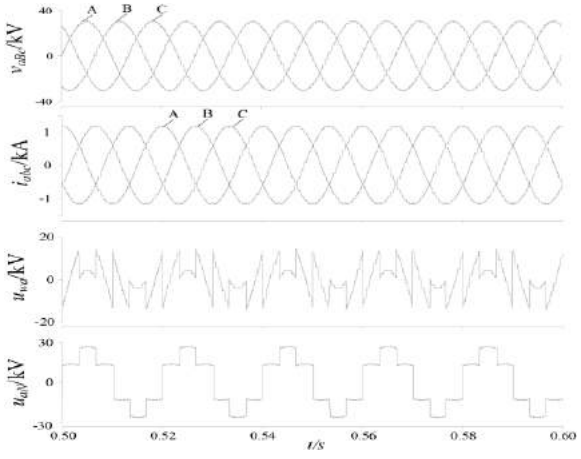


Fig. 6 *Waveforms on steady-state operation*

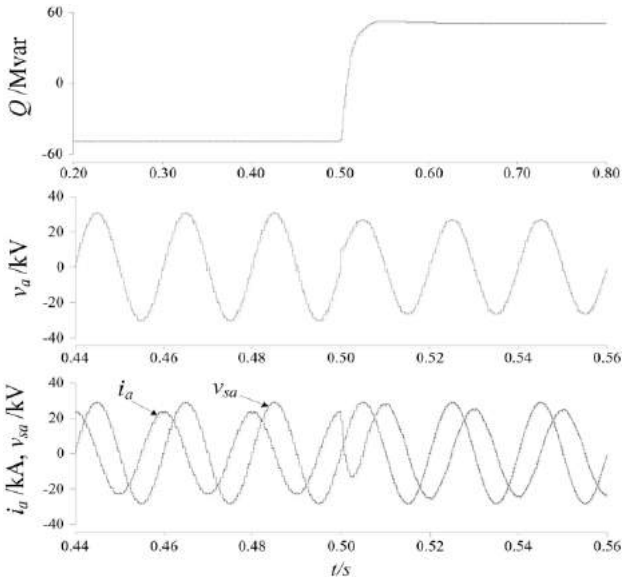


Fig. 7 *Dynamic response of the HCMC-STATCOM to reactive power demand change*

In the above Fig. 6 represents HCMC-STATCOM three-phase output voltage, three-phase AC current, A-phase wave-shaping circuit voltage and the two-level converter output phase voltage. it is also found the system gives best running performance and waveform quality. Harmonic content of HCMC-STATCOMC output AC phase voltage and current is small. In the above Fig. 7 gives the response characteristics of HCMC-STATCOM the changes of HCMC-STATCOM absorption reactive power, A-phase output voltage and current. HCMC-STATCOM absorbs reactive power from –50 to +50 Mvar at 0. Indicates its dynamic response is very fast.

V. CONCLUSION

This paper studies on HCMC-STATCOM (hybrid cascaded multi-level converter type stationary synchronous compensator. It gives the advantages of the conventional two-level converter and the cascaded H-bridge converter with different topology. For control ing the two key components, this paper represents the coordinate control strategy of HCMCSTATCOM. the three-phase 35 kV/ ± 50 Mvar

HCMC-STATCOM simulation model is built.From simulation results it is clear the performance of HCMCSTATCOM topology and effectiveness of the coordinate control strategy.

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Face Detection by Fusion of Infrared and Visible Imagery

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ABSTRACT

This paper presents an approach of fusing the information provided by visible image with that of infrared image. However due to the limitations of hardware devices and applications in environment we are completely working on software basis. This fusion process is challenging which include object detection, extraction of features from image for that we need of different thresholding techniques. We are deciding the feature of image by extracting accurate parameters of pixels of image. Then we are training the dataset according to the features of image whether the feature is of male or female. For the training purpose we are using Carl Database.

Keywords : Face Detection, Infrared Image, Visible Image

I. INTRODUCTION

The main aim of the image processing is to extract necessary data from images. Image fusion is an augmentation technique that aims to combine images which will allow useful information to be extracted from source image and intermix in the fused image the output image will be more informative than the source image. Visible images can afford texture details with high spatial resolution and definition in a manner consistent with human visual system. Infrared images can figure out targets from their backgrounds based on the radiation difference, which works well in all-weather and all-day/night condition .We collected a Carl database which possess the known information of three kind of images i.e. Visible (Natural image),Infrared (Thermal image),Artificial image(Edited image). Firstly we perform read and write operation on visible image then convert visible image into gray scale image probably gray scale image contain the range of 0-255 pixels so that it will be convenient for calculation purpose, after that we convert gray scale image into binary image(0-1) by using thresholding technique. There are different types of thresholding such as THRESH_BINARY,THRESH_BINARY_INV,THRES H_TOZERO etc, we used THRESH _BINARY, by performing the thresholding technique we get the region of interest from image. The most challenging part is to print pixels of an image, after printing and comparing the pixel of both gray scale and binary image we highlight the region of interest of image. For the perfect detection of object from image without any distortion or noise we use object evaluation parameter such recall, precision etc. The experimental results are done to demonstrate the effectiveness of fusion visible and infrared to show whether it is male or female we use a database to train the machine to recognize the feature of male and female.

II. METHODS AND MATERIAL

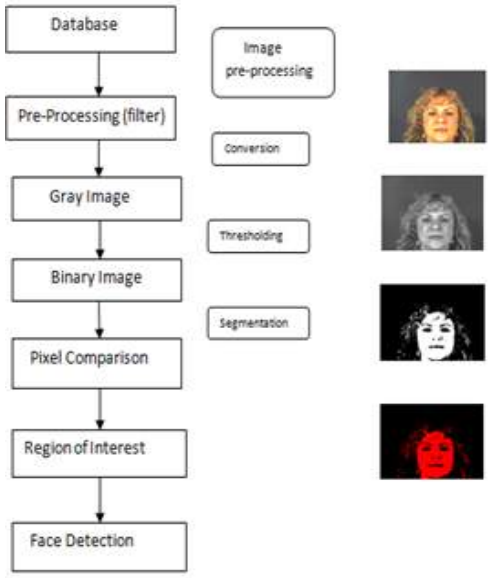

Fig. Flowchart of Face Detection

In the above flowchart, we describe the each process of the face detection in that we acquire the image from the database (Carl Database) and pre-processing is done on the image by using filters. After that we convert the visible image (colour image) into gray scale image after conversion thresholding method is used to convert gray image into binary image (0-1form).compare the pixel of gray scale and binary image to detect the ROI(Region of Interest)then finally detect the object by using object detection or evaluation parameter.

III. RESULTS AND DISCUSSION

For experimental purpose we used Carl database as our experiment is software based so we do not use any kind of hardware. The program implementation was done in eclipse as our project is java based also we used Opencv platform for image processing purpose. Machine learning was done in WEKA. We analysed the improvement in the performance acquired by fusing visible and infrared imagery.

IV. CONCLUSION

In this paper we presented the schema for combining visible and infrared image for object detection and gender reorganization. To acquire accurate object from image we used thresholding technique. We used object detection evaluation parameters to identify automatically gender of object.

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Android Based Nagpur Metro Route Navigator

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ABSTRACT

Android based Nagpur metro route navigator is an integrated service which provide all information about the transplantation in the city. This application is mainly focuses on the Metro rail transportation. In addition, this application will provide more information about another transportation media such as Bus stand, Auto stand, Metro station, Airport and railway station. The proposed system is an Android based application which provides information regarding timing, routes, interchanges, fair of Nagpur metro rail. This application will provide more facilities to the users that is, distance and location of Bus stand, Auto stand, Metro station, Airport and railway station from the current location of user. There is also an admin module where admin can add stations, trains, routes and update the fairs. The admin is a panel consisting of a group of authorized persons.

Keywords : Transport, Metro, Bus-stop, Airport

I. INTRODUCTION

This is an Android based application which will provide information about transportation in the Nagpur City. This application will help the users to get the information about metro rail timetable, stations, routes, interchanges and travelling cost and also helps the users to get the information about another transportation media, this app also show the location of nearest Bus stop, Auto Stand, Metro station, Railway station and Airport from the current location of user.

A person with just an internet can get this all information. Other than that by entering the destination station the user can get all sort of information about trains arriving and departing from the stations, it's fair details and even it provides you the route map.

There is also an admin module where admin can add stations, trains, routes and update the fairs. The admin is a panel consisting of a group of authorized persons.

II. METHODS AND MATERIAL

Following are Based on Metro management:

- **Nagpur metro TechN Labs**

This application is providing services such as Route, Book cab, Metro locator, The smallest route to reach the destination from metro stations, timings of metros in Nagpur.

- **Nagpur Metro effective App Developer**

This application is providing services such as Metro Route Map, Metro stations, Metro Fare-calculation, Metro-parking.

Nagpur Metro techno star

This application only providing information such about Metro Map, Corridor-Stations, Nearest Station, Station is Nagpur, etc.

- **Delhi metro**

Delhi Metro App is only showing the nearest metro Routes from current location of user, but this Application is not only showing the nearest station but also All nearest routes like auto stand, bus stand, Airports, railway stations etc. from the current location of user to its destination. It is an offline application, which once installed, provides all the information of **Delhi Metro** and much more. Information of all the lines, individual stations, first train timings, feeder bus service information, exit gates information, parking, lift, elevator facilities information etc. The **Metro** operates on an automated ticketing system. Tickets (which are cards or tokens) can be purchased from **ticket** counters at stations.

III. RESULTS AND DISCUSSION

Android based Nagpur Metro Route navigator is an application will help the user to get the all information about metro rail transportation. The system will help the user to know the nearby Bus stops, Railway station, Auto stands, Airport, Metro station from the current location of the user. The proposed system is designed to helps the user. By using this application, the users can get metro timetable. Other than that, by entering the source station and destination station the users can get all sorts of information about trains arriving and departing from the stations, it's fair details and even it provides you the route map.

The proposed system is designed to eliminate the disadvantages of the existing system. The proposed system "Android based Nagpur Metro route navigator" is mentioned for tracing the problems in the existing system.

This application includes the following five modules:

Module 1: Transportation media module

This is the module in which we get to know the distance of the nearby airport, railway station, bus stop, auto stand and metro rail from the current area the person is present.

Module 2: Metro time table module

This Module contains facilities like view time chart between two stations.

Module 3: Fair and Route Module

This module contains various facilities like display fair and display route map

Module 4: Admin Module

This module contains facilities like view & reply to complaints, issue smart card, add stations, add train, add route, add & update fair details, add trip and add admin

Module 5: User Module

In this module the user interaction is involved .The user will login into the application and enter the source and detestation to get the desired information.

The objectives of the project are as follows:

- The user can search for the nearby transportation media such as Metro station, Bus stops, Railway station, Auto stands, and Airport.
- User can view metro timetable.
- User can also view the fair details and the route maps.
- User can find tourist location.

- An admin login page where admin can add stations, trains, routes.
- Admins are authorized persons who can add new admin.

IV. CONCLUSION

As the project entitled Android based Nagpur Metro route Navigator was completed successfully. The system has been developed with much care and free of errors and the same time it is efficient and less time consuming. The purpose of this project was to develop a web application for metro rail management .This project helped us in gaining valuable information and practical knowledge on several topics like designing web pages using HTML &CSS, usage of responsive templates, designing of android applications, and management of database using MySQL . The entire system is secured. Also, the project helped us understanding about the development phases of a project and software development life cycle. We learned how to test different features of a project. This project has given us great satisfaction in having designed an application which can be implemented to any nearby shops or branded shops selling various kinds of products by simple modifications. There is a scope for further development in our project to a great extent. A number of features can be added to the system in future like watch me module, each admin having separate permissions.

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Comparative study on Video Steganography in Spatial and IWT Domain

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ABSTRACT

In this project we are introducing an enhacement of the grey-scale image ADAPTIVE Stegnography system using LSB(LEST SIGNFICANT BIT) to get a security for the personal data and communication. elective strategy to ensure the licensed innovation of computerized pictures. This Project shows a cross breed dazzle Stegnography method planned by joining RDWT with SVD considering an exchange off among impalpability and strength. The technique embedded the hidden information in the spatial domain of the cover image and uses simple (EX-OR Operationbased).Watermark inserting areas are resolved utilizing a changed entropy of the host picture. Watermark installing is utilized by looking at the symmetrical grid is acquired from the cross breed plot RDWT-SVD. In the proposed plan.

Keywords : JPEG2000, RWDT-SVD, LEST SIGNFICANT BIT, Watermark, RDWT-SVD.

I. INTRODUCTION

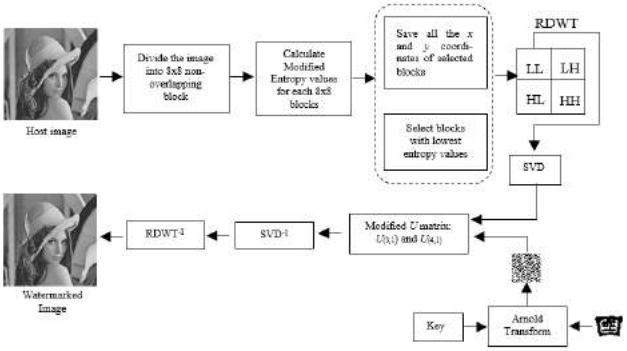
Big data has benefit big popularity and attracting attentions The anticipated idea fuses a model, to be specific, the Features Classification Forest, that extensively enhances the ability of visually impaired Stegnography frameworks without the symptoms of corrupting the physical property and quality, and it will be redone to those Stegnography methods upheld numerical property change or on the other hand a division system. These two courses here imply that a twofold arrangement will be installed by controlling a gathering of the properties of a picture in a methodical way to get a perceived condition inside which each property speaks to exclusively whichever an absolute or opposing approach, that the parallel grouping the absolute approach remains for bit , and furthermore the opposing approach remains for bit 0 will be implanted into the cover image.

Features Classification Forest The main topic utilizes the CRT hypothesis in light of the fact that the adjustment controls and put on the different trigonometric cosine change on an 8×8 estimated square. A DC and three AC quantities are picked on the grounds that the inserting zone to install the watermark bit flow.

The topic is included via the protection of JPEG pressure; at the same time, it's to some degree weaker than the fifth idea, which can be appeared inside the investigation area. The second idea applies (SVD) on a 4×4 measured square . By moving investigation of the connections of parts inside the U orthogonal lattice, the topic found that

the components set at the subsequent line introductory segment and in this manner the third line starting section are next to each option. Consequently, the watermark bit flow is inserted into the connection of those dual sections by modifying any one in everything about components,For this we will be going to use wavelet transform in our project

- The confidentiality and data integrity are required to protect against unauthorized access.
- This has resulted in an explosive growth of the field of information hiding.
- Moreover, the information hiding technique could be used extensively on applications of, military, commercials, anti-criminal, and so on.
- To protect secret message from being stolen during transmission, there are two ways to solve this problem in general.
- One way is encryption, which refers to the process of encoding secret information in such a way that only the right person with a right key can decode and recover the original information successfully.
- Another way is steganography, steganography literally means covered writing.
- Its goal to hide the fact that communication is taking place.



II. Image Processing

Image processing is a method to convert an image into digital form and perform some operations on it, in order to get an enhanced image or to extract some useful information from it. It is a type of signal dispensation in which input is image, like video frame or photograph and output may be image or characteristics associated with that image.

Usually Image Processing system includes treating images as two dimensional signals while applying already set signal processing methods to them. Image processing basically includes the following three steps.

- Importing the image with optical scanner or by digital photography
- Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs.
- Output is the last stage in which result can be altered image or report that is based on image analysis.

III. Research Methodology/Planning of Work

Operation

By taking advantage of human perception it is possible to embed data within a file. For example, with audio files frequency masking occurs when two tones with similar frequencies are played at the same time. The listener only hears the louder tone while the quieter one is masked. Similarly, temporal masking occurs when a low-level signal occurs immediately before or after a stronger one as it takes us time to adjust to the hearing the new frequency. This provides a clear point in the file in which to embed the mark.

However many of the formats used for digital media take advantage of compression standards such as MPEG to reduce file sizes by removing the parts which are not perceived by the users. Therefore the mark should be embedded in the perceptually most

significant parts of the file to ensure it survives the compression process.

Clearly embedding the mark in the significant parts of the file will result in a loss of quality since some of the information will be lost. A simple technique involves embedding the mark in the least significant bits which will minimize the distortion. However it also makes it relatively easy to locate and remove the mark. An improvement is to embed the mark only in the least significant bits of randomly chosen data within the file.

In this section a number of different information hiding techniques will be discussed and examined. The media involved vary from images to plain text. While some techniques may be used to hide a certain type of information, in most cases different information can be hidden depending on space restraints.

Binary File Techniques

If we are trying to hide some secret information inside a binary file, whether the secret information is a copyright watermark or just simple secret text, we are faced with the problem that any changes to that binary file will cause the execution of it to alter. Just adding one single instruction will cause the executing to be different and therefore the program may not function properly and may crash the system.

You may wonder why people would want to embed information inside binary files, since there are so many other types of data format we can embed information in. The main reason for this is people want to protect their copyright inside a binary program. Of course there are other means of protecting copyright in software, such as serial keys, but if you did a search on the Internet, key generators for common programs are widely available and therefore using serial keys alone may not be enough to protect the binary file's copyright. One method for embedding a watermark in a binary file works as follows. First, let's look at the following lines of code that have been extracted from a binary file

A New Stegnography idea is projected that would impressively enhance present day Stegnography practices. This idea endeavors the highlights of minor images of watermarks of the standard image. This will guide us to maintain secrete content and images in the social media.

This will safeguard us from unwanted hackers. Method of Analysis: To make connection methodology and Similar irrelevant images through fuzzy rules are grouped or might be produced using the host image to simulate an extracted watermark.

This technique, as the feature classification, forest, can do dazzle withdrawal and variable to any Stegnography topic utilizing a quantization-based module. In addition, a greater extent, a watermark is acknowledged while an incompatible influence on the physical property of the cover image. Findings: The tests show the profitable re-enactment of watermarks and furthermore the application to surprising Stegnography plans. One among them features classification, forest marginally balanced from a connection to especially opposing JPEG pressure, and furthermore, the authors demonstrate local benefits of the SVD adjustment method to oppose very surprising image

Due to the rapid and massive development of multimedia and the widespread use of the internet, there is a need for efficient, powerful and effective techniques to protect information. Different Stegnography techniques have been developed in spatial and transform domain methods, however, in recent years; the Stegnography techniques based on transform domain are developed to provide better robustness and imperceptibility [1].

Digital Image Stegnography techniques classified as private, semi private and public Stegnography techniques. In private Stegnography technique the

knowledge of cover image and secret key required to recover the embedded watermark from the watermarked image. In semi-private or semi blind Stegnography technique both the secrete key and the watermark required to extract the inserted watermark. In blind or public Stegnography technique only the secrete key is enough to extract the watermark [2]. Private Stegnography techniques have high robustness than the other two techniques. But the drawback of private Stegnography techniques is that they require original information to extract the watermark [31]. The main requirements of any Stegnography technique include robustness, visibility, and capacity. Robustness is the strength of the watermark so that it can withstand different image processing attacks such as cropping, rotation and compression, etc. Visibility of the watermark related to imperceptibility so that the appearance of the watermarked image may not be degraded by the presence of the watermark. The capacity of the watermark defined as the amount of data carried by it. 2 The technique of digital image Stegnography is used to embed copyright information into multimedia content. Generation of watermark, watermark insertion, detection of watermark and attacks on watermarked image are the different steps in digital image Stegnography [5], [6]. There are four essential factors which include robustness; imperceptibility, capacity, and blindness used to determine the quality of the watermarked image. The robustness of the watermark is tested against attacks like salt&pepper noise, Gaussian noise, JPEG compression, JPEG 2000 compression, median filtering, average filtering, cropping, and rotation [31]. If the presence of the watermark is not destroying the imperceptibility of the cover image, then the technique is said to be more imperceptible. The blind Stegnography technique cannot require the cover image to detect the watermark. The non-blind Stegnography technique requires the original image to detect and extract the watermark. If the secret key and watermark bit sequence are required to detect the presence of the watermark, then the technique is referred to as semi-blind Stegnography.

The Stegnography techniques classified as spatial domain and transform domain techniques based on the domain of watermark insertion. The texture block coding method, least significant bit insertion method and patch work method are existing methods in the spatial domain [8]. In these techniques the location and luminance of the image pixels are processed directly and the drawback of this method is that the lossy compression can easily destroy these bits [22]. In transform domain methods, special transformations are used to process the coefficients in frequency domain to hide the watermark. Different transform domain methods include “Fast Fourier Transform”, “Discrete Cosine Transform”, “Discrete wavelet transform”, “Curvelet Transform”,

IV. Conclusion

A digital Stegnography technique is an alternative method to protect the intellectual property of digital images. This paper presents a hybrid blind Stegnography technique formulated by combining RDWT with SVD considering a trade-off between imperceptibility and robustness. Watermark embedding locations are determined using a modified entropy of the host image. Watermark embedding is employed by examining the orthogonal matrix U obtained from the hybrid scheme RDWT-SVD. In the proposed scheme, the watermark image in binary format is scrambled by Arnold chaotic map to provide extra security. Our scheme is tested under different types of signal processing and geometrical attacks. The test results demonstrate that the proposed scheme provides higher robustness and less distortion than other existing schemes in withstanding

JPEG2000 compression, cropping, scaling and other noises.

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Data Mining for Sales Prediction in Tourism Industry

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ABSTRACT

The tourism industries have widely adopted the information technology (IT) to reinforce their operation efficiency and to enhance service quality and customer experience. Tourism industry often use the web as a channel of communication with the targeted customers, because Internet are often easily accessible, cheaper and friendly to user. A system is provided for accurate and reliable prediction to assist the choice makers to plan more effectively and efficiently by providing an admin with previous sales results and therefore the user with positive or negative reviews for better deciding . this technique are going to be using ID3 algorithm to build a decision tree supported a review data and illustrate how this procedure are often used to make a choice on an action supported the present data using previously collected data.

Keywords : Sales Prediction, Tourism Industry, Decision Tree, Reviews

I. INTRODUCTION

Tourism, within the past few decades, has emerged together of the main industries within the world economy by benefiting transportation, accommodation, catering, entertainment, retailing, employment and lots of other sectors. The tourism industries have widely adopted information technology (IT) to reinforce their operation efficiency and improve service quality and customer experience. Tourism firms often use the web as a channel of communication with the targeted customers, because Internet are often easily accessible, cheaper and friendly to user. Internet usages on the private computers (PCs) are shifted to smart phone which are capable and more versatile. Traveler behaviors tend to vary when new technologies come. they're going to plan less and look for information at the purpose of activities. Previously, they might search information from PC then switch to look on a mobile device instead because it's more flexible and convenient. this is often according to a study by Hyde (2000) indicated that traveler avoids vacation planning because flexibility of action and experiencing the unknown are essential among-est the hedonism experience they're seeking.

The system works basically on predicting the trends occur within the tourism industry on basis of review of the tourist visited to explore the planet . This review will predict the potential of the places to hike within the business for the service provider .The system provide useful information of knowledge to predict the foremost promising event within the future response. The analytics diagram, graph, curve trends will help to know the scenario of industry.

II. LITERATURE REVIEW

1.1. Existing System

Tse and Poon (Tse and Poon, 2015) [1] used one year long reservation data provided by Hotel ICON in Hong Kong . They observed certain trends in data and developed a regression model employing a second order equation. Their proposed system predicts hotel reservations using reservation curves from the past data. To predict a selected day's reservation, they use a 90-day window. Authors do daily and weekly predictions, and observe that their model performs better on weekly predictions.

Ellero and Pelegrini (Ellero and Pellegrini, 2014) [2] assess the performance of various widely-adopted models from literature to forecast Italian occupancy rate . They find that exponential smoothing, advanced pick-up, and moving average models show the simplest success within the compared models.

Shenoy et al.(Shenoy et al., 2017)[3] demonstrate their estimation of reservation information supported user activity and search results using the info provided by Expedia. Their studies show that acquisition of serious results becomes possible through clustering and ensemble operations.

Song and Li (2007)[4] included in their review was "A practitioners guide to time-series methods for tourism demand forecasting -a case study of Durnban, South Africa " by Burger, Dohnal, Kathrada and Law (2001). the target of the study was to conduct a forecast folks demand for visit Durban, South Africa. during a review of the planet Tourism Organization in 1995 about African tourism, South Africa was considered to be "one of the foremost promising tourism destinations on the African continent" but it's not been ready to realize its full potential yet.

III. PROPOSED WORK

3.1. Poblem Definition

one among the most purposes of the web site is to facilitate the offline customer online because customer cannot spend their precious times in marketing research . therefore the customer take help outsourcing work which help to enhance the industry business.

There will be many users visiting the web site and hence we require a robust and reliable frontend which may withhold the users on our site. the info we'll be consisting is extremely important which will help everyone

3.2. Aims and Objectives

The main idea behind the project is to predict the sales from analyzing the previous data and giving the anticipated value of sales.

This project have been proposed to bring more detailed and promising features of Tourism industry at the finger tips of our users at some ways imaginable

3.3. PROPOSED SYSTEM

Considering the anomalies within the existing system computerization of the entire activity is being suggested after initial analysis .The android application is developed using Visual Studio with Asp .Net with C# as a programing language.

Proposed system is accessed by two entities namely, Admin and User. Admin got to login with their valid login credentials first so as to access the online application .

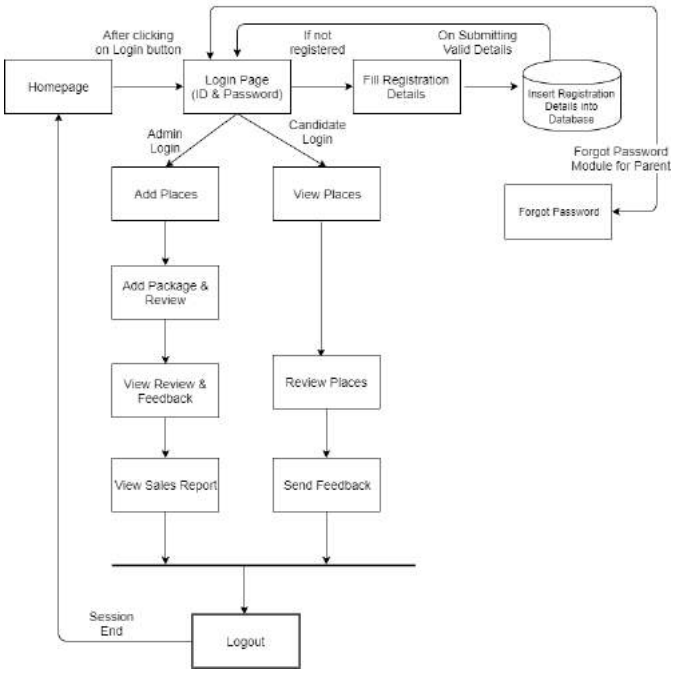

Fig 1. System Architecture

If a user visits an area , he/she can write a review about the visited place. supported user's reviews, system will predict sales for a specific place.

This will be done by a resulting graph which can be generated by order count and therefore the user reviews. the essential keywords of the reviews are assigned a score upto 10 within the database which can help within the generation of the graph.

word	score	flag
not bad	5	1
not good	-1	0
too bad	-2	0
very good	8	1
very impressive	10	0
very nice	7	0
very beautiful	7	0
very excellent	10	0
most beautiful	9	0
NULL	*NULL*	*NULL*

Fig 2. Some Keywords with its associated score

3.3.1. Algorithms Used For Proposed System

Decision Tree :

An Overview of Decision Tree :

Decision Tree may be a prediction model representing the mapping relation between object properties and object values. Given the certain probability of all situations, it's specifically utilized in decision analysis to calculate the probability of zero-or-greater arithmetic mean of net present value, assess the project risks and judge whether a project is desirable or not.

Basic Strategy of ID3 Algorithm :

Starting with one node of the coaching examples, if the examples ar within the same class, the node is known as a leaf and delineate by a corresponding image. Otherwise, the rule employs the entropy-based activity info|of data|of knowledge} gain as heuristic information, associate degreed selects an attribute that may most satisfactorily classify the examples. The attribute represents "test" or "decide" on the node. during this version of the rule, all attributes ar classified, i.e. separate values. for every famous worth of the take a look at attributes, a branch is made, supported that examples ar divided. Following constant method, the choice tree of every division is generated recursively. Once associate degree attribute seems in an exceedingly node, it mustn't be thought-about once more in any descendants of the node.

ID3 rule can perform following tasks recursively:

1. produce a root node for the tree
2. If all examples ar positive, come leaf node 'positive'
3. Else if all examples ar negative, come leaf node 'negative'
4. Calculate the entropy of current state E(S)
5. for every attribute, calculate the entropy with relevance the attribute 'A' denoted by E(S, A)

6. choose the attribute that has the utmost worth of IG(S, A) and split the present (parent) node on the chosen attribute
7. take away the attribute that provides highest IG from the set of attributes
8. Repeat till we tend to run out of all attributes, or the choice tree has all leaf nodes

Entropy :

A decision tree is made top-down from a root node and involves partitioning the information into subsets that contain instances with similar values (homogeneous). ID3 rule uses entropy to calculate the homogeneity of a sample. If the sample is totally solid the entropy is zero and if the sample is equally divided then it's entropy of 1.

Entropy is that the live of the quantity ofuncertainty or randomness in information. Intuitively, it shows sure thing of a definite event. If associate degree outcome of a happening incorporates a chance of 100 percent, the entropy is zero (no randomness exists), associate degreed if an outcome is five hundredth, the entropy takes the utmost worth (i.e. equals to one since it's the log base 2) because it comes good randomness. as an example, think about a coin toss whose chance of heads is zero.5 and chance of tails is zero.5. The entropy here is that the highest potential worth (i.e., equals 1), since there's no likelihood to exactly confirm the end result. as an alternative, think about a coin that has heads on each the edges, the end result of such a happening is foretold dead since we all know beforehand that it'll continually be heads. In alternative words, this event has no randomness, thus its entropy is zero. ID3 follows the rule: a branch with associate degree entropy of zero could be a leaf node (endpoint). A branch with associate degree entropy over zero desires more cacophonic. just in case it's impracticable to attain zero entropy within the leaf nodes, the choice is formed by the tactic of a straightforward majority.

$$E(S) = \sum_{i=1}^{c} - p_i \log_2 p_i$$

Information Gain:

ID3 chooses the cacophonic attribute with the best gain in data, wherever gain is outlined as distinction between what quantity data is required once the split. this is often calculated by decisive the variations between the entropies of the initial dataset and also the weighted add of the entropies from every of the divided datasets.

The formula used for this purpose is:

$$Gain(T, X) = Entropy(T) - Entropy(T, X)$$

This application includes the following five modules:

Admin:

- **Login:** In order to access the system, admin need to login first using valid id and password.
- **Add Places:** Admin can add Places on which users can provide their review.
- **Add Package:** By selecting the added places, admin can create a package with its details.
- **Add Reviews:** Admin can upload an Excel Sheet, Which will consist of Place, Month, and Review.
- **View Reviews:** Admin can have a look on the ratings provided to reviews, for a particular Place.
- **View Sales Report:** Admin will be shown a Bar Graph which will have Ratings for all the places out of 10.
- **View Feedback:** Admin can have feeds from users and he can even delete them if required

User:

- **Register:** User can register themselves and into the system using basic details.
- **Login:** User can Login into the system, using his email id and password.
- **Forgot Password:** If user forgets his password, he can press forgot password and password will be sent to his E - Mail.
- **View Places:** User can have a look on different Places added by admin and view comments on them.
- **Review Places:** User can add his review on a place only once, with details of Place Name and Month they visited.
- **Send Feedback:** User can send feeds to admin mentioning any issues they face, or any new places they want to add etc.

III. CONCLUSION

This project proposed the domain knowledge of a tourism industry during a single window. The admin/customer will have great advantage in increasing the efficiency of their business model. Since this status of the planet having large competition in tourism industry so it's worth to figure on data for accountability, liability and for broadening the boundaries of the tourism industry.The current status of the project is analyzing the review given by the tourist with module work of user feedback, view places for the various location.

IV. ACKNOWLEDGEMENT

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Improvements in Centrifugal Casting Machine

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ABSTRACT

Centrifugal casting or rotocasting is a casting process that is used for the casting of thin cylinders or in this case PIPES. It is used to cast materials such as metals, concrete and glass. The operation of centrifugal casting machine is mainly based on the principle of centrifugal force. The mold which is used can be adjusted for different diameters and thickness of pipe with respect to the rotation speed of the mould which is being rotated by the help of motor. To increase the productivity , a Multiple runner mechanism and brake system is introduced.

Keywords : PIPES, Horizontal Centrifugal Casting, VFD

I. INTRODUCTION

Casting is defined as an object made by pouring the molten metal in a particular mould which is being designed as per the requirement and then allowed to cool down for a certain amount of time to allow the molten metal to set in the desired shape.

In today's date casting comes under one of the largest industries in manufacturing. 50% of the total weight of an average tractor consists of casted metal parts &an automobile engine consists of 90% of its total weight as casted parts. The reason for which casting is tremendously carried out lies wholly in its economy & time factor in terms of time it is the quickest method for producing components, as the process is so easy.

The main focus of our project is on centrifugal casting & removing its disadvantages. So the centrifugal casting of number of processes in which the centrifugal force is taken into action to give the shape of casting by filling the mold & wait till casting is solidified &strengthens.

There are two types of centrifugal casting process.

1) Vertical centrifugal casting
2) Horizontal centrifugal casting.

Vertical Centrifugal Casting: - It is a pressure casting technique that employs rotation about a vertical axis. It produces good filling of the mold& gives high dimensionally accurate products. This method is used for casting products like gears, piston rings& impellers.

Our project's main focus is on the horizontal centrifugal casting process & it is used for making long & hollow casings such as pipes, gun barrels, sleeves, rods, etc.

Horizontal Centrifugal Casting :- In horizontal type the mould rotates at high speed about the horizontal axis, the molten metal is fed into the interior section

of the mold & distributed uniformly around due to centrifugal action rotation continued until solidification is completed But here even after the product is fully formed & the VFD is closed the mold still rotates for very long time. To reduce this rotating time differential band brake is applied to the system.

II. Proposed System

The proposed system will be an additional of brake system in the traditional horizontal pipe casting mechanism. A differential band brake is used to stop the free-running mold to save 55% of the time. in traditional system, after stopping VFD & even after the pipe is cooled & solidified, the mold rotates for at least 60secs, which after applying differential band brake will stop in half of the time as compared to the original time, which will results in saving of the useful time & increasing the production of pipes.

A band brake consists of a flexible band of leather, one or more ropes, or steel lined with friction material, which embraces a part of the circumference of the drum. A differential band brake issued to control the speed of a drum which rotates at a constant speed. As compared to simple band brake, in a differential band brake neither ends of the band is attached to the fulcrum of the lever. The two ends of the bands are attached to the two points on the opposite side of the fulcrum.

1. Design of Brake

M=3000x9.81

M=29430 kg

u=0.3

D=0.75m

R=0.375m

w= V/R =1450/0.375

w=3866.66 radian /sec

$K.E=1/2xIW_o^2$

$K.E=1/2x\ (1/2MR^2)\ (W_o)^2$

$K.E=1/4xMR^2xW_o^2$

$K.E=1/4x29430x0.375^2x3866.66^2$

$K.E=1.547x10^{10}$ J

$E_o=E_f$

$W + Pf + KEo=P^f + K_{ef} +$ heat loss

KE_o=heat loss

$KE_o=Ffq\ (2\pi r)$ (no.of rotations)

No.of rotations= 1440/60 x 15

No.of rotations=363 rotations to stop

No.of rotations=$KE_o/F_{fr}x\ (2\pi R)$

$363=1.547x10^{10}/F_{fr}x\ (2\pi x0.375)$

$F_{fr}=18.087x10^3$KN

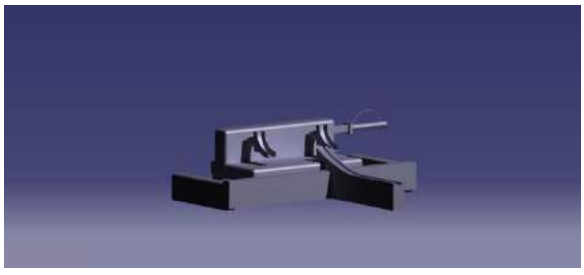
2. Multiple runner system

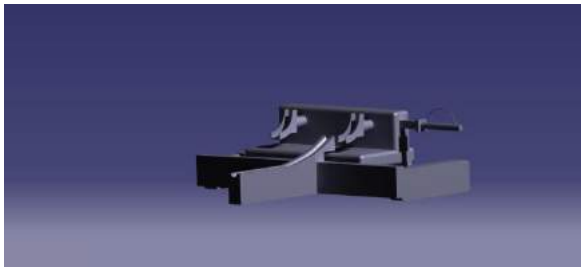
A mechanism consisting of two runners having the allowance of rotation of 180°.

The mechanism would be attached in front of the hopper through which the molten metal is poured in the runner.

The runner is allowed to rotate in such manner so the withdrawal of molten metal which is being accumulated on the surface of the runner gets removed without any human effort.

The mechanism consisting of two runners have guide ways under it. When the first runner is being used and then rotated for removal of the molten metal, the whole mechanism slides and the other runner is ready to use.





Benefits to the company

The application of brakes in the traditionalsystem is to impart the best uses of mechanical technology available& use it for the betterment of the industry.

1) This mechanism of band brake will help in saving production time
2) Workers will not have to wait for such a long time, resulting in reducing boredom
3) Saved time can be utilized in other productive works.
4) The multiple runner mechanism reduces time.
5) The runner is now being cleaned itself, hence reducing manpower.

III. Conclusion

Casting of pipes is done in less time as a differential braking system is applied. The efficiency of the machine is increased resulting in increasing the numbers of pipes produced per hour.

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Use of Acoustic Materials as A Sound Barrier In RCC Structure

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ABSTRACT

The main objective of this work is to determine the noise absorption capacity of a partition sheet prepared with the help of rubber crumb, epoxy resin and hardener with its varying proportion and thickness and comparing its results with the conventional partition which is usually of Brick masonry. An analysis is carried out by preparing a model with a hall using plywood as its exterior wall insulted with foam from inside and parted with a rubber crumb sheet of varying thickness and proportion.There are numerous ways to measure noise, depending on the code in which a noise level measurement is required. Included the possible measurements are: dBA, Leq, Ldn and dB at various frequencies.An analysis work is carried out as per provisions in IS 2526:1862 (Indian Standard CODE OF PRACTICE FOR ACOUSTICAL DESIGN). A long exposure to noise over 85 dB (A) might be a dangerous factor for high blood pressure (BP), and it may induces major increases of (BP) among sensitive individuals. It is a well-known fact that any code based acoustic design approach the performance objective at noise reduction level in preventing the inhabitants of the building against noise exposure and extending a certain level of comfort. On the other hand the owners of the buildings have an idea that once a building is designed without noise control technique the inhabitant of the building will suffer. Based on this new approach, it is possible to design a building that meets the performance levels named above. In order to achieve this "target performance" there are certain design alternatives to be applied one of which is "using rubber crumb". The basic approach in "using rubber crumb" is to provide additional resistance against noise to above conventional level. This approach provides almost elastic response on the structural members and limits the force accelerations sound acting on the structural elements of superstructure and hence to check the efficiency of sound proof structure.

Keywords : Acoustic, Acoustical Design, Rubber Crumb, Epoxy Resin And Hardner, Noise Level Measurement.

I. INTRODUCTION

In India sound pollution is a big problem, every day this problem is increasing and continuously irritating to all the people who living nearby roadways and railway tracks and all that places like bus stand, railway station street ways and so on, which are known to emit unwanted large quantity of sound.

Bestowing to the WHO rules, for a sound sleep, the sound in that room would not be extra than 30dBA. For upholding attention in any workroom, it should not outstrip 35dBA. The uproar level additional than these confines on a nonstop basis, may possibly damage mental as well as physical healthiness on a little time and extended on time basis and to minimize this problem it is required to obstruct sound to enter in workroom or workplaces. It may be in the

form of sheets or panel, which used in outer face or inner face of workroom so as to obstruct sound vibrations coming from highways or roadways.

Huge quantity of rubber tires have been used in shipping over the world for example aero planes, marketable automobiles, two wheelers, etc. That one means that the large figure of tire used is greatly extra than the pollution of vehicle. Finally, the waste tire will be severe environmental problematic due to its Unwanted and potentially hazardous waste since it cannot be despoiled naturally or need very long time for natural deprivation due to three dimensional crosslinking arrangements and occurrence of vulcanized means. Currently, various ways have been suggested for dealing waste tire and it is confidential into three categorizations i.e.: reuse, recycling, rethreading and energy recapture. Reuse method in rubber tire repossession is the lowermost ecological risk since it is changing left-over rubber to another object deprived of influence bad ecofriendly effect associated to energy recovery. Rubber item produced from left-over tire rubber have been broadly executed in human being.

Amongst the severe difficulties characteristic to our current society, those of the contamination and reprocessing have a first rating of importance. In acoustic characteristics, the traffic sound and the left-over tire pollution are a increasing problem. Now in this paper a different way to reduce both harms are presented, consisting in the application rubber waste in the method of recycled material as an absorbent in the manufacture of sound blockades along highways and streets to reduce noise to adjacent residential areas. In this example, the acoustic proposal of new material would be made in such a method that its immersion would be broadband and suitable to the energy band range of the impurity source.

The main objective to do this work is to introduce economical panel for sound proofing so that commercial buildings such as school collages and hospitals can be sound insulated.

II. MATERIALS

Rubber crumb:-

Rubber crumb is grain size waste tire rubber. First of all waste tire rubber are washed very cleanly then left for drying. After drying tire rubber is ready for grinding up to required size like 800micron, 1mm, 2mm, and so on. As plate sheets required.

- It absorbs sound frequencies and gives good sound insulation.
- Effects of heating and cooling are negligible.
- It gives good workability, density and compressive strenths.

Double component epoxy resin:-

one component of epoxy resin is binder which is used for better compaction and another is hardener which gives hard strenths to rubber grain size to combine together so as to sound

can't pass through the crumb rubber sheets or panels.

- It gives superb mechanical strength; it is always cheaper and faster than welding.
- Epoxy has excellence resistance to chemical. After setting, there is no worry of chemical reaction that will weaken the seal.
- It also resists heat. And good for electrical insulation, light weight, sound damping, vibration, and reduction corrosion, Flame resistance, environmental friendly.

III. METHODOLOGY

Study of material

We studied various materials having acoustic properties like foam, fiberglass, rock wool, rubber, etc. We chose rubber as an acoustic material for our work since it is easily available and cheap in cost. As the use of vehicles is increasing day by day the amount of used tyres is also increasing which causes problems in disposing. The used tyres of vehicles needed incineration to disposed off which required high energy and it is highly hazardous for our environment. So instead of disposing we can re-use it in other forms like rubberized asphalt, playground flooring, welcome mats, etc. It is also used in civil engineering to partially replace the aggregates in mortars and concrete. It is also used in the form of crumb or grain to prepare sound insulation sheets. It can provide us economical product for sound insulation.

Rubber crumb

Rubber crumb is a recycled rubber produced from used tyres. We bought a rubber crumb in ample amount from the company where they convert the tyres into crumb for re-use. The used tyres are converted into chips by removing the steel belts, wires, and fabrics. The chips are further processed to form a grain of different sizes through a mechanical process. It shows good acoustic properties. It does not affect through any climatic conditions. The rubber crumb is available in various grain sizes. Different grain sizes posses different coefficient of sound absorption.

Fig.1- Sample of Rubber crumb of specific grain size

Sieve Analysis

We got the rubber crumb in the form of mixture of various grain sizes. Separation of various grain sizes is done by passing the crumb through different sizes of sieves. By passing the crumb through the sieves we got the grain of size 800micron, 1mm, 2mm. We separately stored all sizes of grains for further process. As different sizes of grains posses different absorption coefficient the separation process is done.

Fig.2- Sieve analyis

Preparation of Mould

For the preparation of sheets we needed to prepare a moulds. The preparation of moulds is done by using the wooden boards. We prepared a moulds of size 1ft x 1ft and of variant depth to prepare a sheets of different thickness. As we needed to perform test on sheets of various thickness we prepared a moulds of different depths for the preparation of sheets of different thickness.

Fig.3- Sample of moulds used

Preparation of Sheets

According to the requirement, we took the required grain size of rubber. We mixed the rubber crumb with chemicals and hardener thoroughly in a fixed proportion for proper binding. On a plain surface we placed a plastic bag and a mould over it, mould and plastic bag is oiled or greased properly so that the mould can be removed easily. After mixing the chemical and hardener we place it in a mould with light compaction. For obtaining the proper finishing we smoothened the surface. By using different grain sizes we prepared a sheets of different thicknesses.

Fig.4- preparing sheet by providing compaction

Fig.5- Sample of sheet after de-moulding

IV. EXPERIMENTAL SET-UP FOR TESTING

We have made wooden box of size 5x3x3 ft. Which open from the top so that we can place the necessary items inside it. Firstly we insulated the inside faces of the wooden box with cotton upto the height of 6 inch. At the center of the

box inside we be provided mould setup to fix our rubber sheet. And a table was provided, to keep our instruments on that such as sound, microphone, amplifier, CRO & a multimeter. And from these arrangement we will calculate our result, By producing certain amount of sound. The procedure is very simple, we produced different frequency amount of sound and then wie checked the frequency of sound reduced after passing through the sheet. And the original sound amount & reduced sound reading was taken and compare . According to this readaing we calculated absorption coefficient of the sheet and transmission loss.

V. RESULTS AND DISCUSSION

According to IS code-2526-1862
Absorption coefficient is the ratio of sound energy absorbed to the incident sound energy on a material.

Sheet no.	Thickness of sheet (cm)	Grain size (mm)	Frequency (Hz)	Avg Coefficient of absorption
1	2.5	Small	2000-2500	0.59
			3500-4000	
2	2.5	medium	2000-2500	0.54
			3500-4000	
3	4	Small	2000-2500	0.65
			3500-4000	
4	4	50% small+ 50% medium	2000-2500	0.62
			3500-4000	
5	7	Small	2000-2500	0.78
			3500-4000	
6	7	50% small+ 50% medium	2000-2500	0.72
			3500-4000	
7	8.5	Small	2000-2500	0.85
			3500-4000	
8	8.5	50% small+ 50% medium	2000-2500	0.8
			3500-4000	
9	10	Small	2000-2500	0.89
			3500-4000	
10	10	50% small+ 50% medium	2000-2500	0.82
			3500-4000	

Table no.1- coefficient of absorption calculation with respect to different frequencies and thickness

In table grain size
Small= 0mm - 2mm diameter
Medium= 2mm - 4mm diameter

According to the different coefficient of absorption calculated, we came to know that the different thickness sheets with different

proportion grain size sheets gives different coefficient of absorption. The best sheet which is economical to use is of 8.5cm of small grain size as it gives required insulation so there's no need to

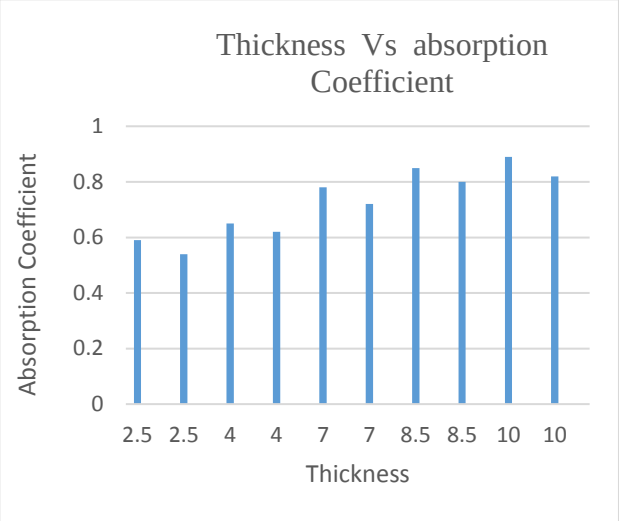

Fig.6- graph showing variations in thickness of different grain size

VI. CONCLUSION

According to the various experiments performed over different thickness sheet made of different proportion of grain sizes by using sound transmission loss equipment made by us in our laboratory, it is concluded that the rubber crumb has good sound absorption properties.

And as we compare different sheets coefficient of absorption, than the sheet made up of least diameter grain size with maximum thickness i.e. of 8.5 cm (90% rubber crumb of 2mm grain size and 12.5% double component epoxy resin) gives the best coefficient of absorption.

Moreover we also came to know that if we want more insulation from sound i.e. more than the traffic intensity than by increasing the thickness of the sheet we can achieve that.

It is durable and can be used in commercial buildings such as hospital, school, and collages because these are places where people gets disturb due to high noise, and hence their mental and physical health gets affected, so to avoid such conditions these sheets can used as its economical and easy to be prepared in less amount of time.

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Evaporative Air Cooler - A Review

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ABSTRACT

Evaporative Air Cooler technology originated from the concept of air cooling with water media very long decade ago. The cool fresh air for domestic and commercial use can be provided mechanically using the air conditioning (AC). The use of AC equipment will increase energy consumption in conjunction with the increasing amount of carbon emissions released into the air atmosphere. In an evaporative air cooler air is cooled by evaporating water in the equipment. Evaporation of water requires heat, so energy or latent heat taken from the air molecules - so the actual temperature of the air drops. The amount of water evaporates increase with the increasing water temperature. Relative humidity increases with the increasing of water temperature and remains constant at the same water temperature reported by few researchers whereas cooling effectiveness increase with the increasing of air stream velocity. Evaporative cooler can minimize consumption of fuel and lower the pollutants in the atmosphere as caused by VCRS. The evaporative cooler performs very well in hot and dry climate. It was reported that the best evaporative cooling period commences in the month of May and finishes in September and minimizes energy consumption for the fresh air cooling with almost 80%. This review is aimed to evaluate the effect of temperature changes on the cooling medium using different cooling pads. In this review we have discussed the utilization of a desert cooler, its performance and drawbacks associated with them along with the results presented by various authors in this field. It is concluded from this extensive survey of literature that evaporative cooling is economical then the existing VCRS systems.

Keywords : Alternate Cooling pads, Energy efficiency, Evaporative cooling, Water spray.

I. INTRODUCTION

EVAPORATIVE cooling is a heat and mass transfer process of decreasing the air temperature that uses water as an evaporative medium for cooling of air in which heat transfer from air to water takes place in large amount. The DEC cools the air when the it creates a contact with water present in the wet cooling pads. The evaporative cooling is very popular in arid areas due to its relativity in low initial and functional cost compared to air conditioning. The outside air is pulled using the fan through media (pads) that are kept wet by water that is sprayed on them in direct evaporative cooling system. If the outside air is sufficiently dry and hot, the water evaporates on the surface of pads and the heat required for evaporation is taken from air and air is cooled. The dust particles are trapped on the surface of the pad and washed down along with the water. Thus, air is cooled and filtered. In contrast, evaporative cooling systems provides with low energy consumption. The most commonly used DEC are basically metal cubes or plastic box structures with flat air filters arranged vertically, called “pads”, in their walls. the pads are kept moist by the water streaming continuously onto their uppermost edges

and further distributing it downwards with the help of gravity. The processed air is drawn by fans operated with motor within the coolers. After the air is cooled and humidified while being flowing between the pads, it leaves the cooler as "conditioned air" for cooling purpose. Coolers consists regulators to vary the leaving air states as needed like 2-speed or 3-speed. The falling water is recirculated from the water basin by the water pump. The cooling efficiency of the evaporative cooling system is found to be increased by imparting the following three methodologies in the system, viz., (i) Arrangement of suitable internal components for increased evaporation; (ii) Combining the DEC and IDEC systems; and (iii) Using different pad materials with different Thicknesses.

Evaporative cooling provides considerable amount of comfort in many locations. However, locations where the humidity is very high, only ECS cannot be used alone for providing thermal comfort especially in houses, offices buildings, etc. The researchers till now carried out researches on evaporative air-cooling process mainly focus on reducing the DBT of the incoming air. Theoretically when the dry bulb temperature of the room and wet bulb temperature of the outside ambient air are equal, the efficiency of 100% can be achieved; Evaporative cooling effectiveness is defined as the ratio of dry bulb temperature across the equipment (cooler) and the difference between inlet DBT and inlet WBT. The purpose of this literature review is to collect and highlight some researches on evaporative cooling technologies as much as possible. The review covers direct evaporative cooling criteria, applications, advantages and disadvantages.

EVAPORATIVE COOLING TECHNOLOGY

The classification of Evaporative air coolers are: 1) Direct evaporative air coolers, in this type the two working fluids (water and air) are in direct contact; 2)The other type is Indirect evaporative coolers, in this system the working fluid is separated by a surface; (3) The Combination of direct and indirect evaporative coolers.

1) DIRECT EVAPORATIVE COOLING (DEC)

The oldest, simplest and cheapest type of cooling system is the evaporative cooling, in this type the direct contact of outdoor air with water takes place, i.e. the sensible heat is converted to latent heat to cool the air. The classification of Direct evaporative cooling systems are: First is the Active DECs which are electrically powered to operate and the naturally operated Passive DECs with zero power consumption.

2) INDIRECT EVAPORATIVE COOLING (IEC)

The aim of the indirect evaporative cooling is cooling of air by decreasing sensible heat without change in humidity,which is a major advantage over DEC systems. The components of IEC unit are: a heat exchanger (HX), small fan, pump, water tank, and water distribution lines. The classification of IEC system are: Wet-bulb temperature IEC systems and Sub wet-bulb temperature IEC systems.

3) INDIRECT-DIRECT EVAPORATIVE COOLING (IDEC)

The combination of both systems DEC and IEC can give better results, since Direct evaporative cooler shows higher effectiveness but increase in humidity while IEC gives lower effectiveness but the humidity is constant, The classification of main components of IDEC system are as follows: heat exchanger of IEC unit, evaporative pad of DEC unit, water recirculation system, water storing tank, and blowers.

ADVANTAGES AND DISADVANTAGES

Based on collected information of direct evaporative cooling system different advantages and disadvantages can be summarized as follows:

Advantages:

- The low cost and high effectiveness are themain advantages of evaporative coolers.
- Gives a wide range of applications and versatility in the apartments, dwellings, commercials and industrial units.
- Direct evaporative devices act like filters, removing dust particles present in air.
- No special skills are required to operate and therefore it is most suitable for rural application.
- Locally available materials can be used.
- The energy consumption is reduced by 70% therefore it is highly efficient.
- Less expensive to install and operate.
- It can be easily made and maintained.
- Due to higher flow rates the distribution of air is found to be better.
- The fans create positive pressures in the conditioned space, so that outside air is prevented from getting infiltrated.
- No chemicals are used.

Disadvantages:

- It is associated with the water consumption for the operation of these systems, which is rarely found resource in hot and dry climates, where this system best work.
- Need to be watered daily because ECS requires a constant water supply to wet the pads.
- It may lead to disease due to micro-organisms if the water used is not cleaned in regular basis and the pads are not maintained properly.
- Requirement of space from outside the home.
- Water with high mineral content leaves mineral deposits on the wetting medium and on the internal parts of the cooler gets damaged.
- DEC is suitable to dry and hot climate. The relatve humidity can go upto 80% in moist conditions, so much of higher humidity is not suitable for direct supply into residence, because it may cause rusting, and mildew of materials.

II. LITERATURE REVIEW

The air conditioning systems based on VCR system are used in many buildings and offices. These systems are harmful to environment as they consume extensive power. Hence, it is important to have low energy consuming devices which includes evaporative cooling systems in order to provide thermal comfort in buildings.

The maximum efficiency at velocity 1.790 m/s and thickness of 150 mm was founded by **Abdullah *et al.*** [1] in pad 5090, on other hand the maximum pressure drop is achieved at thickness of 75 mm for pad 7090 and velocity 1.8 m/s. The saturation efficiency decreases with increase in mass flow rate of air was observed by **R. K. Kulkarni *et al*** [2].They have also seen that higher saturation efficiency can be achieved with material having higher wetted surface area and they obtain result, the aspen and cellulose material gives highest and lowest efficiency of 87.5% and 77.5% respectively. The performance of palash fibers gives better result than that of other materials were concluded by **J.K. Jain, D.A.Hindoliy** [3] Palash fiber effectiveness was founded to be 13.2% and 26.31% more than that of aspen and khusfibers respectively. Special setup to evaluate the performance of natural fibers was designed by **Faleh Al-Sulaiman** [4].He founded the results that the average cooling efficiency is highest for jute at 62.1%, compared to 55.11% for luffa fibers, 49.90% for the reference

commercial pad and 38.90% for date palm fiber. The analysis and performance of coconut coir pad as a media in direct evaporative coolers was done by **Akintunji*et al.*** [5] The mass flow rate of primary air varies between 0.160 kg/s to 0.540 kg/s and the performance analysis of the coconut coir pad is based on the saturation efficiency, leaving air temperature, relative humidity, cooling capacity and water consumption.The decrease in saturation efficiency from 64.7% to 55.9% was founded on the basis of air flow rate in coconut coir and from the results they concluded that at lower air mass flow rates the coconut coir performed better, wherelower leaving air temperature and relatively higher relative humidity are obtained. The efficiency of two different type of cooling pads made of a curtain fabric and a raw cotton fabric was studied by **Banyat*et al.*** [6] The effect at various speed of blower at 725, 1015, 1450 rpm was analysed by him and also investigated the water flow rate 26 lit/min.A procedure for testing evaporative cooling pads was developed by **Koca et al.** [7]They showed that face air velocity, pad angle, static pressure drop across the pads and pad thickness are important parameters affecting pad performance. The performance of DEC in hot and humid regions of Malaysia was experimentally investigated by **Abdul Rehman *et al.***[8] output air temperature, 27.5 to 29.4 was founded by him while cooling capacity ranges between 1.380 kW to 5.530 kW. **R.Bonkhanouf*et al.*** [9] presented a computer model and experimental result for porous ceramic materials with outride DBT 45 He proved that, with maximum cooling capacity of 280W air can be cooled below its WBT, the overall effectiveness of wet bulb is found more than unity. The functionality of The three different cellulose pads in an experiment set in accordance with the standards of AMCA and ASHRAE was assessed by **Koca*et al.*** [10] The first pad which was examined at the study was found to have thickness of 10 cm with 45 to 45° chamfer angle and the second had a 15 cm thickness with 45 to 45° chamfer angle. The cooling efficiency of the pad with 10cm thickness and 45 to 45° chamfer angle, was founded by him which varied from 73to 90% at 1.5 to 2.5 ms-1 air velocity. A study in Cukurova Region (Adana, S.Turkey), to determine the most suitable pad material for evaporative cooling system was carried by **Dağtekin*et al.*** [11], by comparing different pads made of poplar sawdust, nutshell and cellulose, it was determined by authors that cellulose based pad was the most suitable material for the mentioned region. **Hacisevki H *et al.*** [12] theoretically studied the availability of evaporative cooling systems in closed environments in the region based on the Nicosia- Cyprus region 1996 and 1997 climate data, evaporative cooling systems could be used especially between May and June months in Nicosia-Cuprus region was further determined. The three different pad materials efficiencies at different temperatures and air velocity in a study conducted in Evora -Portuguese was evaluated by **Cruz *et al.*** [13]. In the study conducted at four different temperature ranges with an air velocity of 1.6,3.2, 4.8 and 5.6 ms-1 respectively, the highest cooling efficiency (80% and more), was achieved at 3.20 ms-1 air velocity at temperatures of 32 to 34°C. Some performance characteristics of the cellulose-based evaporative cooling pad at different air velocities in Mediterranean climate conditions was examined by **Yild*et al.*** [14] In his study, the values chosen for the velocity of the air passing through the pad were 0.5, 1.0 and 2.0 ms-1, while the pad wetting water flow rate (4 Lmin-1m-2) was kept stable. As a result of the study covering the period from June to September, the cooling efficiency at the selected air velocity was found to be 77 to 84%. Some performance characteristics of an evaporative pad cooling system in a broiler poultry house at Mediterranean climate conditions was examined by **Dağtekin*et al.*** [15] The study results that it was completed in July to August, the cooling efficiency of the system varied between

70 and 80% was determined and nearly 10°C temperature decreases were attained at the outer environment air extracted into the poultry house by passing through the pads.

A study of performance of evaporative cooler with different cooling pad shapes and materials was theoretical performed by **R.K.Rajput*et al.*** [16] . Different shapes such as Rectangular, cylindrical and hexagonal shaped pads of rigid cellulose, corrugated paper, high density polythene packing and aspen fiber material were considered. Geometrical parameters of pad shape like area, volume were calculated for air velocities between 0.75 to 2.25 m/s. For the performance of weather analysis data of Bhopal, India inlet condition of 39.9 0C dry bulb temperature and relative humidity of 32.8 % were selected. With increase in mass flow rate of air saturation efficiency decreases having highest value of 91 % for hexagonal shaped pad with aspen material. The cooling capacity increases with air mass flow rate having minimum value of 35826 kJ/h for rectangular pad with cellulose material for air mass flow rate of 0.3 kg/s.The effects of thickness and inlet air velocity on pressure drop and efficiency of evaporative cooling pads was studied by **Liao et al**. [17] Two different kinds of pad materials were used a coir fiber and a nonwoven fabric perforated pads, the cooling efficiencies varied from 81.19% to 81.89% and 89.69% to 92.86% for nonwoven fabric perforated and coir fiber material pads, respectively. The performance of three natural fibers (palm fiber, jute and luffa) as wetted pads in evaporating cooling was experimentally evaluated by **Al-Sulaiman** [18] For an air velocity of 2.4 m/s, the cooling efficiency was found for jute about 62.1%, as compared to 55.1% for luffa fibers, and 38.9% for date palm fiber. A compact wind tunnel to simulate evaporative cooling pad-fan systems was developed by **Liao and Chiu** [19].They did the investigation on the effects of water flow rate by testing the two different materials for pads and, pad thickness and inlet air velocity on evaporative cooling efficiency. The pads were made from coarse fabric PVC of parameters having sponge mesh 2.5 mm diameter in pinhole and fine fabric PVC sponge mesh 7.5 mm diameter pinhole. Their results showed that the efficiency of coarse fabric PVC sponge is higher than the fine fabric PVC sponge. The two correlations for heat transfer coefficients were founded by **Rawangkulet al.** [20] he did experimental analysis of the performance of coconut coir material as a direct evaporative cooling pad. Evaporative cooling efficiency and pressure drop across two small coconut coir pads of different configuration in a range of velocity1.88–2.79 m/s was determined by them. They confirmed that coconut coir has valid potential and can be used as a wetted media in evaporative cooling systems. **Buffington et al**. (1978) [21] did the comparison of four different materials of evaporative cooling pads to determine the variation in cooling efficiency. The velocity of the air passing through the pad was kept stable at 0.75 ms^{-1}in the study. At the end of the study, they stated that the cement compounded sugar beet pulp pad showed the maximum cooling efficiency and was followed by a cellulose based pad, while the rubberized pig bristle showed the lowest efficiency. **Malli et al.** [22] An experimental investigation was conducted on two types of cellulosic cooling pads i.e. 5090 and 7090. They found that by increasing frontal velocity and the thickness of the pads the pressure drop and the rate of the evaporated water increases and if the frontal velocity is increased then the effectiveness and the variation of the humidity decreases. **Bishoyi et al.** [23] did an experimental investigation on two types of evaporative cooling pads under the Indian climate conditions and found that evaporative cooling pad made of Aspen has an energy efficiency ratio and cooling capacity lower than cooling pad made of Honeycomb paper.

AbdollahMalli et al [24] performed the experimental study on the performance of thermal cellulosic pads made of corrugated papers. He tested the polyethylene samples in a sub sonic wind tunnel. For several inlet air velocities the research work on Pressure drop, humidity variation, evaporated water and effectiveness have been done. The most efficient technique used in cooling towers, humidifiers and evaporative coolers is direct evaporative cooling. During this process the water is sprayed continuously on the pads and the warm air is drawn by the fan through the wetted pads, these pads extracts the heat from the air and the air leaves the system at a lower temperature. Manufacturers have designed pads made of cellulose paper with an aim to improve the cooling effect in different applications like residential sectors, storage warehouses, etc. These pads are energy efficient, cheap; compact is size and light in weight and also pollution free. **B.L.Thakor** [25] in their present work discus about the global warming and its prime concern to the human being. Global warming has got different types of harmful effects. The change in weather of the Globe is taking place in an unpredictable way and Due to global warming and greenhouse effect the countries on equatorial line and on tropics are facing high temperatures. Industrialization leads in increase in concentration of the greenhouse gases. A special machine evaporative air conditioner has been developed to overcome the effect of high temperature and to achieve the human comfort conditions. Principles of evaporative air cooler with air conditioning system together are used in this evaporative air conditioner to give the better results. **J.M. Wu et al** [26] studied and theoretically analysed the heat and mass transfer between the air medium and water in DEC. The discussion covers how the frontal air velocity and thickness of pads effects the cooling of direct evaporative cooler. Approximately 2.5m/s frontal velocity was recommended for the determination of pads frontal area module for the recommended air flow. On finishing the test it was concluded that the relation between cooling efficiency and energy balance analysis of air was valid. **E.Velasco Gómez el al** [27] said that evaporative cooling process is a very common phenomenon in nature by comparing the two systems i.e. evaporative cooling and air conditioning. Evaporative cooling is a cheaper and low energy consumption method and a best replacement to air-conditioning. To overcome the risk, EC was produced from humid environment and is achieved due to the difference of vapor pressure between the surface and the air, in such a way that water evaporates and thus reducing the generation of aerosols to the minimum, responsible for the spread of legionnaire disease. Aerosols are produced in conventional systems because the water is sprayed or comes directly in contact with the stream of air. In this paper a winter AC system suitable for the regions with cold and dry winters was given by **Mohamed M. El-Awad** [28]. The heating process is added just after the humidification process in this system which is a simple modification of the evaporative air-cooler. The theoretical framework is taken to estimate the system was discussed in the paper.The process of heating is done by utilizing the clean and renewable energy source i.e. solar energy, the system also maintains the major advantage of EAC over refrigeration systems with respect to the environmental impact. A neutral network framework to guess the air handling performance of Direct evaporative air cooler under several working conditions was bought by **Qiang et al.** [29]. For environmental controll in agricultural buildings the DC application using water evaporation is widely used. **Zhang** [30] did the assumption that the water evaporates completely to study the heat and mass transfer characteristics of a wetted media. By related investigation of the processes of heat and mass transfer in Direct evaporative air cooler and the

cooling tower. A theoretical research of a cross-flow DEC was presented by **Dai and Sumathy** [31]. this investigation covered constitution of the wet long-lasting honeycomb paper as the wetted pad and the alternating layers of two types of papers with various wave angles which results in formation of air channels were regarded as parallel surface channels with constant spacing. The study of cellulose pads for measurement of adiabatic humidification and dehumidification cooling performance was done by **Zhang and Chen** [32]. The study of performance of the stainless-steel pad and the perforated aluminium pad was done by **You and Zhang** [33]by assuming the adiabatic humidifying process.

III. GAPS IN LITERATURE FUTURE SCOPE

The following are the few research gaps and future scope in the literature: The methodological analysis used by various authors are partially difficult to understand.

- Extensive number of papers are available in various fields of EC but very few papers are available related to integral direct evaporative cooling arrangement.
- Very less research work is done related to reduce noise in operation.
- In future the research is must in the areas such as redusing water consumption, inceasing quality of air, reduction in noise in operation and integral direct evaporative cooling arrangement which are not explored yet with full potential.

IV. CONCLUSION

Following conclusion can be drawn from the literature review performed above:

Direct Evaporative cooling can provide advanced level of thermal comfort in humid as well as dry regions. Researchers trying to search or develop newly efficient and good quality pad materials from all over the world which is important to achieve improved performance of evaporative cooling devices. Evaporative cooling has large potential to provide indoor comfort condition at reduced operation cost in region where WBT is less than 24^{O}C. The process of decreasing air temperaure using water for evaporation is substantially the most environmentally friendly and effective cooling system.Evaporative air coolers have many advantages in this ongoing energy crisis and pollutant emission constrains. Thus, from the literature studied it can be concluded that the air coolers have scope for improvement for better comfort conditions by using new methods and by adding new features like the water spray arrangement inside the cooler in the open space available below the blower fan with the regular cooling medium (wetted pads).We are interested in continuing the work with an integral direct evaporative cooling system integrated with the pad structure. Such an integrated system could be widely used with a better performance than the today operated systems and under different conditions. This paper includes a review-based study in the evaporative cooling techniques in terms of its cost, power & energy consumption, effectiveness etc. but the methodologies presented by authors are partly difficult to understand. So, more attention and lot of research is required in this area for developing new technologies related to evaporative cooling such as making an arrangement of pipe structure in the internal space available below the blower for increasing the contact between air and water which will ultimately increase the effectiveness of the DEC.

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Scaffold : A Review of Safety Conditions on Sites

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ABSTRACT

From the beginning, safety has been an essential point that has to be taken under consideration on any construction site. It may not be possible to completely eliminate the misfortunes in the construction industry because of the perilous nature of construction operations involved in it. However, if safety measures are properly imposed, it will help in curtailing accidental injuries in the various operations involved in different types of civil engineering works. Improper scaffolding and ignorance of the safety instructions may lead to fatal accidents on site. People on construction scaffoldings work in dynamically varying, often adverse climate which may increase risk of accidents. It is therefore necessary that obligatory safety should be taken care on while working in a risky environment to prevent misfortunes and troublesome situations. As scaffolding is a temporary structure used to carry out different works at heights the higher components affecting the scaffolding related works that leads to accidents at the construction sites are caused by the human factors. Scaffolding hazards are accident hazard, physical hazard, chemical hazard, psychological hazard, ergonomic hazard and organizational factors. Control measures are needed to be taken and the labors working on site must be provided with proper training regarding the safety and acknowledgement of scaffolding hazard and perquisites of measures as improper use of scaffolding is considered fearsome. This paper presents a review of all such authors who studied about the safety measures that are to be focused on while laying a scaffolding on site.

Keywords : Safety, Scaffolding, Misfortunes, Perilous, Accidental Injuries, Perquisites.

I. INTRODUCTION

Scaffolding is a temporary structure which is used on construction sites for repair of building, to support people and materials and on other high rise buildings.

As we all know safety is are top most priority in any constructional site. There are many such cases happen in India and all over world due to improper scaffolding.

Accidents take place due to scaffolding which cause of a technical (T), Organisational (O), and human (H) nature.

24.6% off all causes were technical, 48% were organisational causes and 27.4% were human causes.

Accidents came from a lack of or inadequate equipment that secures working on scaffolding, and also improper collective protection measures e.g. Roofing or protective nets, poor stability of scaffoldings or its components and also an inadequate spatial structure of scaffolding.

Nevertheless, 100% safety can never be guaranteed even though the scaffolder have worn all safety measures. By hazard analysis, the rest of accidents in metal scaffolding is found to be 0.32 and that in bamboo scaffolding is found to be 0.68. By AHP, the risk of accidents in metal scaffolding is found to be 0.61.

The safety assessment by the two methods results in even conclusions. The results indicates that the labours in bamboo scaffolding easily get nervous, drained, exasperated and act inconsistently, all of which are easy to make accidents happen.

When synthetically analysing the safety performance, economic effectiveness, as well as quality, company's images Metal scaffolding is much better as compared to bamboo scaffolding.

II. LITERATURE REVIEW

1.Robert Bucon[1], Agata Czarnigowska[2], Piotr Kmiecik[3], Aleksander Robak[4] (2019)

In this paper authors have collected data and compared scaffoldings observed in two big cities Warsaw & Pozan. The authors conducted regular observations of scaffolding erected in selected polish urban areas [1]. It gives a good idea of the qualities of scaffolding that are there in use and enables estimating changes in the number of scaffoldings in a year in polish construction frame scaffoldings are most commonly used type. Users commonly opt for the narrowest option (less than 70 cm of usable width of the platform) and apply them to a variety of works, be it placing concrete, cladding walls with ETICS or even heavy stone elements, or providing access to roofs[1]. Secondly most commonly used type is modulus scaffolding and tube and fitting type is rarely used.

2. Marek Jablonski/.*, Iwona Szer, Jacek Szer (2018)

In this paper the probability of occurrence of health and safety risk on scaffolding caused due to noise exposure has been studied/ carried out. The result is based on measurement of one hundred and ten scaffolds located in five cities in different parts of Poland. Environmental test performed on scaffolding were focused mainly on the level of sound. Sound level is the main point of attraction in environmental test performed on scaffolding.

The study enable is to modify the working environment so that it becomes employee friendly and helps in reduction of problems occurring in a noisy work environment. The study was based on the noise level that the construction workers are exposed to. The second group where building machines are used occasionally generates the average sound exposure level. The group related to building sites comes under group 3.

3. Hitesh D. Bambhava[1], Prof. Jayeshkumar Pitroda[2], Prof.Jaydev J. Bhavsar[3] (2013)

In this research paper, authors reveal the importance of safety and cost as well as relationship in construction. It is also found that metal scaffolding is much safer than bamboo scaffolding, but from their cost the metal scaffolding is expensive than bamboo scaffolding.

In any construction site scaffolding is very important so the study of scaffolding is also important.

The whole study of safety, cost & comparison between metal & bamboo is done by statistical method.

4. Rachel Collins[1], Sijie Zhang[2], Kyungki Kim[3] and Dr. Jochen Teizer[4] (2014)

In this paper the author has discussed about the integration of safety risk factor in BIM for scaffolding construction. This paper shows the results of safety risk that occurs at each stage of scaffolding project life cycle for building a masonry wall & how these risk & related mitigation suggestion can be applied to BIM.

As per the paper safety is integrated with 4 dimensional (4D) BIM by linking the scaffolding safety risk & mitigation with the project schedule. To investigate & develop on approach to integrate safety risk factor with BIM which helps in construction safety monitoring & management.

5. Jaydeep N Desai[1], Dr. Jayeshkumar Pitroda[2], Jaydev Jagmohandas Bhavsar[3] (2014)

In this research paper; author studied about scaffolding, types of scaffolding, and safety measures of scaffolding and economical aspect of scaffolding on any constructional sites. Scaffolding plays a significant role in safety of labors, Repairs in building, Materials in construction & also it can be erected with less energy and less efforts. In durability & safety metal scaffolding is better than bamboo scaffolding. The various type of scaffolds can be used in different type of construction works or in constructional sites and also we can select scaffolding by considering financial level of project.

6. Michal Pienko[1], Aleksander Robak[2], Evan Blazik-Borowa[3], J. Szer[4] (2018)

The paper gives the results of 100 scaffolding structures in terms of safety of use. The authors studies scaffolds in Poland which were at construction & renovation stage in 2016 & 17. The basic elements affecting the safety of scaffolding use such as anchors, supports, platforms, guardrails and toe-boards have been taken into account [7] and checked.

The errors found in the assembly process & use of scaffolding were assembled together, As the legal acts are not clear, they can cause many issues, Incomplete scaffolds can be do very dangerous & accidents may occurs.

III. CONCLUSION

Scaffoldings has no specific pattern it is erected as per the requirement at site. In large constructions frame scaffoldings are the most popular type used. Steel scaffoldings are much preferable safe and economic and efficient in use as compared to bamboo scaffoldings. It is important to modify the working environment so that it becomes employee friendly and helps in reduction of problems occurring in a noisy work environment.

The safety can also be analysed using (4D) BIM software to investigate & to integrate safety risk factor with BIM which helps in construction safety monitoring & management. On site safety should be taken into account and the workers should be properly trained to work under extreme conditions and in risky environments.

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Performance of Buck Boost Ac-Ac Converter with Design and Development of DVR Topologies for Improvement in Voltage Stability

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ABSTRACT

Performance of ac-ac converter with improvement of voltage stability of DVR. The non-inverting operation can be used to compensate voltage sag, and inverting operation can be used to compensate voltage swell. Therefore, the proposed converter as a dynamic voltage restorer is capable of compensating for both voltage sag and swell in a wide range. When used in a DVR. its basic switching cell is a buck converter in a unidirectional circuit. It has no shoot through concerns. it does not require lossy snubber circuit for operation.it can be implemented with power MOSFETs without their body diodes conducting, and without reverse recovery voltages. These types of topologies are of the DC chopper.buck topology is the most basic ideas in all types of topologies.because they control strategies of the buck converter and easily applied to the other converter. Like variable structure control (VSC).

Keywords : Ac converter, Bipolar voltage gain, MOSFET, voltage sag and swell

I. INTRODUCTION

For development of energy fine the use of DVR, the converter which are normally used are the dc-ac strength conversions by way of the usage of thyristor electricity controllers, which use the section attitude or necessary cycle control on input dc voltage, to get the favored output ac voltage. However, the obvious risks of thyristor controllers together with low energy issue, massive overall harmonic distortion in source current and decrease efficiency, have limited their use. In this paper, a singular twin buck-raise ac-ac converter is proposed. It combined the operations of non-inverting greenback and inverting buck-increase converters in a single shape. Similar to the buck converter, it has a non-inverting buck operation, and much like an inverting greenback-enhance converter, it has an inverting dollar-improve operation. In addition, it has an additional operation, wherein the output voltage better or decrease than the input voltage this is in-segment or out-of-phase with the enter voltage may be acquired. Thus, the proposed converter can compensate each voltage sag and swell when used in a DVR.The simple unit of the proposed converter is a unidirectional dollar circuit, consequently it has no quick-circuit and open-circuit issues. It has no commutation problems, and does now not require lossy snubbers and/or soft commutation techniques for operation. Further, it can make use of MOSFETs without their frame diodes carrying out and without reverse restoration troubles and applicable losses. A buck-increase ac-ac converter with inverting and non-inverting operations is proposed. The proposed converter can compensates each voltage sag and swell when used in dynamic voltage restorer. Its primary switching cellular is a unidirectional buck circuit, thanks to which it has no

shoot-through concerns. It has no snubbers and/ or soft commutation techniqus for operation. Further, it may be carried out with electricity MOSFETs without their frame diodes accomplishing, and for present day freewheeling external diodes of suitable reverse recuperation capabilities can be used to limit the reverse restoration issues and applicable loss. The certain theoretical evaluation and experimental effects of a three hundred-W prototype converter are provided.

II. PROBLEM DEFINITION

One of the major issues in nowadays's electrical industry is the strength nice. The trouble in electricity electricity region transport isn't restrained to simplest electricity efficiency and surroundings but extra importantly on pleasant and continuity of deliver or energy quality and supply quality. In recent days electric energy structures are getting the greater complex community with a number of producing stations and a big variety of load centers are linked through the long strength transmission and distribution network. Quality of the strength is the major problem in these days's industries. Because of immoderate losses in power, and these power losses leads to economic losses. With the incidence of variety of the sophisticated electric and electronic equipments are more sensitive to the disturbances and non-linear masses. Voltage sag or voltage dip is considered as one of the maximum extreme and commonplace disturbances as compare to other energy first-class issues. The power distribution systems should offer an uninterrupted power supply to their customers at a rated fee of the voltage with non-stop sinusoidal waveform. Increasing of a voltage at the load, can be accomplished through injecting the reactive strength at the load of PCC. The reactive power compensation may be very plenty important for prevailing the load needs. And those will make the machine more compatible to boom the dependable distribution via converting the nature of the electrical traits. Under mild load and heavy load situations. Normal DVR have risks of thyristor controllers inclusive of low electricity component, large total harmonic distortion in source modern-day and lower performance, have restrained their use.

III. MATRIX CONVERTER TOPOLOGY

Uses an array of managed bidirectional switches as the principle strength elements to create a variable output voltage device with unrestricted frequency. It does not have any dc link circuit and does now not need any large electricity garage factors. The matrix converter has numerous advantages over traditional rectifier-inverter type power frequency converters. It presents sinusoidal enter and output waveforms, with minimum higher order harmonics and no sub harmonics; it has inherent bi-directional energy float capability; the enter power element can be fully controlled. Last but not least, it has minimal electricity garage necessities, which permits to take away bulky and lifetime-limited electricity-storing capacitors. The scope of matrix converter are easily and made up of improved the generation of power and the voltage stabilityfor performance of output and input result by current and voltage sinusoidal waveform with changes in frequency and amplitude of wavenature electricity aspect for any load, Regeneration functionality.

IV. ENHANCEMAENT TECHNIQUES

The availability of constrained herbal assets which can be used to energy business society [1,2]. To overcome the power call for, greater new renewable flowers ideally solar, wind, biogas must be set up. According to many renewable power specialists, a

small "hybrid" electric powered machine offers severa advantages over unmarried system. Hybrid structures can offer a steady network-degree energy provider. Furthermore, due to their immoderate tiers of performance, reliability and long term overall performance, those systems also may be used as an effective backup approach to the public grid in case of blackouts or vulnerable grids and for expert electricity answers which encompass telecommunication stations or emergency rooms at hospitals [3]. For the combination of renewable electricity resources with utility, energy electronic converters are used for efficient conversion of the input dc-dc/ac electricity. A DC-to-DC converter is generally employed whilst the necessities for electricity is excessive In older days, for a hybrid gadget two separate DC-DC converters were used for changing the two energy inputs. Employing individual converter with a controller for every supply increases the electricity value similarly. The Unique electricity belongings can also be associated in collection, as a multi-level system, however it's miles obvious that the whole system's performance suffers from the more than one power conversion degrees and reliability of this cascaded connection is also questionable [5]. To conquer the above said draw backs, the not unusual strategy carried out is the use of twin-input DC-to-DC converters rather than more than one converters in parallel and to synchronize them using complex analog manage loop. The distinguished benefit of the usage of dual input DC – DC converter over unmarried enter dc-dc contrary numbers is to offer a charge-effective solution, improved availability gadget through the implementation of modular additives, reliable and flexible [6,7]. In this regard, a detailed survey on available literature is made. [8] offers evaluation of different power semiconductor switches and converter topologies in conjunction with insight into the operation of these converters. [9] Discusses the modeling and control strategies for essential DC-DC converters thru three precise case studies. It covers both the frequency-domain manipulate techniques and time-area manage methods. [10] describes recent developed strength DC-DC converter Topologies in brilliant programs at the side of renewable energy, excessive –voltage and medium-voltage DC electricity structures, telecommunications and so on. Further the format and optimization of various parameters are addressed systematically. [11] provides an intensive evaluate of diverse converter topologies along with SEPIC (unmarried-ended primary-inductance converter), increase, dollar-enhance and flyback which may be used to acquire the preferred voltage level on grid output. The professionals and cons of those converters are cited. [12] compares the overall performance of a non-forestall control set version predictive controller with the traditional PI controller for a DC-DC dollar converter utilized in most electricity thing monitoring (MPPT) of a photovoltaic (PV) module. [13] provides an assessment and performance of present day and destiny style of non-isolated DC–DC converters (Such as Buck–enhance, Cuk and Sepic) with numerous parameters that helps to decide the proper tool with a selected electricity rating for renewable energy based completely programs. [14] explains the theoretical analysis of excessive gain non-remoted DC-DC converter through combining quadratic increase converter with voltage multiplier mobile. [15] discusses the performances and assessment of the bidirectional functionality and considered one of a type garage element placement of multi deliver dc-dc converters describes a selector primarily based control set of policies at the side of a proportional-vital controller that's used to cause the bidirectional converter to provide progressed voltage balance. [17] gives answer for dynamic universal overall performance necessities under charging and discharging operation cycles of the battery the use of

SEPIC-Zeta converter. [18] provides an efficient reduced order based totally totally solar powered DC-DC SEPIC Converter. The proposed cascade manage method can be able to offer regulated output voltage and eighty–99% of MPPT simultaneously the usage of a single stage non-remoted DC-DC SEPIC Converter. [19] employs a present day control technique primarily based on kind-2 fuzzy neural controller (T2FNC) with the intention to enhance the dynamic response of an ultra-improve Luo DC–DC converter beneath one-of-a-type operational situations. [20] proposes a method to derive small sign model of the referred to four quadrant Luo converter the use of sign go with the flow graph technique. [21] gives a non-perfect model of DC-DC PWM greenback converter considering the parasitic factors (or non-idealities) which includes equal collection resistances (ESRs) of inductors and capacitors, parasitic resistances of semiconductor gadgets (diode, MOSFET) throughout conductivity and additionally the forward fall of the diode. [22] discusses approximately the consistent kingdom and the small signal dynamical behaviors and the comparisons among exceptional quadratic Boost converters are defined and concluded. [23] depicts a greenback–increase Controller designed to care of mode transition mechanically based on deliver voltage. [24] advanced an adaptive passivity-based totally definitely controller for output voltage regulation of DC–DC greenback–enhance converter with an unknown steady electricity load. [25] gives a brand new generation in incorporating the renewable supply and grid for supplying electricity to the villages. This paper additionally explains the significance of renewable electricity sources and the electricity digital converters in efficaciously changing multi-input dc-dc/ac power. [26] proposes a immoderate voltage gain twin enter dc–dc electricity digital converter which can draw non-stop contemporary from enter resources or a single source continuously which makes it suitable for the programs like sun panels. [27- 29] has reviewed approximately the operation of various Multi-enter DC/DC converters. Though numerous research articles are to be had in DC-DC converters, the overall overall performance evaluation of the twin input DC-DC converters is much less available in literature. Taking this into attention, a entire performance evaluation of different dual enter DC-DC converter topologies is accomplished and pronounced in this paper.

A Structural Problems

Basic issues are the most genuine; disappointment is regularly quick and irreversible. Disappointments brought about by stream - incited vibration of warmth exchanger tubes over shadow all other basic disappointments. Cylinder to tube sheet joints disappointment is likewise a regular operational issue. The other sort of auxiliary disappointment experienced in heat exchanger activity is spillage from darted joints. Breaks every now and again happen in spout ribs because of minute stacking of the joint brought about by warm extension of the interconnecting funneling. Now and again, non-temperature conveyance in the cylinder sheet or spread in different pass configuration initiates joint spillage. Supplanting of the spilling gaskets with one having increasingly suitable stacking and unwinding properties is generally the panacea for such auxiliary issues.

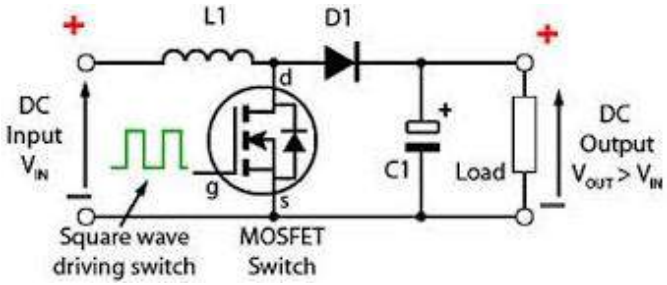

Fig 1 Block Diagram of Buck boost system

V. CONCLUSION

The designed converter has no shoot-through and useless time troubles and, like conventional dc-dc converters, it is able to be operated with simple PWM manipulate. It gives high frequency and high performance operation due to the fact excessive speed MOSFET can be used as switching device with out the opposite restoration problems and losses of its body diode. Experimental effects confirmed that the proposed converter can gain ninety seven% efficiency at 60 kHz switching frequency. These simulated consequences of SPMC illustrates that it's far feasible to understand the matrix converter as a frequency step-up converter. Further works are required to implement low-pass clear out on the output to make sure continuous waveforms which are suitable in real packages. Also while the usage of with RL load, Undesirable spikes appear to seem with an affordable degree of magnitude that calls for elimination. This possibly can be solved the use of novel commutation strategies

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IOT Based Monitoring and Controlling of Agriculture Robot by Using Blynk App

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ABSTRACT

Automation has given luxury and comfort to humans. In India the agricultural techniques have ameliorated over the years but still the human efforts which can be utilized for productivity are restricted to performing perpetual tasks like switching on/off pumps or monitoring the farm fields to understand the atmospheric conditions or to check the fields for trespassers. The infrastructure of the farms , investment constraints and utilize acceptability do not sanction planarity automated agricultural systems rather it shall be preferable to automate tasks step by step. The proposed work presents a novel design of a robot which can provide the farm sensor data over IOT to user's mobile which can be accessed by Blynk app. The temperature, Humidity readings are exhibited on the app and Moisture sensor readings is withal exhibited along with utilizing it for watering the plants by deciding threshold value of moisture. Another paramount consideration as regarding the intrusion of people in farmlands or for the assistance in moving the robot is the provision of camera which can be of any mobile. The mobiles which are already in utilization or have been discarded can be mounted on the robot chassis and can be interfaced to view the circumventions on laptop. The proposed work Fixates on utilizing IOT as a technique to implement this system and additionally control the robotic forms of kineticism through an app. This shall provide access to the farm land remotely without the need to physically go and check the farm fields.

Keywords : IOT, blynk app, robot, agricultural automation, sensors.

I. INTRODUCTION

Agriculture sector has undergone rapid changes, considering the increase in production and changes in farming tools and technology used. IOT (Internet of Things) is now being integrated with agricultural mechanisms to keep the farm owners updated about the farm lands. Initially all works related to wireless technology was done using Zigbee modules or GSM technology. The farmland needs to be covered with an array of sensors physically placed which provides sensor data to the controllers over WSNs (Wireless sensor Networks) and through GSM or Zigbee modules it is received by the user. Another up gradation which facilitated the users was provision of getting data in mobile app using IOT. IOT has various applications in the field of agriculture owing to its numerous advantages which leads to it success. The main advantage of IOT is that it can provide sensor

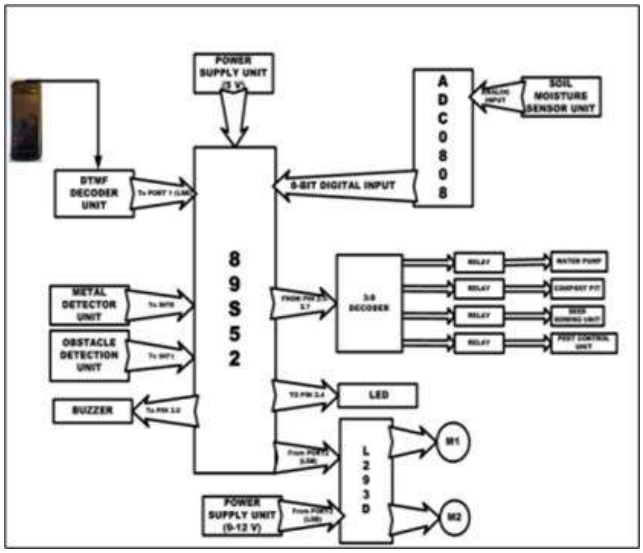
data for monitoring or can send data to the system for controlling its applications. General applications of IOT in agricultural techniques also include providing temperature monitoring of farmlands to observe the crop patterns and effects of temperature on the crops. As the climate change is drastic over these years, integrating farmland owners data over IOT can help agricultural research centers to analyze effects and causes of various crop pattern changes and in cases of crop damage due to sudden climatic changes, it can help monitor and predict behavior of plants and crop over the next year so that precautionary measures are taken to avoid repetition of same conditions.

II. LITERATURE REVIEW

Mainly automation techniques have been reviewed in order to check the recent works regarding farming techniques which can help to monitor the farm lands or to ensure some repetitive tasks that can be replaced by automation. DTMF and GSM have been popularly used as the major technologies for this purpose.

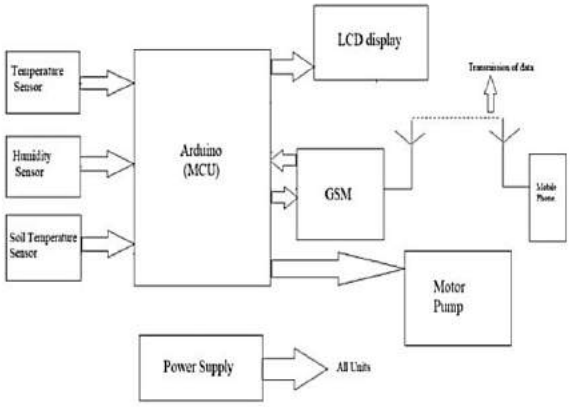
A. DTMF based farming robot vehicle.

In this system, robot movement is controlled through dual tone multi frequencies which are fed by the user and soil moisture is sensed and irrigation motor pump is switched on accordingly. [1]



Fig(iii) DTMF system block diagram

B. GSM based agricultural system



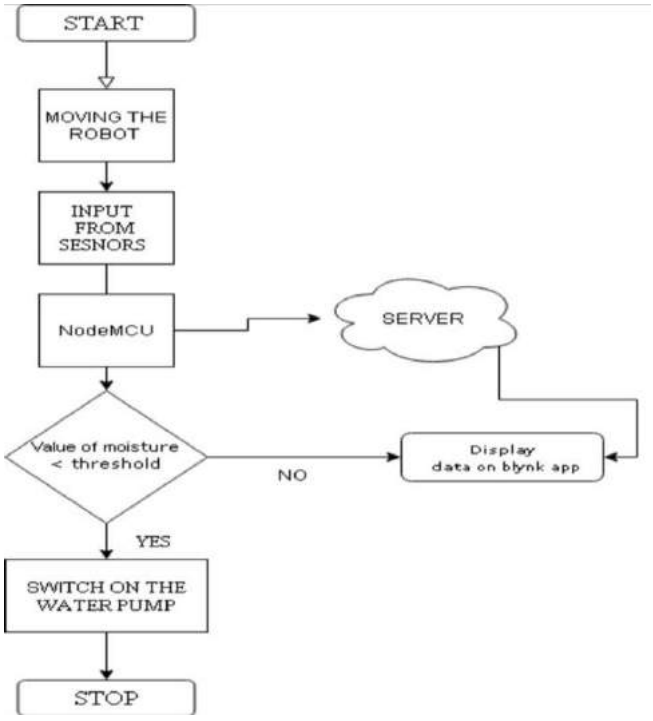
Fig(ii) GSM system block diagram

In this system, sensors are placed on farmland and information of these sensors are sent through GSM and the farmer can take the decision of switching the system's of water pump and pesticides pump. [2]

III. Methodology

In the proposed work, IOT is used as a core technology to implement the design. A robot has been designed for agricultural work. The control of this work is based on IOT, which shall control the movements of robot through Blynk app. In the design

two sensors are used, Resistive moisture sensor and Temperature-humidity sensor (DHT11). These two signals provide the farmland data to the user on Blynk app. Initially, robot movements are controlled and it is allowed to enter the farmland through users control. It utilizes camera of mobile to see the surroundings and check for obstacles or clear path. The sensor provides data to the controller unit which then sends the data to Blynk app. Another important feature added to this project is regarding the moisture sensor, to automate the task of watering the plants, it is necessary to know whether a soil needs water or not. A shaft is attached to the dc motor which moves down by users input on Blynk app and provides the moisture content reading for display on app. If the reading moves below 30%, water pump will switch On and watering of plants shall be done. Temperature and humidity sensor continuously provides the data to the Blynk app. The water pump used is a submersible pump which can be installed in a small portable water tank which is installed on the chassis. Fig (i) shows the flowchart of the project which represents the step by step procedure.



Fig(iv) Flowchart.

Fig (ii) shows the block diagram of project which indicates the connections of different components with each other.

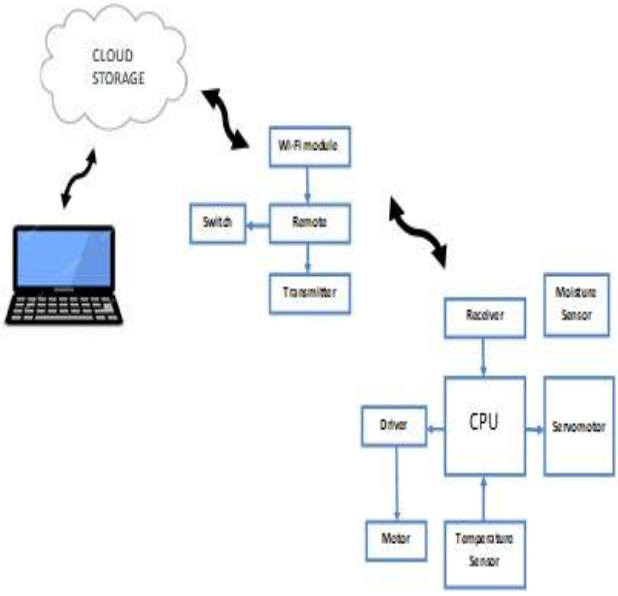


Fig (v) Block Diagram of Smart Agriculture robot

IV. Technology used

1. **IOT (Internet of Things):** It is the most widely used technology owing to the presence of internet services and itscoverage all over the country. As internet usagehas increased and also number of users has increased which makes it a feasible technology for users.
2. **Arduino IDE:** The programming of NodeMcu is generally done on Arduino IDE which is open source software compatible with multiple controller boards.

V. Component Details

1. **Moisture Sensor:** In this project, it is very important to measure the moisture content of soil, which will help to automate the task of watering the plants according to the predefined threshold level set; in this case it shall be 30% of moisture content.

Fig (vi) Resistive Moisture sensor

This moisture sensor works on the principle of changing resistance according to the flow of current; hence the name resistive moisture sensor.

2. **DHT11 (Temperature and Humidity sensor):** Another important aspect for watering the plants or surveying the farm is the knowing and analyzing the temperature and humidity to understand the overall effect of climatic change that is happening and work accordingly with it.

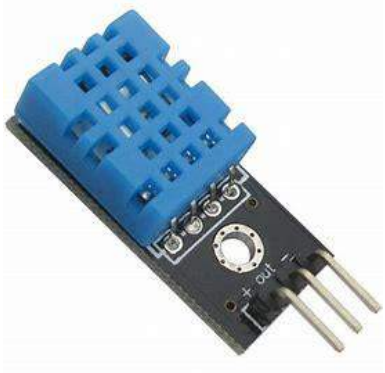


Fig (vii) Resistive Moisture sensor

3. **NodeMcu (Node Microcontroller):**It is a controller which has built-in Wi-Fi module and in the project serves the function of analyzing the sensor data, providing it to the Blynk app screen of user and also receiving commands from user for movements of robot.

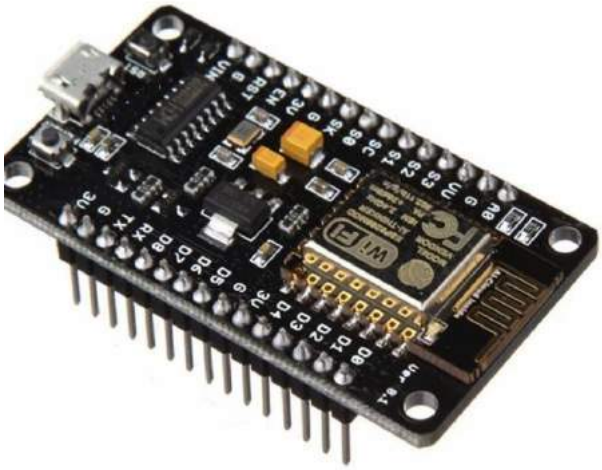


Fig (viii) NodeMcu

4. **DC Motor:** The DC motor can move clockwise and anti-clockwise which can help for robotic movement. (Forward, reverse, right, left). It is also used to move the shaft up and down. Shaft is mounted on the robot chassis.

Fig (ix) DC motor.

VI. Blynk App Design

Blynk app is a third party app development service which works with open source platforms and provide compatibility to IOT based projects. The following figure shows the basic design of projects app functions.

Steps for Blynk app

i. Download the app
ii. Select new project
iii. Drag and drop the buttons
iv. According to the labels, programming in IDE is done to check the functionality.
v. After token is authorized, the Blynk app can now connect and work in synchronization with the hardware module of the project.

VII. Schematic Circuit Diagram of project

The components are connected according to the diagram as shown below which will help to highlight the pins used and functionality of the overall project.

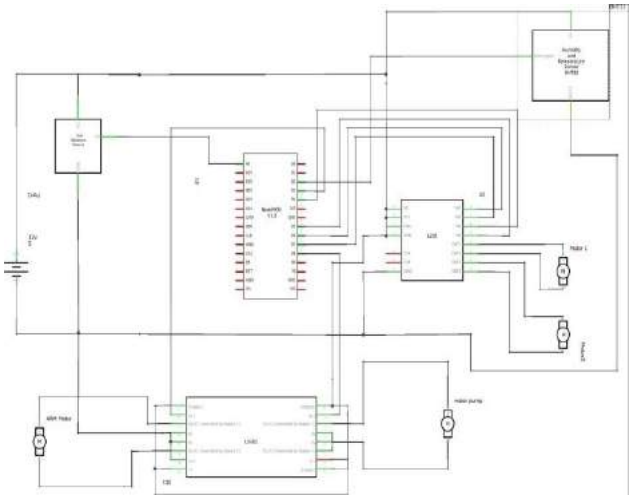
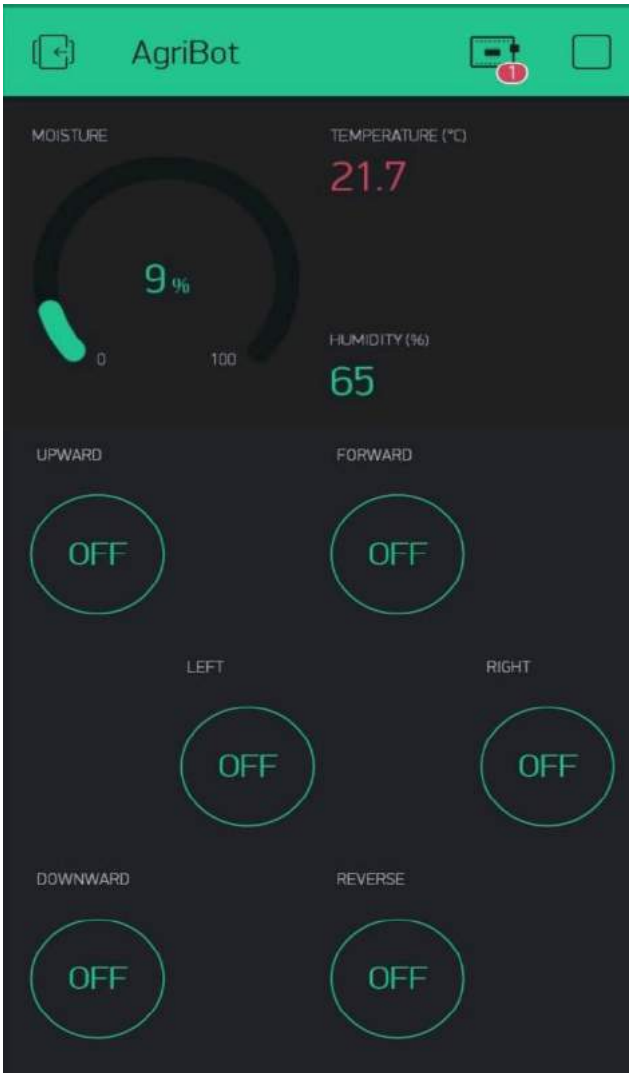


Fig (x) Schematic Diagram

VIII. Result and Conclusion

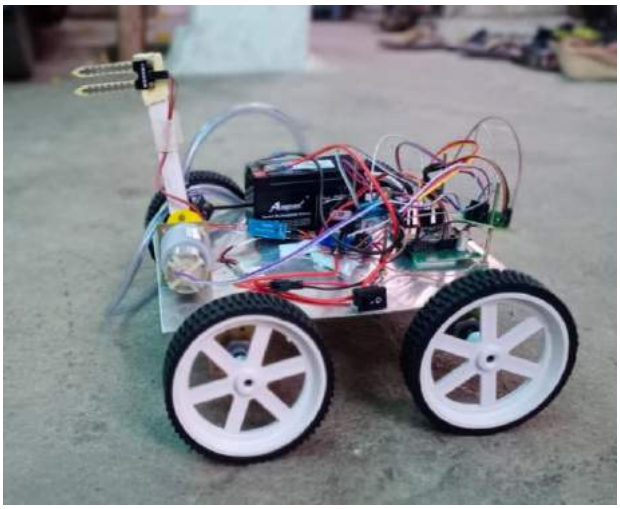
The robot designed helps to complete different agricultural task like watering the plants, monitoring the farms etc. The prototype design is an endeavor to promote the automation of agricultural tasks and remove the hardships associated to farming techniques used by our Indian farmers. It is also very important to monitor the temperature and humidity of farm lands in order to understand the requirements of water or crop growing patterns. As it is not feasible to have an infrastructure of using sensor arrays on farmlands hence our proposed system is economically feasible and also helps to automate the task of watering the plants according to different crop requirements. Figure below shows the gui of our app which can control the movements of robot through this app.

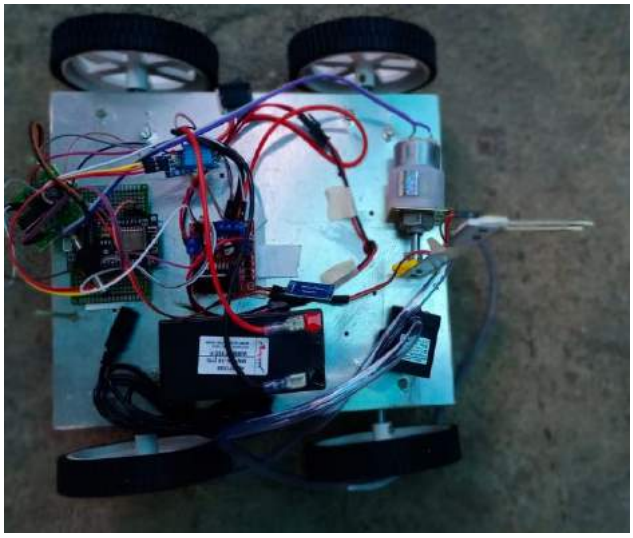


Fig(xi) Blynk app GUI

The moisture sensor is connected to a shaft controlled by the dc motor which can be moved upward and downward. Any other agricultural work can also be carried out by changing the shaft bit. The entire sensor data is displayed on the app. Controlling

function can be carried out b clicking on respective buttons.





Fig(xii) Agricultural robot

IX. Acknowledgements

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Fingerprint Sensor Based Protection System for Electric Line-Man

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ABSTRACT

In present scenario , electric line-man have to request staff personnel to switch off the line which has to be repaired or maintained. There is a major chance of miscommunication and a potential risk to human life. The proposed system focuses to eliminate this problem by providing a secured mechanism to switch on/off the supply in line. The access of this system should not be open to all hence it has an authentication process through use of fingerprint sensor. In case there is a problem in detecting fingerprint or it causes a failure we have provided a backup system which also provides user authentication. The backup system uses RFID technology to provide access to the system. Electric line-man provides a request to access system using a fingerprint sensor. If the fingerprint matches that with the one in record , access is granted and line can be switched on/off according to requirement. The LCD provides output status of the access granted or access denied. The relay is used connect or disconnect with the load and indicate the load as on or off according to status of the system. Microcontroller co-ordinates all the tasks of this system and has to be programmed for providing output when authorized users place requests. The proposed system aims to reduce chances of human errors and ensure safety for Electric line-man.

Keywords : Controller , Fingerprint sensor , relay , RFID , Electric lineman

I. INTRODUCTION

Innovation is done to bring leisure to mankind. All inventions are built to decrease human exertion. In the dilemma of decrement in human exertion, the technology has long forgotten the safety of man. In this project, we are to design a system that does not only improve safety but also diagnoses the fault. As per insurance companies, even with the telephonic communication facility accidents happen that not only fry up household electronics, or burst transformers, in some cases electrocute technicians to death, just because of the miscommunication between the maintenance staff and electric substation staff. We are to design a fingerprint and RFID-based system which will be with ease for lineman. Whilst such ease of access, in case of fingerprint failure, there shall be a RFID system with security protection to turn on or off the system. Our System is based on an Atmega 328Micro controller: Our designed system will also have the capability to provide security and allow only authorized people to access the safety.

II. LITERATURE REVIEW

2.1. Existing Method

In existing system whenever any of the problems occur at distribution lines, lineman have to informs the substation operator to shut down the power of that specific line on which fault has occurred through making a phone call to substation operator or by going by himself to the substation for the maintenance of that distribution line, there is a huge chance of communication gap between the electric lineman and sub-station operator or staff. This communication gap may risk the life of an electric lineman or a transformer or other components, or household appliances.

Figure2.1: Lineman at work

Disadvantages:

- There is no safety for the lineman.
- There is a room for miscommunication.
- Time-consuming.
- Remote Control does not exist.

2.2. Previous Work

1) **Electric lineman protection using password-based circuit barker**

Disadvantages:

- There is a chance of forgetting the password
- The lineman must go for the power station for setting up the password

2) **Electric lineman protection using user changeable password-based circuit breaker:**

Disadvantages:

- The lineman must go for the power station for setting up the password.

3) **Electric lineman protection using circuit breaker based on an android via Bluetooth:**

Disadvantages:

- The lineman must go for the power station for setting up the password.
- It works under the capacity of Bluetooth range only.

4) **Transmission line fault detector in remote areas using advanced wireless technology.**
5) **Arduino based underground and overhead cable fault detection.**
6) **Fault location for power transmission systems using magnetic field sensing coils.**
7) **Microcontroller Based Code Locking System with Alarm.**

III. METHODOLOGY

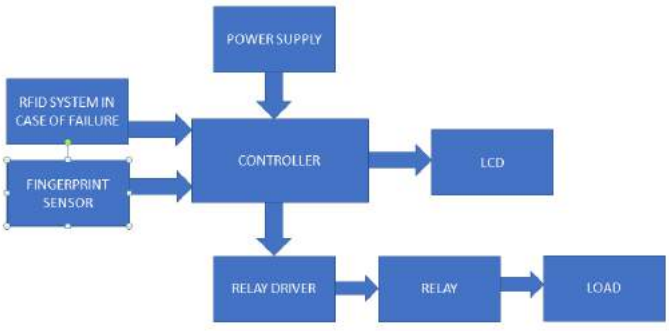

Figure 3 Block Diagram

3.1 Working

- A line-man puts a request of switching off power supply of the line which has to be repaired or

maintained. The request is granted only if the fingerprint matches with the ones stored in record and controller sends signal to circuit breaker for switching off supply. The line is switched off through relay mechanism

- Relay driver: A Relay driver IC is an electro-magnetic switch that will be used whenever we want to use a low voltage circuit to switch a light bulb ON and OFF which is connected to 220V mains supply.
- The required current to run the relay coil is more than can be supplied by various integrated circuits like Op-Amp, etc. Relays have unique properties and are replaced with solid state switches that are strong than solid-state devices. High current capacities, capability to stand ESD and drive circuit isolation are the unique properties of Relays.
- The lcd is used for indication of status of circuit breaker.
- Arduino nano is programmed to provide signal to relay driver ,lcd once a fingerprint input has been recognized .
- LCD displays the status of system.
- A backup system using RFID based I-card system is employed in case if there is a delay in allotting biometric system details to new employees or any uncertain cases.
- An indicator for output is very important as it informs the user whether the line voltage is turned on or off.
- In our project this information is indicated by connecting a load at the output like a bulb.
- If an authenticated user provides his/ her details then lcd display will indicate "ACCESS GRANTED".
- If an unauthenticated user provides his/ her details then lcd display will indicate "ACCESS DENIED".
- This process ensures that no unauthorized access is provider and no intruder can access the system at any cost.
- This system is designed to replace the manual techniques or an lock and key mechanism that may exist and has chances of human error.
- As rfid and fingerprint sensor technology, both have advantages of user authentication it proves to be advantageous over other existing systems.
- This system ensures safety of all lineman.

3.2 Flowchart

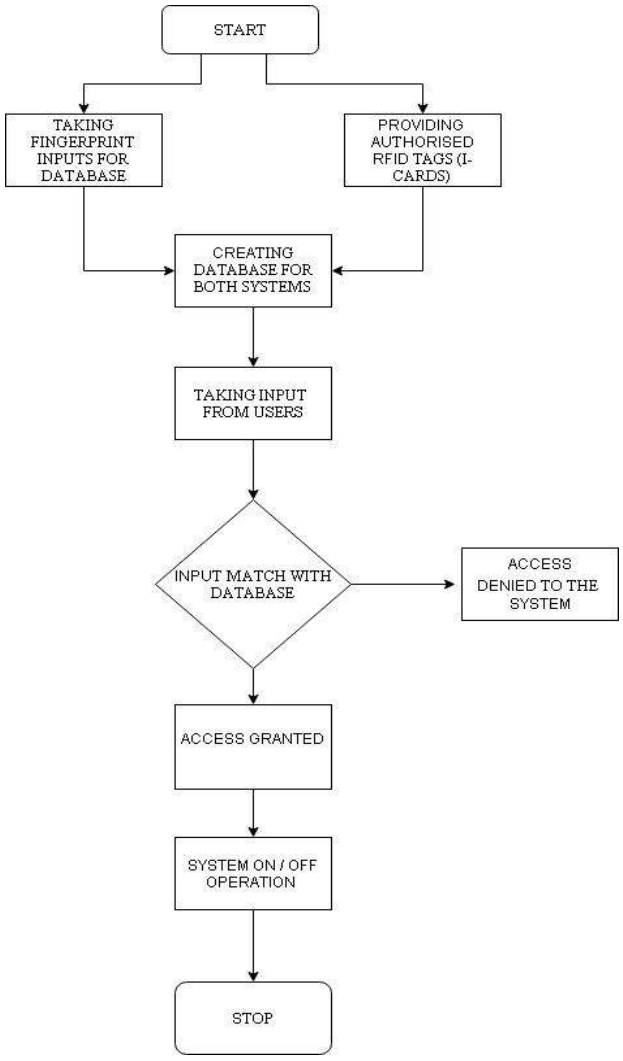

Figure 3.2 Flowchart of the Proposed System

IV. HARDWARE DESCRIPTION

In our project, we utilized best and economical devices with exact and precise readings to make our project smart and intelligent. The Hardware components we use are:

- Arduino Nano
- Fingerprint Sensor Module
- Rfid Reader And Tags
- Connector
- Resistors
- Capacitors
- Connecting Cables
- LEDs (Light Emitting Diode)
- Optocoupler
- Connection Wires
- LCD display
- Relays

V. SOFTWARE

Two softwares are used for this project

1. Proteus : It is used for PCB designing and circuit designing.
2. Arduino IDE: For programming of the project.

5.1 Proteus

Proteus ISIS is circuit designing and simulation software used for designing PCB Layouts. First you make your required circuit on Proteus, test it, and then make the desired PCB layout.t is a software suite containing schematic, simulation as well as PCB designing.

- ISIS is the software used to draw schematics and simulate the circuits in real time. The simulation allows human access during run time, thus providing real time simulation.
- ARES is used for PCB designing. It has the feature of viewing output in 3D view of the designed PCB along with components.
- The designer can also develop 2D drawings for the product.

The Proteus Design Suite combines schematic capture, SPICE circuit simulation, and PCB design to make a complete electronics design system. Add to that the ability to simulate popular micro-controllers running actual firmware, and have a package that can dramatically reduce development time when compared with a traditional embedded design process.

5.2 Arduino IDE

IDE stands for “Integrated Development Environment” :it is an official software introduced by Arduino.cc that is mainly used for editing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go.

VI. DESIGN & IMPLEMENTATION

6.1 Steps involved in designing a system

1. Simulation of circuit
2. Programming
3. Hardware testing (breadboard testing)
4. PCB designing
5. Component mounting
6. System testing

6.2 Connection of components to arduino

1. Finger print sensor module to arduino

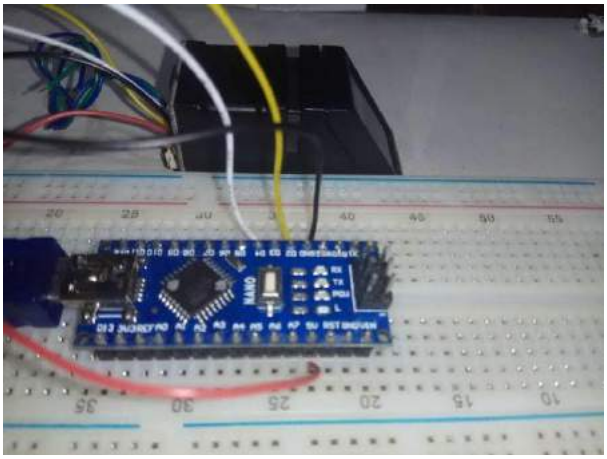

Figure 6.2 Connection of Arduino Nano to Fingerprint Sensor

2. Libraries

   To run the program and to make sketching a code easily we need to download these library.

   - Adding Adafruit-Fingerprint-Sensor-Library
   - After downloading the ZIP file libraries add it to your arduino IDE libraries by locating the SKETCH include library then add ZIP library and then look for your zip file on your download folder.

6.3 Connection of arduino nano to RFID

Figure 6.3 Arduino Nano to RFID

1. Download the RFID library
2. Unzip the RFID library
3. Install the RFID library in your Arduino IDE
4. Restart your Arduino IDE

Place the NANO on the solderless breadboard. Connect the black jumper cable from the GND pin on the LCD. Connect the red jumper cable from the VCC pin on the LCD to the VCC pin on the NANO. Connect the green jumper cable from the SDA pin on the LCD to the A4 pin on the NANO Connect the yellow jumper cable from the SCL pin on the LCD to the A5 pin on the NANO.

6.4 Connection of arduino nano to relay module

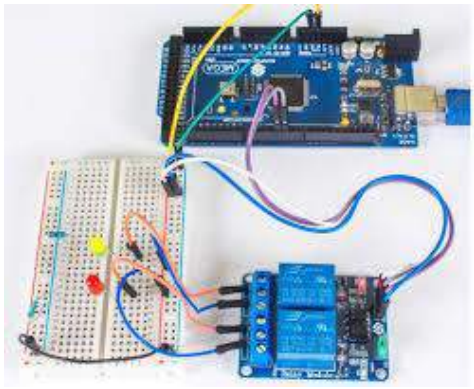

Figure 6.4 Connection of Arduino Nano to Relay Module

6.5 Connection of arduino nano to LCD

Place the NANO on the solderless breadboard Connect the black jumper cable from the GND pin on the LCD to the BND pin on the NANO. Connect the red jumper cable from the VCC pin on the LCD to the VCC pin on the NANO Connect the green jumper cable from the SDA pin on the LCD to the A4 pin on the NANO

Connect the yellow jumper cable from the SCL pin on the LCD to the A5 pin on the NANO. Next step load the Arduino IDE and upload the sketch

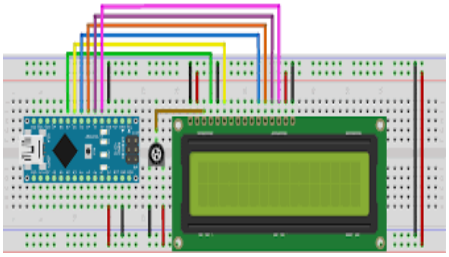

Figure 6.5 Connection of Arduino Nano to LCD Display.

6.6 Schematic circuit diagram of project

6.7

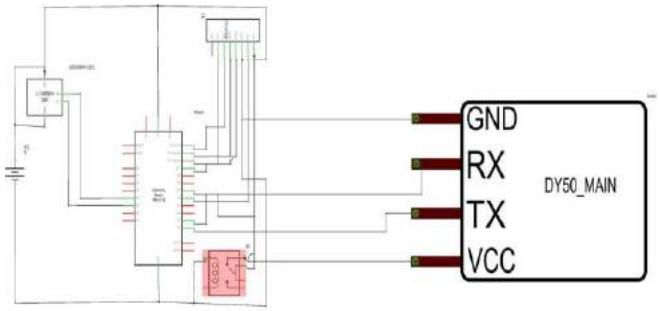

Figure 6.6Circuit Diagram of Project

6.7 PCB Etching

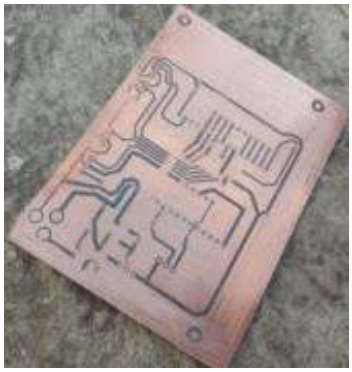

Figure 6.7.3 PCB before etching process

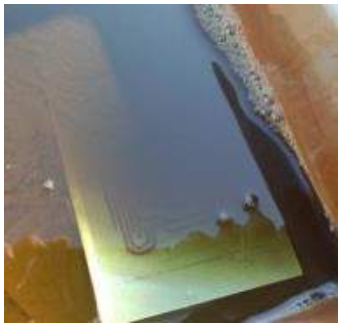

Figure 6.7.2 PCB during etching process

Figure 6.7.3 PCB after etching process

VII. RESULT

This system provides a solution, which can improve the safety of the project. It is designed to control a circuit breaker with the help of a fingerprint access mechanism. The maintenance staff e.g. Line man's for control to turn ON/OFF. The line works with the line man only this system is arrangement such that a password is required to operate the circuit breaker (ON/OFF) but it has man disadvanages hence moving o anoher approach. Line man can turn off the supply and comfortably repair it, and return to the substation, then turn on the line by accessing the system. The system fully controlled by a ATmega 328 IC. If the user is no authenticaed then he cannot access it and if it is authorized access is correct, then the line can be turned (ON/OFF). Security is prime concern in our day-to-day life. Everyone wants to be more secure as to be possible. This system provides a new approach to a lineman security for their life. The circuit can be used without any fail of a lineman. The circuit can be used without any load can also be controlled when required

VIII. ADVANTAGES OF MODEL

8.1 ADVANTAGES

There are many advantages related to this model which are listed below, which indicate
Effectiveness and reliability of this system.

- Quick response time
- No need of remembering passwords
- Team based system to facilitate smooth working.
- Fingerprint sensors are accurate
- Backup system available
- RFID system assures authentication of user
- Cost effectiveness
- Avoids electrical accidents to line man

- It improve the line man safety
- Project is implementable a large scale
- Uses commonly available components
- Most useful to operate in the public areas

8.2 Applications

- It is used in electrical substations to ensure line man safety.
- RFID based circuit breaker is used in buildings and houses.
- Used for saving power in hotels and shopping malls.

IX. FUTURE SCOPE

The system designed ensures a cost effective and novel approach of designing of a safety mechanism for lineman but this does not restrict the design from modifications or adding up of extra features which shall increase the safety further. There is a scope of improvement of this project in terms of technology used like we can also use internet as platform to provide the status of usage of this mechanism. The system can be tested for different complex working conditions and also can be used to identify further needs. Mentioned below are points that can be considered for future scope of this project.

- Provision of system front end
- Keeping track record of lineman workers

Using the concept of internet as a service.

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Reward Generated by Smart Plastic Bottle Recycling Machine

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ABSTRACT

Target to the issue of plastic bottles recycling and reuse of wastage of plastic material, The system is necessary to develop to reduce the plastic garbege from environment. This system having main component ATmega 328P Which is main IC and GSM SIM 900A for communication purpose. This system not only collect the bottles but also generate the reward to attract more people to use this machine. The prototype model tests result shows already used plastic bottles & other plastic like plastic bags. LCD display displays instruction and keypad for easy usage of consumer for getting the reward code / cash back by entering the users cellpohne No. And further this code will be transfer to the users mobile no with the help of SMS. The collection of plastic bottles is mainly leads to reduce the pollution which is generated because of plastic waste as it is non decomposable material ,harmful to soil fertility ,water drains,choke the pipe lines and which is one of the major issue caused by drainage of plastic. In this way this system cash back by plastic waste is beneficial to the society .Overall the interesting rewards / promo codes options will attract the people. This collected scrap plastic will be further transfer for the recycling process , which is again reuse direct or indirect way.In this way the plastic recycling chain will be going on continue without harming to the Environmental health.

Keywords : Atmega328P, GSM module Microcontroller, Sensors.

I. INTRODUCTION

Cash Back By Plastic Recycling Machine is used for recycling of materials such as paper, bottles, cans, and plastic bags. This paper focuses specifically on reverse vending machine of plastic bottles. The purpose of reverse vending machine is purely to encourage recycling and provide an incentive for the user. The operation of this machine is very straight forward and simple.Users simply place their empty plastic bottles into the machine; the machine collects those plastic bottles and users put there contact number on keypad GSM module send the reward points on users contact number stated which is redeemable for cash. The incentive can be of any type such as cash, reward points on smart cards, shopping coupons, bus/train tickets, mobile phone credit or donating to charity. This type of machines are widely used now-a-days;they are installed in hospitals, schools, universities, departmental stores, shopping malls and offices. They are widely used in countries like China, USA, Germany, Wales, Scotland, Ireland, Australia, Norway, Brazil, the Middle East and the UK. Bottles were detected using a sensor. This prototype enables the user to recycle plastic bottles and get cash rewards. An LDR sensor is used to recognize different bottle sizes, according to which the cash reward is calculated. This project will make machine cheaper

than most of the reverse vending machines. As the main objective of this project is to recycle and thus help protect the environment; this machine has to be as affordable and accessible as possible to have a positive impact on society.

II. PROPOSAL

As we can see, it has become easier to provide digital cash inputs. In the next few years, this trend will go up. Along with the ATM era, creating other features like banking, UPI and digital wallets is meant to save customers time, increase accuracy and make the system safer.

In today's age, the topic of water bottles and plastic bags is nothing new. If there is water, then plastic bottles will come! And bags are a necessity today. Humans produce about 2.5 plastic bottles every second. For this, its dissolution has become compulsory.

In addition to this, the government is also implementing new initiatives to curb this increasing pollution. As part of such an initiative, a small effort has been made to make this presentation.

III. METHODS AND MATERIAL

A. Block Diagram

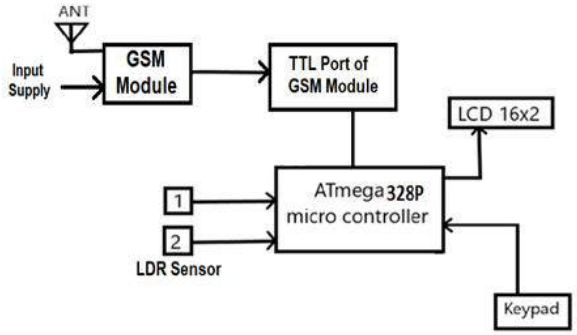

Fig 1. Block Diagram of Recycling Machine

B. Components Description

GSM module - A GSM/GPRS Module is an IC or chip that connects to the GSM Network using a SIM (Subscriber Identity Module) and Radio Waves. The common radio frequencies in which a typical GSM Module operates are 850MHz, 900MHz, 1800MHz and 1900MHz. GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM).

ATMEGA328P:-It is high performance, low power controller from Microchip. ATMEGA328P is an 8-bit microcontroller based on AVR RISC architecture. It is the most popular of all AVR controllers as it is used in ARDUINO boards.

LCD 16x2:- It is a 16 pin liquid crystal display. LCD 16x2 each character is displayed 5x7 pixel matrix.

IC7805:- Voltage regulator output voltage constant 5 volt value. IC 7805 member of 78xx series. Where the xx indicate the output voltage it provides.

LDR sensor:- An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.

C. Working

As shown in the fig. block diagram the 12V DC supply is given to GSM module with which antenna is connected for the signal.

Then from the TTL port of GSM the 5V from the Vcc pin is given to IC Atmega 328P for working.

Now, with IC Atmega many components are connected like keypad,LCD 16*2,LDR sensor 1 and 2 for diffrent diffrent operation.

GSM is used for sending the code by sms to the customer's mobile.

16*2 LCD is used for displaying purpose and keypad for entering the mobile number of users.

LDR sensor is use to detect the number of bottles enter in the container.

IV. System design

This section discusses the system modelling, process and theoretical design of the Smart Bottle Recycle Machine. It also describes the design flow which was used to implemen the design.

A. Process diagram

The first block in the Block Diagram portrays the input of the system (Bottles), which is placed in the machine by the user. The second block portrays the mechanism of the sensor used, which detects and differentiates the bottles. The third block is the Bottle Counter, which takes an input from the sensor and counts the number of different types of bottles. The fourth block, the Points Counter, takes inputs from the previous block and provides the appropriate reward points. The fifth block, Binary to BCD converter, converts output from the binary values to BCD values to be displayed on the LCD and 7-segment display. The last two blocks, the 7-segment display and LCD, shows the height of the bottles and the calculated reward points for the user, respectively.

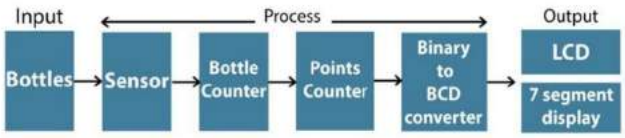

Fig. 1 Block diagram of Smart Bottle Recycling Machine design.

B. Physical Design

The design has two push buttons (see Fig. 2). One push button is used after each bottle is placed into the machine and the second button, the “done button”, is used when all the bottles from a user is placed into the machine. There is also a LCD mounted on the design which displays the final recycling value/incentive the user will receive. There is a two hole in the middle for the user to place the bottles & plastic bags. The internal view of the design shows the LDR sensor mounted at the top.The plastic bottles are placed through the hole and fall at the bottom where the sensor detects them.

After detection of bottles the procedure of counting of bottles and sorting is to be done in the processor after all processing reward will be generated.

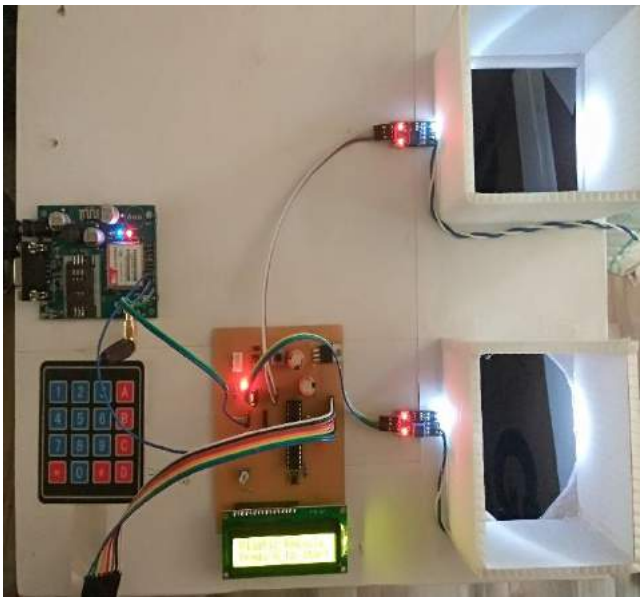

Fig.2 The prototype (top view)

V. RESULTS AND DISCUSSION

Plastic bottle recycling box is a creative design production based on microcontroller system. Application of embedding technology to waste treatment, not only broaden the technology’s application field, but also enhanced the technical level of waste treatment, more over meet people’s curiosity for new things, thus achieved the purpose of waste recycling. The experimental result shows the good effect of collector recycling and plastic treatment. Moreover, the recycling box improves the user’s participation, autonomy and interesting through onboard reward interactive interface, significantly reduces labor cost through the integration of network information auto management.

Recycling box with incentive mechanism, enhanced the refuse classification thinking, reinforced environmental protect awareness, provide a new idea for recycling waste and design corresponding innovation product.

Fig.3. The prototype (Front View)

VI. CONCLUSION

The prototype of the Smart Bottle Recycling Machine is successfully implemented and the whole system functions effectively. All the devices are working and functioning as expected and operates well with the designed circuit. The user inputs his/her bottles into the system, the system enables the summation of points throughout the recycling process and the LCD displays the number of each type of bottles and the total reward points. The reward points and number of bottles increment with every input to the system, using an LDR sensor, which is readily available in the market and very cost efficient.

I. FUTURE SCOPE

There is endless scope of research and improvement for the improvement for the cashback by plastic based reward generated machine.

However,in developing countries Reverse Vending Machine (RVM)) are not very populardue to their high implementation and maintenance cost. Simply, they are not affordable and hence are not implemented. This project should work as a proof of concept for a low cost RVM in such cases. The remaining challenges and scopes of this work are:

1) Improved detection accuracy of the sensor system.
2) Sorting system for different materials .
3) Redemption of reward points.
4) Lower energy consumption.

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Train Accident Prevention System

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ABSTRACT

Railway accidents are one of the major issues evident in India. The main objective of this study is to develop and implement an accident prevention system on railway track. The system developed is able to detect obstacles including crowd of humans, animals or any vehicle stuck on railway track. It is also useful in the hilly region where land sliding occurs. It detects the obstacles at a distance greater than the loco pilot's eye vision and notify or give an alert about the obstacle, giving sufficient time to the driver to prevent or control the situation. This study presents concluding remarks on the limitations of existing studies and provides recommendations for further research and appraisal practices

Keywords : Deep Learning, Neural Network, Object Annotation, Object Recognition, Python , TensorFlow Lite Tool

I. INTRODUCTION

We are currently developing Accident Prevention System in which we are detecting obstacles on the track using camera. This paper mainly describes a related method of detection using images captures by the camera and process them by using object recognition with Deep Learning

Deep learning is a subset of machine learning in Artificial Intelligence that teaches computers to do what comes naturally to humans. In Deep learning, models are trained by using a large set of labelled data and neural network architectures that contain many layers.

TensorFlow Lite is an open source deep learning framework which is used for on-device inference. TensorFlow Lite works as an accompaniment to TensorFlow by using Python Language. TensorFlow Lite takes the resulting model as an input, packages, deploys and then interprets it in the client application, that handles the resource-conserving optimizations along the way. In this we are accomplishing the task of Object Recognition. Object recognition refers to a set of related tasks for identifying objects in digital photographs. In deep Learning, object Detection is a subset of Object Recognition.

Object Detection combines two related tasks that are Image Classification and Object Localization which includes assigning a class label to an image and drawing a boundary box around one or more objects in an image respectively. This allows for multiple objects to be identified and located within the same image. The model developed by using above technology summarizes the following: 1. A rail detection algorithm which focuses on the characteristics of shapes such as edges, resulting in clipping of the image. 2. An image recognition algorithm that enable detection of obstacles in terms

of their shape and sizes. 3. Resulting processed image is further used for verification.

While verification, the processed image is matched with the images of an obstacles stored in system database. If the verification is successful then it will generate an alarm to alert the loco pilot so that loco pilot can be able to take quick action.

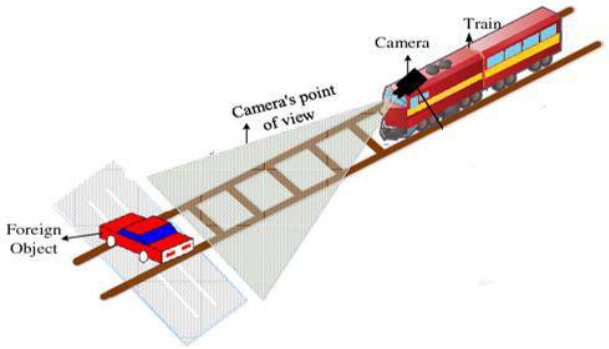

Figure 1: External Overview of the System

II. METHODS AND MATERIAL

A. DESCRIPTION OF HARDWARE

This model uses PiCamera, Raspberry pi, display that in all are connected and with each other.

1) Camera : The camera is placed in front of the engine and is used to capture the live video of the current track on which the train is running. Following are the specifications of the camera used-

- 15-pin MIPI camera Serial Interface which Plugs directly into the Raspberry Pi Board.
- Picture resolution: 2592 x 1944
- Video: supports 1080p @ 30fps,720p @60fps and 640 X 480p 60/90 recording
- Size: 20 X 25 X 9mm
- Weight: 3 gm

2) Raspberry pi : It is used for the overall processing of the system where the code is implanted within. Following are the specifications of Raspberry pi used-

- 64 GB SD card.
- 4 GB RAM.
- Raspbian OS.

3) Display : Display is used to show the exact obstacle on the track.

4) Voice module : It is used to give an alert signals.

B. DESCRIPTION OF SOFTWARE

1) TensorFlow Lite : It is an open source artificial intelligence library, using data flow graphs to build models. It permits developers to generate large-scale neural networks with many layers. TensorFlow is largely used for Classification, Perception, Understanding, Discovering, Prediction and Creation.

2) Raspbian Operating System

3) LabelImg **:** It is a graphical image annotation tool written in Python and uses Qt for its graphical interface. Annotations are saved as XML files in PASCAL VOC format, the format used by ImageNet.

C. METHODOLOGY

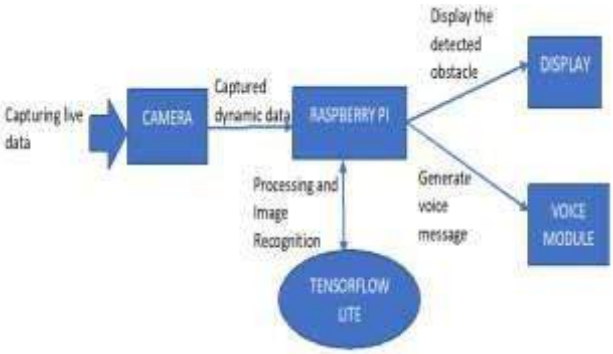

Figure 2: Work flow of the system

The camera is positioned in middle front side of our train engine. This camera is connected to raspberry pi. The camera captures live video that is dynamic data while train is running on the track. This data is processed in Raspberry pi by using TensorFlow Lite.

The TensorFlow lite is a tool which used in deep learning for Object Recognition in which the model is trained in such a way that the data captured by the camera is processed by comparing on track event with the stored dataset. For this to happen, the dataset is created using different images of obstacles that could be possibly present on track responsible for accident. This dataset folder contains two sub-folders images and annotation. The images folder contains at least 50 images of each obstacle. Annotation folder contains labels of each image stored in images folder.

All these results into obstacle recognition along with its label. This output will be displayed on the display provided. Meanwhile, the voice module used in the model generates a voice message to notify the loco-pilot.

III. RESULTS AND DISCUSSION

A. LITERATURE SURVEY

In the past few decades, the railway infrastructure has been widely expanded in urban as well as rural areas, making it the most compound medium of rail transport networks. Safe and comfortable travel on railways has always been a mutual goal for transportation engineers and researchers, and entails railways in excellent condition and efficient maintenance practices.

While having survey with the Central Railway, Nagpur, we had a talk with different loco-pilots about their running experiences. And it was found out that to accomplish above expectations, it is also necessary to create awareness among the loco-pilots about the events that can result to perilous accidents.

Most of the train accidents occur as a result of Derailment of rail tracks, Collision with other trains and vehicles, failure of signal light to provide adequate warning, human error, Mechanical failure, High Speed, Obstruction on the tracks etc.

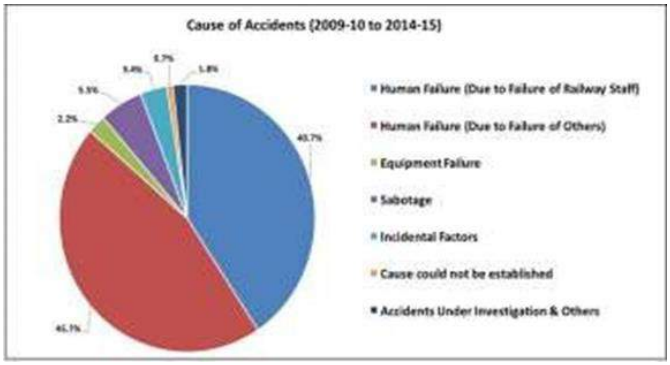

Figure 3: Pie-Chart of Causes of Railway Accidents

Out of these, our main focus is on the Obstruction on the tracks. In such cases, foreign objects such as vehicles or equipment may be left in the path of an oncoming train; if the loco-pilot fails to see them or if the train is going too fast, then he may not be able to avoid striking them, causing an accident The local train runs at a maximum speed of 140 Kmph but they do not exceed it above 110 Kmph as a cause of precaution. That is why, a system is to be developed to detect the presence of obstacles that corresponds to the above speed of the train, giving the train driver sufficient time to take further action as per the situation.

B. ANALYSIS

In India, it has been observed that about 607 people were injured or killed in 2016-17 due to train accidents and the number stood at 254 in 2017-18. In the 6 years period between 2009 to 2015, there was a complete of 803 accidents in Indian Railways during

which 620 people were killed and 1855 people were injured.

While on survey in Central Railway, it was found out that there are many reasons for train accident but one of them is obstruction of train.

C. EXPECTED OUTCOME

The camera placed in the middle front of the engine would capture the live data while train is in running state. This would be the input to the system that would detect and recognize the obstacle present on track.

If the obstacle is detected, the system would display it on the LED screen that is the part of our model, and generate an alert notification for the loco-pilot to be aware of the situation and take necessary action.

IV. CONCLUSION

The proposed work ensures the safety of passengers in railway transportation and of humans on Track if any. This Paper describes general preventive measures targeted to reduce Railway accidents because of obstacles on the track. It discusses the existing countermeasures for reducing accidents.

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Desingning Of Cuk And Sepic Converter As Power Factor Preregulator

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ABSTRACT

As the matter of concern due to huge electricity demand some improved conversion system are used for the improvement of power generation in this paper. The SEPIC and Cuk convertors which are working as power factor pre - regulators (PFP) have many desirable in discontinuous mode (DCM). In this paper we are designing the operation of both convertors as DCM-PFP. The SEPIC and Cuk are used with the solar energy, wind energy and fuel cell energy conversion system for improved electricity production. The combination of the Cuk and SEPIC convertors eliminate the need of additional input filters to filter out the high frequency harmonics. These type of DC to DC convertors are used in the applications where the output voltage is considerably greater than the input voltage. The Cuk and SEPIC convertors have certain advantages over the other conventional convertors such as: both Cuk and SEPIC convertors works as a voltage follower (i.e. it does not need any current loop), its power factor is unity theoretically and the input current ripple is obtained at designing stage. The results are simulated, verified and presented using MATLAB Simulink software.
Keywords: Cuk, SEPIC, converter.

I. INTRODUCTION

In the present era, due to these increasing demand in the fossil fuels which are being depleted and with the increasing concern of the global warming conditions, many of us are foccusing and taking the step forward for the sustainable energy sources for the existing world to preserve it for the future generations. These energy sources can be wind, solar, hydro or fuel cell which has capabilities of meeting our present energy demands. These all sources are having their own advantages fo better energy production and have some of their drawbacks or say limitations due to their intermittent nature that makes them unreliable.

In this paper we are using wind energy, solar energy and fuel cell energy sytem with the Cuk and SEPIC converters topology. When any of the sources are unavailable or insufficient for meeting the load requirement then the another energy sources can be compensated for that period of operation. We are also using the hybrid of wind and solar energy system with Cuk and SEPIC converters topology. The desing of Cuk and SEPIC converter as power factor preregulator has been proposed in this paper and also further explained.

Conventionally, we used Full Bridge Rectifiers and large input filter capacitors. However, there are a few major disadvantages regarding it, for ex. the value of peak input currents is very high and also harmonics are present in the line. The power factor is very low. Thus, the power available to the user is less in addition to line noise and peak currents. The solution

for the above mentioned problems is to use dc-dc converters along with bulk capacitors and diode bridge rectifiers. By controlling dc-dc converters properly, power factor is controlled giving rise to the name power factor preregulators (PFP).

Power factor regulator in additional has two feedback loop that include: an input current loop and an output voltage loop. At the input the input current loop acts as the current sink and at the output the output voltage loop acts as the dc voltage source.

Why to operate in discontinuous mode:

Here in continuous mode whenever there is energy transfer, the current in the inductor never reaches zero value, while in the discontinuous conduction mode, current do reach the zero level. If the peak of inductor current is less than the inductor current dc component, the current in the diode will always be above zero and it will turn ON forcibly when switch is OFF. Whereas, if the peak of ripple of inductor current is more than the dc component of inductor current, total current is zero value while the diode starts conducting. The diode stops conducting and inductor current will be zero value till switch is gated. Therefore, discontinuous conduction mode is formed. Therefore, in discontinuous conduction mode, value of inductance will be less than whatever is the value for continuous conduction mode. When the same power flows through both the convertor the requirement of inductor current is always more in discontinuous conduction mode as compared to the continuous conduction mode. Therefore, we find that discontinuous conduction mode is more efficient than continuous conduction mode.

In order to implement power factor preregulator, the Cuk and SEPIC convertor are advantageous that too particularly in SEPIC and Cuk convertor.

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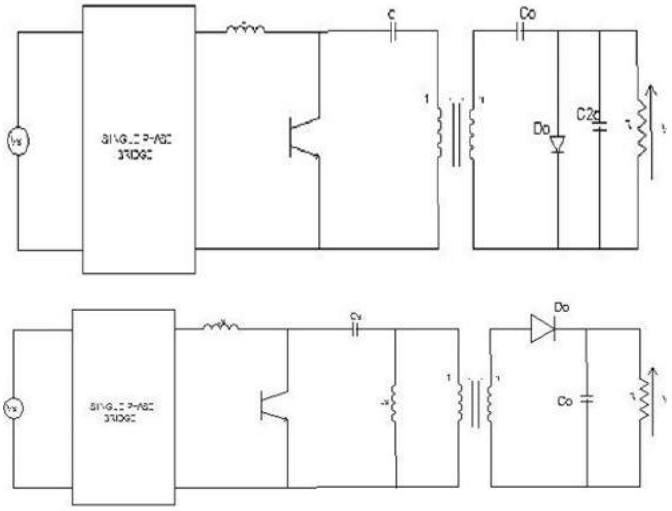

II. CUK CONVERTER

Some type of power conversion capability is required for storage or other DC component to be used on conjunction with AC loads. The DC/DC converter needs to have a wide input voltage range to regulate the constant output voltage, although we are considering that the output characteristics of photovoltaic cell has a wide voltage range depending on the operating condition of a photovoltaic cell. The major consideration in the renewable application due to the low voltage of PV array and fuel cell is to achieve high step-up and high efficiency DC/DC converters. The purpose of dc-dc converter is insuring the impedance adaptation between the photovoltaic source. Generally, a PV PCS uses either a single string converter or a multilevel module integrated converter (MIC) for operation. Each of these approaches has its both advantages and disadvantages while performing the given operation. A series connection of a module integrated DC–DC converter output with a photovoltaic panel was proposed for a high conversion efficiency and low cost photovoltaic module. The output voltage of the photovoltaic panel was connected to the output

capacitor of the fly-back converter and thus, the converter output voltage was added to the output voltage of the photovoltaic panel. Only between the PV panel voltage and the required total output voltage the isolated DC-DC converter generates difference voltage. While following this method there is reduction in the power level of the DC–DC converter which enhances energy conversion efficiency compared with a conventional DC–DC converter. The Cuk converter (pronounced *Chook*) is a type of DC/DC converter that has an output voltage magnitude that is either greater than or less than the input voltage magnitude. Basically, it is essentially a boost converter followed by a buck converter with a capacitor to couple the energy.

With inverting topology, the output voltage of non-isolated Cuk is typically also inverting, and can be lower or higher than the input similar to the buck–boost converter. Unlike most other types of converters which uses an inductor, this converter uses a capacitor as its main energy-storage component. This converter is named after Slobodan Cuk of the California Institute of Technology, who first presented the design.

Advantages Of Cuk Converter

1) Cuk converters have advantages like it requires reduced hardware and aso has good output voltage regulation.
2) Cuk converters are having high power efficiency.
3) Higher order dc-dc converters, such as the Cuk converter, have a significant advantage over other inverting topologies since they enable low voltage ripple on both the input and the output sides of the converter.
4) The Cuk converter can either operate in continuous or discontinuous current mode as with other DC-DC converters.
5) In order to reduce the switching losses across the switches, the soft switching has been implemented for all the three active switches of modified Cuk converter, which results in high conversion efficiency at high-frequency operation, improved transient, and and also there is steady state response without significant increase in voltage and current stresses on switches discontinuous voltage mode.

III. SEPIC CONVERTER

The single-ended primary-inductance converter (SEPIC) is a DC/DC-converter topology that varies from the above to below the output voltage and also provides a positive regulated output voltage from an input voltage. This type of conversion is handy and reliable when the designer uses voltages (e.g., 12 V) which are from an unregulated input power supply such as a low-cost wall wart. Unfortunately, the SEPIC topology is difficult to understand which requires two inductors, and which makes the power-supply footprint quite large. Recently, several inductor manufacturers began selling off-the-shelf coupled inductors in a single package at a cost which is only slightly higher than that of the single inductor comparably. The coupled inductor not only provides a smaller footprint but also, requires only half the inductance which is required for a SEPIC with two separate inductors to get the same inductor ripple current.

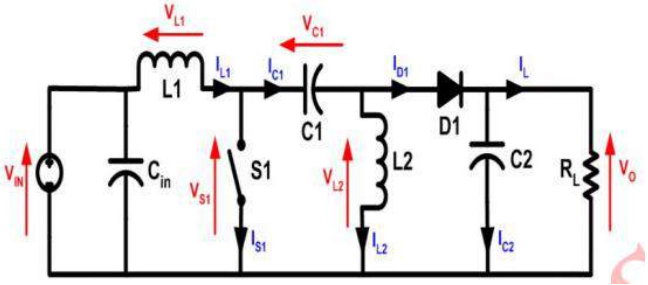

Fig 1. SEPIC CONVERTOR

A wind turbine or said to be the wind energy converter is a device that converts the wind's kinetic energy energy into electrical energy with the help of the generator. Electrical power is normally generated either with an induction generator or with a synchronous generator. Conversion of mass requires that the amount of air entering and exiting a turbine must be equal. Synchronous generators are typically interconnected to the grid through power electronics converters and different types of other electronics devices which are used to produce the energy. Power output is typically between 10KW to 2.5 MW and wind power is captured using a blade that is connected to the rotor of a generator. The power is generated only when the wind blows in the desired direction to blow the blades of the wind turbine. Like photovoltaic systems, there are no fuel costs, but periodic maintenance of the wind turbines is required for the better performance fo the system. The wind turbines need regular maintainace to stay reliable and available to generate to generate energy 98% of the time.

IV. CONCLUSION

The perfect preregulators are Cuk and SEPIC converter working as power factor preregulators. Here we see that the ripples in the input current is limited by proper design and choosing an adequate amount of input inductor. High input quality current is guaranteed by properly choosing capacitor. The experimental results have confirmed the validity of the analysis and design approaches present here. The two converters are such that they can be used individually as well as in the hybrid form and thus provide the flexibility of the operations.

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Design of Grain Refining Machine

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ABSTRACT

The study has been undertaken to get the refined grains directly after the threshing process. It is the portable machine and its capacity may change as per requirement. It will help in cost reduction of refined grains available in market and will also reduce human effort. It is a semi-automatic machine which will remove impurities i.e. stone, husk, flask etc. present in its grain With the help of Neodymium magnet and light density particle will be eliminate from the Blower. A magnetic bed specially designed to separate under constraints operational and environmental condition.

Keywords: Portable Machine, Semi-automatic Machine, Neodymium Magnet, Blower.

I. INTRODUCTION

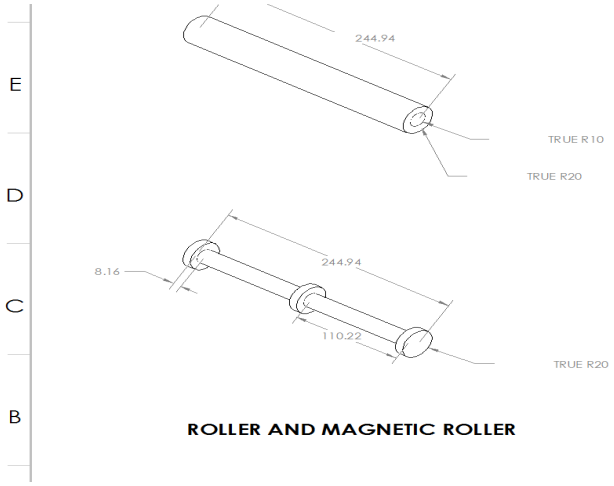
The Grain refining machine itself describe by name. The grain refining machine in which we can separate the stone, flask and other dust particle. After Threshing some impurities like stone, husk are left over in grain after threshing it is very necessary to remove thus particles. As we know that it is harmful for human being which leads to affect the health. By using this machine we can remove the dust particle and other impurities. In this machine several components are mounted for some special purpose.

The grain Refining machine is available in different sizes according to use. Small grain refining machine will be used at home for refining small quantity of grains. By using this machine we can reduce the man power and fatigue.

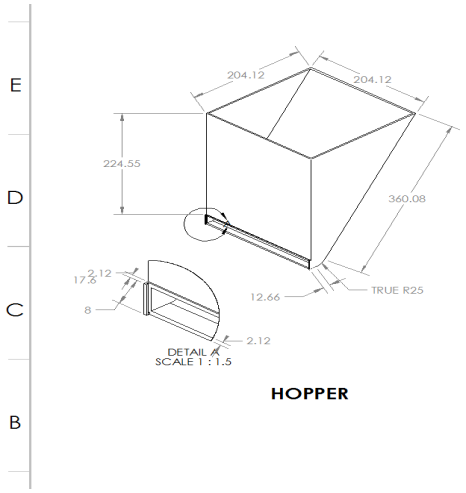
Nowadays separating mud balls and Black stones are the rising issues industries are facing now. There machines are not highly efficient to remove impurities from grains. They are trying to solve the problem of removing paramagnetic impurities and looking for machines which have the capacity to solve various kinds of problems regarding the separation of mud balls, Black stones, Metallic, Glass pieces, Rat faces and other impurities from grains like rice, wheat, Gram etc.

Day-by-day in flour mill and cleaning line the mud ball and Black stone is one of the biggest issues. Industries are looking for newly designed and high capacity machine because their equipment is still not able to remove impurities and black stones. Their machines are not capable enough to remove mud balls and black stones.

II. METHORD AND MATERIAL



ROLLER AND MAGNETIC ROLLER



HOPPER

Area of opening cross-section=2584.15mm^2
Material of Hopper is Galvanized Iron.

III. RESULT AND DISCUSSION

Contamination in Food product is a challenging part for the industries especially when the world is moving towards, purity, and healthy consumption. By keeping the critical situation in mind, we making this grain refining machine for betterment of our health. By introduction of high intensity magnet and blower, By using highly intense magnet that attract the dust, stones and other ferrous material and blower that blows the light material like husk and straws. In this machine we can easily separate out the impurities from the grains by using 0.25HP motor which rotates the roller and belt.

IV. CONCLUSION

The Grain Refining Machine is the machine in which we can reduce the effort of man power. In this machine we can achieve the most pure form of grains. Since we know that the application of Neodymium Magnet that attract the soil impurities and dust particles. By application of Blower which remove the husk and other light particle. The Grain Refining Machine gives the most pure form of grain after threshing.

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Resource Efficient Structure by Green Concrete

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ABSTRACT

"Green concrete" the word itself denotes to the concrete which is eco-friendly. It is a Concrete that uses less energy in its production and produces less carbon dioxide than normal concrete can be termed as GREEN CONCRETE. The other name for green concrete is resource saving structures with reduced environmental impact for e.g. Energy saving, co2 emissions, waste water. (2) Concrete decreases the emission of CO2 by 10% .

Keywords : Green Concrete, Recycled Concrete, Environment Friendly Materials.

I. INTRODUCTION

Green Concrete is the revolutionary topic in the history of concrete industry, this was first invented in Denmark in year 1998.(2)Having an overview of today's scenario of increasing amount of pollution Green Concrete as the name suggests is eco-friendly and saves the environment by using waste products generated by industries in various forms like rice husk ash, micro silica, etc to make resource-saving concrete structures. Use of green concrete helps in saving energy, emissions, waste - water. As per economical point of view Green concrete is very often also cheap to produce as it uses waste products directly as a partial substitute for cement, thus saving energy consumption in production of per unit of cement (2).Using green concrete eliminates many costly efficient materials.

Why to use Green Concrete? Green Concrete is essential because we are running out of resources to continue living as we have in the past. Green concrete has greater strength and durability than the normal concrete. It is realistic to assume that the technology can be developed, which can reduce the CO2 emission related to concrete production. Generally the construction industry accounts for a massive environmental impact due to its high demand of energy. As a result of the awareness built during the past few years about green- house effect and damage to the nature, more people and countries became conscious about their future.(2)We want there to be enough resources for everyone now and in the future.(1)

Green concrete capable for sustainable development is characterized by application of industrial wastes to reduce consumption of natural resources and energy and pollution of the environment. Marble sludge powder can be used as filler and helps to reduce the total voids content in concrete. Natural sand in many parts of the country is not graded properly and has excessive silt on other hand quarry rock dust does not

contain silt or organic impurities and can be produced to meet desired gradation and fineness as per requirement.(2)

Uses &Comparative Analysis with normal concrete:

- Green Concrete is widely used in construction of bridges,
- It can also be used in building construction.
- Column can also be casted from this concrete.
- Construction of road works is also carried out .
- Having more strength.
- Reduces the consumption of cement overall.
- Green concrete is economical compared to conventional concrete.
- Green concrete having better workability than conventional concrete.

II. SOME STRUCTRES OF GREEN CONCRETE

Increasing concept of sustainable development has evolved the use of Green Concrete , with recycle materials.

As Indian is facing pollution and disposal issue it will not take much time for Green Concrete to come to India.

Figure 1. green concrete

III. SUITABILITY OF GREEN CONCRETE IN STRUCTURES

Reduce the dead weight of a facade from 5 tons to about 3.5 tons. Reduce crane age load, allow handling, lifting flexibility with lighter weight. Good thermal and fire resistance, sound insulation than the traditional granite rock. Improve damping resistance of building. Speed of construction, shorten overall construction period. (4)

IV. CONCLUSION

This study reported a critical review of existing studies related to green concrete worldwide. This paper deals with the actual concept of Green concrete, its need and the current existing scenario of Green Concrete. The objective of Green concrete is providing sustainable structures while keeping the importance of health and nature in mind. It can be concluded that definitely use of concrete product like green concrete in future will not only reduce the emission of co2 in environment and environmental impact but also economical to produce.(3)

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A Review on Automated Drainage Cleaning System

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ABSTRACT

Now-a- days even though automation plays a vital role in all industrial applications in the proper disposal of sewage from industries and commercials are still a challenging task. The huge drainage pipes are used for the disposal so, due to this may be loss of human life while cleaning the blockages in the drainage pipes. Semi-Automatic Drainage Cleaning System proposed to overcome the real time problems. Waste water is characterized as the stream of utilized water from homes, organizations, ventures, business exercises and foundations which are subjected to the treatment plants by a precisely planned and built system of funnels. This sort of waste water is characterized and characterized by its wellsprings of cause. The measure of stream dealt with by a treatment plant shifts with the season of day and with the times of the year. The procedures looked into here incorporate both those that expel poison soils in waste water and those that vanishes them. Utilizing a waste water treatment innovation that expels, instead of decimates, a toxin will give a treatment remains. At waste water treatment plant, this stream is dealt with before it is permitted to be come back to the earth. In this project the proposal concept is to replace the manual work in drainage cleaning by automated system. Now a day's even through mechanical machine plays a vital role in all industrial applications in the proper disposal of sewage from industries and commercials are still a challenging task. We implement design "Drainage water cleaner system". We designed our project to use this in efficient way to control the disposal of wastages and with regular filtration of wastages. As long as the draining system is considered as the function of main drainage system is to collect, transport & disposed of the water through an outlet.

Keywords : Floating waste, Waste water, Auxiliary Treatment, Sewage, Drainage, Filter, Disposal, Cleaning, Upsetting.

I. INTRODUCTION

It has been suggested in the prior art that the effectiveness of enzymatic drainage cleaner should be improved by including an effervescent couple in the composition. Automatic Drainage Water cleaning and Control System Using auto mechanism proposed to overcome the real time problems. With the continued expansion of industries, the problem of sewage water must be urgently resolved due to the increasing sewage problems from industries of the surrounding environment. Our proposed system is to cleaning and control the drainage level using auto mechanism technique. auto mechanism is the major controlling unit and the drainage level. A moveable cleaning system enables cleaning of relatively flat surfaces, and especially elevated and/or sloped and/or vertical surfaces without the use of personnel at the specific site of cleaning. System can be fully automated, with programming set to enable the

system to clean an entire surface or structure (e.g., an office building or hotel) or allow system control by someone distal from or proximal to the direct point of application of the cleaning activity.

Automatic Drainage Cleaning overcomes all the drainage problems and promotes blockage free drains promoting continuous flow of drain water. In the modern era there have been adequate sewage problems where sewage water needs to be segregated to clean our surrounding environment. Automatic drainage water cleaning and control system using automatic mechanism proposed to overcome the real life problem. Mechanical control techniques include the total or halfway evacuation of Plastic containers and Not disintegrated solids by mechanical means, including: gathering, destroying, cutting, rotating, and binding. Mechanical control techniques can likewise be utilized to speed up manual cleaning exercises, including hand cleaning, raking, and cut stump control, with the utilization of engine driven hardware.These administration strategies for A scope of hardware for overseeing and controlling amphibian vegetation is being used today, intended for particular plant sorts (floating, submersed, and new vegetation) and for operation in particular sea-going environments (untamed water, trenches, shorelines, and wetlands).

II. LITERATURE REVIEW

Ganesh U L, et.al. Showed the usage of mechanical drainage cleaner to replace the manual work required for drainage cleaning system. Drainage pipes are very dirty. Sometimes it is harmful for human life while it is need for cleaning drainage system. To overcome this problem, they implemented mechanical semi-automatic drainage water cleaner and so the water flow is efficient because of regular filtration of wastages with the help of that project. Different kinds of environment hazards reduced with the help of Drainage system machine.

Elangovan K., et.al.reviewed about drainage cleaning to replace manual work to automated system because manually cleaning system it is harmful for human life and cleaning time, is more so to overcome this problem they implemented a design “Automatic drainage water pump monitoring and control system using PLC and SCADA”. PLC and SCADA were designed. In this project to use efficient way to control the disposal of wastage regularly.

NDUBUISI C. Daniels, et.al. Showed the Drainage system cleaner machine used to remove garbage and sewage automatically which helped to protect the environment from different kinds of environmental hazards. The drainage system cleaner has three major parts which are the Propeller, the Cleaner and the Pan all makes up for its effective functioning.

Prof S.D.Anap, et.al. , showed blockage is the major cause of the pollution and flooding in the metro cities. They have designed the drainage blockage detection system to avoid such problems. The system provides monitoring of drainage condition and to inform authorities of this condition. This design preset an implementation wireless sensor network in the monitoring of drainage system using GSM system. To detecting blockage and monitoring

Juha Latvala et al has the aim to find out whether systematic improvement of drainage can produce significant savings in rail network maintenance.

A. DESIGN DESCRIPTION

Configuration comprises of use of logical guideline, specialized data, and creative energy for advancement of new component to perform

particular capacity with most extreme economy and effectiveness. Thus cautious outline approach must be embraced. The aggregate plan work has been part into two sections.

System design
Mechanical design

SYSTEM DESIGN:

Framework configuration is for the most part concerns the different physical limitations and ergonomics, space prerequisites, game plan of different segments on casing at framework, man-machine collaboration, no. of controls, position of controls, workplaces, of upkeep, extent of change, weight if machine from ground level, add up to weight of machine and significantly more.

MECHANICAL DESIGN:

In mechanical design the components are listed down and stored on the basis of their procurement, design in two categories namely.

Designed parts

Parts to be purchased

Mechanical outline stage is imperative from the perspective of originator as entire achievement of venture relies on upon the right plan examination of the issue. Numerous preparatory options are killed amid this stage. Creator ought to have sufficient learning about physical properties of material, load stresses and disappointment. He ought to recognize all inside and outer powers following up on machine parts.

III. CONCLUSION

By study of many literature review we conclude that Many specific empirical studies have been carried out and categories such as automatic drainage cleaning system and its automation have been studied to a great depth. We focus more on making the system in the drainage.

In the treatment system of drainage Waste water control by the motor, conveyor and sprocket, lifter, and the collecting to achieve automatic control of sewage waste water treatment.

The system can move in the drain to collect the floating waste so as to reduce human labour.

The cleaner functioned move effectively during the heavier rains which had more volume of running water with garbage and high velocity.

In this project the automation plays important role to reduce the human work exponentially & this has to be taken for better ways to improve the future. After all the manufacturing and testing we are successful in representing our idea of the project in practical way.

The deplete squander water cleaner machine is planned and made by utilizing gear changing and shaft coupling rule. It comprise fundamentally DC equipped engine, shafts, squander expulsion plates, clean receptacle, course, sprocket and chains. Construction materials are effortlessly available, creates work (development and maintenance), simple to build.

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Design and Fabrication of Electric Bicycle

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ABSTRACT

The main gist of this paper is to give the exact view by bridling the various sources of energy available to mankind. In today's modernized world travelling is very essential for human beings in order to protract in this world and to do so his travelling should be done in minimum possible way. This paper details about the electric bike which runs on the battery thereby providing voltage to the motor. This paper compromises with design and fabrication of electric bicycle which makes use of electric energy as the primary source and solar energy is possible by attaching solar panels. There is a provision for a charging the battery by ejecting it from main system. The electrical power generated bicycle replaces the conventional bicycle which is manually driven. Another it could be the option to the petrol run vehicles as it is pollution free.

Keywords : Electric bicycle, Battery, Motor, Belt drive, Environment

I. INTRODUCTION

An electric bicycle is also known as an e-bike. It is integrated with electric motor. Many kinds of e-bikes are available worldwide, from e-bikes that only have a small motor to assist the rider's pedal-power to somewhat more powerful e-bikes. It reduces the human effort along with increasing the efficiency. It is eco-friendly vehicle and helps in conserving petroleum. It is not available in affordable cost. Electric bicycles are good for the environment as they use electric power along with human power. Electric bicycles were documented within various US patents. Bolton et al. (1895) was granted US patent 552271 for a battery powered bicycle with "6 pole brush and commutator direct current hub motor mounted in the rear wheel".

There were no gears and the motor could draw upto 100A from a 10 volt battery. Libbey et al. (1897) of Boston invented an electric bicycle US patent 596272 that was propelled by a "double electric motor". The motor was designed within the hub of the crankset axle.

The model was later re-invented and imitated in the late 1990s by Gaint Lafree e-bikes. Steffens et al. (1898) a rear wheel drive electric bicycle, which used a driving belt along the outside edge of the wheel, was patend. Also, the US patent 627066 by Schnepf et al. (1899) depicted a rear wheel friction "roller wheel" style drive electric bicycle. Schnepf's invention was later re-examined and expanded in Wood et al. (1969) with his US patent 3431994. Wood's device used 4 fractional horse power motors connected through a series of gears. Torque sensors and power controls were developed in the late 1990s. T. Yutky of Japan filed a patent in 1997 for such a device. In 1992 Vector Services Limited offered and sold an e-bike dubbed by Zike. The bicycle included NiCd batteries that were built into a frame member and included an

850g permanent magnet motor. Despite the Zike, in 1992 hardly any commercial e-bikes were available.

Production grew from 1993 to 2004 by an estimated 35%. By contrast, according to Gardner, in 1995 regular bicycle production decreased from its peak 107 million units. Some of the less expensive e-bikes used bulky lead acid batteries, whereas newer models generally used NiMH, NiCd and Li-ion batteries which offered lighter, denser capacity batteries. Performance varies however in general there is an increase in range and speed with the later battery types. By 2001 the terms e-bike, power bike, pedelec, pedal-assisted and power-assisted bicycle were commonly used to refer e-bikes. The terms "electric motorbike" or "e-motorbike" refer to more powerful models that attain upto 80km/h.

In a parallel hybrid motorized bicycle, such as the aforementioned invention by Libbey (1897), human and motors inputs are mechanically coupled either in the bottom bracket, the rear wheel or the front wheel whereas in a (mechanical) series hybrid cycle, the human and motor inputs are coupled through differential gearing. In an (electronic) series hybrid cycle, human power is converted into electricity and is feed directly into the motor and mostly additional electricity is supplied from a battery. By 2007 e-bikes were thought to make up 10-20 percent of all two-wheeled vehicles on the streets of many major Chinese cities. A typical unit requires 8 hours to charge the battery, which provides the range of 25-30 miles at the speed around 20km/h.

This study focused for making an assembly for electric cycle having different components such as pulley, motor, belt-drive etc. Energy crisis is one of major concerns in today's world due to fast depleting resources of petrol, diesel and natural gas. It is proposed the solutions for all these perilous problems. The electric bicycle which works on the battery that is power by the motor is the general mode of transport for a local trip. E-bikes use rechargeable batteries, electric motors and some form of control. There are two distinct types of controllers design to match either a brushed motor or brushless motor. Brushless motors are becoming common as the cost of controllers continues to decrease. The solar panels can be alternative source for this by adding it to the system. The electric bicycle which will be running on battery, the power is supplied by the motor, thereby supplying this power to drive the other gear components.

II. DESIGN AND MODELING OF THE ELECTRIC BICYCLE

DATA:

Pr = 1200W,N1 = 5200rpm, V = 60km/h

N2 = 568rpm, C = 260mm

(Pr = Rated power of motor, N1 = Speed of small pully, N2 = Speed of larger pully, C = Centre distance between two pully)

1) Design Power of Belt

Pd = Pr*K1*K0 ---------- (K1 = 1.1, K0 = 1)

Pd = 1200*1.15*1.1= 1518W

(K1 = Load factor of belt, K0 = capacity coefficient of inclination of belt)-----(T-XV-3, T- XV-2,)(Design data book B.D. Shiwalkar)

2) Belt tension (F1-F2)=Pd/Vp

Vp = 55m/sec (Given)

F1-F2 = 1518/55 = 27.6---------- (i)

Vp = n*D1*N1/60D1 = 202mm

D2 =18mm, D2 = 20mm, F2 = 20.59N

(F = Force of pully, Pd = Design power, Vp = belt velocity, D1&D2 = Diameter of small &larger pully)

3) Belt Tension Ratio F1/F2 + e^{Uo}

U = 0.35

0= n-D2-D1/C0 = 2.4F1/F2 = 2.34F2-F2 = 27.6

(u= coefficient of friction between belt & pully, 0 = angle of lap on smaller pully)---------- -------- (T-XV-1)(B.D. Shiwalkar)

F1 = 48.19N

4) Belt Dimensions

a) Steady state Si = Fi/b*tSi = 1.5MPa Fi = 17.19N

1.5 = 17.19/b*t*= 11.46

b) Dynamic Condition b*t = F1/Sd-Sf

Sd = 1.125

Scf = PvA2*10A-6

P = 1250 kg/mA3

Scf = 1.25*55A2*10A-6Scf = 3.78*10A-3 MPa

b*t = 48.19/1.125-3.78*10A-3

b*t = 42.9

t = 0.02*D

t = 4mm

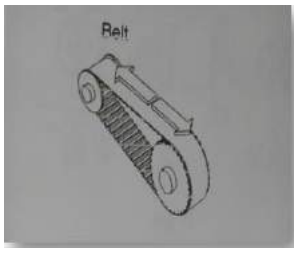
b = 10mm

Sd = Design stress of belt, Scf = Centre stress, p = density of belt, b = width of belt, t = thickness of belt)

(a)

(b)

Figure 1: (a) BLDC motor, (b) VESC



(c) Belt

(d) Large Pully

(e) Small Pully

III. RESULT

An Electric bicycle designed, fabricated and driven successfully. The different components are 24 V brushless DC motor, toothed belts, 3D printed pulleys. A bicycle is manufactured in Rs. 19,800, while the cost of bicycle is start from 1 lakh.

IV. CONCLUSION

With the increasing consumption of natural resources of petrol, diesel it is necessary to shift our way towards alternate resource like the electric bike and others because it is necessary to identify new way of transport. Electric bike is a modification of the existing cycle by using electric energy and also solar energy if solar panel are provided, that would sum up to increase in energy production. Since it is energy efficient, electric bike is cheaper and affordable to

anyone. It can be used for shorter distances by people of any age.

It can be contrived throughout the year. The most vital feature of the electric bike is that it does not consume fossil fuels thereby saving crores of foreign currencies. The second most important feature is it is pollution free, eco-friendly and noiseless in operation. For offsetting environmental pollution using of on-board electric bike is the most viable solution. The operating cost per/km is very less and with the help of solar panel it can lessen up more. Since it has fewer components it can easily dismantled to small components, thus requiring less maintenance.

With the help of this research on e-bike may be the solution to our problems which we are experience now a days like traffic congestion, parking difficulties and pollution from fossils fueled vehicles.

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Experimental Study of Torsional Effect on Flat Plate used in Built-up Column Section

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ABSTRACT

The built-up columns are widely used in the field of steel industries. The built up columns are extensively used as a compression members in truss, roofing, industries and elevated steel water tanks etc. The lacing and batten are the main components of built up column, the steel flat plate are mainly used as lacing and battens in built up columns. The structural behaviour of steel column and its stability are studied by many researchers. When the loading is eccentric to the column and are fixed in bottom and moment at top so that the column undergoes the torsion forces and the twisting moment directly impacts on lacing and battens of column. This paper present the torsional behaviour of flat plate use in built up column, it show the torsional effect on flat plate by experimental and analytical modelling in ABAQUS 6.13.

Keywords: Built up Column, Flat Plate, Torsion, FEM (Finite element method) ABAQUS.

I. INTRODUCTION

Built-up columns are widely used in the field of steel structures. The built-up column is used as compression members in buildings and bridges. The built-up columns are composed with two parallel steel components that are connected with each other along with their length by the lacing or battens. The I-shape and channel sections are most commonly used steel components in built-up columns. The plates, angles and flat bars are used as lacing or batten in built-up column. The main advantage of the built-up section is that the lower steel weight and higher moment of inertia. However as compared to solid columns, usually the built-up section are low in shear that is why the lacing and batten are provided to resist the shear forces where the buckling resistance of built-up column under axial load has been addressed by many researchers. It is also observed that intensity of axial load has a significant effect on the ultimate strength of column and only few studies have been carried out on seismic behaviour of built-up column. Whenever the earthquake occurs the built-up column under goes the shaking moment and forces due to these loadings are eccentric to the column. Due to sudden impact the torque generated into the column and the column fail due to the poor connection between two profiles that is lacing and batten, so in this paper the experimental study of torsional effect on flat plate which is used in built-up column section are carried out and the comparison between the experimental and analytical modelling of flat plate is been

done ,this method is used for solving the problem of engineering and model typical problems area of interest including structural analysis. To solve the problems of FEM the flat plate is divided into number of meshes to get the accurate result, in this paper the Abaqus model of flat plate is analyses by FEM and the comparison between the experimental and analytical modelling is done to investigate the torsional behaviour of flat plate.

II. METHODOLOGY

The torsion test is conducted on flat plat in torsion machine, flat plate is placed in the machine in such as a way that its longitudinal axis coincides with axis of the grips so that it remains same during the test. Rotation is applied at constant speed at one end and other end remains fixed, then twisting will develop in cross section of the flat plate whose behaviour is increase linearly. From torsion testing machine the force (N) & angle of twist (ɵ) can be plotted, The dimensions of the test sample are (4x40x300mm).The mild steel rectangular flat plate specimen is used as shown in Fig (2) Torsion test is been conducted on torsion testing machine of having the maximum capacity 600 kgf that is 5886 Nm and the results outputs parameters are given in tables 2

Table 1. Specimen details

Specimen Thickness	Specimen Width	Specimen Length
4mm	40mm	300mm

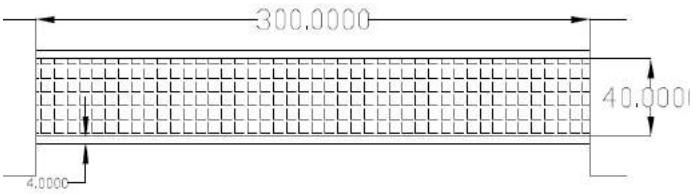

Fig (1) Flat Plate

Modulus of Rigidity Calculation:

Formula:

$$G = T/Ip \times L/\theta$$

Where, θ = angle of twist, Ip = polar moment of inertia, L = length of specimen T = maximum torque in (N)

θ = 360°, L = 300mm, T = 450 x 9.81, T = 4418.5 N

$Ip = b*d*(b^2+d^2)/12$

b = 300mm

d = 40mm

$Ip = 300x40x (300^2+40^2)/12$

$Ip = 9.16x10^{-5}$ mm⁴

Therefore, $G = 4418.5/9.16 \text{ X } 10^{-5} \text{ X } 300/360^{O}$

$G = 40.16 \text{ X } 10^6$ N/mm²

Fig (2) Flat plate sample

III. RESULTS AND DISCUSSION

Table 2. Modulus of rigidity on flat plate

Specimen (4x40x300)mm	Modulus of rigidity (N/mm2)	Maximum torque (N)
1	$40.16x10^6$	4414.50
2	$38.55x10^6$	4237.92
3	$41.32x10^6$	4542.03
Average Value	$40.01 \text{ x } 10^6$	4398.15

Table no (3) modulus of rigidity of standard bar

modulus of rigidity standard bar	78000 N/mm2

From the table no 2 it is been seen that the average value of modulus of rigidity of flat plate comes out to be **40.01 x 10^6** and which is much higher than standard value as per table 3 . As per Table no 4, 5, 6 it shows that when the loading is increased then the specimen also increase its ductility, this may be due to the specimen compression in its longitudinal axis as specimen is constrained at its ends and in some axial strain the specimen failed at the point of maximum loadings.

Table no (4) Sample 1 Result

Angle (Degree)	Torque (Kgf/cm)
0	0
30	50
60	98
90	122
120	145
150	164
180	200
210	234
240	284
270	337
300	390
330	430
360	450

Table no (5) Sample 2 Result

Angle (Degree)	Torque (Kgf/cm)
0	0
30	45
60	97
90	124
120	146
150	160
180	200
210	235
240	280
270	340
300	388
330	432

Table no (6) Sample 3 result

Angle (Degree)	Torque (Kgf/cm)
0	0
30	48
60	97
90	120
120	146
150	166
180	201
210	234
240	284
270	340
300	390
330	432
360	463

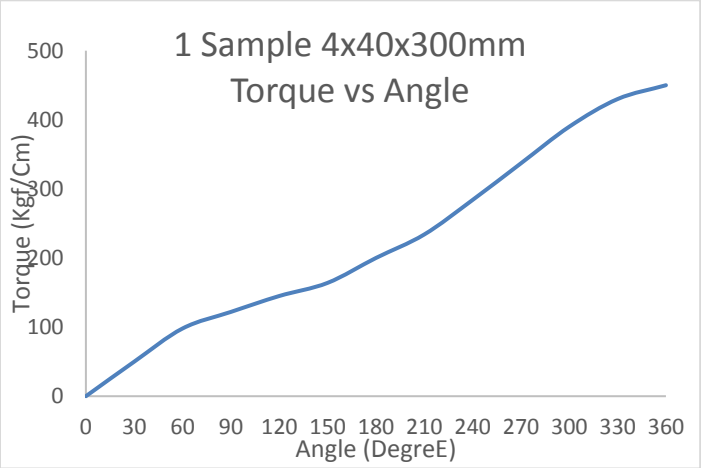

Fig (3) Sample 1 Graph

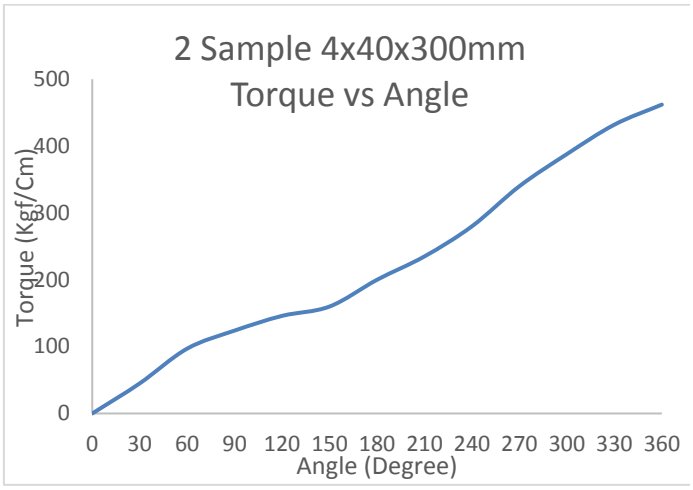

Fig (4) Sample 2 Graph

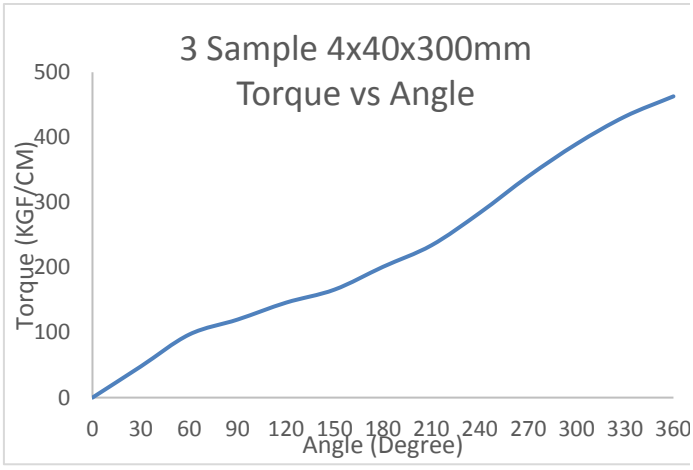

Fig (5) Sample 3 Graph

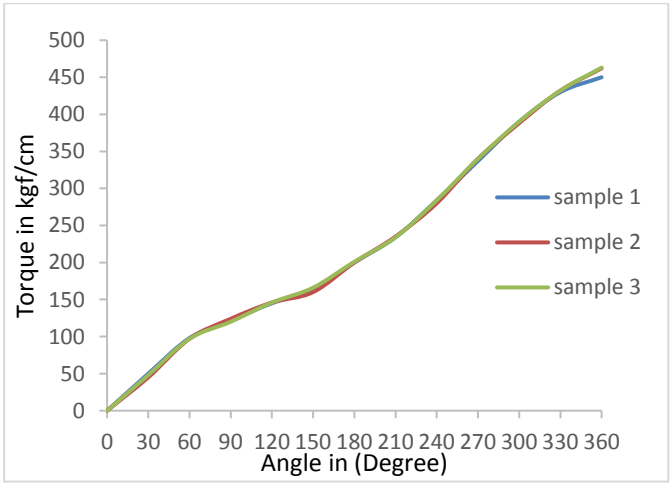

Fig (6) Combined graph

Fig (7) Specimen in torsion testing machine

Finite Element modelling

For better understanding the behaviour of flat plate under torsion ,the analysis of flat plate of size (40x300x4) mm is modelled in Abacus and the boundary condition is applied same as that in experimental set up that is one end is fixed and other is rotating Fig.10 shows the flat plate is fixed by boundary condition in Abacus at one end other is rotated with 6.28 rad that is 360^0 rotation that is $U_1=U_2=U_3=0$ $UR_1=UR_2=0$ & $UR_3=6.28$ radius As torque is applied in which $UR_1=UR_2=UR_3=0$, $U_1=U_2=0$ and $U_3=$ Applied torque, Abacus model shows the good results and performance because of much lesser mesh in the flat plate. Figure 10 show the maximum strain developed in the flat plate and it is been observed from the figure that red mark show higher strain which are mostly comes at the periphery of the plate.

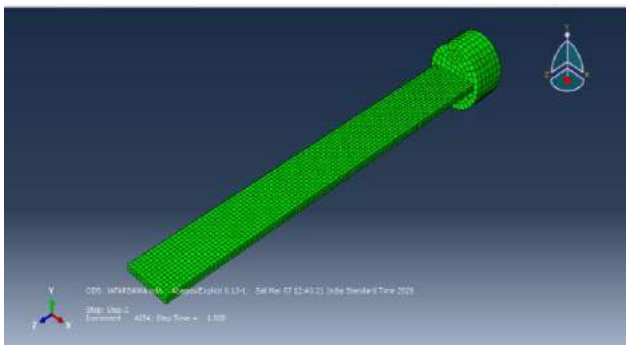

Fig (7) flat plate on Abacus

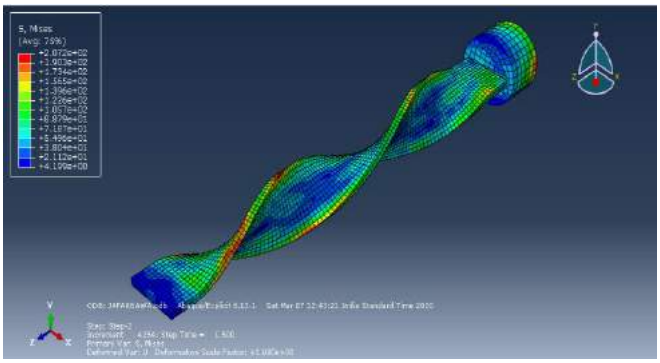

Fig (9) flat plate under torsion in Abacus

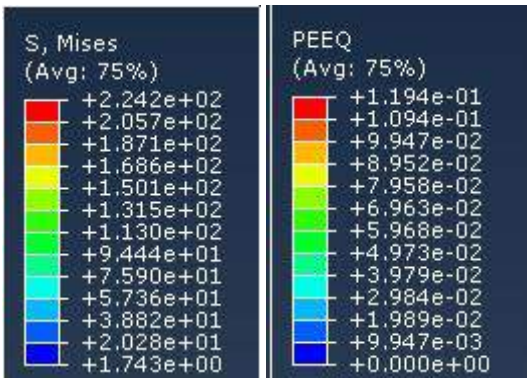

Fig (10) output from abaqus

IV. CONCLUSION

Torsion test is been done on mild steel rectangular flat plate specimen by using torsion testing machine the following conclusion are made.

1) Based on the experimental test conducted on flat plate , it is been observe that it gives the modulus of rigidity as $41.32 \times 10^6 N/mm^2$.which is much use full in the calculation of torsional buckling of column
2) More different types of flat plates having different thicknesses will give much satisfactory results.

From the above study it is been concluded that the rectangular flat plate used in built up columns as lacing or battening are highly resistible to the torsion forces as compare to bars or angles because of higher modulus of rigidity and moment of intertia.

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Numero Uno Business Solutions for Healthcare Domain

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ABSTRACT

In order to reduce costs, increase revenue and improve patient safety and outcomes while the data sources been generated in billions and overall difficulty in handling the complexity of data generated within healthcare organisation. The need for advanced analytics to support decision-making capabilities is much required. People require predictive modelling and data visualisation tools from modern business intelligence software applications to gain insights regarding patient care and satisfaction. 'Numero Uno Business Solutions for Healthcare Domain' is about analysing the data to produce quality insights and help understand the health of your business.

Keywords : Revenue, Data sources, Complexity, Predictive modeling, Visualization, Standards, Insights, Underutilized services.

I. INTRODUCTION

Now-a-days, almost every organization is based on Business Intelligence (BI) for its growth and increased profits. This enables the businesses to predict events based on past or recent data and also enables them to work on data from past events and find out about the current/ongoing events.

As millions of data is created everyday there is need to organize it in a certain manner that will be useful not just for businessmen, decision makers but also to some extent general public.

Here we have transformed the raw data into a meaningful data that provides guidance to general public and lucrative opportunities for the Stakeholders.

Here we present an information-based approach to enable organisations improve efficiencies in a fiscally responsible manner. Most of the inefficiencies and the opportunities for improvement in an organization are hiding in its data about its processes.

Another enabler is to give users a self-service service environment with advanced usability and visualization features to get the answers they need. This thinking shapes our approach to delivering a BI program that aims to bring information to the front line staff to assist them in their work.

II. METHODS AND MATERIAL

Methods which are used here are purely based on techniques of BI. Here we have used techniques such as Descriptive Analysis, Diagnostic Analysis & Predictive Analysis which will be mostly used by the clients.

Descriptive and Diagnostic analysis are the one which makes the most of BI(90%) and remaining part is of Predictive Analysis(10%). Descriptive Analysis which is the interpretation of historical data to better

understand the changes occurred in business. Descriptive analytics describes the use of a range of historic data to draw comparisons.

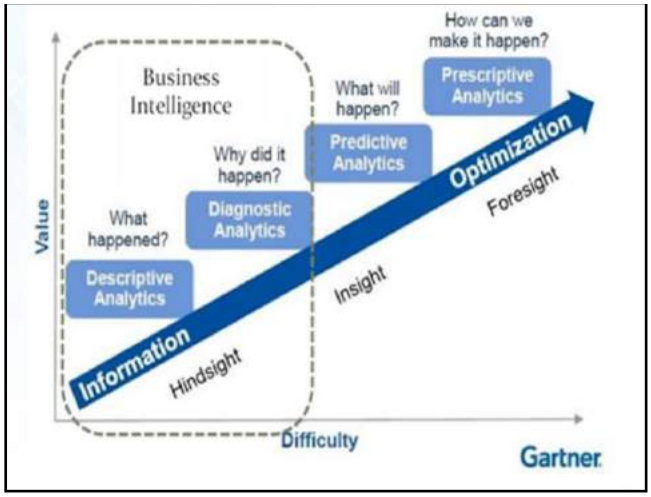

Figure 1: Clarification of Business Intelligence

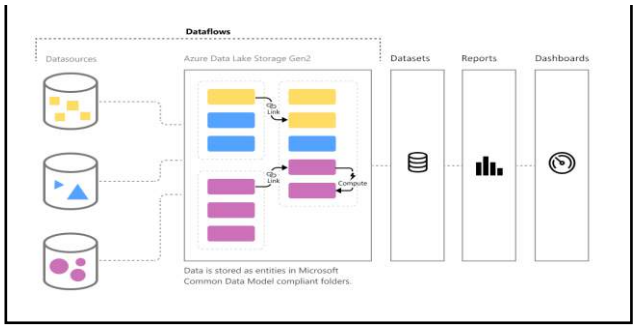

Figure 2: System Architecture

First we have gathered the data from various heterogeneous sources and bring them together to one common platform that is Power BI. Data from various sources such as Spread sheets, Excel files, Azure etc. is pre-processed(such as cleaning, integration & reduction) here by caring out meticulous searches such as finding the errors in names(Capitalisation), date format, repeating values, missing values(by finding out the most common occurring values and filling those missing values with them.) etc. These data of various sources are converted into datasets

These problem are carefully removed one by one and we have to ensure that the original values are not affected thereby damaging the integrity of the data.

All the data is first converted into datasets as soon as they've been uploaded to Power BI. The first process before we could start any work is finding out relationships. Relationships are based on the concept of Database Keys. Tables are connected to each other by primary and foreign keys. Relationships are of three types one-to-one, one-to-many, many-to-many which play a crucial role on cross filtering direction and thereby giving us the data which can be manipulated on our fingertips .

Once the relationships are established work can be started on the datasets. Datasets are analyzed, integrated, manipulated into different form. Appropriate DAX functions are applied on them to create more meaningful data out of it. Certain "Measures" are also applied when necessary to find aggregate, sum, percentage, TopN, etc.

Once all the work is done it is presented in the form of report which will be given to clients directly or it can be uploaded to Power BI services as personal dashboards or for an organization.

On Power BI server there is an option of Natural Query Language, clients who don't understand how to interact with the dashboards they can simply type for whatever they are looking for and the AI of Power BI will present the output on their screen.

III. RESULTS AND DISCUSSION

The report which we have created can be used by not only the members of Health Ministry but also by the businessmen/businesswomen such as pharmacist and also by the general public.

This report will give an insight to general public that which is the most commonly occurring disease in

their vicinity and what precautions should they take to avoid that. They and also find out which hospital in their area is top rated, which is the best doctor to consult and which is the best pharmaceutical drug among other drugs in market for one particular problem.

Pharmacist will be able to find out which pharmaceutical drug is mostly used for the most common diseases and they can also supply medicines to hospitals based on the special treatment that particular hospital has its reputation for.

Health Ministry can identify the prone areas where diseases can grow based on the highest number of admission counts and can take necessary steps for bringing cleanliness and hygiene in polluted areas.

IV. CONCLUSION

As we are about to conclude our project we can say that we have created a report on healthcare domain in such a way that it provide assistance not just to a patient who is looking for the treatment or guidance from the best doctor to alleviate they're troubles or helping the doctor to find out which of the various pharmaceutical drug is best for one certain diseases to a pharmacist who is trying to find which medicine is high in demand for his/her/they're welfare

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IOT Based Automatic Reading/Billing System of Energy Meter

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ABSTRACT

One time in a month we always see a person from MSEB or electricity board comes to our home and takes the readings and submit it to the board of electricity and then according to the readings the person handover the bills to the customer. Here the person from the electricity board has to go in each and every home for clicking the photograph of the energy meter which is the biggest drawback and it is time consuming and also has many disadvantages like extra bill amount, notification from the MSEB after paying the bills , all this are the common problems. And to overcome such problems we have to eliminate the third part i.e. the person from MSEB between the customer and the service provider.

In this paper we are introducing IOT and Arduino. In this method we are using Arduino because it is efficient, consume less energy and it is fastest. In this paper the energy meters which are installed in our houses are kept as it is but only a small change is done on the installed energy meter i.e. changing the existing meters into smart meters.by using the GSM module provides a feature of notification through SMS. The customers can easily excess the working of the energy meter through webpage.

Keywords : IOT(internet of things), GSM(Global system for mobile communication), ArduinoIDE

I. INTRODUCTION

SMART energy meter has unit measuring meter. This device will be in turn connected to the main server with the help of IOT. The algorithm is such that, at the end of each month the device will generate the rate of units and send it to the user's smartphone along with the bill. The Android application which will be connected to the same server where the smart meter is connected. On the Smartphone user will get the bill on a monthly basis. The interesting feature is that the user can set his limit of consumption as per his requirement. The application will be having the option of online payments via credit cards or the specific Id card. The meter will send both units and bills to the user. The user can also check the units on a daily basis. The application will also have the option to optimize the bill based on his usage. And the user can also control the connected appliances with the webpage.

II. Existing Work

The present system only provides feedback to the customer at the end of the month. Also the meter readings are taken manually. Consumer can know the units consumed by seeing their electricity bill only.

Also huge manpower is required to take the readings. There is no protection for energy meter tampering. The consumers cannot monitor the everyday consumption or usage. The major drawback of this system management of power consumption is difficult.

In this proposed method, the consumer can manage their energy consumption by knowing their energy time to time. This method not only provides two way communication between utility and consumer byt also provides other functions that are if the consumer fails to pay the electricity bill the energy supply would be cut down from the utility side and once the bill is paid the energy supply is reconnected. Another huge advantage of this system it notifies the consumer & utility at the event of the meter tampering. By this informative the consumer and the utility can control the tampering are reduce energy crisis.

3. Architectual Model:

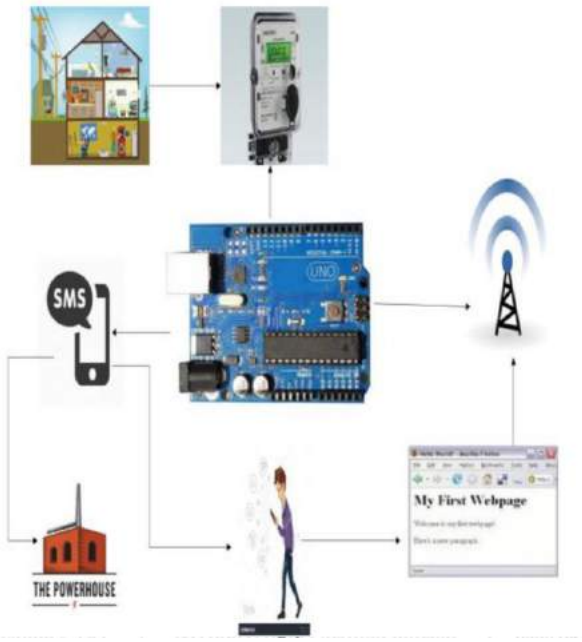
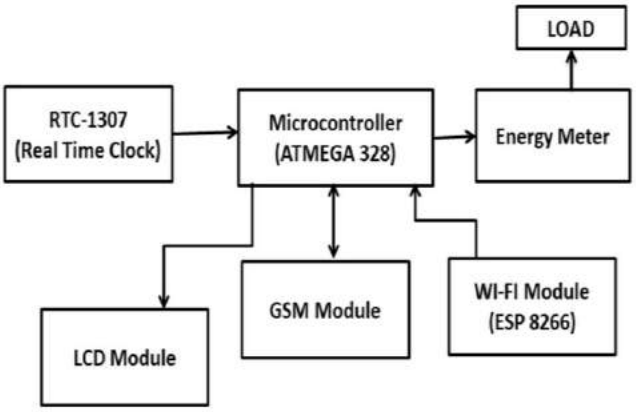


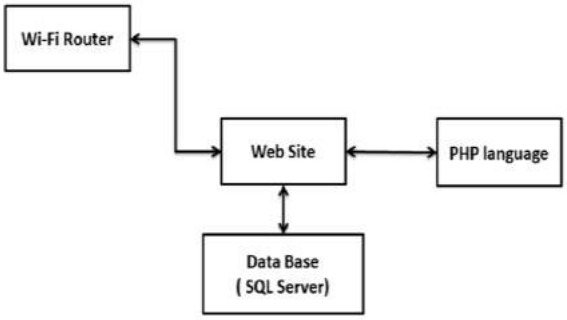
Fig 1. Architectual Model

Block Diagram

1. Transmitting Side



2. Receiving End



4. Circuit Diagram:

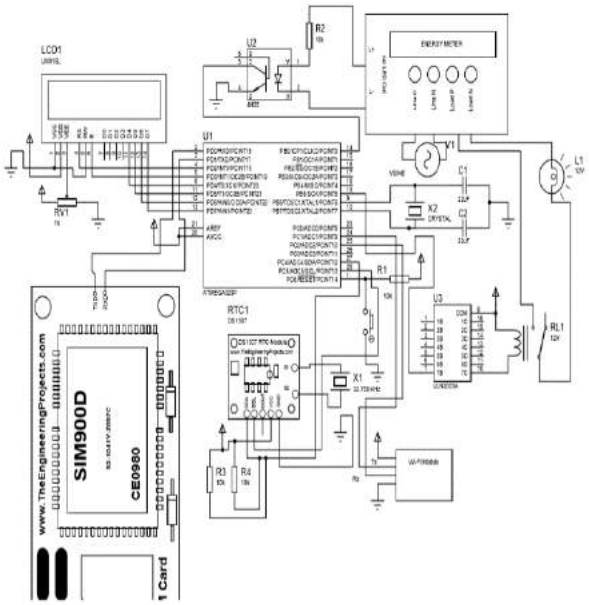


Fig 2. Connection of all Components.

4.1 Energy Meter:

An energy meter is a device that measures the amount of electric energy consumed by a residence, a business or an electrically powered device. Electric utilities use electric meters installed at customer's premises for billing purposes. They are typically calibrated in billing units, the kilowatt hour (kWh). They are usually read once each billing time. When energy saving during certain periods are desired, some meters may measure demand, the maximum use of power in some interval. "Time of day" metering allows electric rates to be changed during a day, to record usage during peak high-cost periods and off-peaks, lower-cost, periods.

4.2 GSM Module:

GSM (Global System for Mobile Communications, originally Group Special Mobile), is a standard developed by the European Telecommunications Standards Institute (ETSI).

It was created to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones and is now the default global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories.

4.3 LCD Module:

We come across LCD displays everywhere around us. Computers, calculators, television sets, mobile phones, digital watches use some kind of display to display the time. An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16×2 LCD display is a very basic module commonly used in DIYs and circuits. The 16×2 translates o a display 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5×7 pixel matrix.

4.4 Wi-Fi Module:

The ESP8266 WiFi Module is a self- contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

4.5 Arduino:

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board -- you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

4.6 RTC Module:

DS3231 RTC is Precise Real-Time Clock Module with 32Kbit EEPROM and a built-in 10-bit temperature sensor having a resolution of 0.25C.

The DS3231 RTC module Precise Real-Time Clock Module is a low-cost, extremely accurate I²C real-time clock (RTC) with an integrated temperature-compensated crystal oscillator (TCXO) and crystal. The device incorporates a battery input and maintains accurate timekeeping when main power to the device is interrupted.

The integration of the crystal resonator enhances the long-term accuracy of the device as well as reduces the piece-part count in a manufacturing line. The ds3231 Arduino is available in commercial and industrial temperature ranges and is offered in a 16-pin, 300-mil SO package.

4.7 Xampp Server:

XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends,[2] consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server possible.

Officially , XAMPP's designers intended it for use only as a development tool, to allow website designers and programmers to test their work on their own computers without any access to the Internet. To make this as easy as possible, many important security features are disabled by default. XAMPP has the ability to serve web pages on the World Wide Web. A special tool is provided to password-protect the most important parts of the package.

III. Conclusion

An attempt has been made to make a practical model of 'IOT Based Smart Energy Meter.' The propagated model is used to calculate the energy consumption of the household, and even make the energy unit reading to be handy. Hence it reduces the wastage of energy and bring awareness among all. Even it will deduct the manual intervention.

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Literature Review on Simulation and Trajectory Planning of Six-axis Robotic Arm

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ABSTRACT

Robots have been a success in the manufacturing industry. It is a well-known fact that robotic arms have played an important role in improving the efficiency of production lines across various sectors In this paper we have discussed the simulation, path planning and kinematic analysis of robotic arms using Robot Operating System and MoveIt in detail. We have also briefly introduced other options available for the purpose of simulation and path planning.

Keywords : MoveIt, Path planning, Robotics, ROS.

I. INTRODUCTION

Robot development requires a multi-disciplinary approach including mechanical engineering, electronics engineering, electrical engineering as well as computer science.A simulator provides a virtual environment to test the robot that is to be developed. Using simulation techniques we can check all the hardware and software related aspects of a robot without making a real robot. Simulation techniques are important in robotic development for quick verification of new prototype, algorithm or applications and performance.[1]

Most of the robot manufacturers such as ABB, KUKA robotics have built their own simulation suits. There are other platforms such as Microsoft Robotic Developer Studio (MRDS) is a Windows-based environment for robot control and simulation. MRDS can handle a wide variety of robot hardware, include support for packages to add other services to achieve complex behaviors.[2] MRDS is likely to be a powerful and widely used platform before it has not been updated or patched since 2012.Open Robotics Automation Virtual Environment (OpenRAVE)[3] provides an environment for the development of motion planning algorithms in robotics applications, which focuses on offering interfaces and implementations of motion planning algorithms. ADAMS virtual prototype environment can also be used for motion planning purpose along with Solid Edge ST4 for modelling.[4] ROS is an open-source, meta-operating system developed by Willow Garage, a California based company, formed in 2006.[5] It is a middleware which implements various open source packages. It provides an environment to test every aspect of a robot ranging from kinematics to electronic sensors. A large community of active ROS developers makes it easier to tackle any problem. Since ROS is open source and has a large user base it

has a large variety of many successful robotic frame works.[6]

II. METHODS AND MATERIAL

The steps involved in simulation of a robotic arm can be broken down n following manner.

1) Modeling
   a) Creating a 3D model in Solidworks.
   b) Converting 3D model into Unified Robot DescriptionFormat (URDF)
2) Creating a MoveIt configuration package.
3) Path planning of arm in Rviz.
4) Simulating the same motion in virtual environment using Gazebo with ROS as a middle ware

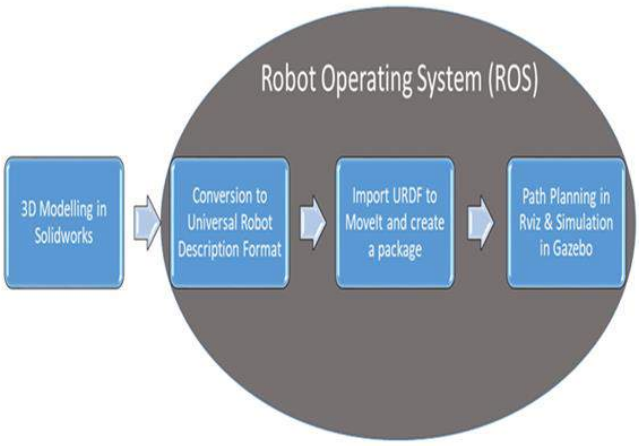

Figure 1: Flow chart for path planning and simulation of robotic arm

1. Modelling

This is the first step which involves creation of a 3D model of a robotic arm. There are many options to perform the same task such as using a 3D modelling software and then converting the design in meshes using Blender software. The other option is of using Gazebo model editor to create a model. However Gazebo uses SDF (Simulation Description Format) for modelling. However SDF is currently not compatible with MoveIt hence it will not be a best option for path planning using MoveIt.
The best method is to breakdown this step into two sub-steps which are given below

a) Creating a 3D model in Solidworks.

There are many software available for 3D modelling. But Solidworks is the best suited for robot modelling as it is much easier to convert a Solidworks model into Unified Robot Description Format (URDF).

b) Converting 3D model into URDF

A 3D model can be converted into URDF either manually or directly by using SW2URDF plug-in.[7] The direct method is much simpler but it requires a modeler to make some modification in final URDF script.

2. Creating a MoveIt Configuration Package

A MoveIt configuration Package[9] is a set of configuration files which consists all the necessary information regarding the robotic arm. The inputs required for creating this package are given below.

a) URDF of arm
b) Self Collision Matrix
c) Virtual Joint (to connect the robot with world)
d) Planning Groups
   i) Manipulator Group
   ii) Kinematic Chain
   iii) Joints and Links

3. Path Planning of Arm in RViz

The MoveIt package from second step is imported into the RViz. In various studies the simulation results were visualized using Rviz and were found

to be satisfactory[10]. Here we set an initial position and goal position and we can choose any motion planner provided by RViz to plan and execute the path between the two positions. RViz provides multiple option for motion planners which are mentioned below.

a) Open Motion Planning Library (OMPL)
b) Covariant Hamiltonian Optimization for Motion Planning (CHOMP)
c) Stochastic Trajectory Optimization for Motion Planning (STOMP)

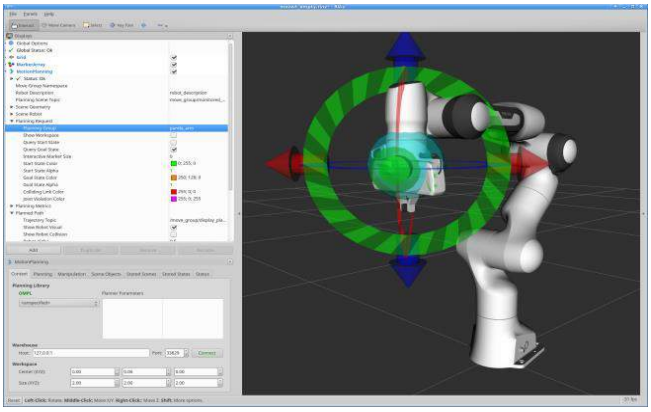

Figure 2: Example of path planning in RViz

One can compare the performance of these motion planners and select the most appropriate one. Or one can also use two motion planners in a pipeline for smoother performance.

4. Simulation in Gazebo

The RViz configuration can be stored and then we can create a program to execute the motion planned in RViz. However instead of testing the program on real robotic arm we can test our codes in simulation using Gazebo.[10]

This will help us in improving the efficiency of our program without actually making a real model. We can run our program through ROS and visualize the results in Gazebo.

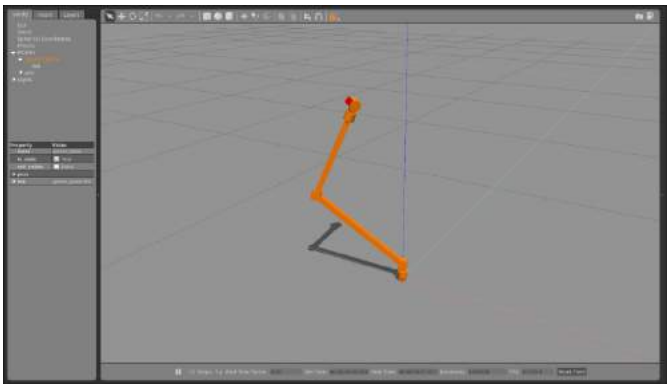

Figure 3: Example of Simulation in Gazebo

III. CONCLUSION

After conducting this literature review we reach to the conclusion that ROS being an open source platform has wide variety of frameworks for robot development. Most of the other platforms are focused on a particular brand and their scope is also limited to that particular brand. Hence ROS comes out to be the best option for developers and rsearchers working in the field of robotics.

We have also discussed a method for path plannning using Rviz, Moveit, Gazebo and ROS. There is plenty of supporting material available on the web for free regarding the same procedure. One should also refer to those tutorials and documentations for better understanding.

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Smart Crop Cultivation and Security System

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ABSTRACT

This involves the idea of Smart Crop Cultivation and intelligent sensor techniques for Security System have achieved significant attention in agriculture. In smart crop cultivation ,Hydroponics is one of the methods of modern agriculture. In the system, hydroponics is a method of growing plants in a water based, nutrient rich solution. Hydroponics does not use soil, instead the root system is supported using an inert medium such as perlite ,clay pellets. The basic thing behind hydroponics is to allow the plants roots to come in direct contact with the nutrient solution and access to oxygen which are essential for crop growth. Also these project has Security System using intelligent techniques (wireless sensors). So, the farmer could monitor several parameters without using laboratory instruments, and the farmer could control the entire system remotely. Moreover, the technique also provides a wide range of information which could be essential for plant researchers and provides a greater understanding of how the key parameters of Hydroponics correlate with plant growth in the system. It offers full control of the system, not by constant manual attention from the operator but to a large extent by wireless sensors. Furthermore, the adoption of the intelligent techniques in the Hydroponics system could reduce the concept of the usefulness of the system due to complicated manually monitoring and controlling process.

Keywords : Smart Crop Cultivation, Hydroponics Concept, Wireless Sensors Easy Monitoring and Controlling Process In Agriculture

I. INTRODUCTION

We live In a world where everything can be controlled and operated automatically, but There are still a few important sectors in our country where automation has not been adopted because of several reasons and one of its reason is cost .One such field is that of agriculture. Agriculture has an ancient history of thousands of years. Advancement in agriculture has been done by implementing the several new systems, practices, technologies, and approaches with respect to time. Several studies reported Hydroponics as a modern and innovative plant cultivation technique. The growing food crisis due to increasing population and due to several reasons could be resolved with the intelligent techniques, Such as Hydroponics with the intelligent sensor techniques for security system can be used for Smart crop cultivation. Where, Hydroponics is a method for growing crops without soil where water serves as the substrate for growing the plants with the addition of fertilizers to supply the plants essential nutrients and promote its commercial success. Hydroponics farming fully provides required amount and type of nutrients that the plant need at a right time. Also soil related problems are solved by hydroponics. The intelligent sensor techniques that are used for monitoring and gathering information from hydroponics farm. To

assess the future using these data streams, intelligent technologies of sensors that identify the data as they occur is needed. On the other hand, hydroponics is one of the farming technologies that was considered as the quickest growing sector of agriculture and can give food production in the future. By combining hydroponics with the intelligent sensors for the security reason. it can make it successful smart cultivation.

II. PROBLEM DEFINITION

Several research studies concluded that overall world agriculture uses approximately seventy percent per year available fresh water to irrigate only seventeen percent of the land. Another side, the total available irrigated land is gradually decreasing due to the rapidly increasing of food requirements and effects of global warming . In other words, agriculture is dealing with new main significant challenges. FAO reported that world food production must be increased by seventy percent to provide sufficient food production for the fast-growing population and urbanization. The expected world population growth for the half of the present century is daunting. The primary motivation of this review is to provide an idea about the use of intelligent sensor techniques in the hydroponic system. It could provide an opportunity or full automation, scalability, anytime-anyplace access monitoring, and fault diagnostics in the Hydroponic system. Moreover, it would be helpful for the local farmer and grower to provide timely information about rising problems and influencing factors for successful plant growth in the Hydroponic system. The farmers could start to understand their crops at a micro scale and able to communicate with plant through accessible technology. To the best4 of our knowledge, this is the first work to provide a brief review of the use of intelligent sensor techniques in the Hydroponic system. Besides, several new techniques and application have been introduced and patented to improve the traditional agriculture practices.

III. RELATED WORK

Related work has been published with design and implementation of smart farm. The Hydroponics model and its design of smart farming with intelligent sensor applications to perform necessary task in smart crop cultivation .Relevant works has been published in designing and implementing smart farming. A conceptual model and system design for decision support of smart farming with network sensor applications in order to perform necessary tasks required for farmers has been proposed with a hydroponics model using intelligent sensors approach which will be applied to agriculture [5]. It measures the key parameters for crops such as temperature, humidity, heat level, soil moisture. The data acquired from the on-board sensors of the gardening rover are sent to the storage platform on a regular basis. Most of these works that were designed to have intelligent sensors framework for future smart farming applications .A hydroponics farm is integrated with the use of sensors and soft ware for the monitoring and controlling for governing the growth of the plants.

IV. OVERVIEW OF SMART HYDROPONICS SYSTEM

A. Construction of Hydroponics system

The construction of hydroponics system in farm has buoyant pads to support the plants which are immersed in the nutritional solution. Air pump is also given in the system foe the circulation of air for the plants and also the water circulation pump is also

given for the water circulation. The construction of the hydroponics system for the crop cultivation is as shown in fig.1

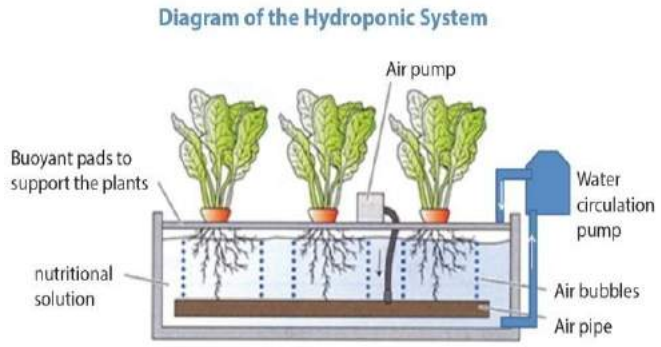

Fig.1 Basic diagram of The Hydroponic system for crop cultivation system

B. Hardware and sensor network

Hardware requirements are microcontroller , rectifier , relay driver, relay ,gas sensor module, moisture sensor module , LDR sensor module, LCD display . The software required are KEIL , PCB ARTIST, EMBEDDED C. These sensors are connected to a microcontroller using Raspberry Pi (Rpi) since it can handle large amount of data

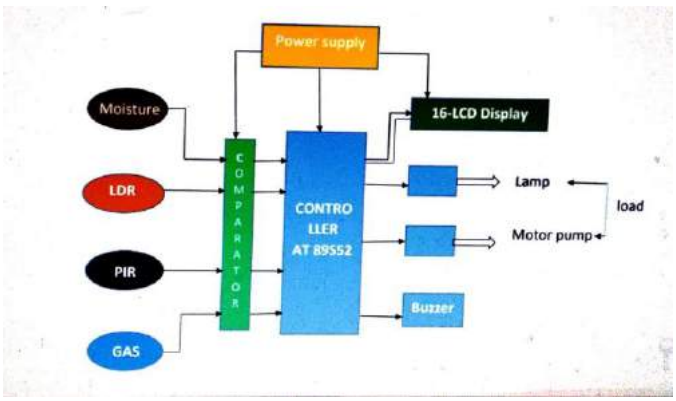

Fig.2 Block diagram of use of sensors for monitoring and controlling of hydroponics system

V. Advantages of Sensor Techniques in the Hydroponics System

In the world increasing food demand require improvement in the development of food production system. However, In Agriculture the quality and productivity of the cultivated crop must improved. People have found lot of modern technologies in crop cultivation. So that , One of the modern concepts of Smart cultivation in agriculture is Hydroponics. Thus, the hydroponics is one of the methods which uses only water for the growth of crop without any support of soil. In the hydroponics system, the nutrient solution and a water level is required for successful plant growth. For example, if the plant has some sudden stress and the farmer is not present at the farm then may that crop will die. Then to avoid this The farmer will use his knowledge and implements the hydroponics model with the use of wireless sensors like the gas level by gas sensors, soil moisture sensors, microcontroller for the data acquisition ,relay for any theft from the farm these things makes our Hydroponics concept more smarter.

For the security reasons of the crop For Example, save crop damage from pet or wild animals the relay and the LDR sensor with alarm are used. The wireless sensor network offer number of advantages with faster response to unwanted climatic conditions and good quality control of the crop that results the productivity of crop. This advancement in the hydroponics system through wireless sensor network is beneficial .This smart cultivation where the wireless sensors which will provide security to the crop cultivation. This sensors also offers environmental and nutrient parameters information which would be required for the study of plant growth.

VI. CONCLUSION

Hydroponic systems could be a solution to help increase crop security in agriculture. Simplified hydroponic systems have relatively low investment costs, are a sustainable way of growing produce, and offer an easy to learn, convenient growing method for an area with limited resources. Partial implementation of hydroponic systems with the use of intelligent sensor techniques in Farm .Smart crop cultivation and security system gives food security and access to fresh, nutritious crop however, further research must be done to investigate produce growth rates in the model systems as well as potential interest and funding of this initiative. farm. It is concluded that the crops yielded from using the automatic control is better than the crops yielded from manual control due to computed gain differences between 20% to 60% for all parameters used to evaluate good quality crops. Due to realized real-time data automatic acquisition and data analytics of hydroponics farm parameters and biological information, the farmers can achieved good economic and ecological benefits.

VII. ACKNOWLEDGEMENT

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Design of Prototype of Power Generation from Waste heat of Industries using Thermoelectric Generator

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ABSTRACT

This paper presents the investigation of power generation using the combination of heat and thermo-electric generators. A majority of thermal energy in the industry is dissipated as waste heat to the environment. This waste heat can be utilized further for power generation. The related problems of global warming and dwindling fossil fuel supplies has led to improving the efficiency of any industrial process being a priority. One method to improve the efficiency is to develop methods to utilize waste heat that is usually wasted. Two promising technologies that were found to be useful for this purpose were thermoelectric generators and heat pipes. Therefore, this project involved making a bench type, proof of concept model of power production by thermoelectric generators using heat pipes and simulated hot air. In recent years, global warming and the limitations in use of energy resources increase environmental issues of emissions. Also In industry, most of the expenses are due to energy (both electrical and thermal), labour and materials. Yet, out of them vitality would identify with the sensibility of the expense or potential cost investment funds and therefore vitality the board will help in cost decrease. The possibilities of thermoelectric systems' contribution to "green" technologies, specifically for waste heat recovery from industry exhausting flue gases. It results into extensive research on green technologies producing electricity. As waste heat recovering techniques, such as thermoelectric generator (TEG) is developed. Its implementation in automobile industry is carried out in many ways.

Keywords : Waste Heat From , Waste Heat Recovery, Thermoelectric Generator Module, Controller, Electricity.

I. INTRODUCTION

In recent years, an increasing concern of environmental issues of emissions, in particular global warming and the limitations of energy resources has resulted in extensive research into novel technologies of generating electrical power. Thermoelectric power generators have emerged as a promising alternative green technology due to their distinct advantages.

Previous research shows that TEG as a waste heat harvesting method is useful. Due to distinct benefits of Thermoelectric generators, they have become a promising alternative green technology. Thermoelectric generator direct converts waste-heat energy into electrical power where it is unnecessary to consider the cost of the thermal energy input. The application of this technology can also improve the overall efficiency the of energy conversion systems.

A thermoelectric power generator is a solid state device that provides direct energy conversion from thermal energy (heat) due to a temperature gradient into electrical energy based on "Seebeck effect".

The thermoelectric power cycle, with charge carriers (electrons) serving as the working fluid, follows the fundamental laws of thermodynamics and intimately resembles the power cycle of a conventional heat engine. Thermoelectric power generators offer several distinct advantages over other technologies.

They are extremely reliable (typically exceed 100,000 hours of steady-state operation) and silent in operation Since they have no mechanical moving parts and require considerably less maintenance;

- They are simple, compact and safe;
- They have very small size and virtually weightless;
- They are capable of operating at elevated temperatures;
- They are suited for small-scale and remote applications
- Typical of rural power supply, where there is limited or no electricity;
- They are environmentally friendly;
- They are not position-dependent; and
- They are flexible power sources.

In this project the conversion of the Heat energy in to electrical energy. By using this energy fan will operates and the energy is stored in a battery. The control mechanism carries the A.C ripples neutralizer, unidirectional current controller and 12V, from this battery supply will pass to the inverter and it is used to drive AC/DC loads. The battery is connected to the inverter. This inverter is used to convert the 12 Volt D.C to the 230 Volt A.C. This 230 Volt A.C voltage is used to activate the loads. We are using 8051 microcontroller AT 89S52 with 16*2 LCD display the voltage from the values of battery.

In this project we are using TEP Transducer .Transducer is a device which converts one form of energy in to another form of energy. This includes electrical, mechanical, light and heat energy also. While the term transducer commonly implies the use of sensors/detector any device which converts energy considered as Transducer.

The following literature papers studies for the completion of prototype. Most of the recent research activities on applications of t Literature survey 2:- Mariem SAIDA, Ghada ZAIBI, Mounir SAMET, Abdennaceur KACHOURI, A new design of thermoelectric generator for health monitoring, 2017 International Conference on Smart, Monitored and Controlled Cities (SM2C), Kerkennah, Tunisia, February, 17-19, 2017, p 59-63 , From literature survey 2 we analysed about thermoelectric generator and its specification.

Literature survey 3:- Ahaad Hussein Alladeen, Shanshui Yang, Yazhu Liu, Feng Cao, Thermoelectric waste heat recovery with cooling system for low gradient temperature using power conditioning to supply 28V to a DC bus, 2017 IEEE Transportation Electrification Conference and Expo, Asia-Pacific (ITEC Asia-Pacific), 2017 , From literature survey 3 we studied different types of cooling system and different types of coolant.

Literature survey 4:- Arash Edvin Risseh, Electrical Power Conditioning System for Thermoelectric Waste Heat Recovery in Commercial Vehicles, IEEE Transactions on transportation electrification, 2018, p 2-16 , From literature survey 4 we got an idea about how to recover the waste heat from automobile application

hermoelectric power generation have been directed towards utilisation of industrial waste heat. Vast amounts of heat are rejected from industry, manufacturing plants and power utilities as gases or liquids at temperature which are too low to be used in conventional generating units (<450 K).

In this large-scale application, thermoelectric power generators offer a potential alternative of electricity generation powered by waste heat energy that would contribute to solving the worldwide energy crisis, and the same time help reduce environmental global warming. In particular, the replacement of by-heat boiler and gas turbine by thermoelectric power generators makes it capable of largely reducing capital cost, increasing stability, saving energy source, and protecting environment. recover waste heat and how to utilize waste heat from different industries Literature survey 5:- T.J Zhu, Y.Q. Cao, F. Yan And X.B. Zhao, nano structuring and Thermoelectric properties of Semiconductor Tellurides, 2007 International Conference on Thermo electrics. From literature survey 5 we knew about thermoelectric materials and its properties.

II. OBJECTIVES

The current research is focusing on a technology, which is able to convert the thermal energy contained in the exhaust gas directly into electric power. In this project concept it invented exhaust gas-based thermoelectric power generator for an industry application. In this invention, the exhaust gas gases in the pipe provide the heat source to the thermoelectric power generator. So, this project proposes and implements a thermoelectric waste heat energy recovery system from the exhaust heat from running machineries. The key is to directly convert the heat energy from automotive waste heat to electrical energy using a thermoelectric generator. While the electric power generation by such a system is able to generate is still relatively small at a maximum of 10 W from a single TEG module, rapid progress in materials research can make the ambitious objective of generating higher watts by all means of feasible proposition.

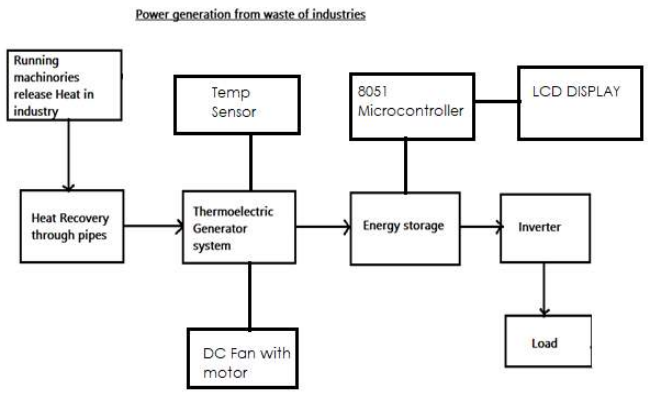
Availability of Waste Heat from machine

The quantity of waste heat contained in a exhaust gas is a function of both the temperature and the mass flow rate of the exhaust gas:

$$\dot{Q} = \dot{m} \times C_p \times \Delta T$$

Where, $\dot{Q}$ is the heat loss (kJ/min); $\dot{m}$ is the exhaust gas mass flow rate (kg/min); C_p is the specific heat of exhaust gas (kJ/kg°K); and ΔT is temperature gradient in °K. In order to enable heat transfer and recovery, it is necessary that the waste heat source temperature is higher than the heat sink temperature. Moreover, the magnitude of the temperature difference between the heat source and sink is an important determinant of waste heat's utility or "quality". The source and sink temperature difference influences the rate at which heat is transferred per unit surface area of recovery system, and the maximum theoretical efficiency of converting thermal from the heat source to another form of energy (i.e., mechanical or electrical). Finally, the temperature range has important function for the selection of waste heat recovery system designs.

Block diagram



Working

Non-conventional energy using is converting mechanical energy into the electrical energy. Here in this project a power generation arrangement is made. Use of thermoelectric principle makes this system efficient and reliable.

In any industry machineries continuously run for their production. It release large amount of heat. This is wastage heat. We utilized this wastage heat to produce electricity. In this way we can minimize some amount air pollution also.

When we apply TEG with Heat sink module to wastage heat through heat pipe executed from machine. Then at the same time TEG starts converting Heat energy into Electrical energy. We can measure this heat with the help of temperature sensor attached to the system.

One DC fan is attached to system to indicates the flow and conversion of heat energy into Electrical energy . As the amount of temperature is increases, the flow of fan is also increases.

Generated electrical energy is stored in battery. This stored energy is supply to inverter to convert DC to AC.

At the output AC load is obtain. This AC load is utilized to run various loads in same industry like, fan, AC , light etc.

We also attached 8051 microcontroller (AT89S52) with LCD display to measure the amount of voltage stored and remaining in battery.

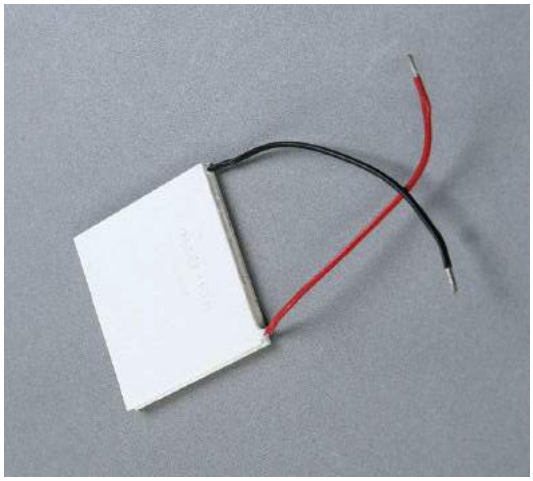
In this way, whole system work. Start from wastage of heat dissipated in industry through production process. Then conversion of heat into electricity. Indication of conversion electricity through DC fan and motor. Storage of electricity in battery. Conversion of DC voltage to AC voltage with help of inverter. Microcontroller attached to show the voltage present at battery. And last AC load attached to inverter.

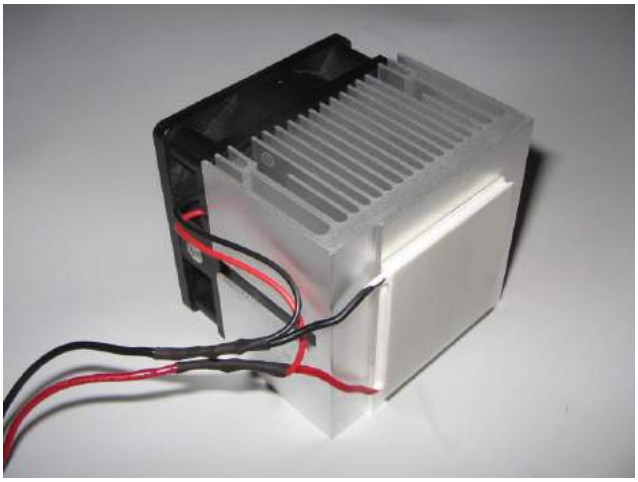
If such system utilized in industry, the amount of wastage heat we can utilized it. And also minimized air pollution problem cussing in industry.

Thermoelectric plate

The Thermoelectric plate (TEP transducer) is known as the peltier plate .the TEP extends to THERMO ELECTRIC PLATE.

The Peltier Plate is a smart swap temperature control option providing a temperature range of –40 to 180 °C, with a maximum heating rate of 30 °C/min, and temperature accuracy of +/- 0.1 °C. A platinum resistance thermometer (PRT) sensor is positioned in the middle of the lower sample plate and ensures accurate measurement and control of sample temperature. It is the most common system for standard parallel plate and cone and plate testing of structured fluids. The open design facilitates easy sample loading and cleaning of geometries.





- **Thermoelectric effect**:

The thermoelectric effect is the direct conversion of temperature differences to electric voltage and vice versa. A thermoelectric device creates voltage when there is a different temperature on each side. Conversely, when a voltage is applied to it, it creates a temperature difference. At the atomic scale, an applied temperature gradient causes charge carriers in the material to diffuse from the hot side to the cold side.

This effect can be used to generate electricity, measure temperature or change the temperature of objects. Because the direction of heating and cooling is determined by the polarity of the applied voltage, thermoelectric devices can be used as temperature controllers.

Seebeck Effect

Seebeck found that if you placed a temperature gradient across the junctions of two dissimilar conductors, electrical current would flow. The effect is shown below in the Fig.

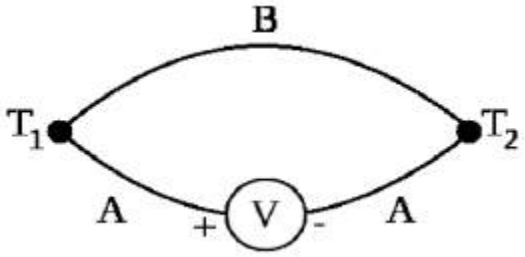


Fig. Seeback effect

- **TEG Working Principle**

TEG consists of one hot side and one cold side. The hot side with higher temperature, will drive electrons in the n-type leg toward the cold side with lower temperature, which cross the metallic interconnect, and pass into the p-type leg, thus developing a current through the circuit as sown in Fig.4.1. Holes in the p-type leg will then follow in the direction of the current. The current can then be used to power a load.

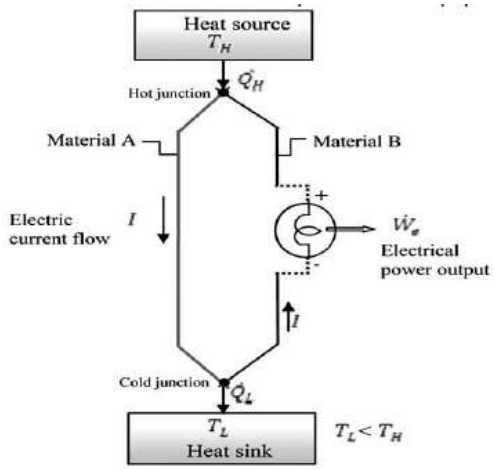


Fig. Principle of thermoelectric generator

If temperature difference is kept constant, then the diffusion of charge carriers will form a constant heat current, hence a constant electrical current. If the rate of diffusion carriers were equal, there would be no net change in charge within the TE leg.

T1= Hot side inlet temperature

T2= Hot side outlet temperature

T3= Cold side inlet temperature
T4= Cold side outlet temperature
Tin= Exhaust gas temperature at TEG system inlet
Tex= Exhaust gas temperature at TEG system exit

III. RESULT

TEG Output Power Vs Input Power of Exhaust heat Gas

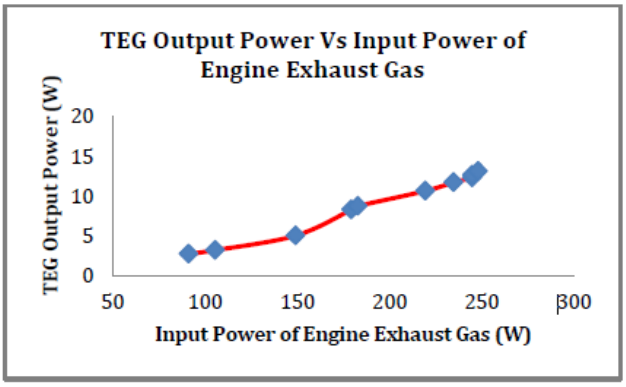


Fig. TEG Output Power Vs Input Power

The graph shows that at the engine speed of 3736 rpm, input power of engine exhaust gas is 248.03 W & the TEG output power is 13.106 W, hence the overall efficiency obtained is 5.28%.

Power Output Vs Mass Flow Rate of Exhaust Heat Gas

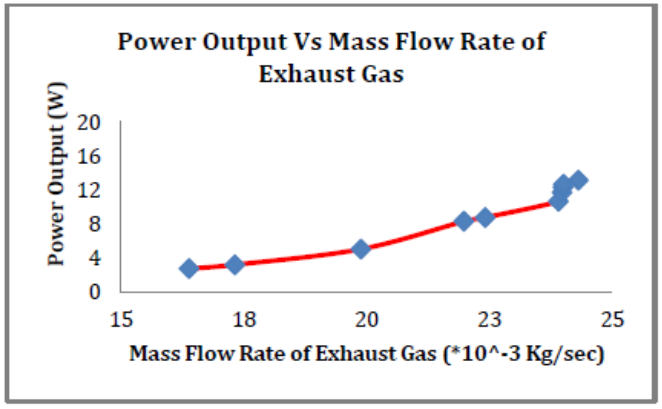


Fig. Power Output Vs Mass Flow Rate of Exhaust heat Gas

The graph shows that the power output is function of mass flow rate of exhaust gas. At the mass flow rate of exhaust gas of 24.317 Kg/sec. the power developed by TEG system is average 10 W.

Experimental Project Image

SCOPE OF THE STUDY

- By using thermoelectric generator connecting in series /parallel we can generate the power for maximum level
- Even body heat also generate the heat that can be utilizing by using TEG to generate the power to charge the portable equipment like laptop mobile etc
- By installed in the vehicle above the radiator means the vehicle battery will charge self.

IV. CONCLUSION

Waste heat recovery entails capturing and reusing the waste heat from machineries in industries and using it for generating electrical work. It would also help to recognize the improvement in performance and emissions of the machineries if these technologies were adopted by the production industries.
If this concept of thermoelectric system is taken to the practical level then there will be large amount of electricity can be generated, which will be used to

run industrial load itself. Also large amount of wastage heat for pollution is also uses in this system in continue manner. And such industries also somehow help to protect the environmental pollution.

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A Review on Design and Development of Citris Fruits Cleaning, Polishing and Grading Machine

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ABSTRACT

The main aim of our project is to design the citrus fruits cleaning, polishing, and grading machine. This machine help in reducing the difficulty of existing product available in the agro as well as food industry at the same time increase the use of this product in the agricultural field. The automatic citrus fruits cleaning, polishing, and grading machine has been designed considering the entire requirement and looking at the current farmers situations in India. In this machine the process of cleaning, polishing and grading is done by a single unit without any manual labor. The machine does not require any cleaning, waxing or polishing agent for the for polishing purpose which helps in preventing the health hazard. As all the three processes takes place in a single unit thus saving floor area and requires very low maintenance. As the machine is completely automatic thus this machine eliminates human effort. The commercial machines which are used in food industries requires a lot of floor space, higher installation chargers and the machines are highly complicated and the cost associated with the machine is very high, thus this machine being compact and portable in natural is very affordable and cost effective The problem which arises in the manual operation has been reduced in this machine. Taking all these into account we have designed this product which reduces the burden of manual operation at the same time increases the use of modern techniques

Keywords : Citrus Fruits Cleaning, Polishing, Grading, Machine, Vidharbha, Food Industry.

I. INTRODUCTION

High value fresh agricultural produce such as orange must be carefully handled and graded in order to meet customer demands and quality standards. Manual grading is widely adopted practice which is costly and time consuming. The existing mechanical graders grade fruits on the basis of size and owing to mechanical nature have limitations of lower capacity and efficiency. The present work describes the development of electronic grading machine on weight basis for oranges. The machine comprised of various elements such as feeding unit, weighing assembly, dropping and collection unit. The machine is capable of individually metering fruits in weighing section and weighing of individual fruits and grading them in four different weight grades. The introduction of this machine helps in efficient work by combining the cleaning and polishing at one place. It reduces the human effort. This machine is portable and economical it not only completes the needs but also helps in total reduction of labor cost and saves time. The product is related to agro sector in citrus fruits farming, where the farmers have to deal with the work of cleaning, polishing and grading of the fruits thus includes a large amount of labor. To deal

with this problem agricultural sector is the target audience for the machine in order to deal with the problem and providing a suitable solution. This machine contributes to the helping of farmers to deal with the problem saving large amount of labor, saving time and saving every year cost related to the job related for manual labor for cleaning, polishing and grading. This machine is an one time investment for the farmers which will inculcate the reduction of labor work and thus saving money for the farmers, as the machine is designed cost effective and requires low maintenance, as the machine do not require any waxing or polishing media also aids in health benefits of the fruits which in turn will work in the favor of the farmers. Thus agro sector and farmers are our main target audiences.

The product is majorly related to agro sector where majority of farmers are indulged in citrus fruits farming, where the farmers have to deal with the work of cleaning, polishing and grading of the fruits thus includes a large amount of labor. To deal with this problem agricultural sector is the target audience for the machine in order to deal with the problem and providing a suitable solution. This helps farmers to deal with the problem saving large amount of labor, saving time and saving every year cost related to the job related for manual labor for cleaning, polishing and grading. This machine is an one time investment for the farmers which will inculcate the reduction of labor work and thus saving money for the farmers, as the machine is designed cost effective and requires low maintenance, as the machine do not require any waxing or polishing media also aids in health benefits of the fruits.

II. LITERATURE SURVEY

[1] The paper presented by (1).FMC Corporation, (1) Howard.C.Lisle, (2) James.W.Morse, Publication of USA. They were worked on" Fruits and vegetables cleaning machine " on May 25 1953 In which they was proposed to design a fruits and vegetable cleaning machine, using fruits and vegetable polishing facility for this machine. This invention is of a machine with the help brush the fruits for cleaning and polishing the fruits. The system of this machine comprises it is a objected machine to provide and put up a series of rollers aligned on a machine that will put the effort for reducing the 5-cline over which the fruit or vegetable is running of the roller. These collaborated steps and action are prominent for organizational purpose other than physical. Some organizations have stated to maintain and develop processes, while they not are able to define other process.

[2] The paper presented by W.W. Jacobs Dated 17.1901 They were design a Cleaning and grading machine for oranges, this inventing relates to a cleaning and grading machine designed especially for handling oranges and by this process the oranges of various sizes will be thoroughly brushed and cleaned and then graded simultaneously and delivered it under particular bins are provided. During the designing of the machine they took consideration that it should be more useful and efficient than that of those manual operation and will help in reduction of the difficulty exists.

This machine had appropriate farming method which is a system comprised of standing vertical hinged supports with clothed top end with a circular cross section . The rail is given in order to carry the oranges which are traditionally removed with the help of manual hand pickup. The wheels which are provided on the surface of the bars are provided over the rail. The top end of the bars is connected across the braces, and the outer bar is to cover the upward and inward end to form the top section of frame. The

up top of the frame supports the upper top end of an identical stationary shafts which goes down to the center of the machine. The machine had its lower end protected with the base of the machine . Thus The combination of a framing a rotating table mounted using brackets taken by Frame and a stationary rail hinged using a said bracket and later mounted adjacent over the periphery of the rotating wheel, and being of irregular form, various sections of the rails are provided on varying distances from the periphery of the wheel, as set forth. If there is a case of break down and waste has to be removed is a loss of man power, thus a tremendous modification is required in this area of design which increase the advancement of the technology and reduction in loss of manpower and increasing efficiency

[3] The paper presented by Lawrence J. Larsen " Continuous fruit pitting by singularization of fruit pieces" were design and develop a machine Continuous fruit pitting by singularization of fruit pieces, which could reduce the difficulties in existing products available in the market and at same time increase the use of this product in agricultural sector. The machine comprises of a conveyor recession and wells for receiving fruit pieces to process. The conveyor receives the fruit pieces into wells, passes the fruit over pitting region where the pitting machine detaches the pits from fruit. The main problem with this machine was a matrix of punching /pitting needles. The system works in an oscillatory way in sync with the regular movement engaged on the conveyor thus degrading the quality of the fruits and thus loss of money and efforts along with that the use of needle pins requires a lot of maintenance. This study was brought up with the help of data collected from literature review, and customer survey and market study. The machine was modified according to the result from the analysis data records. A prototype model of the above concept was designed to authenticate the design. User feedback was obtained on the new design of the machine, thus a tremendous modification is required in this area of design which increase the advancement of the technology.

[4] The paper presented by (1)J. Nayfa,(2) A. Stanley " Floor surface cleaning and polishing machine" In this designed machine a self-rotating machine which has a main housing supported on front side and rear rollers .They had a control handle over the rear. Front and rear brushes are driven in circular motion over horizontal surfaces , the brushes on front end being placed on front roller and the rear brush placed over the rear roller. A machine is used for Floor surfaces in houses having front and rear ends common relation to normal placement on Floor.

III. PROPOSED SYSTEM

The machine comprises of three stages, in the initial stage the fruits are added to the hopper which is a connecting path for the regular cleaning of the fruits over a flat bed, the bed comprises of nylon tubular roller which are responsible for the removal of dust, dirt and unwanted plant wastage in the initial stage. In the second stage the cleaned fruits are moved towards polishing rollers where the polishing buffers are used for the natural polishing of fruits where "use of wax or any polishing fluid is eliminated" thus producing a natural shine over the fruit. The fruits are further passed over the third stage where they are collected in a tray box where they are to be passed over the grading channel where the grading of fruits according to the size will be done. The whole unit is driven by motor, the rollers are driven with the help of roller chain driver, and tumbler mechanism is being used for the purpose of grading. This is a fully automated machine serving the purpose of cleaning, polishing and grading. The measurement of citrus

fruits is generally made in tons , thus the machine is designed according to perform the required task , the average time required to clean one tons of fruits will approximately done within 15-20 minutes.

IV. AIMS AND OBJECTIVES

The main purpose of "design and development of citrus fruits cleaning and polishing machine" is to provide a machine to the farmers at Low cost for Citrus fruit cleaning, Grading and Polishing Machine which is completely automatic in order to eliminates human effort.

The goals of the system are:

- All the three processes take place in a single unit thus saving floor area.
- The machine is completely automatic thus this machine eliminates human effort.
- Due to les number of moving parts it requires very low maintenance
- The machine does not require any cleaning, waxing or polishing agent for the for polishing purpose which helps in preventing the health hazard.
- The machine being compact and portable in natural is very affordable and cost effective.
- Labor cost, broker costs and dealers cost are completely eliminated.

V. CONCLUSION

After referring to the literature and modification one regarding this topic some ideas were put forward thus in this machine the process of cleaning, polishing and grading is done by a single unit without any manual labor. The machine does not require any cleaning, waxing or polishing agent for the for polishing purpose which helps in preventing the health hazard. As all the three processes takes place in a single unit thus saving floor area and requires very low maintenance. As the machine is completely automatic thus this machine eliminates human effort. The commercial machines which are used in food industries requires a lot of floor space , higher installation chargers and the machines are highly complicated and the cost associated with the machine is very high, thus this machine being compact and portable in natural is very affordable and cost effective. The product is majorly related to agro sector where majority of farmers are indulged in citrus fruits farming, where the farmers have to deal with the work of cleaning, polishing and grading of the fruits thus includes a large amount of labor. To deal with this problem agricultural sector is the target audience for the machine in order to deal with the problem and providing a suitable solution. This machine contributes to the helping of farmers to deal with the problem saving large amount of labor, saving time and saving every year cost related to the job related for manual labor for cleaning, polishing and grading. This machine is an one time investment for the farmers which will inculcate the reduction of labor work and thus saving money for the farmers, as the machine is designed cost effective and requires low maintenance, as the machine do not require any waxing or polishing media also aids in health benefits of the fruits which in turn will work in the favor of the farmers. India is one of the biggest market for tremendous amount of various citrus fruits, being part of India, thus involves excessive amount of labor work for the purpose of cleaning, polishing and grading of the fruits .Thus in order to counter the excessive amount of labor work and time allotted for the work to be done, we are here proposing a mechanically designed machine for complete reducing of the labor and time wasted for the purpose of cleaning, polishing and grading of the fruits. In

today's time all the work related to polishing and grading is done manually by hand cleaning and grading which is time consuming and high wages are required, in order to counter the economic condition and have an economic perspective this machine is an economic machine for the reduction of time money and saving human labor.

The agricultural and trading activities being inter-linked there is a good scope for low cost citrus fruits polishing and grading machine. As the cost of this unit is minimum as compared to the units available in the market there will be high demand for this machine in the market. As the citrus fruits been cultivated on large scale here there will be huge demand for this machine as it is cost is minimum it can be affordable by a farmer in order to make maximum profit. It's one time investment machine with minimum maintenance. As the citrus fruits is widely consumed all over the country the demand for machine will be there among the traders as well as the farmers

(1)High speed rotation of the brush helps in cleaning the citrus fruits effectively and the rotating brush attached to the same the shaft helps in polishing the citrus fruits effectively, and the cleaning and polishing the grading purely based on size is done provided just below the cleaning and polishing unit.
(2) This machine is very useful for the farmers in India as the maximum production of citrus fruits takes places in vidharbha, thus yielding more profits by the farmers and neglecting the human labor to clean polish and grade the fruit or selling the lot to the food processing company at low prices.

(3) Thus we can conclude from the above that the usage of citrus fruit cleaning polishing and grading machine is useful and affordable to local farmers to take more profits at very low one time investment.

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Ensuring Power Quality in Industrial and Medium Voltage Public Grids using DVR

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ABSTRACT

In this paper we are trying to compensate the power quality problems like voltage sag, voltage swell due to balance and unbalanced faults on the transmission lines. Now a days amount of sensitive loads are increasing and hence it is compulsory to reduce the power quality problem in this paper a new control technique is used in the DVR to compensate voltage Sag and voltage swells.

Keywords : Voltage Sag, Voltage Swell, Power Compensation, Power Quality, Power Quality Problems, DVR

I. INTRODUCTION

Now a days electricity is the basic need of human being and the electrical power system is the whole network which generates electricity and the quality of power given to the transmission ,distribution lines and for domestic purposes needs to be very improved and of good quality therefore power quality is the major concern in electrical power system .the power quality disturbances such as sags, swells, harmonic distortions and other interruptions have an impact on the electrical devices and machines and in severe cases cause serious damages. Therefore, any kind of disturbance must be recognized and compensated as soon as possible to guarantee the normal and efficient functioning of the energy system. This project presents the design and modelling of a new facility and a new multifunctional DVR control method for voltage quality correction. The new control method was built into the fixed frame by combining the proportional resonant driver and the sequential decoupling resonant drivers. Motors and voltage distortions are described. The simulation result shows capability of the proposed Dynamic Voltage Restorer to compensate the quality of the power supply under different operating conditions and The proposed method for the new DVR controller is capable of detecting voltage disturbances and controlling the converter to inject the appropriate voltages independently for each phase and compensate for the load voltage.

Three single-phase transformers. The organization of the document is section 2 which contains the main power quality problems, section three explains the DVR, section 4 contains the operation of the DVR, section 5 contains the DVR control techniques, section 6 contains laboratory DVR simulation and last section contains analysis of results and waveforms 2.

II. Main problems with power quality

Energy quality can be defined as the ability of the power supply system to provide its customers with an

uninterrupted flow of energy in the form of a sine wave. But in the real case there are many power quality problems, such as voltage drop, voltage rise, transients, harmonics, interruptions, etc. To reduce all these problems, we will design a multifunction DVR.

Voltage Drop - Voltage drop or drop is a short-lived reduction in amplitude, which occurs when the voltage RMS drops between 10 and 90 percent of the rated voltage for half a minute cycle. It is one of the rapid occurred disturbances in distribution systems. It is caused by faults in the power supply system, excitation of the transformer or by the start of large induction motors, among other causes. Voltage swelling - Increase the rated voltage by 10 to 80% per half cycle to one minute. It is not as common as voltage drop. The main causes of voltage swells are the switching of large capacitors or the starting / stopping of heavy loads, among other causes. Interruption is defined as a reduction in voltage or current to less than 10% of the nominal value, not exceeding 60 s in length. Prolonged interruptions occur when the supply voltage or current drops to zero for more than 1 minute. These are the result of faults, equipment faults, control malfunction or incorrect switch intervention. Harmonics: are the waves with frequencies that are the integral multiple of the frequency of the reference wave (to which the power supply system is designed to operate). The transients are defined as a short duration derives from the electricity in the power supply system caused by a sudden change of state.

III. Bottom of Form Multifunctional DVR

Major components of DVR

1. Booster transformer
2. Voltage source converter
3. Harmonic filter
4. Dc links
5. Energy storage unit
6. Controller
7. Detector

Boost transformer- the injected voltage is supplied to the distribution system through an injection transformer. Connect the DVR to the distribution system through the high voltage winding and transform the injected compensation voltage generated by the voltage source converter into the availability voltage after any disturbance has been detected by the controller. Additionally, the injection transformations are accustomed isolate the DVR circuit from the ability system.

Harmonic filter-The most task of the harmonic filter is to stay the harmonic voltage content generated by the VSC at the allowed level. The filter is positioned to dampen the switching harmonics generated by the PWM VSC control.

DC-Link and Energy Storage Unit-The most function of those energy storage units is to supply the required real power during the drop. Two sorts of systems are considered; the primary during which energy is taken from the input power through a bypass converter and also the second during which energy storage devices like flywheels, batteries, superconducting magnetic energy storage (SMES) and super capacitors are used. The energy storage devices have the advantage of rapid response.

The Voltage Source Converter- a VSC is an electronic power supply system consisting of a device and switching devices, which converts the dc voltage of the energy storage unit to a controllable three phase ac voltage. The inverter switches are normally tripped employing a sinusoidal pulse width modulation

(PWM) scheme. In a very multifunctional DVR, the VSC can operate with unbalanced switching functions for 3 phases, and manages each phase independently. Generally VSC isn't only used for voltage sag/swell compensation, but also for other power quality issues, e.g., flicker and harmonics.

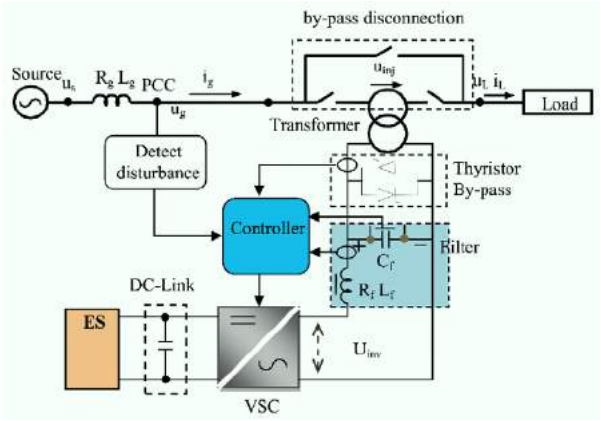


Fig 1. Block diagram of DVR in Power system

IV. Modes of DVR

The DVR has three modes of operation: protection mode, standby mode (during steady state), and injection/boost mode (during sag/swell). In protection mode, the DVR is protected against the overcurrent on the load side because of short-circuit on the load or large inrush current. The DVR may be isolated from the system by using the by-pass switches. In standby mode, no switching of semiconductors occurs and therefore the load current will undergo the transformer primary. In boost (Injection) mode, when the voltage disturbance occurs within the supply is detected, the DVR are injected a compensation voltage through the voltage injection transformer.

V. Control Techniques of DVR

In general, the method control of DVR includes three steps: (1) Detection of voltage sag/swell occurrence within the system; (2) Comparison with the reference value; and (3) Generation of gate pulses to the voltage source inverter (VSI) to come up with the DVR output voltages which compensates / absorbs the voltage sag/swell.

Grid Synchronization Techniques Synchronization to the provision voltages is incredibly important so as to regulate the DVR. It keeps a signal synchronized with a reference signaling in frequency and phase. Synchronization methods are developed and presented in many publications. The foremost often used synchronization method in engineering applications, the phase-locked loop (PLL) has been employed in this paper. It consists of three blocks: the phase detector (PD), loop filter (LF) and voltage-controller oscillator (VCO). The signaling is voltage at PCC bus. The phase detector generates an signal proportional to the phase difference between the signaling and also the signal generates by the voltage-controller oscillator (VCO). It should contain high-frequency components. The loop filter may be a low-pass filters; it's accustomed suppress high frequency components.

The loop filter provides control signal to voltage controlled oscillator which work as an integrator.

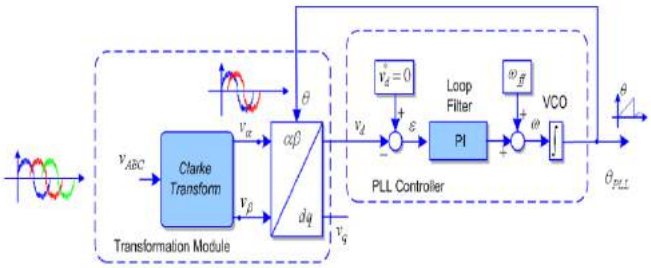


Fig.2 Phase locked loop control

The output of the PI controller is that the inverter output frequency that's integrated to get inverter phase θ. The PI regulator of the LF will set the spatial relation of the dq arrangement to

create Vd = 0 within the steady state, which suggests that the PLL are going to be active when the difference between grid phase and inverter phase is reduced to zero. Sag/Swell Detection Techniques.

Voltage sag/swell phenomena are necessary to detect the place to begin, the top point, sag depth and phase shift. There are many alternative methods for detecting voltage sag, swell, like peak value, root mean square (RMS), Fourier transform, wavelet transforms and space vector method. Among variety of methods, space vector control is that the only method which is employed widely in DVR applications. during this method, the three phase voltages Vabc are transformed into a two-dimensional voltage Vdq which successively will be transferred into magnitude and angle. The voltage magnitude and angle shift information is compared with the reference value within the dq frame, which had to be transformed back to the three-phase frame.

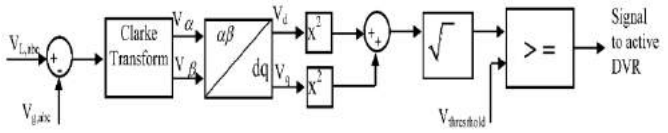


Fig.3 Sag swells detection technique

Control techniques of DVR-

The system is incredibly important in a very DVR, with the necessities of fast response for voltage sags and variations within the supplied load.

Current controller-PR is used as a current controller

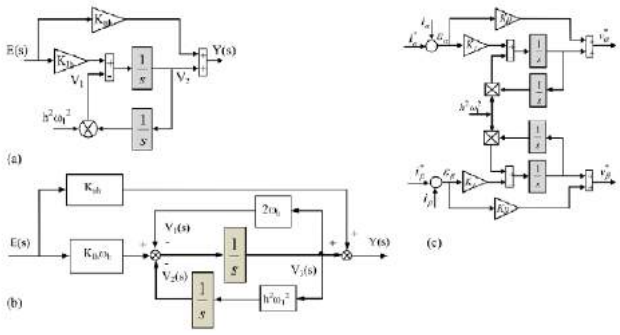


Fig.4. Current controller strategy

Voltage controller-SDR (sequence Decouple resonator) is employed as a voltage controller. it's helpful in extracting the positive and negative component in unbalance condition faults. Finally, we propose the new double loop controller designed in stationary frame by combining a PR controller and a SDR controller Double loop Controller- during this method, the three-phase voltages of the grid are sensed and transformed to two-phase system (αβ) within the stationary organization. Then, the positive sequence and therefore the negative sequence components are extracted. Positive sequence grid voltage vector is compared against the positive sequence load voltage command vector. the method of the negative sequence controller is analogous. The proposed controller performs in stationary frame so its structure is less complicated than the double-loop controller using the PI controllers in rotating frame.

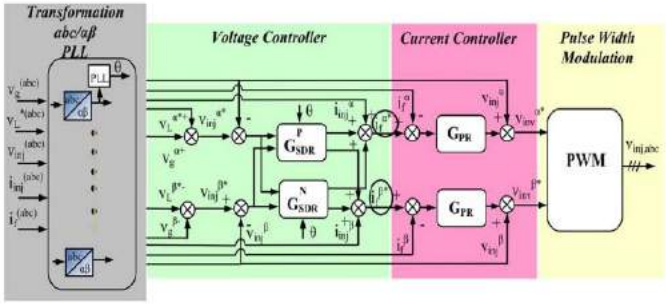
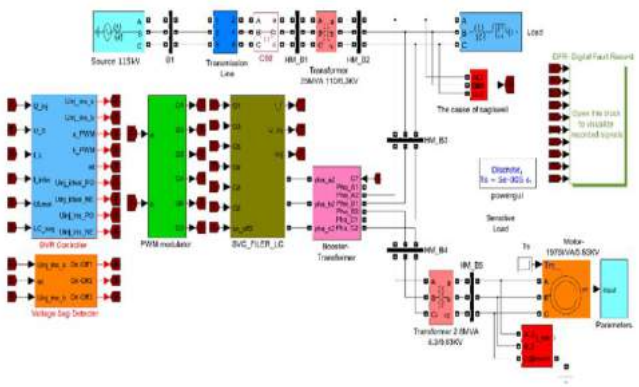


Fig 5. Double loop controller

In the proposed control method, the method variable isn't only injection voltage but also injection current. The output of voltage controller are the reference currents within the stationary frame if α∗ iα∗ f and iβ∗ f if β∗ which are used as an input variables within the current controller to manage the injection voltage. this controller can regulate the injected currents and improve response and proper operation of the voltage controller to revive the load voltage. The proposed new controller is ready to

detect the voltage disturbances and control the converter to inject appropriate voltages independently for every phase and compensate to load voltage through three single-phase transformers.

VI. MAT LAB SIMULINK DIAGRAM



VII. RESULTS AND DISCUSSION

The balanced voltage sag at PCC because of three phase contact occurs within the facility, the voltage decreased to 50% from 1.00 s to 1.10 s. grid voltages, the injection voltages of DVR and the load voltages during the sag event.

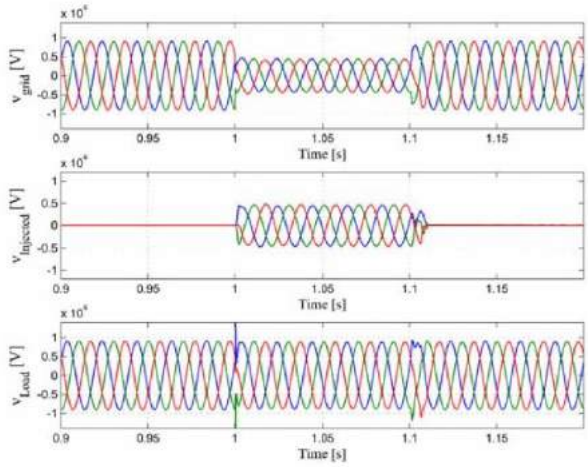


Fig. 6 sag compensation

The Unbalanced Voltage Sag during this case study, from 1.00 s to 1.10 s, a phase to phase short (between phase A and C) occurred within the installation, the voltage at PCC reduced to 35% in phase A, and to twenty-eight in phase C and increased slightly by 10% in phase B respectively to the reference pre-sag voltage and also the phase jump of grid voltage

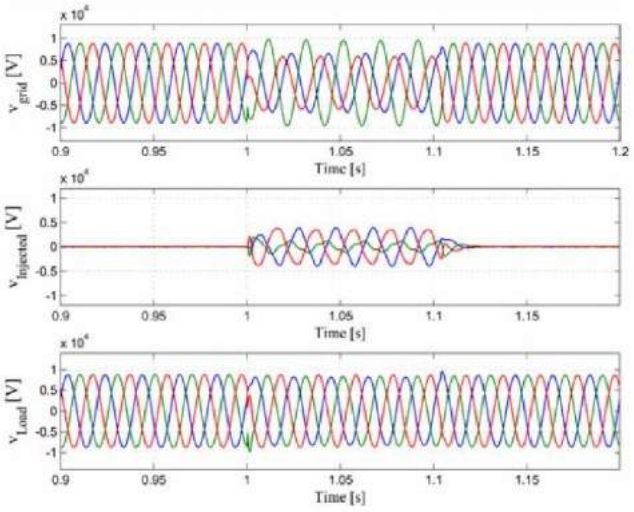


Fig. 7 swell compensation

Observe that the DVR quickly injects the required voltage components; with correct both magnitude and phase to keep up balanced load voltages. It's shown that the DVR can detect and mitigate the voltage sag in numerous phases independently and inject the compensation energy through three single-phase transformers to correct the grid voltage.

VIII. CONCLUSION

For improving the compensation abilities of power quality disturbances like sags, swells, harmonic distortion and other interruptions that have an impression on electrical devices and machines and in severe cases can cause serious damage, a completely unique structure with a complicated controller has been presented during this paper. The proposed DVR has the unique ability to compensate balanced and unbalanced voltage sags and swells and other utility voltage disturbances thanks to a double loop-

controller that's able to detect the voltage disturbances and control the converter to inject appropriate voltages independently for every phase and compensate to load voltage through three single-phase transformers. The DVR was described well, with its configuration, its sag/swell detection voltage techniques, grid synchronization techniques and control techniques. The numerical simulation results under several conditions, balanced and unbalanced voltage sags and swells, fluctuations and distortions are presented.

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Design and Implementation of Smart LPG Leakage Detection and Booking with Alert System over IoT

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ABSTRACT

This project includes the detection of gas leakage considering safety and intimates the user through the GSM system. If the LPG leakage sensed by the MQ-2 sensor, then immediately block the gas regulator using Solenoid Electric Valve and the exhaust fan is turned ON. Whenever there is a change in the surrounding environment it will detect by the sensors (load cell, MQ-2) a siren is triggered. Booking a new LPG cylinder every month when the old cylinder gets emptied, has been a very long time consuming and manual process. This can be simplified by automating this process with the help of a load cell which is interfaced with a Microcontroller and IoT technology. The gas cylinder on top of a load cell, the load gets decreased as the gas cylinder is being used and when a particular threshold is met it will be detected and the message will be sent to the gas agency through GSM technology.

Keywords : Internet of things (IoT), Load cell, GSM(Global System for mobile communication), LPG(Liquefied Petroleum Gas), LCD, Gas sensor.

I. INTRODUCTION

LPG gas is essential in our daily life. Nowadays the use of LPG is extending to so many applications. Though it is useful when it leaks tends to an explosion. So the leakage of this gas has to avoid unnecessary explosions. Here we design and implement a system that detects the leakage of LPG gas and quick alerts the user to audio-visual indication. This circuit can detect leakage in our home or in a service station, storage tank environment. This unit can be easily operated to an industrial level by upgrading its ranges, can be extended to receive "SMS ALERTS" by using a GSM modem. This system is an effective way to monitoring the weight of gas quantity in the cylinder, and to intimate as well as to place a refill order in the respective gas agency, via message by means of GSM module. The continuous measure is done using the load cell which intern works on the principle of piezoelectric sensor, i. e; when a gas container is placed on the load cell it measures the weight and sends an electric pulse to the microcontroller which will compare the pulse with an ideal value in the form of digital. If the compared output is high then it sends a high pulse to the IoT which will update it to the internet but doesn't place an order, but if the compared output is low then it sends a low pulse to the IoT which will update it to the internet an even place a gas refill order, so the need of providing it

with these is that when a gas order is being placed it notifies the consumer with a Text SMS.

II. DESIGN AND IMPLEMENTATION

This method consists of a gas leakage detection system and weight measurement module with the help of Arduino UNO, microcontroller, GSM 900A, and alert system. The Arduino UNO microcontroller requires the power supply ranging from 7 to 12 V which are radially available as adaptors these days. The power supply may be either from an AC through DC adaptor or battery. The main purpose we are using Arduino UNO is to provide the flexibility to write the code in a convenient way.

The load cell is the other main component we are using in our project. A load cell is a transducer that is used to convert a force into an electrical signal that is used to measure a weight of LPG cylinder so that alert the user within how many days the cylinder is to be empty. For the leakage gas detection, we have used the gas sensor (methane and propane), we make use of the MQ-2 gas sensor which is suitable for detecting CH4, natural gases and excessive smoke. For showing the output of the result at various sensor values we can use the 16×2 LCD screen. Also, we are including the Exhaust fan (BLDC Fan) for the removal of leakage LPG gas in a particular area which has to be operated automatically and it will help to the cleared surrounding atmosphere.

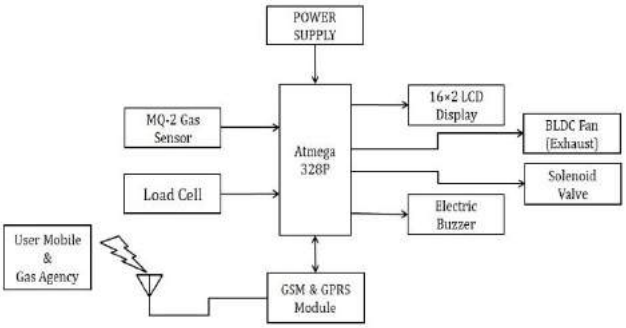

Fig 1. Block Diagram

A. MQ-2 (Gas Sensor)

MQ 2 sensor is basically an LPG (liquefied petroleum gas) which is composed of propane & butane, so when gas leakage is sensed by the sensor it will send a high pulse to the micro-controller which will update it in the IoT, and even a buzzer is start alerting. And the problem can be analyzed, sorted & solved. Thus the overall components & sensors play a role in the system.

Fig. 2 MQ-2 Gas Sensor

B. LCD Display

LCD stands for Liquid Crystal Display. They have become very common with the industry by clearly replacing the use of Cathode Ray Tubes (CRT). CRT consumes more power than LCD display it is heavier and bigger also. We all know about LCDs, but no one knows the exact working of LCD. It is finding widespread use replacing LEDs (seven segments or other multi-segment LEDs) due to the following reasons:

- The declining prices of LCDs.
- The ability to display numbers, characters and graphics related data in the simplest form.
- It is compact and very light-weights compared to CRT.

- With the Incorporation of a controller into the LCD, thereby making the CPU to keep displaying the data.

C. Microcontroller

ATMEGA 328P is an 8-bit microcontroller based on AVR RISC architecture which provides high performance and low power controller from Microchip. It is a 28 pin microcontroller. It has 14 digital pins as an I/O, in which 6 can be used as PWM outputs and 6 can be analog input pins. It is used in ARDUINO boards, and also the most popular of all AVR controllers. It will operate ranging from 3.3V to 5.5V but normally we use 5V as a standard voltage. It has been excellent features include such as cost-efficiency, low power dissipation, programming lock for security purposes, and real timer counter also many operations with the separate oscillator.

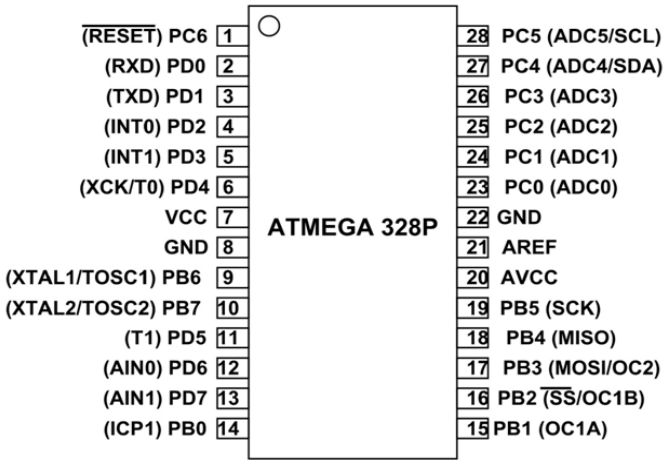

Fig. 3 ATMEGA 328P Microcontroller

D. Load cell

As per the dictionary, a load cell is namely suggested as a "weight measurement device necessary for electronic scales that display weights in digits." However, a load cell is not restricted to weight measurement in electronic scales. The load cell is one of the passive transducer or sensor which converts applied force into electrical signals, They are also referred to as "Load transducer". However, the only load cells which are prevalent are the load cells based on strain gauges. Hence, the term load cell means strain gauge-based load cells. The reason behind the wide adoption of strain gauge based load cells.

E. GSM technique

This project designed is as an automatic LPG booking, leakage detection, and also economical, real-time gas monitoring system. In this system, whenever the LPG leakage is detected through the sensor and information is sent to the user by SMS & simultaneously alerts the customer using a GSM module. The additional advantage of the system is that it continuously monitors the level of the LPG and updated over the internet present in the cylinder using the weight sensor and automatically books the cylinder using a GSM model. This model is it contained GSM which is an old technique used & has a bit of lack of awareness for the uneducated people.

F. Solenoid Valve

A solenoid valve is an electromechanically operated valve. The solenoid valve varies in the characteristics of electric current. The solenoid valve is the most frequently used control element fluidics. Solenoid offers safe switching as well as high reliability with fast response, long service life good medium compatibility of the materials used, low control power and compact design, they used the strength of the magnetic field they generate, the mechanism they used to regulate the fluid, and the type and characteristic of fluid they control.

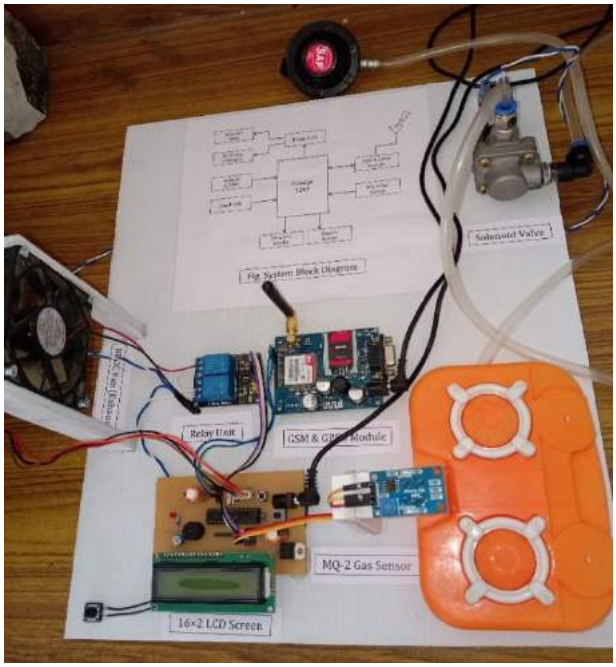

Fig. 4 Design of Project

III. RESULT AND DISCUSSION

The below figure shows the status of the gas sensor which senses any chance of gas leakage near to the gas container. The sensor continuously keeps on sensing if any change is observed then it is updated.

Fig. 5.1 Gas Leakage Alert

Fig. 5.2 Leakage Gas in Air (PPM)

The below figure shows the status of Load Cell for any change in the LPG gas level, That data should be uploaded on the internet through IoT. There are only two levels that are either half of the Threshold level or low level (< 1kg).

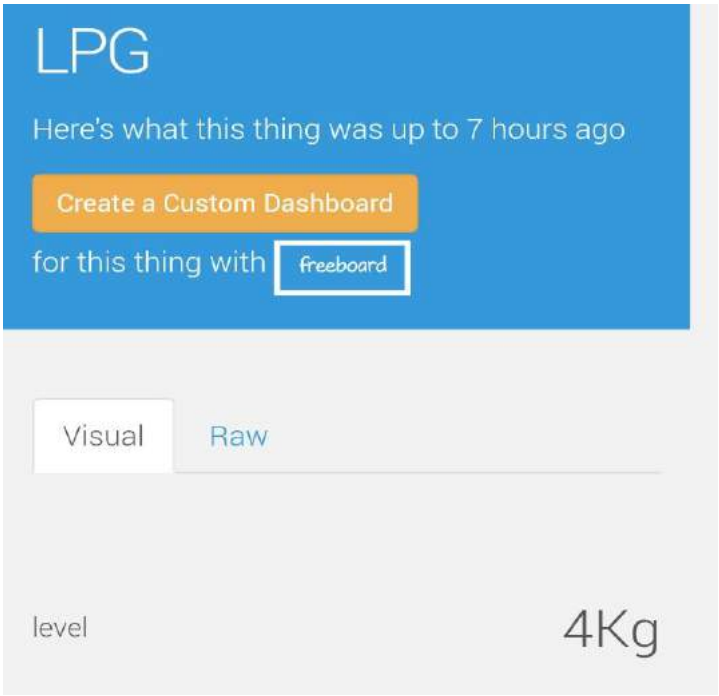

Fig. 6 Gas level Monitoring (Using IoT)

IV. APPLICATION

a. Protection from any gas leakage in cylinder areas and cars.
b. For safety purposes from gas leakage in heating gas-fired appliances like boilers, domestic water heaters.
c. Large industries which use gas as their production.
d. For safety from gas leakage in cooking gas appliances like oven, stoves, etc.

V. ADVANTAGES

1. It is used in the house as LPG leakage detection.
2. The sensor has excellent sensitivity combined with the quick fast response time.
3. The system is highly reliable, tamper-proof and secure.
4. In the long run, the maintenance cost is very less when compared to the present systems.

5. It is possible to get an instantaneous result and with high accuracy.

V. FUTURE SCOPE

a) In the future, a temperature sensor can be fitted.
b) Along with that an exhaust and a driver circuit may be fitted in case there is a fire and the user is not able to get to the location in time.
c) This monitoring system can be additionally upgraded by utilizing the Bluetooth setup of GSM to send the alarm messages to the user.
d) Audio output can be introduced to make it user-friendly.

VI. CONCLUSION

Hence, from the above discussion, we can conclude that this system for the application of the users who use gas in their daily life. It not only helps in making the daily work easier but also plays a major role in the security purpose or avoidance of accidents to the user and it helps in leading an easy life. It has a more advantageous function than the existing system thus the real-time automatic approach in case of rebooking of the cylinder. This monitoring and detection system is proposed mainly to meet the safety standard and to avoid fire accidents because of leakage.

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Remote Gsm Monitoring Dual Axis Solar Tracking with Cleaning Mechanism

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ABSTRACT

As the requirement of electricity is increasing, the sources are rapidly decreasing in the environment. As a result, renewable resources are playing vital role in replacing the sources. The solar energy is one of the best energys which can be used as renewable resources. This paper represents a dual axis solar tracker system, its construction includes – sensors, motors, integrated electric biaxial system and the GSM which will report the fault notice automatically. It's a fusion to locate the sun and keep a constant track of it continuously. The dust gets accumulated on the module which automatically reduces the efficiency of the module. In order to maintain it efficiency the regular cleaning of the module is necessary.

Keywords : DC motors, GSM, LDR, microcontroller, servo motor, solar module.

I. INTRODUCTION

A renewable resource is a resource which can be reused and replaced naturally. Renewable energy almost never run out for example solar energy is powered by heat from the sun likewise tidal energy and wind energy.

In last ten years, many residential areas and commercial building around the world used electrical solar system as a backup power. The solar energy is derived from the sun in the form of radiation. It is also an unlimited energy resource which is going to become increasingly important in next few years.
In order to utilize the superiority of solar energy the solar tracker was constructed. The solar tracker is use to track the light throughout the day using light sensors. The only way to increase the efficiency of the module is to increase the intensity of light falling on it and by keeping the module aligned with the sun position. But according to environmental conditions where with time dust gets accumulated on solar module it decreases its efficiency. The periodic cleaning of the module is very necessary in order to maintain the efficiency. The cleaning can be done by two ways by manual cleaning and automatic cleaning. But manual cleaning may include life risk so the automatic cleaning is mostly preferred and it also reduces human work. Regular monitoring of module is not possible every time so by implementing the GSM it gives real time monitoring of module.

II. DISCRIPTION

A. Solar module

The solar module is an assembly of photo-voltaic cells mounted on a frame work for installation. Photo-voltaic cells directly generate electricity by using sunlight as a source as energy. In this project the panel used of rating 20watts, 12volts and 1.4amps.

B. Servo motor

Servo motor is one of the various types of DC motor. It is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. Servo motor only rotates by the maximum of 180 degrees. In this project the servo motor used of rating is 2Kg/Nm.

C. DC Motor

A DC motor is a rotary electrical motor that convert electrical energy to mechanical energy. This single-phase motor operates on Flemings hand rule. In this project two motors are used of same rating 12volt, 500mA. One is for cleaning and another for module rotation.

D. Light detecting resistor

Light dependent resistor is a type of variable resistor whose resistance decreases with increase in intensity of light. In this project two LDR are used. One for detecting the intensity of light and another for sensing necessity of cleaning.

III. Block diagram

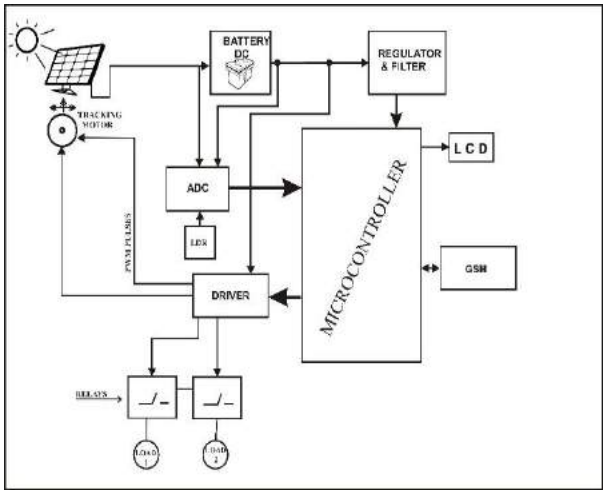

FIGURE 1 : Block diagram of remote GSM monitoring of dual axis solar tracking with cleaning mechanism

IV. Working

The working of dual axis tracker with cleaning mechanism of solar module and its GSM monitoring is explained in tree steps:

A. Tracking mechanism

The tracking mechanism is based on the rotation of earth around its own axis and angle associated with the sun. The system is always in synchronization with the rotation of the earth throughout the day from the time of sunrises to sunset. The sun light falls on the solar module LDR sense the intensity of light and adjust the solar module in such a way that it is always aligned to sun's position. The position of the module changes throughout the day in order to track the maximum intensity of light. After the sunset the module is again brought back to its original position by using limit switch.

B. Cleaning mechanism

The cleaning mechanism is based on the amount of dust accumulated on the module. As the dust gets accumulated on the module, it reduces the intensity of the light falling on the module. As the intensity of the light reduces LDR will sense it and as a result, it will send a signal to the motor and it will start the cleaning through the wiper placed on the module. And hence, module will get the required amount of intensity of the light.

C. Monitoring mechanism

Monitoring mechanism is done by GSM monitoring, which includes all the parameters that is required to be monitored. This helps to get the required information about the module in real time monitoring. The parameters to be monitored are as follows -

a. Voltage
b. Intensity of light
c. Battery charging percentage

V. Experimental setup

Table.1 shows the current and voltage value received from both the static and tracking panel for different times in a day. From the table it is seen that at 9:00am there is much improvement in current by tracking panel compared to the static panel. But as time passes on this difference in current these two technologies decrease up to 1:00pm. As the sun moves towards west this difference increases again. But in case of voltage the variation is lesser as compared with current, as the voltage has no direct relation with sunlight intensity.

TABLE1: Current and voltage values of static and tracking panel at different times in a day

Time	Static panel		Tracking panel	
	Current (ampere)	Voltage (volts)	Current (ampere)	Voltage (volts)
9:00 am	0.20	10.3	0.27	10.9
11:00 am	0.23	10.8	0.30	11.3
12:00 pm	0.29	11.5	0.35	11.8
1:00 pm	0.26	11.2	0.31	11.6
3:00 pm	0.16	10.9	0.26	10.7
5:00 pm	0.12	6.7	0.14	6.8

Table 2 shows the power value of both the static and tracking panel. The maximum power output of tracking panel is increased as compared to the static panel. More amount power gain is achieved during the morning and afternoon because the tracking system can accurately track the sun's position while the static system not.

TABLE 2: Power values of both static and tracking panel

Time	Static panel power	Tracking panel power	Power gained by tracking panel (%)
9:00 am	2.4	3.34	34.45
11:00am	2.8	3.57	27.32
12:00pm	3.2	4.02	25.65
1:00pm	3.17	3.54	19.34
3:00pm	2	2.15	39.02
5:00pm	0.68	0.8	25.80

VI. Conclusion

In this paper of sun tracking with cleaning mechanism and GSM monitoring of module is presented where solar module move 180^{o} in a day. It is observed that the energy generation in dual axis solar tracking is increased much high than the flat module. It consists of a wiper which slides over a module and clean it, which increases the intensity of light falling on the module by 15-20% in case of tracking-cum-cleaning.

For industrial need, this tracking-cum-cleaning is most suitable also the real time monitoring. Real time monitoring is necessary so as that we can get all the required parameters also detects the fault if any. In industry, the panel setup is at a distinct distance and it is nearly impossible to reach all of the modules in time.

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Various Software to Analyze Survey Data - A Review

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ABSTRACT

In the modern age of technology, the art of surveying has taken a huge boost due to technological advances. With the new software enabling us to mark, measure, and present the survey data with intense accuracy and details so as to improve the progress of the projects.

Keywords :- Survey, Software, Google, Technological

I. INTRODUCTION

In this review, we shall see various software that can be used to analyze survey data and prepare a plan accordingly.

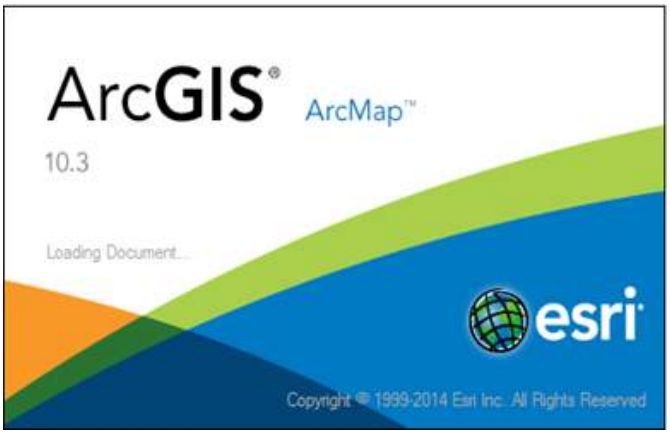
- We shall learn about so
- me basic softwares used to analyze survey data.

II. Types of Software

1. ArcGIS
2. QuikGrid
3. AutoCAD
4. TCX Converter
5. Google Earth

1) ArcGIS:

ArcGIS is a powerful mapping and analytic platform designed to help the users to search information and share location-based data. The software provides contextual tools for spatial reasoning and mapping to industries, educators, developers.



This program has premium features which use Geographical Information system (GIS) to solve problems. The unique set of capabilities include; spatial analytic, mapping & visualization, 3D GIS, Imagery and remote sensing. Real-time GIS, and data collection & management.

The functionalities apply location-based analysis to the business practices to create a deeper understanding and help you quickly visualize how your business information is connected and where everything is happening.

One major benefit of ArcGIS is the use of geographical information system (GIS). The GIS helps organizations of all sizes to question, analyze, visualize, and interpret data to gain an understanding of relationships, trends, and patterns. The system provide an improved communication, better record keeping, cost savings, and better decision-making.

Overview of ArcGIS future:

- Spatial Analytics
- Mapping and Visualization
- 3D GIS
- Real-Time GIS
- Imagery and Remote Sensing
- Data Collection and Management

Devices Supported:

Windows

- Deployment:

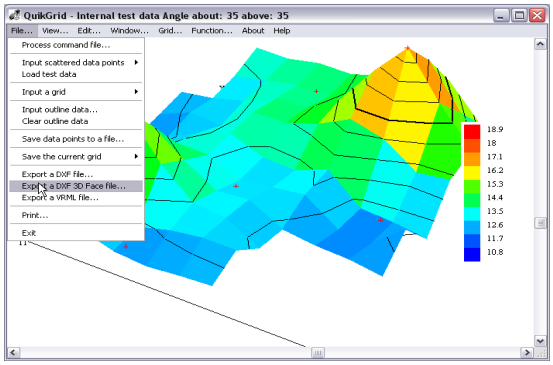
Cloud Hosted

- Language Support:

English.

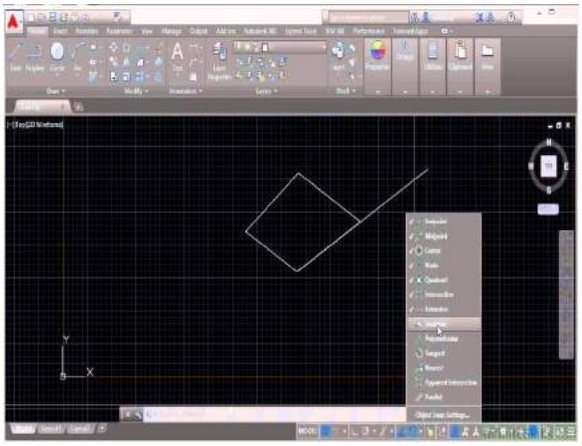
One of the newest addition to the AutoCAD allows the integration the available GIS data from geo-databases, application of spatial analysis by using implemented expert knowledge, and auto-production of maps and reports.[1]

2) QuikGrid



QuikGrid is a program freely available for windows that visualizes data 3D elevation maps. It can be used to visualize data as 3D model map. This program converts a set of scattered data points to create maps. It is easy to use and it will run on various, even old hardware platforms as well.[2] It is suited in situations where a quick look at a set of data points is required.[5] QuikGrid will read in a set of scattered data points which represent a surface and generate a grid which represent the surface defined by these points.

3) AutoCAD

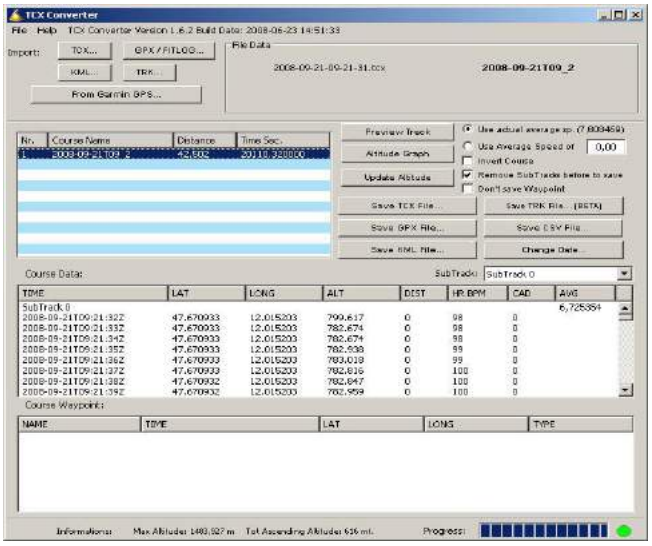


AutoCAD is a software application for 2D and 3D drafting and Engineering Drawing. It is designed by Autodesk (Luke Kennedy, 2014).[3]

2D Engineering Drawing is designed by Gaspard Monge(1746-1818), also Orthographic Drawing is possible and Scientific Drawing is available.[3] AutoCAD enables users to import data from PDF files so they can collaborate with their teammates as they review their models and drawings. The users can modify & move section planes to examine the inner details of 3D objects, enabling them to cut through solids, surfaces, meshes, or regions. AutoCAD can also be classified depending on domain it serves.

- Architecture
- Electrical design
- Mechanical design
- MEP (mechanical electrical and plumbing)

4) TCX Converter:



Every GPS device and mapping software supports only a few kinds of files, many of their users have to deal with file compatibility problems.

The free TCX Converter application has been designed to solve such problem. TCX converter is much more than a simple conversion solution for TCX files. It can also load TRK, GPX, KML, FT, FITLOG, PLT and CSV files and export to TCX, GPX, KML, PLT, HRM, TRK, CSV and FIT files.[6] It can load multiple GPX track files and stick them into a single course. It can manage waypoints, truncate tracks, view and update altitude data. It has a well-organized interface, and it can import data directly from Garmin GPS devices.[6]

5) Google Earth

Google Earth is a computer program that renders a 3D representation of Earth based primarily on satellite imagery. It was first introduced in 2005. The program maps the Earth by superimposing satellite images, aerial photography, and GIS data onto a 3D globe, allowing users to see cities and landscapes from various angles. Users can explore the globe by entering addresses and coordinates, or by using a keyboard or mouse. The program is also available to be downloaded on a smartphone or tablet, using a touch screen or stylus to navigate easily. A maintainability analysis visualization system is developed under AutoCAD environment. Thus the designers can analyze the product design according to easy, maintenance concurrently.

III. CONCLUSION

In this review, we have looked at some key features of various softwares used in the analysis, design and planning of survey data obtained from the field. Each software presents a unique feature that makes it stand out.

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Futuristic Maglev Traction System Using Solar

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ABSTRACT

This paper involves the idea of a new type of magnetic levitation system using solar technology and electrical power generation using foot step for platform application, which is the best form to use in the present situation. Revolt changes have taken place in the life of human being since he has succeeded to achieve his needs to be done faster through maglev. Electrical energy plays an important role for the maglev. For that the solar energy is use for the electricity generation for the modern train i.e. to work efficient and effective the electrical consumption of maglev train can be decreased. Energy is needed at an increasing rate the existence and well-being of man ever since he came on the earth. Due to lot of this energy resource have been exhausted and wasted. Proposed solution for the utilization of waste energy with foot power human locomotion is very much pertinent and is important for populated countries like INDIA and CHINA. With the use of piezoelectric sensor, we can generate the voltage using foot step force. By using such principle, the energy can be utilized in the whole area where the mechanical energy is being converted into electrical energy.

Keywords : Levitation, Revolt, Maglev, Proposed Solution, Pertinent, Piezo-Electric Sensor.

I. INTRODUCTION

Maglev uses, axels and bearings. In maglev system, a vehicle is levitated away from a guideway using magnets by the short distance (air gap) to lift and thrust. High speed maglev trains promise dramatic improvements for human travels it wide spread adoption occurs. It used as a highly advanced and efficient technology in various industrial applications. The maglev magnetic levitation to propel vehicles with magnets instead of wheels train model gives suitability for the operator so that mobilization can be achieved in simpler way and which consumes less time. Accordingly, demands for innovation means of public transportation have increased. Thus, in order to appropriately serve the new generation transportation system to the public the system must meet certain requirements such as rapidity, reliability, and safety. Hence for working of train it requires some energy in the form of electrical finally to convert into mechanical support (for the propulsion). Which can be done using solar which is the best form (converts energy into electrical energy) by using solar panels and which then used for the needs to run faster through Maglev. Thus, maglev is proving to be cheaper, safer and quieter with less environmental impact than conventional rail. Given the superior economics, maglev could be put in place years ahead of conventional rail. Also, we have investigated to generated energy for platform with the help of foot step using piezoelectric effect by non-conventional means simply walking or running on the foot step.

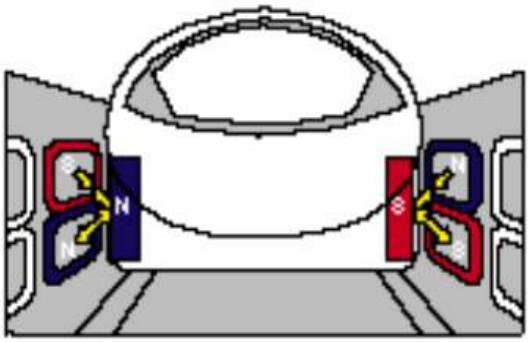
II. BASIC CONCEPT

Magnets repel each other when they're placed with their like poles together because they create a magnetic field when they're created. While scientists don't rightly know why electromagnetic fields take the shape that they do, their general consensus states that the field leaves one pole and tries to reach the nearest opposite pole that it can, and when you place the like poles together the opposing fields repel one another.

III. DESCRIPTION

A. Principle of Magnetic levitation

Maglev is magnetic levitation in which the train float on a guideway using principle the of magnetic repulsion. The repulsive force of magnets is used in maglev trains. Thus, instead of using permanent magnets the principle of electromagnets is used to create strong and large temporary magnets. This electromagnetic forces between superconducting magnets which are present on guideway and bottom of the train.



B. Propulsion

Propulsion is done by superconducting magnets by repulsive and attractive force induced between superconducting magnets. This propulsion magnets are located on the track which are energize by three phases alternating current. This coil is present on guideway.

C. Vehicle

Vehicle is the most important for high-speed maglev system. It consists of levitation of chassis by using magnets mounted on the chassis, secondary suspension system and vehicle section. Besides it includes such an electrical appliance which is used for on board batteries, emergency braking system and levitation control system.

D. Guidance

Guideways guides and supports the maglev. It also directs them movement of vehicle. Maglev is a floating vehicle above the guideway which is supported by either electromagnetically traction or repulsion forces. These forces are also known as guidance force. The maglev that levitate by magnetic repulsion the train lies above the guideway. Now the similar poles from top and bottom of maglev repel and this pushes the train upward into overring position. Similarly, maglev levitate by magnetic attraction the bottom of train wraps around the guideway levitation magnet which are on the underside of guideway are placed so that it attracts the opposite poles of magnets on that wrapped part of maglev. It raises the train just few centimeters over the ground into floating position. Now by this induced electromagnetic forces from both sides' cancels out each other. Thus, the train runs in center of guideway.

E. Stability

The combination of static magnets cannot be in a stable equilibrium. Therefore, it requires the dynamic magnetic field to achieve stabilization. Electromagnetic systems based on active electronic stabilization which is use for constantly measures the bearing distance which is adjust the electromagnetic

current, and gives passive stability. Magnetic technology is used to fly, stabilization of pitch, Rolland yaw the maglev vehicle. In addition to rotation, move forward and backward, sway (sideway motion) or heave (up and down motions) can be problematic with other technologies.

F. Flexibility and reliability

Air crafts are flexible but commercial air routes are not. High-speed maglevs are designed to compete on journey times with flights of 800kilometres (500miles) or less. Additionally, when maglev serve several cities in between such routes and be on time in all weather conditions, airlines cannot come close to such reliability or performance. Because maglev vehicles are powered by electricity and do not carry fuel, maglev fares are less susceptible to heavy price sales created by oil markets. Maglevs are safe to travel as compare to air travel since maglevs are designed to not to crash into other maglevs or leave their guideway.

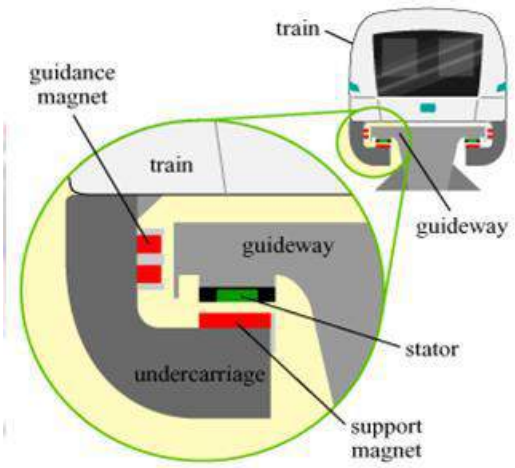
IV. MAGLEV TECHNOLOGY

There are two notable types of maglev technology:

1) Electromagnetic suspension (EMS), uses electromagnets which attracts the magnetically conductive (usually steel) track.
2) Electromagnets suspension (EDS), uses electromagnets on both track and train to push the train away from the rail.

A. Electromagnetic suspension

In EMS system, the train is levitated above track while electromagnets are attached to the train, and oriented towards the rail. The system is typically arranged on C-shaped guideway, with the upper portion attached to the vehicle, and lower inside edges containing the magnets. The train levitate between the upper and lower edges.

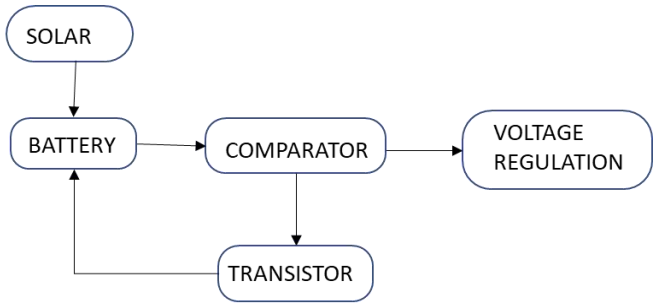


B. Electrodynamic suspension

In electromagnetic suspension (EDS) the train is levitated by the repulsive forces between magnetic field which is produced by the magnets, present on guideway and bottom of the train. The magnetic field is generated by permeant magnet and electromagnets. The advantage of EDS and repulsive magnetic field is that they are naturally stable, it also narrows the distance between track and magnets and creates strong force to repel the magnets back to their original position, due to the slight increase in distance, the force reduced and again returns vehicle to the right separation. In EDS system the feedback control is not needed. The advantage of EDS system over EMS system is that it can provide levitation as well as propulsion using an on-board linear motor, while EMS system can only levitate the train and not propel it forward. As the vehicle like maglev needs other technologies for propulsion. A linear motor can be Mounted in the track as a solution. For the long distances where cost of propulsion coils could be restricted, a jet engine or a propeller can be used instead of coil.

V. WORKING

The working shown below is the general block diagram representation of maglev-based rail system. Input power transfer is not convenient through mechanical contacts. Therefore, in maglev system ground supply by energizing magnets (supplies the on-board system) through magnetic coupling between track coils and train. Operation is based on the concept of capturing the unused energy surrounding any system and which then converts into electrical energy that can be used to extend life of system by suitably providing energy through solar radiation. Here we are using 12V battery. The solar energy is converted into electrical energy using solar panels. This energy is stored in the battery during and after charging from solar panel. For the indication of battery IN4007 diode is used as protection diode to reverse he current from battery to solar panel using LM358. Inside LM358 there are two comparators for detection of either positive or negative going input voltage depending upon the type of input voltage of the operation amplifier. Whenever battery voltage goes below its maximum voltage solar panel will charge the battery. When the battery gets fully charge transistor comparator will disconnect, he contacts of battery from solar panel. Voltage regulator LM317 supports output voltage levels to give a constant voltage supply. And Piezo electric sensor is use to generate energy by using foot step energy which is then converted into electrical energy, this energy is use to charge the battery.



VI. CONCLUSION

The features implemented in this project such as generating electricity using solar energy can be used for lighting system of maglev train and battery backup. The maglev train using solar technology is in the development stage with the help of solar energy, lighting and fan system can be successfully automated. In low to medium speed maglev train, the operating routine is shorter than the high-speed train. However, in high speed operation EDS technology is preferred for controllability and reliability. In addition, as along with the development of the high temperature supercapacitor new type of neodymium magnets, stronger magnetic energy that is more cost effective will be used for the maglev train. Also, we are generating electricity through foot step energy using piezo sensor.

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Software Controlled Switchboard: A novel technique for Home Automation

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ABSTRACT

Comfort and luxury has been an utmost priority in today's time. It has also been linked with a necessity of automated systems for the help of physically challenged people and senior citizens as they find it difficult to perform the tasks which are repetitive in nature or the ones which require them to get exhausted or tired up easily. A switchboard is one thing which we have always seen and not many designs have modified its structure or functioning. Only its outer appearance and looks have been modified to cater to the need of growing demand of consumers to make it more appealing for the purpose of matching it with the interiors of rooms and house. This paper presents an extra module to be attached with the switchboards which can increase its functionality and make it more usable. The added module is a circuit designed with controller and wifi module to make it accessible for users. An app has been designed along with it to control the switching mechanism through mobiles Phones. The proposed module is a novel approach to provideautomation of switching mechanism that is efficient and cost effective. This module is scalable for homes, schools, colleges, offices etc. The app designing is done through MIT app inventor website. WEMOS board has been used in hardware circuitry along with relay to control the switching mechanism. Router has to be used to provide internet connectivity as WIFI is needed to connect to the app and hardware module. This module is dependent on WIFI connection but it doesn't acts as a limitation of this project because internet in today's time is a facility which is available in majority of the places where this module can be used.

Keywords : WEMOS, Relay, WIFI, automation

I. INTRODUCTION

Automation in industries, factories have been noteworthy but automation in lives of common man doesn't lag far in terms of automation in electronic appliances or in household items. An example is televisions with remote controls which helps the consumers to control various functionalities from a restricted distance. If every electrical device is accompanied with a remote, users shall have to maintain remotes for every device and also every device shall have to be attached with extra control circuitry. This system shall not be economically feasible and also won't be feasible according to consumer's usability. Appliances like T.V, A.C's are accompanied with remotes keeping in view users usability of these. Fans with remotes were launched in market but didn't become a huge success owing to its high cost as compared to conventional fans apart from this important parameter is its maintenance according to the consumers point of view. This gap among the market scalability and automation at small scale was the motivation factor for the authors of this paper. Some important points that were kept in mind

that is while designing this module were economic, technological and consumer feasibility. Past research works related to this idea were studied and their research gaps were taken under consideration to design a system which has market scalability in field of automation and that can also be employed with the current infrastructure without the need to employ new devices and appliances. This paper proceeds with literature survey and then the methodology to design this module is discussed. This module is implemented in our college to prove its user accessibility and economic feasibility.

II. LITERATURE REVIEW

A. DTMF based home automation system

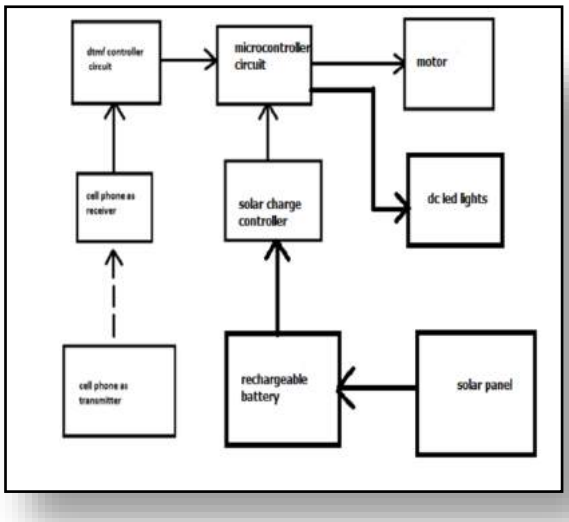

Fig 1 : DTMF based home automation system

DTMF means dual tone multifrequency, in this type of system the mobile phone's keypad tunes are used to switch on/off the system but the main disadvantage of this system is usage of one extra mobile that will be permanently attached to the switchboard side and it has to be charged time and again. Also we need to call the specified number and then turn on or off the system. Owing to the stated disadvantages this system was not launched in market.

B. Bluetooth based home automation system

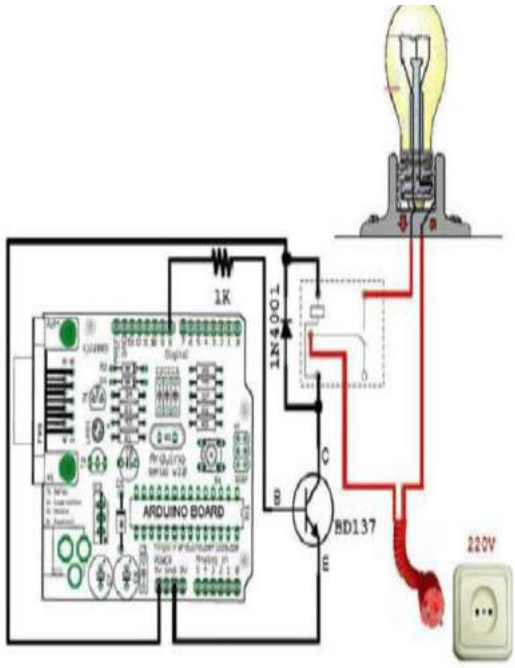

Fig: Bluetooth based home automation system

Bluetooth system uses a Bluetooth module connected to a hardware system attached to the switchboard where mobile user has an app that is compatible with Bluetooth system and user inputs are provided through the app. The biggest disadvantage is that it can work only in a limited range and hence is not a feasible model for markets hence these systems although launched in market but weren't popular among the users and slowly became obsolete.

III. Methodology

Figure below shows the basic block diagram of the project which has a controller, demonstrations is done using four relays but more number of relays can be used to connect more devices. The commands to turn on or off are done using graphic user interface (GUI) of a button which is placed on the screen of app.

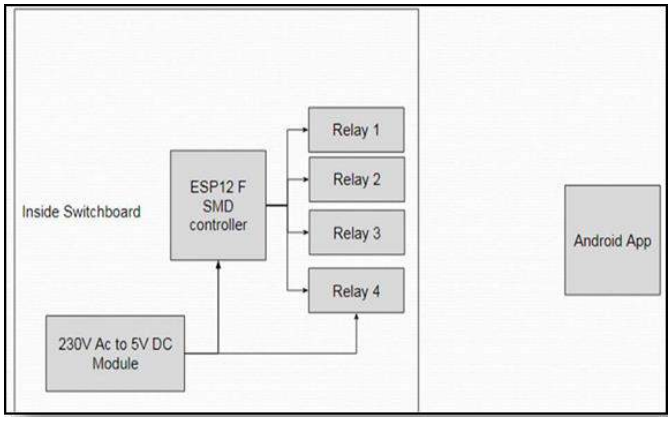

Fig: Block diagram of module

Working

The input is taken from user which is given through app and as WIFI is available it can connect with inbuilt wifi, the app and hardware module gets connected with each other. Input taken from user is received by the controller module which will then decode the signal received and accordingly turn on or off the electrical device like light or fan. This module is automated using relay which gets the signal from controller and it switches between two states i.e., ON and OFF. As there are four relays in the hardware module, four buttons are provided in app to control its switching.

Hardware

WEMOS

An important component which can help to control the switching operation and understand the input signals sent by the user through app is the controller board which has an inbuilt wifi module attached to it. ESP8266 is the IC configuration which is used in this board. This board performs two functions i.e. connecting with the wifi network to receive commands from the users, process those commands and send signals to relay module for switching mechanism of these devices.

Fig: WEMOS D1 mini board

Relay module

A four channel relay module is used in this project whose four inputs are connected to four pins of controller which helps to turn ON or OFF the module. The second connections are done with the loads like lights and fans between common, NO and NC. The terminal gets switched from common and normally close to make contact with another i.e. Normally open and common terminal.

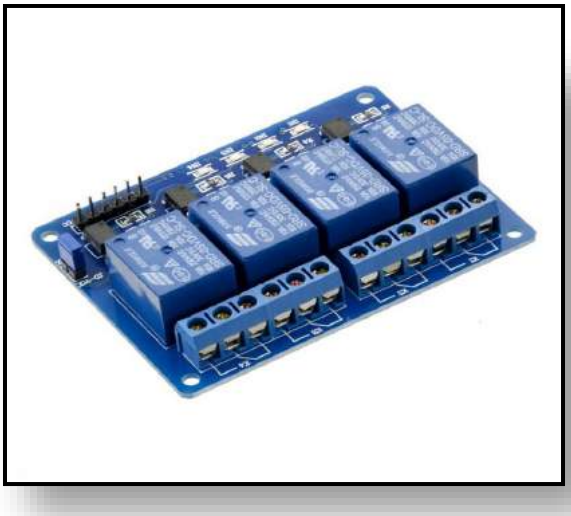

Fig: 4- channel relay module

Power supply

The components connected in this module do not operate on AC voltage and high voltage range hence a voltage regulation should be made available for thesis components and generally five volt supply should be used. The controller boards are provided with inbuilt voltage regulator and the components which do not have this provision will have to be fed through the regulated power supply.

Connections with Switchboard

Fig: module connected with switchboard

The figure shows an implemented module connected with switch board where four switch control mechanism is undertaken as there are four relays used in this module. The app designed shall provide with input signals and the connected four devices shall respond to the switching commands provided to the controller.

Fig: Circuit connections with 4 relays.

Software

Three softwares are used in this project mentioned below

- EasyEDA: For designing of PCB.
- MIT App Inventor: To design app
- Arduino IDE: For programming of controller.

EasyEDA:

PCB designing process is very important as the connection between components must not be loose or else the best designs of module can fail. PCB design is done on EasyEDA tool which will help to select the size of boards and also select the components to be placed on the board.Once the components are placed, connecting lines are chosen to connect the various inputs and outputs. Once the circuit is designed it will be then printed on a copper clad and further processes can be completed. This software also allows for simulation of hardware projects so that it can be tested virtually before working on hardware.

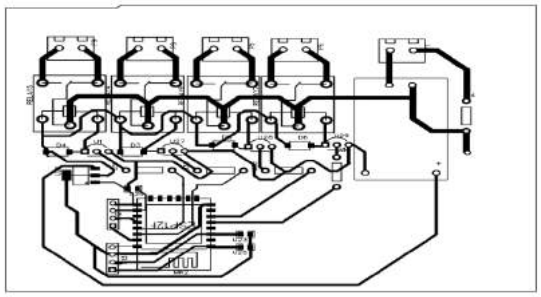

Fig PCB design of hardware module

MIT App Inventor:

Applications are generally designed with professional softwares that make use of Java as a language but there are a variety of softwares and websites which help to design apps through block programming for the ones who are not professional programmers and intend to design an app on their own.

Fig: Backend programming for app

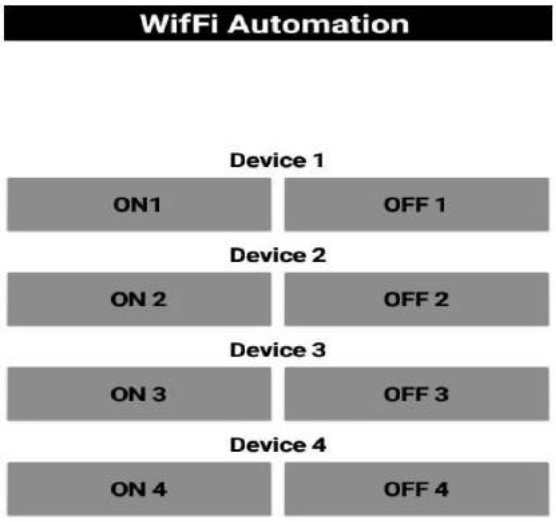

Fig: Mobile screen app GUI

Arduino IDE:

The controller has to be programmed to make it understand its functionality in the project. Arduino has provided an open source platform to program the controller board.

Steps to program Wemos board:

i. Install the arduino IDE.
ii. Select and install the Wemos board.
iii. Write the program
iv. Verify it and after connecting the board to laptop/ PC, select the board from Tools and upload the program to the board.
v. The board can be first tested with LED blinking program
vi. Once the programming is done it will continue in loop every time the system is turned ON.

Fig: Arduino IDE

IV. Results and Conclusion

The hardware designed module with an app is a novel approach for automation at small scale keeping in mind the economic factor as well as behavioral feasibility of users. The system is implemented in our college at departmental level to indicate its feasibility of practical implementation. This system is further tested to take into consideration any critical points that might have been ignored while implementation phase and we thank our Guide Dr, Sayyad Naimuddin Sir for his guidance at all stages of this project. An important point that can be stated is the use of routers at places where internet connection is poor but it does not comes as a restriction in our project as internet is majorly available at all places and routers

are as it is used in schools and colleges already. The design module facilitates the automation of devices without totally replacing the devices and just with an addition of this module to switchboards, switching mechanism can be controlled without changing infrastructure.

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Review on Development of Smart Villages

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ABSTRACT

Over recent decades, rural and urban communities are facing numerous social and economic changes and challenges. Some of those challenges have been increasingly addressed through the lenses of technological developments and digitalization. In this paper, we have made a review of already existing practices while focusing on the existing implementations of the Smart Village concept and the importance of digital transformation for rural areas. We give special attention to EU policies that we are using as an already existing framework for understanding our own forthcoming examples. We have shown the parallels between the findings and insights from different regions and made an evaluation of presented practices. Our main argument stems from our own previous experiences and experiences of other research approaches, and is grounded on the argument that rural areas are not uniform, and that smart rural development has to be applied in combination with place-based approach.

Keywords: Smart Village, Awareness program, Infrastructure Development.

I. INTRODUCTION

In today's world, one of the most concerning issues is protection of human civilization from the threatening effect of manmade wastes .Indeed, wastes are generally unwanted after primary use. Among different waste materials, solid wastes are generated in our society through various humans' activities. In its consequence population and their education level, monthly income is also a contributing factor in waste generation. The waste management is easy for limited population however, in India due to rapid increase in population together with modern urbanization the lifestyle has also been simultaneously changed. Consequently, solid waste management becomes a major concern in the twenty-first century.

In India, there are several Villages out of which many are backward which requires designing and building as Smart Village. Now a days, people migrate from one place to another for different facilities such as education, employments etc. So, modern village should be self-dependent in providing services, employement,education facilities, infrastructure, solid waste management, clean water, should provide accommodation for sustainable family relationship without disturbing the lifestyle. And participatory democracy which helps to support further improvement of the villages.

The review examined the conceptual intersection between the main features of primary health care, and sustainable development goals. Survey respondents mentioned improved health in their populations as one of the key achievements in their implementation of primary health care, for example, progress in maternal health and child care, a decrease in communicable diseases, a high success rate in immunization coverage and control of vaccine-preventable diseases, and improved life expectancy. A smaller number of respondents cited the reduction in non-communicable disease risk factors such as tobacco and alcohol use And the initiatives such as public health insurance schemes and other financing mechanisms addressed socioeconomic disparities and made health care more accessable.

II. LITERATURE REVIEW

1. Kochare Akshay, Kendre Madhav, Anarse Prabhu, Bhosale Ajit, Prof. A.Tripathi (05 May- 2019) this project report deals with study and development of village as a smart village. They said smart village as bundle of services of which are delivered to its residence and businesses in an effective and efficient manner. " Smart Village" is the modern energy access acts as a catalyst for development in education , health, security, productive enterprise, environment that in turns support further improvement in energy access. In this report they focused on improved resource use efficiency, local self-governance, access to assure basic amenities and responsible individual and community behavior to build happy society by making smart village with taking smart decisions using smart technologies and services.

2. Swapnil B. Kale, Kiran R. Varpe, Rohit S. Chothave, Khushal S, Borse, Prof. P.H.Khairnar (3 merch-2017) they had provided E-Learning facilities to village school. The child attracted towards the digital media. Hence the increasing the interest of child by using E-class. To aware the villagers towards consumption of electricity. Use solar energy, wind energy as source of electricity. To aware villagers to use CFL bulbs, LED lights, etc. Smart health services are needed to improve the quality of life in village. The village hospitals needs new devices. Provide X-ray machine and other machines which are very important for complete checkup purposes. To provide well under ground drainage system, Waste water treatment plant, Rain water harvesting to new building, soak pit in groups. Use of water treatment plant for purified water. Agriculture id lifeline of villagers and our nation. To provide the new technology for increase yield of crops by using compost fertilizer, reduce or neglecting chemical fertilizers. To use latest instruments to speedup agricultural work.

3. Bhagya Niranjanbhai Patel1, Prof. Rinni Shah (12 Dec-2017) Smart villages will serve as complementary engines of economic growth to smart cities producing goods and services for local rural markets as well as high value added agricultural and rural industry products for both national and international markets. And they will act as stewards for the environment as well as, in some cases, functioning as ecotourism hubs. This project provide conversion of Normal village to smart village by providing or improving facilities solid waste management, sanitation, Swachta to Development of village and Increase living of standers and employment. Trying to providing or improving this solid waste management, sanitation facilities, cleanness implement facility between Village development & uplipment. Above facilities is to be improved or provided through government scheme and fund and under campaign for smart village.

4.Rutuja Somwanshi, Utkarsh Shindepatil, Deepali Tule, Archana Mankar, Namdev Ingle (6 june-2016) had established a waste collection, transport and treatment within the panchayat. They collected bio-

degradable as well non-biodegradable waste from each house itself by making two dustbin green and red dustbin. They have also uses Reverse Osmosis (RO) instead of spending money on medical facilities use clean drinking water. RO is a water purification technology that uses semipermeable membrane to remove ions, molecules and larger particles from drinking water. They have also installed BIOGAS PLANT which is produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage green waste or food waste. The cow dung is brought from cowsheds from nearby areas, where owners want to dispose it anyway. It is a cheaper technology, helps to reduce the greenhouse gases and also helps to reduce waste generated.

5. Dr. Pritesh Y Shukla (13 feb-2016) he has suggested that smart villages are the foundation for growing India. Smart villages are the need of the hour as development is needed for both rural and urban areas. The technological support already exist for urban areas and there is hard pressure on urban landscape due to migration of rural people for livelihood. Smart villages will not only reduce migration but also irrigate the population flow from urban to rural areas as well. And at most the overall development of the country can be possible with the development of the villages only.

6. Mrs. B. Josephine Sandhya Rani (3 December-2016) the primary aim was to harness the benefits of information technology forth rural folks. The initiative is a community effort to mobilize the collective strengths of people from various streams and integrate it with information technology to provide benefits to the rural community. Gandhian Concept of Ideal Village-SWARAJ. Gandhi Ji said, my idea of Village Swaraj is that it is a complete republic, independent of its neighbor's for its own vital wants, and yet interdependent for many others in which dependence is a necessity. Reconstruction of rural India on the basis of the concept of ideal village was Gandhian dream because it embodies great environmental ambiance needed for healthy human living. Theoretically, Gandhian approach to rural development maybe labelled as 'idealist'. It attaches supreme importance to moral values and gives primacy to moral values over material conditions.

7. Dr. Milind Kulkarni (may-2015) in villages the problem of solid waste is not as acute as in urban areas due to less generation. However it will be a good move to inculcate the habit of segregation of wet and dry waste. Wet waste can be treated in biogas plants where dry waste can be recycled. He has also studied about Indoor air pollution that women and infants in villages suffer from high level of exposure to air pollutants generated due to use of low grade cooking fuels. The exposure results in respiratory diseases and adversely affects the health. Thus, ventilation in houses can play a major role in reduction of concentration of air pollutants indoors. A simple innovation such as provision of vent helps a lot.

8. Agarwal Sunny Kumar P., Upadhyaya Deep S. (11 April- 2014) They did a primary surveys such as household surveys, questionnaire survey, to know the real status of the infrastructure services and quality of life they are living in the particular area and the major problems and issues they are facing, questionnaire survey of the real estate developers to know the scope and trend and scope of the development and status of the market and demand of that place. The study of the existing situation of infrastructure services and other physical feature will be included in it.

Meeting and Interviews of the key persons, expertise and Government regarding the existing situation, limitations and constraints, also possibilities of

different Government approaches, Acts and schemes. From the above study situation analysis, study of the existing institutional framework, primary and secondary data analysis and mapping the best appropriate strategy to be formulated with possible recommendation, implementation strategy and allocating the roles and responsibilities of the different local bodies.

TABLE 1

Sr. No.	Tittle of Paper	Name of Author	Year of Publication	Focused Area
1.	Case study of smart and local village	Kochare Akshay, Kendre Madhav, Anarse Prabhu, Bhoale Ajit, Prof. A.Tripath	2019	Focused on improved resource use efficiency, local self-governance, access to assure basic amenities
2.	The Development of Village	Swapnil B. Kale, Kiran R. Varpe, Rohit S. Chothave, Khushal S. Borse, Prof. P.H.Khairnar	2017	E-Learning facilities to village school
3.	Smart village a case study of kola Vada village	Bhagya Niranjanbhal Patel, Prof. Rinni Shah	2017	Focused on providing or improving facilities solid waste management, sanitation, Swachta to Development of village and Increase living of standers and employment.
4.	Study and development of village as a smart village	Rutuja somwanshi, Utkarsha Shindepatil, Deepali Tule, Archana Mankar, Namdev Ingle	2016	To establish a waste collection, transport and treatment within the panchayat.
5.	The Indian smart village: Foundation for growing India	Dr. Pritesh Y Shukla	2016	Focused on government programs such as Major programs in Agriculture, to improved employment, to improve nutrition security
6.	Smart Village – The Real Future of India	Mrs. B. Josephine Sandhya Rani	2016	The primary aim was to harness the benefits of information technology

				forth rural folks
7.	Clean and Smart Village	Dr. Milind Kulkarni	2015	Sanitation, solid waste management, indoor air pollution
8.	Infrastructure Development of Village	Agarwal Sunny Kumar P. Upadhuaya Deep S.	2014	Situation analysis, study of the existing institutional framework, primary and secondary data analysis and mapping

III. CONCLUSION

- Development of Smart Villages is needed for both rural and urban areas for better livelihood and technology.The technological support already exist at the urban side and there is high pressure on urban side due to migration of rural people for livelihood.
- Smart Village will not only reduce this Migration but also irrigate the population from urban to rural areas as well.
- Education, classes for vocation, awareness programs etc. to villages can well established the thinking of the youth. An Educated rural youth will be a powerful asset to the country and even, if he/she shifts to a urban side can prove to be a well channelize youth rather than any burden
- At most the overall development of the country can be possible with the development of villages as "The future of India lies in its villages" Mahatma Gandhi.

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Mems and IOT Based Automatic Fall Monitoring : A Review

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ABSTRACT

Falls and fall-related injuries are major incidents, especially for elderly people, which often mark the onset of major deterioration of health. More than one-third of home-dwelling people aged 65 or above and two-thirds of those in residential care fall once or more each year. Reliable fall detection, as well as prevention, is an important research topic for monitoring elderly living alone in residential or hospital units. The aim of this study is to review the existing fall detection systems and some of the key research challenges faced by the research community in this field. We categorize the existing platforms into two groups: wearable and ambient devices; the classification methods are divided into rule-based and machine learning techniques. The relative merit and potential drawbacks are discussed, and we also outline some of the outstanding research challenges that emerging new platforms need to address.

Keywords : Short-Time Fall Monitoring, Fall Detection, Fall Prevention, Wireless Sensors, Wearable Sensors

I. INTRODUCTION

Adults 65 years of age or older experience higher rates of falling and are generally at a higher risk for falls. 1–4 One in every 3 persons over the age of 65 years are estimated to fall 1 or more times each year. 5–7 Falls and fall related injuries represent a significant threat to the health and independence of adults 65 years of age and older. Falls can have severe consequences such as injury or death; in 2010 in the United States, 21,649 older adults died from fall related injuries. 8 Even if a fall does not result in a physical injury, it can often produce fear of falling resulting in a decrease in mobility, participation in activities, and independence. 9, 10 Fear of falling can be amplified in the presence of the "long lie", which is identified as involuntarily remaining on the ground for an hour or more following a fall. 1 Such an event can results in substantial damage to the individual's body and morale. Lying on the floor for an extended period of time often results in several medical complications such as dehydration, internal bleeding, pressure sores, rhabdomyolosis or even death. Half of those who experience the "long lie" die within 6 months of the fall. 11 A recent cohort study reported a "long lie" was seen in 30% of fallers; 12 therefore it represents a great threat to the long term health of older adults.

Evidence-based methods to prevent falls include regular exercise, vitamin D supplementation and having regular fall risk assessments. 2, 13–15 However, despite prevention efforts falls are still likely to occur as one ages, and they need to be quickly identified to prevent further injury to the fallen individual. Personal emergency response systems or PERS represent one commercial solution to addressing this issue. These clinical alarm systems provide a way for individuals who fall to contact an emergency center by pressing a button. 16 While appropriate in many situations, the PERS system is rendered useless in the event that the person is unconscious or unable to reach the button. Even

when the system is available, a recent cohort study found that around 80% of older adults wearing a PERS did not use their alarm system to call for help after experiencing a fall.

In this project, a surveillance system based on Arduino, fall detection is proposed. Raw data of three-dimensional accelerometer are provided by Arduino with ADXL345., analyzing, storing and acquiring any time from any place as long as they have access to the Internet. The system architecture is shown is Fig. 1 as follows.

Figure 1. System Architecture

II. LITERATURE REVIEW

Falls represent one of the leading causes of deaths and injuries in the elderly population. According to Lord et al. [1], more than one-third of home-dwelling people aged 65 or above and two-thirds of those in residential care fall one or more times each year. More than two-thirds of people who have experienced a fall are prone to falling again [2]. Vellas et al. [3] reported that 219 out of 487 elderly subjects had experienced a fall during a two-year study period and one-third of which developed a fear of falling after the incident. The psychological consequences often lead to decreased mobility and independence among elderly population [4]. Falls can occur on level surfaces, mostly in living rooms, bedrooms, kitchens, bathrooms, or hallways [5]. The rate of fall-related injuries is generally higher among women [6] and the medical costs increase rapidly with age [7]. Damages caused by falls include tissue injuries, lacerations, joint dislocations, bone fractures and head trauma. Carroll et al. [8] reported that the total direct medical costs of fall injuries among elderly people in the U.S. in 1997 were $6.2 billion. The costs increased to $19 billion in 2000 [7] and $30 billion in 2010 [9]. Fall-related injury is considered one of the 20 most expensive medical conditions among community-dwelling elderly population [7]. Most elderly people are unable to get up by themselves after a fall and it was reported that, even without direct injures, half of those who experienced an extended period of lying on the floor (>1 h) died within six months after the incident [10].

Fall is defined as “an event which results in a person coming to rest inadvertently on the ground or other lower level”. This definition has been used as a baseline in many fall prevention and fall-risk assessment studies [11–14], and covers most types of falls targeted by fall detection research. Variations of fall definitions from different perspectives of seniors, health care providers and research communities can be found in [15]. Thus far, there are several review papers on fall detection and prevention. Noury et al. [16,17] reported a short review on fall detection methods and proposed a set of protocols to evaluate fall detection algorithms. In the study, a fall is divided into four phases, i.e., prefall, critical (impact), postfall and recovery phases, and fall detection algorithms are categorized based on whether they focus on “direct”

detection of the critical phase or postfall phase. The critical phase, which consists of a sudden body movement towards the ground, lasts for approximately 300–500 ms.

III. DESIGN COMPONENTS

Fall detection sensor system uses a sensor device, a hardware that detects the body position and motion, which then communicates with the system (thesoftware part) to send out an emergency to the contact person if falling is detected. The system would only send the signal after the alarm is triggered by the sensor for 15 seconds. The hardware needed is presented in Sections 4.1 and 4.2 while the software languages used in provided in Section 4.3.

3.1 Arduino UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (Figure 3). It has 14 digitalinput/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 AC-to-DC adapter or battery to get started [8, 9, 10, 11, 12].

Figure2: Arduino UNO board

In most fall situations, the body leans to the side and touches the ground with high acceleration. So, an algorithm must detect a fall in these situations when there is a rapid change of position in a very short amount of time.

Commonly, fall detection systems use a gyroscope and an accelerometer. A gyroscope is used to determine an orientation and an accelerometer provides the information about the angular parameter as three-axis data. But we also need to decide a threshold so that the system can differentiate between a fall and normal activity.

The circuit we discuss in this tutorial is built around an Arduino UNO and an MPU6050 accelerometer and gyroscope breakout module. We will also try to send the SOS message via a Wi-Fi module. First of all, we need to decide on an algorithm

3.2 Arduino Programming Language

Arduino programs can be divided in three main parts: structure, values (variables and constants), and functions. The Arduino language is based on C/C++ and supports all standard C constructs and some C++ features. In Arduino, the standard program entry point
(main) is defined in the core and calls into two functions in a sketch. The function setup() is called once, then loop() is called repeatedly until the board is reset. Besides, Arduino development environment, SPI Arduino Library and SoftwareSerial Arduino Library are also needed [13].peaker in a voice signal by analyzing it.
Our long term goal is to implement a gender classifier that can automatically predict the gender of the speaker based on the above investigation.

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Solar PV Array Fed Cuk Converter-VSI Controlled BLDC Motor Drive for Water Pumping

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ABSTRACT

The utilization of solar photovoltaic (PV) energy in water pumping is conservative particularly in isolated regions where the transmission of power is either impractical or exorbitant. In this research work, various topologies for solar PV array fed water pumping are developed using a brushless DC (BLDC) motor drive. A high efficiency BLDC motor substantially reduces the size of PV array and hence its installation cost. Moreover, its high power factor results in a reduced capacity of the used voltage source inverter (VSI). Besides these, unlike an induction motor, the speed of a BLDC motor is not limited by power frequency. This leads to a reduced size of the motor. A reduced sensor based simple, efficient and cost-effective BLDC motor drive is investigated with fast control of its speed. The voltage sensor at the DC bus of VSI and the motor phase current sensors are eliminated in the proposed drive. In addition, the speed control loop is not required, as the speed of BLDC motor-pump is adjusted by the DC bus voltage of VSI. The VSI is switched at fundamental frequency, which offers a high conversion efficiency by reducing the switching losses in VSI. The system possesses a maximum power point tracking (MPPT) of PV array by introducing a DC-DC converter between the PV array and a VSI, feeding the motor. The various DC-DC converters are placed for MPPT, and analyzed based on their performance, simplicity, design, cost and efficiency. The work is extended towards an elimination of DC-DC converter and a single stage PV array fed BLDC motor drive is also investigated for water pumping. This system is capable of operating the solar PV array at its optimum power using the same VSI, which is used for motor control. In order to make a PV water pumping further economical and compact, the position sensor-less BLDC motor drives are also developed for both two stageand single stage PV based water pumping. The sensorless control is the only reliable way to operate the BLDC motor for applications in submersible water pumping. A promising case of interruption in the water pumping due to the intermittency of PV power generation is resolved by using a single phase utility grid as an external power backup.A grid interacted PV array and its control are demonstrated to get a reliable and fully utilized water pumping with BLDC motor such that the pumping is not affected by an intermittency of PV generation. The power is drawn from the grid in case the PV array is unable to meet the required power demand. Both unidirectional and bidirectional power flow control are implemented for a grid interfaced PV fed BLDC motor driven water pump. The bidirectional power flow control based topology offers an additional merit of feeding power to the utility grid by the installed PV array, in case the water pumping is not required. This practice leads to a full utilization of installed resources.

Moreover, it emerges as a source of earning by sale of electricity to the utility. The maximum power point (MPP) operation of PV array, and power quality (PQ) standards such as power factor and total harmonic distortion (THD) of grid current as per IEEE-519 standard, are met by this system. All the proposed configurations are modeled and simulated using MATLAB/Simulink platform in order to demonstrate their performance during starting, dynamic and steady stateconditions. Simulated results are verified through test results obtained from hardwareimplementation using a developed prototype in the laboratory. The applicability andcommercial potential of proposed systems are justified by their in depth analysis based on efficiency, cost, simplicity and performance.

Keywords: BLDC motor, SPV, Cuk converter, INC-MPPT, soft starting.

I. INTRODUCTION

Renewable energy generations such as solar photovoltaic (SPV) array and wind energies are receiving wide attention now a days due to the global energy crisis in near future. Despite of low efficiency of SPV generating system and its dependence on variable atmospheric conditions, its several advantages such as everlasting energy source, pollution free generation and no running cost are attracting the researchers towards SPV array installations. Worldwide annual and cumulative SPV array productions have reached 36,241 MW and 128,550 MW respectively in 2012 [1]. Likewise, worldwide cumulative SPV installation has reached 102,156 MW in 2012 [2]. Application of SPV generation in water pumping is appreciable and economical especially in remote areas where the transmission of conventionally generated electricity is either not possible or very costly.

The DC motor and various AC motors have been used to drive the water pumps for household and irrigation purposes in the agriculture. The DC motor can be directly connected to the SPV generator and one conversion stage (VSI-Voltage Source Inverter) can be avoided. The directly coupled SPV-motor pump system necessitates a complete knowledge of the whole system so that the system parameters can be chosen in such a way that the operating curve of the load should match with the PV array MPP (Maximum Power Point) locus [3-4]. Performance improvement of SPV powered permanent magnet DC motor for water pumping application using various maximum power point tracking (MPPT) techniques [5-12] has been studied in [7-8] using an intermediate DC-DC buck converter, in [9] using buck-boost converter and in [10] using Cuk converter. However, a DC motor is not preferred because of the frequent maintenance requirement caused by the commutators and brushes. The water pumping system based on an induction motor is more reliable and maintenance free as compared to the DC motor driven pumping system. Requirement of complex control is the only limitation of induction motors [13] otherwise it is suitable for use even in hazardous and contaminated areas. Current controlled VSI fed cage induction motor [14] and field oriented controlled 3- phase induction motor [15] have been used for solar powered pumping system with a DC-DC boost converter. A high efficiency of permanent magnet synchronous motor (PMSM) as compared to the induction motor and usefulness in submersible installation has turned the attention towards it for high power SPV based water pumping [16]. A DC motor, PMSM and the induction motor are compared and concluded that the PMSM is better choice for

global efficiency optimization of SPV fed water pumping system [17].

Because of low inertia and friction, permanent magnet brushless DC (BLDC) motor can run at much higher speed.High efficiency, long life, high reliability, low radio frequency interference and noise and no maintenance are the other important features of this motor. These features attract to use this motor in SPV array fed pumping application. Dynamic performance of BLDC motor for this application has been analyzed in [18] without introducing the MPPT technique, hence requires the complete knowledge of the PV-motorpump system to match the optimum operating point of the SPV characteristics. Nevertheless the MPP can be changed with the variation of weather condition. Fuzzy logic incremental conductance (FL-IC) MPPT is introduced, utilizing the Z-source inverter (ZSI) fed BLDC motor driven SPV based pumping system in [19]. Implementation of FL is difficult and a skilled user is an essential requirement. A boost converter for the same application is used in [20] which cannot ensure the soft starting of the motor. Other DC-DC converters e.g. buck-boost, Cuk, zeta, SEPIC (Single Ended Primary Inductor Converter) converters are also used with BLDC motor but not in SPV array based water pumping applications.

A DC-DC Cuk converter is employed in different SPV array based applications [10-12] for MPPT. Nonetheless, the SPV array based BLDC motor driven water pumping is still unexplored with the use of a Cuk converter. In this paper, a Cuk converter is used as an intermediate DC-DC converter in SPV array based BLDC motor driven water pump. The Cuk converter is operated in both buck and boost modes hence does not have any kind of restrictions on MPPT unlike a simple buck or boost converter where the MPP can be tracked if it lies within a bounded region. This feature is also very important to achieve soft starting of the motor. It has low switching losses and high efficiency. In addition, another important advantage of Cuk converter is a continuous current at its input and output. It is possible to simultaneously eliminate the ripples in input and output currents, hence external filtering is not required. An inductor at the input of the boost converter works as input ripple filter also but using this boost converter cannot provide soft starting of the motor because this always increases the input voltage level at its output. On the other hand, in SPV array based applications, buck and buck-boost converters are always needed a ripple filter to limit the current and voltage ripple at its input. In conclusion, a Cuk type buck-boost converter is a simple DCDC converter which suits for SPV array based applications.

An incremental conductance MPPT algorithm is used to control the SPV array to operate at its optimum operating point. An electronically commutated BLDC motor with inbuilt encoder is used to drive centrifugal pump as a load. Transient, dynamic and steady state performances of the BLDC motor fed by SPV-Cuk converter under varying insolation levels are analyzed based on simulated results using MATLAB/ Simulink.

II. SYSTEM CONFIGURATION

Fig.1 shows the configuration of the proposed SPV-BLDC motor drive based water pumping system. A DC-DC Cuk converter is used between a PV array and a voltage source inverter (VSI). The VSI feeds the BLDC motor which drives a pump load. Switching pulses for VSI are generated through electronic commutation using the Hall Effect position signals. An inbuilt encoder provides the Hall signals according to the rotor position. Switching pulse for the Cuk converter is generated by MPPT algorithm.

The design and working principle of each stage of the configuration are elaborated in the following sections.

III. DESIGN OF PROPOSED SYSTEM

The proposed system consists of a solar PV array, a Cuk converter, a VSI, a BLDC motor and a water pump. These components such as the solar PV array, the Cuk converter and a centrifugal pump are designed as per the requirement of SPV fed pump system. A centrifugal pump of 6 kW and a BLDC motor of 6.14 kW power rating are selected. According to the power rating of the centrifugal pump and a BLDC motor, each stage of the proposed system is designed as follows.

A. Design of Solar PV Array

The maximum power capacity of 6.87 kW of a SPV array is selected and it is designed for a 6 kW pump because SPV generating system should generate somewhat slightly more power than required by motor-pump so that extra generated power can be used to meet converters and motor losses.

First of all, a module consisting of 36 cells connected in series is designed which has an open circuit voltage = 13.32 V and short circuit current = 4.0 A. The maximum power, P_{mpp} generally occurs at 80% of open circuit voltage and short circuit current. Hence, the voltage at MPP is as, V_m =0.8*13.32 = 10.66 V and the current at MPP is as, I_m = 0.8*4 =3.2 A for a module.

The maximum power of the SPV array, P_{mpp} is given

$$P_{mpp} = V_{mpp} * I_{mpp} = 6.87 \text{ kW} \quad (1)$$

As per the requirement of the proposed system, the voltage at MPP is as, V_{mpp} = 286 V which is considered and it gives a current at MPP, $I_{mpp}=P_{mpp}/V_{mpp}$= 6.87*1000/286 = 24.02 A.

Numbers of modules connected in series are as, N_s = 286/10.66 = 26.83 ≈27.

Numbers of modules connected in parallel are as, N_p = 24.02/3.2 = 7.5 ≈ 8.

Based on these selected parameters, the PV array of appropriate size is used in the proposed system.

B. Design of Cuk Converter

An output voltage polarity of the Cuk converter is opposite to that of the input voltage. The rated DC voltage of the BLDC motor is as, V_{dc} = 310 V and the PV voltage at MPP is as, V_{pv} = V_{mpp} = 286 V. The relationship between the duty ratio, D of the insulated gate bipolar transistor (IGBT) switch, output voltage, V_{dc} and input voltage, V_{pv} of the Cuk converter is given as [21],

$$\frac{V_{dc}}{V_{pv}} = -\frac{D}{1-D} \Rightarrow D = \frac{V_{dc}}{V_{dc}+V_{pv}} = \frac{310}{310+286} = 0.52 \quad (2)$$

A high value of switching frequency, fsw = 20 kHz is selected to keep ripples in the current flowing through the inductors as low as possible even with the lower values of inductors. The current flowing through L_1, equal to the SPV current at MPP is as, I_{pv} = I_{L1} = 24.02 A. Allowing 6% current ripples, an input inductor, L_1 is estimated as [21],

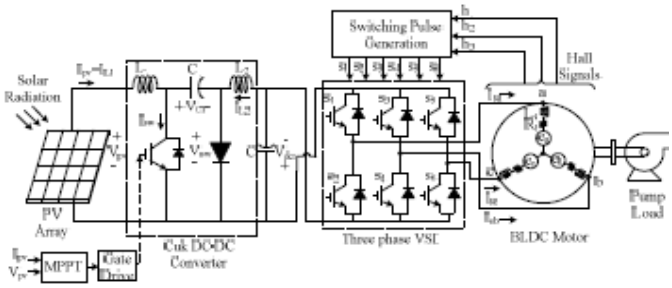

Fig.1 Configuration of the SPV-Cuk converter fed BLDC motor driven water pumping system.

$$L_1 = \frac{V_{pv} D}{f_{sw} \Delta I_{L1}} = \frac{286 \times 0.52}{20000 \times 24.02 \times 0.06} = 5.1 \text{ mH} \quad (3)$$

C. Design of DC Link Capacitor of VSI

A new approach to design a low valued DC link capacitor is used. To design a DC link capacitor, C, the lowest and highest frequencies of the VSI output voltage to the motor are taken into account. The highest value of VSI output voltage frequency, ω_h (in rad/sec.) is calculated corresponding to the rated speed of the BLDC motor as,

$$\omega_h = 2\pi f = 2\pi \times \frac{N_{rated} \times P}{120} = 2\pi \times \frac{2300 \times 6}{120} = 722.57 \text{ rad/sec.}$$

where f is the frequency of VSI output voltage in Hz; N_{rated} is rated speed of the BLDC motor; P is the numbers of poles in the BLDC motor. Since 6th harmonic component of the motor voltage appears on the DC link, allowing 8% voltage ripple across C, it is estimated corresponding to ω_h as

$$C = \frac{I_{dc}}{6 \times \omega_h \times \Delta V_{dc}} = \frac{22.16}{6 \times 722.57 \times 310 \times 0.08} = 206.1 \ \mu F$$

where I_{dc} is current flowing through the DC link = P_{pv}/V_{dc} = 6870/310 = 22.16 A; ΔV_{dc} is an amount of ripple voltage allowed across C.

Similarly, the lowest value of VSI output voltage frequency, ω_l (in rad/sec.) is calculated corresponding to the minimum speed of a motor required to pump the water (N = 1100 rpm)as,

$$\omega_l = 2\pi f = 2\pi \times \frac{N \times P}{120} = 2\pi \times \frac{1100 \times 6}{120} = 345.57 \text{ rad/sec.}$$

Allowing 8% voltage ripple across C, it is calculated corresponding to ω_l as,

$$C = \frac{I_{dc}}{6 \times \omega_l \times \Delta V_{dc}} = \frac{22.16}{6 \times 345.57 \times 310 \times 0.08} = 431 \ \mu F$$

D. Design of Centrifugal Pump

A centrifugal pump of 6 kW power rating is selected forproposed system. An output power, P of a centrifugal water pump is given as [22],

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Face Recognition Based Automated Student Attendance System : A Review

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ABSTRACT

The face is one of the easiest ways to distinguish the individual identity of each other. Face recognition is a personal identification system that uses personal characteristics of a person to identify the person's identity. Human face recognition procedure basically consists of two phases, namely face detection, where this process takes place very rapidly in humans, except under conditions where the object is located at a short distance away, the next is the introduction, which recognize a face as individuals. Stage is then replicated and developed as a model for facial image recognition (face recognition) is one of the much-studied biometrics technology and developed by experts. There are two kinds of methods that are currently popular in developed face recognition pattern namely, Eigenface method and Fisherface method. Facial image recognition Eigenface method is based on the reduction of face-dimensional space using Principal Component Analysis (PCA) for facial features. The main purpose of the use of PCA on face recognition using Eigen faces was formed (face space) by finding the eigenvector corresponding to the largest eigenvalue of the face image. The area of this project face detection system with face recognition is Image processing. The software requirements for this project is matlab software.

Keywords: face detection, Eigen face, PCA, matlab, short-time fall monitoring, fall detection, fall prevention, wireless sensors, wearable sensors

Extension: There are vast number of applications from this face detection project, this project can be extended that the various parts in the face can be detect which are in various directions and shapes.

I. INTRODUCTION

Face recognition is an important application of Image processing owing to its use in many fields. Identification of individuals in an organization for the purpose of attendance is one such application of face recognition. Maintenance and monitoring of attendance records plays a vital role in the analysis of performance of any organization. The purpose of developing attendance management system is to computerize the traditional way of taking attendance. Automated Attendance Management System performs the daily activities of attendance marking and analysis with reduced human intervention. The prevalent techniques and methodologies for detecting and recognizing face fail to overcome issues such as scaling, pose, illumination, variations, rotation, and occlusions. The proposed system aims to overcome the pitfalls of the existing systems and provides features such as detection of faces, extraction of the

features, detection of extracted features, and analysis of students' attendance. The system integrates techniques such as image contrasts, integral images, color features and cascading classifier for feature detection. The system provides an increased accuracy due to use of a large number of features (Shape, Colour, LBP, wavelet, Auto-Correlation) of the face. Faces are recognized using Euclidean distance and k-nearest neighbor algorithms. Better accuracy is attained in results as the system takes into account the changes that occur in the face over the period of time and employs suitable learning algorithms. The system is tested for various use cases. We consider a specific area such as classroom attendance for the purpose of testing the accuracy of the system. The metric considered is the percentage of the recognized faces per total number of tested faces of the same person. The system is tested under varying lighting conditions, various facial expressions, presence of partial faces (in densely populated classrooms) and presence or absence of beard and spectacles. An increased accuracy (nearly 100%) is obtained in most of the cases considered.

II. OBJECTIVES

The objectives of the project are given below:

1. Detection of unique face image amidst the other natural components such as walls, backgrounds etc.
2. Extraction of unique characteristic features of a face useful for face recognition.
3. Detection of faces amongst other face characters such as beard, spectacles etc.
4. Effective recognition of unique faces in a crowd(individual recognition in crowd).
5. Automated update in the database without human intervention

III. METHODOLOGY

In this proposed system, the system is instantiated by the mobile .After it triggers then the system starts processing the image for which we want to mark the attendance. Image Capturing phase is one in which we capture the image. This is basic phase from which we start initializing our system. We capture an image from a camera which is predominantly checked for certain constraints like lightning, spacing, density, facial expressions. The captured image is resolute for our requirements. Once it is resolute we make sure it is either in png or jpeg format else it is converted. We take individuals different frontal postures so that the accuracy can be attained to the maximum extent. This is the training database in which every individual has been classified based on labels. For the captured image, from an every object we detect only frontal faces from viola-jones algorithm which detects only the frontal face posture of an every individual from the captured image. This detects only faces and removes every other parts since we are exploring the features of only faces. These detected faces are stored in the test database for further enquiry. Features are extracted in this extraction phase. The detected bounding boxes are further queried to look for features extraction and the extracted features are stored in matrix. For every detected phase this feature extraction is done. Features we look here are Shape, Edge, Color, Wavelet, Auto-Correlation and LBP. Face is recognized once we completed extracting features. The feature which is already trained with every individual is compared with the detected faces feature and if both features match then it is recognised. Once, it recognizes it is going to update in the student attendance database. Once, the process is completed the testing images gets deleted since, we

are trying to design it for both the accuracy as well as efficiency co-efficient.

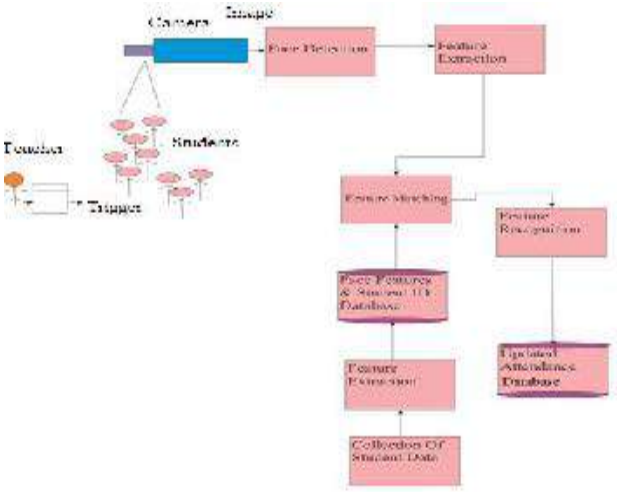

Fig 1 System Model

IV. Experimental Results

Statistics

1. Sensitivity:measures the proportion of actual positives which are correctly identified as such. Here the condition is we have 100 non-defective tomato images and 85 images satisfy this condition. Sensitivity = TP / (TP + FN) = 20/(20+0) = 1
2. Specificity:measures the proportion of negatives which are correctly identified as such. Specificity = TN / (TN + FP)= 20/(20+0) = 1
3. Accuracy: measurement system is the degree of closeness of measurements of a quantity to that quantity's actual (true) value. Accuracy = (sensitivity+specificity)

V. CONCLUSION

There may be various types of lighting conditions, seating arrangements and environments in various classrooms. Most of these conditions have been tested on the system and system has shown 100% accuracy for most of the cases. There may also exist students portraying various facial expressions, varying hair styles, beard, spectacles etc. All of these cases are considered and tested to obtain a high level of accuracy and efficiency. Thus, it can be concluded from the above discussion that a reliable, secure, fast and an efficient system has been developed replacing a manual and unreliable system. This system can be implemented for better results regarding the management of attendance and leaves. The system will save time, reduce the amount of work the administration has to do and will replace the stationery material with electronic apparatus and reduces the amount of human resource required for the purpose. Hence a system with expected results has been developed but there is still some room for improvement

VI. SCOPE FOR FUTURE WORK

1. Currently, the system has reached the accuracy level up to 80% for partial and dense images. It can further be improved to obtain higher accuracy levels.

2. Further, 2 or more IP cameras can be employed and each image can be processed separately. The results of these can be merged to obtain better results and accuracy in denser classrooms.

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Energy Saving of Cooling Tower by Using PLC Automation

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ABSTRACT

A cooling tower is a heat rejection device that rejects waste heat to the atmosphere through the cooling of a water stream to a lower temperature. Cooling towers may either use the evaporation of water to remove process heat and cool the working fluid to near the wet-bulb air temperature or, in the case of closed circuit dry cooling towers, rely solely on air to cool the working fluid to near the dry-bulb air temperature. Common applications include cooling the circulating water used in oil refineries, petrochemical and other chemical plants, thermal power stations and HVAC systems for cooling buildings. The classification is based on the type of air induction into the tower: the main types of cooling towers are natural draft and induced draft cooling towers

Keywords: PLC, Energy Saving , Cooling Tower, Thermal power station

I. INTRODUCTION

Cooling towers are a very important part of many plants. The primary task of a cooling tower is to reject heat into the atmosphere. They represent a relatively inexpensive anddependable means of removing low-grade heat from cooling water. The make-up water sourceis used to replenish water lost to evaporation. Hot water from heat exchangers is sent to thecooling tower. The water exits the cooling tower and is sent back to the exchangers or to otherunits for further cooling.

The Cooling water facility in a Process industry offers great scope for energy efficient operation by way of selective switching and speed control of various equipments. As the power consumption of pumps and fans is directly proportional to cube of speed, a reduction in speed, based on quality and quantity of cooling water required, results in saving of huge quantum of energy.

Incorporation of a Programmable Logic Controller (PLC) for automation of operation of plant is also aimed in this project. Switching of Cooling water pumps and fans, based on requirement can also be achieved by incorporation of PLC. Another attempt is also made to save the energy by connecting power factor improving capacitor as using this the customer can get power with good voltage regulation and can also reduce the electricity bill. Here PLC is used as maintenance is and operator canchange the program as per his requirement. The analysis has been done as per the data in FACT in Udyogamandal, where the cooling water facility is examined from the energy conservation angle. Cooling towers vary in size from small roof-top units to very large hyperboloid structures (as in the adjacent image) that can be up to 200 metres (660 ft)

tall and 100 metres (330 ft) in diameter, or rectangular structures that can be over 40 metres (130 ft) tall and 80 metres (260 ft) long. The hyperboloid cooling towers are often associated with nuclear power plants although they are also used in some coal-fired plants and to some extent in some large chemical and other industrial plants. Although these large towers are very prominent, the vast majority of cooling towers are much smaller, including many units installed on or near buildings to discharge heat from air conditioning.

II. LITERATURE SURVEY

Natural draft cooling tower neeteshsingh raghuvanshi, dr. aloksingh[1] (2014) Cooling tower closing maintenance is extremely complicated and time intense. This drawback is happens once correct sequencing procedure isn't employed in closing maintenance. Closing maintenance of cooling system is happens once the part of cooling system aren't activity their functions properly causes the performance of cooling system reduces. Once we use the correct sequence of closing maintenance activity then we are able to cut back the quality in maintenance activity and reach the less time with minimum labor. Once these maintenance activities square measure unplanned then it will increase the overhauling value of a cooling system in terms of labor value and time consumption.

Xiaoxiao Li, Hal Gurgenci, Zhiqiang Guan, Yubiao Sun[2] The heat rejection rate of natural draft dry cooling system, furthermore because the in operation performance of an influence plant, will be full of varied close factors. The cold flow is unfavorable air turbulence at the highest of the cooling system and includes an important negative impact on the performance of natural draft cooling towers. Within the gift analysis, results square measure given for a 20m high natural draft dry cooling system experimental system tested at totally different close conditions. Measurements of crosswind influence on a natural draft dry cooling tower for a solar thermal power plant by

Xiaoxiao Li, Hal Gurgenci, Zhiqiang Guan, Yubiao Sun[3] International Journal of Pure and Applied Mathematics Special Issue 2747 Crosswind could be an important concern for natural draft dry cooling towers. The priority is a lot of serious for shorter towers. Therefore, the current of air influence could be an important threat to the utilization of natural draft dry cooling towers in concentrating star thermal power plants, that square measure typically engineered at sizes smaller than typical fossil-fired plants and use comparatively shorter towers.

ZhengZou, Hengxiang Gong[4] Solar increased natural draft dry cooling system (SENDDCT) could be a new heat rejection device victimization alternative energy to reinforce its cooling performance. In a trial to seek out the best structural arrangement of SENDDCT, this paper conducts threedimensional CFD simulations to match cooling performances of varied style choices. The simulations start by investigation whether or not the look possibility with lower-height heat exchangers at collector entrance has higher cooling performance than that with partial blockage at an equivalent location.

Guanhong Zhang, Suoying He, Zhiyu Zhang[5] Evaporative pre-cooling with wetted-medium can improve heat exchange of natural draft dry cooling towers (NDDCTs) in hot days (usually in summer). However, the media introduce further pressure drop that reduces the air flow of a NDDCT, and as a result, impairs the tower performance. Students studied the impact of state change pre-cooling on performance of cooling system through experiments or simulations

by taking into thought every the advantage of state change pre-cooling and additionally the disadvantage of further pressure loss. Performance analysis of a low approach low temperature direct cooling tower for high temperature building cooling systems by Mehdi Nasrabadi, DonalP.Finn[6] . For certain temperate climate varieties, cooling towers have the potential to provide hot temperature chilled water, that when used in conjunction with bright and displacement cooling technologies, have prompted interest throughout this idea as a potential approach for the acquisition of buildings. The feasibleness of the projected system depends principally, on achieving low approach water temperatures at intervals Associate in nursing fittingly designed cooling system, at acceptable levels of energy performance. Design of cooling tower. by b bhavanisai, i swathi, k s l prasanna[7] (2016) Has delineate an in depth methodology of a evoked draft cooling system of counter flow kind throughout that its efficiency, effectiveness, characteristics area unit calculated. The technical info has been taken from a mechanical draft cooling system. Cooling towers area unit heat removal devices accustomed transfer methodology waste heat to the atmosphere. Cooling towers produce use of evaporation whereby variety of the water is vaporized into a moving air stream and later discharged into the atmosphere. Prediction of blade resonance of cooling tower fans using vibration analysis By boxes, shafts, and engines offers early warning of machine failures. Performance analysis of Natural draft wet cooling tower at optimized injection height Lalok Singh, Sanjay Soni, R. S. Rana[9] Cooling tower is associate integral a part of thermal power generation plant. Essentially cooling square measure heat rejection devices accustomed transfer waste heat to the atmosphere. Investigation involves the two-dimensional process fluid dynamics model supported actual reference conditions. Temperature and humidness within the tower square measure having main influence on the performance of natural draft cooling.

III. METHODOLOGY

Open evaporative recirculating cooling water systems share a common set of operating objectives. At the most basic level, the prevention of any unplanned loss in production, whether due to inadequate heat exchange or capital equipment failure is of paramount importance. Total production loss aside, the impairment of production operations must be avoided as well. While production may continue, throughput or yield can be constrained, and/or extremely highdemand for energy, resulting in unfavorable production economics. With the basic requirements satisfied, the focus turns to optimizing the total cost of cooling operations over time without disrupting production, experiencing catastrophic loss, or compromising safety, and with the greenest footprint possible.

While the basic goals haven't changed much, the challenges to achieve them have. The primary levers of optimization are threefold. The first is the optimization of chemical application: applying the right amount of chemicals at the right time with minimal variation to ensure system performance. Continuously applying chemicals to protect against an episodic "worst case" scenario is simply no longer economically acceptable or warranted. The secondlever is the minimization of fresh water consumption. As freshwater becomes increasingly scarce and expensive, higher cycles of concentration and/or confident use of alternative, lower quality source waters, can provide the solution to fresh water availability constraints. Finally, there is human productivity. Since most businesses are engaged in their own increasingly competitive markets, the reality is they are often stretched for humanresources.

Through automation or other means that simplify and shorten the effort required to achieve favorable results, human resources can be "created." Incremental resources can either be used to perform more desperately needed water management activities that are desperately needed or other important tasks in the plant environment.

Obtaining optimal results from open, evaporative cooling systems requires careful management of the three inter-related dimensions of corrosion, deposition, and microbiological activity (Figure 1). For several decades, this concept has been widely understood and practiced by knowledgeable providers of water management services and operators of cooling systems themselves.

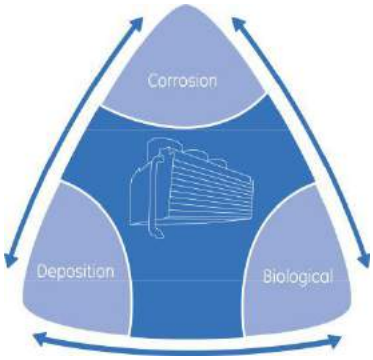

Figure 1. Dimensions of effective cooling water management.

LADDER DIAGRAM:

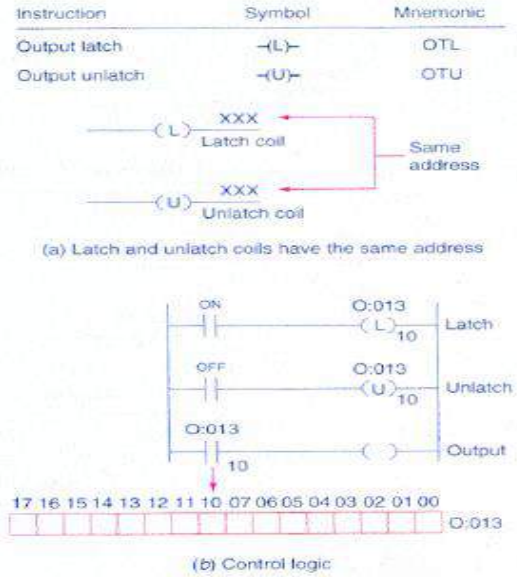

Figure The outputs that have a TRUE logical function, evaluatedfrom the left to right and from the top to the bottom, are energized

RS LOGIX 500:

The RSLogix family of IEC-1131-compliant ladder logic programming packages helps you maximize performance, save project development time, and improve productivity. This family of products has been developed to operate on Microsoft Windows operating systems. Supporting the Allen-Bradley SLC 500 and MicroLogix families of processors, RSLogix 500 was the first PLC programming software to offer unbeatable productivity with an industry-leading user interface.

RSLogix 500 programming package is compatible with programs created with Rockwell Software DOS-based programming packages for the SLC 500 and MicroLogix families of processors, making program maintenance across hardware platforms convenient and easy.

IV. CONCLUSION

This project titled ' ENERGY SAVING OF COOLING TOWER BY USING PLC' is a combination of software programming and hardware interfacing circuit designed for the automatic control and power saving of the cooling water. Our proposed system uses programmable logic controllers and variable frequency drives.

Techno economic analysis shows that there could be a greater improvement in the power consumption and also in expenditure.

"Thus precise and economic utility of resources such as fuel, water and energy can be achieved by implementing PLC automation in Industrial as well as private scale sectors".

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Heart Disease Prediction using Machine Learning Algorithms

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ABSTRACT

Data Mining is a technique to recognize proposals of information or choice making awareness in the database and extracting these to be used in different areas such as decision support systems, predictions, and forecasting and estimation. The medical field collects huge amounts of Medical data which regrettably, are not "mined" to find out concealed information for successful decision making. This study has urbanized a verdict Support in Heart Disease Prediction System (DSHDPS) by means of data mining and modeling method, namely, Naïve Bayes. By considering 15 special medical profiles of 303 patients and achieved accuracy of 82.5 % which is better than some other classifiers. Naive Bayes can envisage the likelihood of patients getting a heart disease.

Keywords: Data Mining, Decision Support, Heart Disease, Naïve Bayes.

I. INTRODUCTION

Data Mining technique used in finding valid, novel, and potentially useful Technique and finally easily known pattern in data with the more use of databases and the Data mining is the search for the links and global patterns that remain in huge databases but are masked among bigger amounts of data. The important process of wisdom Discovery is the alteration of data into wisdom in order to aid in conclusion, referred to as data mining.

In Many hospitals information systems are designed in keeping view of patient billing, management, generation of simple statistics things. "When a patient data is given, predict the chances of patients obtaining a heart disease." Clinical related decisions are made based on doctors' incitation and experience moderately than on the ability rich data masked in the database. This method bulge to unnecessary biases, faults and more medical costs which involve the aspects of service given to patients. The designed system that incorporate of medical decision which is supported by means of computer-based patient records may break medical faults, improve patient safety, reduce unnecessary practice variation, and enhance patient outcome. This approach is assuring as data designing and testing tools, e.g., ML , have the ability to produce a knowledge rich medium which can help to consequently enhance the quality of Medical decisions.

Now-a –days it is a must for all the hospitals with more flow of patients to keep track of patient data there is a wealth of concealed information in these data which is largely unused. Data is curved into practical information that is useful for doctors and healthcare practitioners to formulate intelligent medical decisions. The main purpose of this intended study is to enlarge a Decision Support in Heart Disease Prediction System (DSHDPS) using data mining technique, called as Naïve Bayes We are able to give the report of the patient in 2 ways by using1) chart and the second one as 2) pdf which will tell u whether the intended person has the heart disease or not. Data mining, have the prospective to make a information rice environment which is used

to considerably get better excellence of clinical decisions.

II. METHODS AND MATERIAL

Clinical databases have collected large amount of information about patients and their medical situation. The term Heart disease encompasses the various diseases that influence the heart. Heart disease is the major reason of sufferers in the world. Due to Heart disease one person expires for every 34 seconds in U S. The three different forms of heart disease are 1) Coronary heart disease,2) Cardiomyopathy and 3) Cardiovascular disease. The term "cardiovascular disease" include a extensive range of circumstances that concern the heart and the blood vessels and the way in which blood is pumped and circulated through the body. Cardiovascular disease (CVD) results in cruel illness, disability, and leads to death. The data for our research is obtained from the Cleveland Heart Disease database which has 15 attributes and with 303 patients . The records were split into two datasets: 70 percent as training dataset and 30 percent as testing dataset. The attribute "Diagnosis" is recognized as the expected attribute with value "1" for patients with heart disease and value "0" for patients with no heart disease.

Key attribute

Input attributes

1. Age in Year
2. Sex (value 1: Male; value 0: Female)
3. Chest Pain Type (value 1:typical type 1 angina, value 2: typical type angina, value 3:non-angina pain; value 4: asymptomatic)
4. Fasting Blood Sugar (value 1: >120 mg/dl; value 0: <120 mg/dl)
5. Restecg – resting electrographic results (value 0:normal; value 1: having ST-T wave abnormality; value 2: showing probable or definite left ventricular hypertrophy)
6. Exang - exercise induced angina (value 1: yes; value 0: no)
7. Slope – the slope of the peak exercise ST segment (value 1:unsloping; value 2: flat; value 3: downsloping)
8. CA – number of major vessels colored by floursopy (value 0-3)
9. Thal (value 3: normal; value 6: fixed defect; value 7: reversible defect)
10. Trest Blood Pressure (mm Hg on admission to the hospital)
11. Serum Cholestrol (mg/dl)
12. Thalach – maximum heart rate achieved
13. Oldpeak – ST depression induced by exercise
14. Smoking – (value 1: past; value 2: current; value 3: never)
15. Obesity – (value 1: yes; value 0: no)

III. RESULTS AND DISCUSSION

Confusion Matrix:

A. A confusion matrix is used to indicate the performance of a ML classifier on a set of given test data . It tells about the performance of an algorithm.

TABLE 1. Confusion Matrix

TP	FN
FP	TN

1) True Positive (TP) : Observation is positive, and is predicted to be positive.
2) False Negative (FN) : Observation is positive, but is predicted negative.
3) True Negative (TN) : Observation is negative, and is predicted to be negative.
4) False Positive (FP) : Observation is negative, but is predicted positive.

Classification Rate/Accuracy:

Classification Rate or Accuracy is given by the relation:

Predicative Accuracy : TP+TN / (TP+FN+FP+TN)

Sensitivity = Number of true positives
Total number of individuals with the illness

The specificity of a test is the probability that a test gives a negative result given that the patient will not have the disease.

Specificity = Number of true negatives/Total number of individuals without the illness

TABLE 2. Comparative Analysis

Algorithm	**Predicative Accuracy**	**Correctly Classified Instances**	**Sensitvity**	**Specificity**
Naïve Bayes	**82.5**	**250**	**0.85**	**0.79**
Tree	72.6	220	0.72	0.73
SVM	82.5	250	0.89	0.73
Logistic Regression	81.5	247	0.85	0.76

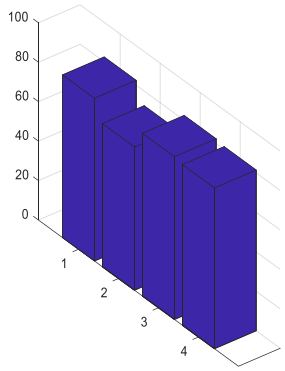

Figure 1 : Predicative Accuracy Vs Algorithms (Naivye Bayes, Desicion Tree, SVM, Logistic Regression)

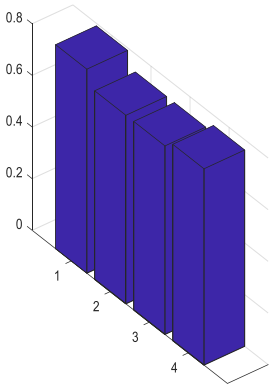

Figure 2 : Sensitivity Vs Algorithms (Naivye Bayes, Desicion Tree, SVM, Logistic Regression)

CONCLUSION

DSHDPS is elaborated by using Naive Bayesian ML technique. The system extracts knowledge from heart disease database. This is the most successful model to estimate patients with heart disease. This model could give solution to difficult queries, refere to every one wwith its own quality w.r.t to model explanation, access to complete data and accuracy. It can be further intensify and elaborated. It can take in to consideration other medical attributes also. It can also use other ML techniques. We can use all forms of Data like1) numeric 2)categorical and 3)both.

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IoT Based Secure Medical Data Transmission Model

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ABSTRACT

The transmission of data through any channel of communication needs strong encryption techniques for the purpose of data security. Internet of things (IoT) creates an integrated communication environment of interconnected devices and platforms by engaging both virtual and physical world together. Due to the major advancement of the IoT in the healthcare sector, the security and the integrity of the medical data became big challenges for healthcare services applications. In this paper proposes a hybrid security model for securing the diagnostic text data in medical images. The propose model is develop through integrating 2D Discrete Wavelet Transform 2 Level (2D-DWT-2L) steganography technique with a proposed hybrid encryption scheme. The proposed hybrid encryption representation is built using a combination of Advanced Encryption Standard (AES), and Rivest, Shamir, and Adleman (RSA) algorithms. The recommend model starts by encrypting the secret data; then it hides the result in a cover image using 2D-DWT-2L. Both colour and gray-scale images are used as cover images to conceal different text sizes. The performance of the propose method was evaluated based on four statistical parameters; the Peak Signal to Noise Ratio (PSNR), Mean Square Error (MSE), Structural Similarity (SSIM) and Correlation. Compared to the state-of-the-art methods, the recommend model establish its ability to hide the confidential patient's data into a transmitted cover image with high imperceptibility, capacity, and minimal deterioration in the received stego-image.

Keywords : IoT, security, privacy, DWT-2 level, AES, RSA, steganography, medical image.

I. INTRODUCTION

The rapid and constant development in information technology has forced computer networks to grow extremely in a very short time. This results in facilitating electronic data transfer and in large amounts. The awe-inspiring advancement in the electronic ways of data exchange and the widespread of image use have put a huge potential on both security and protection of top secret data from unauthorized permission. Accordingly, development of security systems is very dangerous to guarantee the security of data during transition through the internet.

Cryptography is considered as one of the largest part commonly utilized techniques to guarantee data security. In recent years, great development has been achieved in data encryption technology. several data encryption approaches are currently used especially for digital image security. Random encryption keys are formed in these techniques, whereas the genuine content becomes imperceptible.

Steganography is the science and art of hiding information within a carrier, where no one excluding the intended recipient, has the knowledge of the

existence of hidden information. Steganography as a term is derived from the antique Greek words “steganos”, which means covered and “graphic” which means writing. In this operation, a secret message is hidden in another piece of normally looking information, which is known as the cover. This process aims to keep the secret information hidden without informative any kind of distrust to the viewer's.

Currently, there are lots of algorithms used to encrypt data in ways and styles. A hybrid encryption is a protocol using multiple codes of different types together. One of the common approaches is to generate a secret message to encrypt a random symmetric, and then encrypt this message into cipher message by using Hybrid Encryption (AES & RSA) Algorithm.

In this work, an integration of encryption algorithms on the basis of (AES and RSA) was used to develop the security of data transfer. It uses the AES algorithm for data transmission due to its high competence in the encryption block.

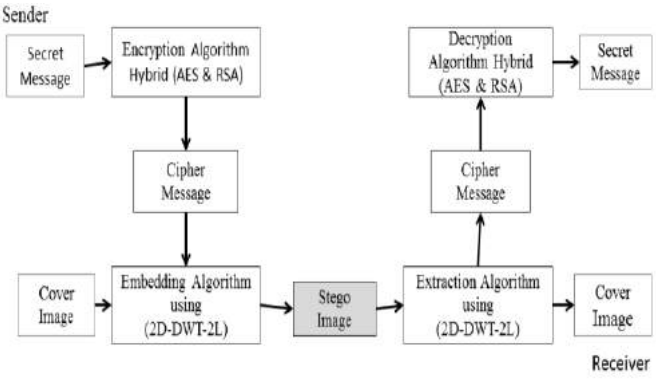

Figure .1 Proposed Framework for hid information

II. LITERATURE SURVEY

A Survey on Internet of Things and Cloud Computing for Healthcare.L. M. Dang, Md. Jalil Piran, Dongil Han, Kyungbok Min and Hyeonjoon Moon.

The rapid development of the Internet of Things (IoT) technology in current years has supported connections of several smart things along with sensors and established faultless data exchange between them, so it leads to a stringy requirement for data analysis and data storage platform such as cloud computing and fog computing. Healthcare is one of the application domains in IoT that draws big interest from industry, the research association, and the public sector. The improvement of IoT and cloud computing is improving patient safety, staff satisfaction, and operational efficiency in the medical industry. This review is conducted to analyze the latest IoT components, applications, and market trends of IoT in healthcare, as well as study current development in IoT and cloud computing-based healthcare applications since 2015. We also consider how capable technologies such as cloud computing, ambient supported living, big data, and wearables are mortal applied in the healthcare industry and establish various IoT, e-health regulations and policies worldwide to determine how they support the sustainable development of IoT and cloud computing in the healthcare industry. Furthermore, an in-depth review of IoT privacy and security issues, including potential intimidation, attack types, and security setups from a healthcare viewpoint is conducted. Ultimately, this paper analyzes previous well-known security models to deal with security risks and provides trends, highlighted opportunities, and challenges for the IoT-based healthcare future development.

The impact of the hybrid platform of internet of things and cloud computing on healthcare systems: opportunities, challenges, and open problems.Ashraf

Darwish, Mohamed Elhoseny, Arun Kumar Sangaiah, Khan Muhammad, Aboul Ella Hassanien

The Cloud Computing (CC) and the Internet of Things (IoT) have emerged as new platform in the ICT revolution of the twenty first century. The adoption of the Cloud IoT concept in the healthcare field can bring several opportunities to medical IT, and experts believe that it can significantly improve healthcare services and contribute to its continuous and systematic improvement. This paper present a complete review of the current literature on integration of CC and IoT to solving various problems in healthcare applications such as smart hospitals, remote medical services and medicine control. Moreover, a brief introduction to cloud computing and internet of things with an application to health care is given. This paper presents a new concept of the integration of CC and IoT for healthcare applications, which is what we; call the Cloud IoT-Health concept. The term Cloud IoT-Health and some key mixing issues are presented in this paper to propose a practical vision to integrate current components of CC and the IoT in healthcare applications. Also, this paper aims to present the state of the art and gap analysis of different levels of integration mechanism, analyzing different existing proposals in Cloud IoT-Health systems. Ultimately, related researches of CC and IoT integration for healthcare systems have been reviewed. Challenges to be addressed and future directions of research are acknowledged, and an extensive bibliography is presented.

An efficient steganographic approach for protecting communication in the Internet of Things (IoT) critical infrastructures. Bairagi, A. K., Khondoker, R., & Islam, R.With the expression of the Internet of Things (IoT) and fog computing, the quantity of edge devices is increasing exponentially all over the world, providing better services to the end user with the help of existing and upcoming communication infrastructures. All of these devices are producing and communicating a huge amount of data and control information approximately this open IoT environment. A huge amount of this information contains private and important information for the user as well as for the organization. The number of attack vectors for malicious users is high due to the sincerity, circulated nature, and lack of control over the whole IoT environment. For building the IoT as an effective service platform, end users need to confidence the system. For this reason, security and privacy of information in the IoT is a great concern in critical infrastructures such as the smart home, smart city, smart healthcare, smart industry, etc. In this paper, we propose three information hiding techniques for protecting communication in significant IoT infrastructure with the help of steganography, where RGB images are used as carriers for the information. We hide the information in the deeper layer of the image channels with minimum distortion in the least amount significant bit (lsb) to be used as sign of data. We analyze our technique both mathematically and experimentally. Mathematically, we show that the challenger cannot predict the actual information by analysis. The proposed approach achieved better imperceptibility and capacity than the various existing techniques along with better conflict to steganalysis attacks such as histogram analysis and RS analysis, as proven experimentally.

“secure medical image steganography with RSA cryptography using decision tree.” Jain, M., Choudhary, R. C., & Kumar, A.
In this paper, a new technique about secure medical information transmission of patient inside medical cover image is presented by concealing data using decision tree concept. Decision tree shows a robust

mechanism by providing decisions for secret information concealing location in medical carrier image using secret information mapping concept. RSA encryption algorithm is mortal used for patient's unique information enciphering. The outcome of the RSA is structured into various similarly distributed blocks. In steganography, secret cipher blocks are assigned to carrier image for data inserting by mapping method using breadth first search. Receiver gets hidden secret medical information of patient using RSA decryption, so only authorized beneficiary can recognize the plain text. Performance is analyzed and measured using various parameters between medical stego and carrier images. Results are analyzed and compared with many of existing algorithms.

Hybrid security techniques for Internet of Things healthcare applications. Yehia, L., Khedr, A., &Darwish, A.The Internet of Things (IoT) describes the future where every day physical objects will be connected to the internet and be able to identify themselves to other devices. IoT is a new revolution of the Internet and it will effect in a huge number of applications such as smart living, smart home, healthcare systems, smart manufacturing, environment monitoring, and smart logistics. This paper provides integration, summarizes and surveys some of the security techniques specially hybrid techniques that can be applied with healthcare applications in IoT environment.

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Hybrid security techniques for Internet of Things healthcare applications."Yehia, L., Khedr, A., &Darwish, A

The Internet of Things (IoT) describes the future where every day physical objects will be connected to the internet and be able to identify themselves to other devices. IoT is a new revolution of the Internet and It will effect in a large number of applications such as smart living, smart home, healthcare systems, smart manufacturing, environment monitoring, and smart logistics. This paper provides integration, summarizes and surveys some of the security techniques especially hybrid techniques that can be applied with healthcare applications in IoT environment.

III. OBJECTIVE

The aim of this Project is to improve and recommend a new hybrid technique for data security through combination between cryptography and steganography algorithms. This system is used to embed an encrypted secret message into a cover image to get high imperceptibility and robustness

with minimal deterioration in the received stego image. The main objectives of this model is :

- ✓ Develop a security system for hiding text data in an image using hybrid (AES & RSA) and steganography 2D-DWT-2L techniques individually.
- ✓ Develop a hybrid security system which integrates both data encryption (AES and RSA) and steganography techniques 2D-DWT-2L to increase data imperceptibility, robustness and performance of stego image.

The Elements of Steganography:
Two pieces of data are required in steganography, which are the cover and the data to be hidden:

1. The Cover
The cover refers to the medium into which the information we will be embedded. The effectiveness of the steganography technique is dependent up on selecting the most suitable cover. The cover also work as a container for the given message. Steganography is based on hiding the data behind the cover to protect it from being known as secure, dislike encryption.

2. The Data
The data that are required to be hidden should be serilizable in order to be embedded bit by bit in the cover. The size of data shouldn't exceed the cover size in order to contain all the data. In case of images, both the cover and the data may have the same number of pixels; however the cover will have more color information for each pixel than the hidden data.

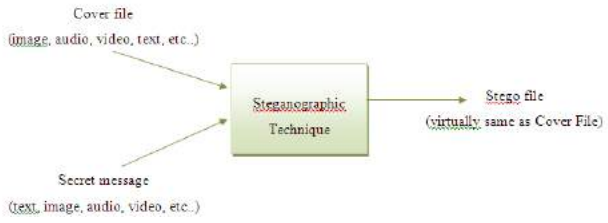

Figure shows the basic approach of steganography process.

IV. CONCLUSION

The main advantages of our system are providing more security, more flexibility, greater embedding capacity and more invisibility. There are two techniques are used in our system which are hybrid algorithm and steganography algorithm. This hybrid system is considered as an combination of AES and RSA algorithms. The hybrid encryption AES and RSA algorithm had higher performance when applied on color and grayscale images with different text sizes. This system is based on the four statistical parameters such as (PSNR, MSE, SSIM, and Correlation). The performance of the four approaches was further evaluate by comparing their results with those obtain from other approach on both color and grayscale images with different text sizes. Our approaches had higher PSNR values and lower MSE values than those obtained by the reference results. . However, the steganography (2D-DWT-2L) with hybrid (AES and RSA), shows the slowest performance when compare with other technique it was noticed that although text encryption increases the text security, it decreases the invisibility of the cover image. In conclusion, our approaches had higher performance in hiding secret data when compare with the reference approaches used in this study.

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A Review on Automatic Voice Recognition (Cry Sound) In Infants

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ABSTRACT

In this presents paper an infant emotion recognition system using cry sound. Different causes of infant crying are characterized by examining changes in the acoustic features that are extracted from acoustic signals in the cry segments.[1]. We analyze the infant's crying sound using the FFT technique and also GUI (graphical user interface) technique is used. Code is made from processed data (crying sound), there is two type of data:- (a) training data (b) testing data. We used a feature extraction technique that includes power spectrum, mean-average values then covert into mel frequency cepstral coefficents (MFCCS). In this research we study four parameter viz happy, emotional need, hungry, sad,etc. furthermore,it is a goodway to improve the quality of medical service in places which lack medical facilities[9].

Keywords: Cry signal, Feature extraction: MFCC, GUI (graphical user interface)

I. INTRODUCTION

This Crying is not just child behavior, but part of a the behavioral system in the human species that provides helpless child survival by causing others to meet basic need. Cry is the only communication link between an infant and his guardian.[4]. Crying is the child's first means of communication. These cries sound the same, but there are many differences between the cries of the two children. A mother can make her child different from others by crying. Infant crying contains a lot of information about the baby, such as hunger, pain, drowsiness or boredom. This includes 30 seconds of crying from one stimulus application. The recorded cry is served to an automated computer analysis system that digitizes scream and either presents a digital spectrogram of the scream[1]. Voice recognition is a popular theme in today's life. Voice recognition's programs are available which make our life far better.[10]. The invention of sound spectrographic techniques in the 1940s has made it possible to objectively analyse infantile vocalizations [9] these methods are graphical record sound at any time. Fast fourier transforms coefficient were determine and analyzedto detect the crying signal.

Cry Causes	Description
Pain	Cry due to pain (caused by vaccination, physical hurt)
Emotional Need	Cry when the baby wants to go back to parents
Environmental factors	change in environmental conditions.
Hunger	Cry when the baby is hungry

II. LITERATURE SURVEY

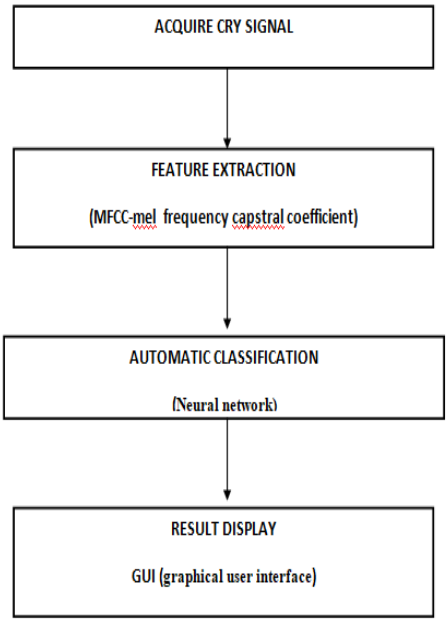
a. **Shivam Sharma and Vinay Kumar Mittal** "*Infant Cry Analysis of Cry Signal Segments Towards Identifying the Cry-Cause Factors*" Proc. of the 2017 IEEE Region 10 Conference (TENCON), Malaysia, November 5-8, 2017

b. **Lichuan Liu, Yang Li, Kevin Kuo "***Infant Cry Signal Detection, Pattern Extraction and Recognition*"978-1-5386-5384 5/18/$31.00©2018 IEEE .this paper suggests a voice recognition technique to recognize a crying baby signals Modern signal processing methods are used. analyze a baby's cry with sound features over time-frequency domains in an attempt to classify each cry into Specific need.

c. **Shreya Narang1, Ms. Divya Gupta "***Speech Feature Extraction Techniques: A Review" International Journal of Computer Science and Mobile Computing, Vol.4 Issue.3, March- 2015, pg. 107-114.* This paper presents the main developments in the field of speech recognition. This document covers voice recognition methods and provides a brief description of the four steps voice recognition methods are classified The purpose of this article is to summarize feature extraction techniques used in speech recognition.

d. **Ghada Zamzmi,Ruicong Zhi ,Rangachar Kasturi,Dmitry Goldgof ,Terri Ashmeade And Yu Sun "***A Review Of Automated Pain Assessment In Infants:Features,Classification Task And Databases* "Ieee .In This Review Paper Study That Assess Infant's Pain At Constant Intervals By Observing Specific Behavioral And Physiological Signs Of Pain.

III. METHODOLOGY AND MATERIAL



Cry signal

Infant crying comprises the rhythmic alteration of cry sounds (statements) and inspirations. Crying is part of the [7] acoustic data can be used to extract useful information about signal sources, the environment and background noise in the same way as any other mode.[10]

Feature extraction

Feature extraction starts from an initial set of measured data and builds derived values (features) intended to be informative and non-redundant, facilitating the subsequent learning and generalization steps, and in some cases leading to better human interpretations

- **Pitch information** :- pitch is a term we use to describe how high or low sound are . the frequency of a pitch is measured with a unit called hertz . pitch is important attribute of voice speech .therefore, estimating the fundamental frequency or the frequency of the tone (pitch information) is an important part of the analysis of crying babies (infants).
- **Mel frequency capstral coefficient :**-in sound processing, the mel-frequency cepstrum (mfc) is a representation of the short-term power spectrum of a sound, based on a linear cosine transform of a log power spectrum on a nonlinear mel scale of frequency.

Automatic classification(neural network):-

A neural network is composed of units (neurons), arranged in layers, that convert an input into an output vector. Each unit accepts an input, applies a function (often nonlinear) and then passes the output to the next level.

GUI (graphical user interface)

A graphical user interface (GUI) is a human-computer interface (i.e., a way for humans to interact with computers). major advantage of GUIs is that they make computer operation more intuitive, and thus easier to learn and use

IV. RESULTS

The perception of pain makes children cry, which can attract parents or guardians who can help reduce pain, several databases and compare the crying signals, which will be tested with the signals and the reason for the crying will be identified.

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Artificial Intelligence Method for Estimation of Air Quality Index

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ABSTRACT

Air Pollution has changed the way the world perceives climate change. The world has been forced to take cognizance of the way the things have changed over the years in reference to the air they are breathing. Number of vehicles, industries, air conditioners, refrigerator and other luxury are piling up every minute and the issue now demands serious introspection and measures to counter this. Prediction has a big role to play in this scenario as it allows to find out the probable quantum of pollution level that may be prevalent over the course of time and thus may help the authorities to initiate suitable measures in advance to counter the ill effects of air pollution. Numerous of techniques have been employed over the years. Artificial intelligence has been extensively used to predict the values of pollution. This paper tries to present the finding and the limitation of the existing prediction method.

Keywords : Artificial Intelligence, pollution prediction, Neural Network, Multilayer Perceptron.

I. INTRODUCTION

Air pollutants and their effects on human, environment and other living organisms are very important. These pollutants are reached to human body by accumulating on the soil and vegetation. They cause severe effects on the human such as respiratory problems, cancer and destruction of immune system. In order to take precautionary actions against harmful air pollutants, their prediction is one of the best options. The release of environmental air quality forecast can provide scientific basis for environmental management and decision-making departments to timely, accurately and comprehensively grasp the future change trend of urban environmental air quality. It can be targeted to increase pollution source control before the arrival of serious pollution day, timely warning and taking restrictive measures to mitigate the health hazards to the public. Therefore, urban environmental air quality forecast, as an important link of air pollution prevention and control, has been highly valued by governments at all levels. Unlike other modeling techniques, artificial neural networks (ANFIS) make no prior assumptions concerning the data distribution. ANFIS is capable of modeling highly non-linear relationships and can be trained to accurately generalize when presented with a new data set, The aim of this paper is to utilize the strong capability of artificial neural networks in predicting fuzzy data and the successful application of this approach in various fields gives the idea of implementing ANFIS to predict air quality based on previous data.

II. LITERATURE SURVEY

In this section we have surveyed some papers in which related works are performed.

[1] **Lu Bai, Jianzhou Wang, Xuejiao Ma, Haiyan Lu (2018)**, "Air Pollution Forecasts: An Overview" in International Journal of

Environmental Research and Public health (IJERPH) presented a clear perspective on air pollution forecasting, this study reviews the theory and application of those forecasting models. In addition, based on a comparison of different forecasting methods, the advantages and disadvantages of some methods of forecasting are also provided.

[2] **Kostandina Veljanovska, Angel Dimoski (2018)**, " Air quality index prediction using simple machine learning algorithms" in International Journal of Emerging Trends & Technology in Computer Science (IJETTCS)which presents the comparison of four simple machine learning algorithms, neural network, k-nearest neighbour, support vector machines and decision tree. The air pollution database contains data for each day of 2017 from measurements stations in capital city of the Republic of Macedonia.

[3] **Gaganjot Kaur Kang, Jerry Zeyu Gao, Sen Chiao, Shengqiang Lu, Gang Xie (2018)**, "Air Quality Prediction: Big Data and Machine Learning approaches" in International Journal of Environmental Science and Development (IJESD),this research work focuses on investigation of various big-data and machine learning based techniques for air quality forecasting. This paper reviews the published research results relating to air quality evaluation using methods of artificial intelligence, decision trees, deep learning etc. Furthermore, it throws light on some of the challenges and future research needs.

[4] **Nazira Abdul Rahim, Zainal Ahmad (2017)**, "Graphical User Interface Application in Matlab Environment for Water and Air Quality Process Monitoring" in Chemical Engineering Transactions (CET), this system also offers a Graphical Interface Editing Sub-module, which allows a system administrator to change the water quality data of other rivers as well as the air quality data. This study is about exploring more towards the advanced monitoring system of the river water and air quality by neural network approach, which later will be presented in GUI for online testing /prediction which result in ease of monitoring, diagnostic and control.

[5] **Yuchao Zhou, Suparna De, Gideon Ewa, Charith Perera, Klaus Moessner (2017)**, "Data-driven Air Quality Characterisation for Urban Environments: a case study" in IEEE Access, in this study the researchers developed an air quality estimation framework that implements a neural network that is enhanced with a novel Non-linear Autoregressive neural network with exogenous input (NARX), especially designed for time series prediction. The framework is applied to a case study featuring different monitoring sites in London, with comparisons against other standard machine-learning based predictive algorithms showing the feasibility and robust performance of the proposed method for different kinds of areas within an urban region.

[6] **Vikram Reddy, Pavan Yedavall, Shrestha Mohanty (2017)**, "Deep Air: Forecasting Air Pollution in Beijing, China", this paper investigates the use of the LSTM recurrent neural network (RNN) as a framework for forecasting in the future, based on time series data of pollution and meteorological information in Beijing. Due to the sequence dependencies associated with large-scale and longer time series datasets, RNNs, and in particular LSTM models, are well-suited.

[7] **Khaled Bashir Shaban, Abdullah Kadri, Eman Rezk (2016)**, "Urban Air Pollution Monitoring System with Forecasting Models" in IEEE sensors journal, this paper presents system for monitoring and forecasting urban air pollution. The system uses low-cost air-quality monitoring motes that are equipped with an array of gaseous and meteorological sensors. These motes wirelessly communicate to an intelligent sensing platform that consists of several modules. The modules are responsible for receiving and storing the data, preprocessing and converting the data into useful information, forecasting the pollutants based on historical information, and finally presenting the acquired information through different channels, such as mobile application, Web portal, and short message service.

[8] **Kanchan Prasad Amit Kumar Gorai Pramila Goyal (2016),**"Development of ANFIS models for air quality forecasting and input optimization for reducing the computational cost and time " in Atmospheric environmental journal, This study aims to develop adaptive neuro-fuzzy inference system (ANFIS) for forecasting of daily air pollution concentrations of five air pollutants [sulphur dioxide (SO2), nitrogen dioxide (NO2), carbon monoxide (CO), ozone (O3) and particular matters (PM10)] in the atmosphere of a Megacity (Howrah). of the models were evaluated on the basis of four statistical indices (coefficient of determination, normalized mean square error, index of agreement, and fractional bias).

[9] **Varun Noorani Subramanian (2016)**, "Data analysis for predicting air pollutant concentration in Smart city Uppsala", this paper shows the use of data analysis for application which will provide users with real-time pollution concentration level along with the predicted value of the location hereby helping in raising awareness of its causes and consequences.

[10] **Aiswarya Baby, Aneena Ann Alexander (2016)**, "A Review on Various Techniques used in Predicting Pollutants" in IOP Conf. Series: Materials Science and Engineering, this paper discusses findings and limitations of existing contributions in the field of pollution prediction.

[11] **Fatma Kunt, Zeynep Cansu Ayturan, Sukru Dursun (2016)**, "Used Some Modeling Applications in Air Pollution Estimates" inJ. Int. Environmental Application & Science (JIEAS), in this study the researchers compared different modeling programs with some gases which cause air pollution were estimated. The results were compared to select the most suitable modelling program.

[12] **Dhirendra Mishra, Pramila Goyal (2016)**,"Neuro-Fuzzy Approach to Forecast NO2 Pollutants Addressed to Air Quality Dispersion Model over Delhi, India" in Aerosol and Air Quality Research, the application of introducing AERMOD aims to improve the forecasting ability of model on the basis the emissions from anthropogenic sources. The training and validation have been made with the eight and two year's available seasonal daily data respectively. The evaluation of the model has been made by comparing its results with observed values as well as other statistical models like MLR and ANN, which reveals that the NF model is performing well and can be used for operational use.

[13] **Lidia Contreras Ochando, Cristina I. Font Juli´an, Francisco Contreras Ochando, C`esar Ferri (2015)**, "Airvlc: An application for real-time forecasting urban air pollution", this paper presents Airvlc, an application for producing real-time urban air pollution forecasts for the city of Valencia in Spain. The application employs regression models able to predict the levels of four different pollutants (CO, NO, PM2.5, NO2) in three different locations of the city. These models are trained using features that represent traffic intensity, persistence of pollutants and meteorological parameters such as wind speed and temperature.

[14] **Suhasini V. Kottur, Dr. S. S. Mantha (2015)**, "An Integrated Model using Artificial Neural Network (ANN) and Kriging for Forecasting Air Pollutants using Meteorological Data" in International Journal of Advanced Research in Computer and Communication Engineering, this paper presents an integrated model using Artificial Neural Networks and Kriging to predict the level of air pollutants at various locations in Mumbai and Navi Mumbai using past data available from meteorological department and Pollution Control Board.

[15] **Godbless Swagarya, Shubi Kaijage, Ramadhani S. Sinde (2014)**, "Air Pollution Monitoring System based on Wireless Networks –Simulation" in Innovative Systems Design and Engineering, this paper proposes an industrial air pollution monitoring system based on the technology of wireless sensor networks (WSNs). This system is integrated with the global system for mobile communications (GSM) and its communication protocol used is Zigbee. The system consists of sensor nodes, a control center and data base through which sensing data can be stored for history and future plans.

[16] **Anikender Kumar, P. Goyal (2012)**, "Forecasting of Air Quality Index in Delhi Using Neural Network Based on Principal Component Analysis" in Pure and Applied Geophysics, the main objective of the present study is to forecast the daily AQI through a neural network based on principal component analysis (PCA). The AQI of criteria air pollutants has been forecasted using the previous day's AQI and meteorological variables, which have been found to be nearly same for weekends and weekdays.

[17] **Prachi, Kumar Nishant, Matta, Gagan (2011)**, "Artificial neural network applications in air quality monitoring and management" in International Journal for Environmental Rehabilitation and Conservation, shows the comparison of various for the prediction of air quality ranging from numerical, mathematical and statistical methods (e.g., regression) to techniques based on artificial intelligence, particularly ANNs. All the meteorological variables and factors have a non-linear relationship with air quality, which can be accurately captured by nonlinear models such as ANNs and Support Vector Machines.

[18] **Suraya Ghazali, Lokman Hakim Ismail (2010)**, "Air Quality Prediction Using Artificial Neural Network", the aim of this research was to develop neural network air quality prediction model. In this study, a prediction method is developed using feed-forward neural network.

[19] **Anurag Kandya, Manju Mohan (2009)**, "Forecasting the urban air quality using various statistical techniques" in the seventh International Conference on Urban Climate, Yokohoma, Japan; in this study, five statistical techniques i.e. Single Exponential Smoothing (SES), Adaptive Response Rate Single Exponential Smoothing (ARRSES), Holt's Linear Method (HLM) ARX (Auto Regressive eXogenous) Model and Auto Regressive Integrated Moving Averages (ARIMA) are adopted for predicting the urban air quality over Delhi.

[20] **Vincent Henri. Peuch (2005)**, "Air Quality Forecasting" in ECMWF Seminar on Global Earth-System Monitoring, describes the use of RAQ modeling and forecasting models for the measurement of air quality index.

[21] **Air Quality Forecasting - A Review of Federal Programs and Research Needs (2001)**, describes the need of forecasting system to support operational air quality forecasting. The system must include a method to continuously evaluate and improve the forecast consistent with the needs of the users. A program plan should be put in place that identifies operational, research, and developmental needs and, where possible, agency resources that can be used to address these needs.

III. CONCLUSION

The alarming problem of air pollution caused serious changes to the earth. Hence to monitor the pollutant level feature based model is deployed which considers the meteorological data along with pollutant level of in order to make the forecast of AQI. The model shows a reduced error rate when compared with other machine learning algorithms and also ranks the metrological factors based on their order of importance. The model will in lower RMSE values which makes it suitable for real me AIQ prediction.The model can be further extended to predict the AQI in a wider geographical area by augmenting additional factorsAlthough a conclusion may review the main points .

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Analysis and Simulation of Uterine Contraction Signal

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ABSTRACT

The Electrohysterogram (EHG) is a new instrument for pregnancy monitoring. It measures the uterine muscle electrical signal, which is closely related with uterine contractions. The EHG is described as a viable alternative and a more precise instrument than the currently most widely used method for the description of uterine contractions: the external tocogram. The EHG has also been indicated as a promising tool in the assessment of preterm delivery risk. This work intends to contribute towards the EHG characterization through the inventory of its components which are: Contractions; Labor contractions;Alvarez waves; Fetal movements; Long Duration Low Frequency Waves;

The instruments used for cataloging were: Spectral Analysis, parametric and non-parametric, energy estimators, time-frequency methods and the tocogram annotated by expert physicians. The EHG and respective tocograms were obtained from the Icelandic 16-electrode Electrohysterogram Database. 288 components were classified. There is not a component database of this type available for consultation. The spectral analysis module and power estimation was added to Uterine Explorer, an EHG analysis software developed in FCT-UNL.

The importance of this component database is related to the need to improve the understanding of the EHG which is a relatively complex signal, as well as contributing towards the detection of preterm birth

Keywords : Electrohysterogram, Uterine Explorer, EHG Components Database, Preterm Birth

I. INTRODUCTION

Premature Birth is the delivery of babies that are born alive, before the 37 weeks of gestation. Premature birth is one of the most important factor contributing to infant indisposition and mortality. According to recent statistics about 7% of total babies born are premature [1] [2] and around 50% of all infant deaths are caused by preterm delivery of babies [3]. In time prediction and treatment of Premature Birth can save many infant lives and with proper treatment the consequences of premature birth like impairments to hearing, vision and non-communicable diseases can be avoided and treated properly. Around 40% of the survivors of premature birth develop chronic lung disease [4].

One of the major hurdles in the successful prediction of premature lab or are the unpredictable uterine contractions. However, research has shown that the most accurate method yet established is the classification of EHG signals [5]. Electrohy sterography (EHG) measures electrical activity in the uterus, and is a specific form of electromyography (EMG), the measurement of such activity in muscular

tissue. EHG signal is recorded inexpensively and noninvasively using bio-potential electrodes from the abdominal wall of pregnant women [5]. Previous researches indicate that these signals can be helpful to separate uterine records of term and pre-term deliveries [6], [7], [8].

Some notable research has been done on the subject which includes the classification of Term and Preterm Deliveries using linear features, using non-linear features [6] and other features like wavelet transform [8]. It is known from similar work on the problem that non-linear features like Peak frequency and Sample Entropy yield much better results as compared to the linear ones [9].

Since the underlying physiological mechanisms of biological systems are non-linear processes [10] and the female uterine wall is composed of billions of interconnected cells whose responses are non-linear, it may be regarded as a complex, non-linear dynamic system. To analyze the outputs of such a system, non-linear signal processing techniques are applicable. Therefore, one can hypothesize that non-linear signal processing techniques may yield better results in analysis of the EHG than linear ones. Besides, previous studies on the use of some nonlinear signal processing techniques [11] have produced promising results

Most of the recent research studies have utilized using EHG for detection of true labor, In contrast this paper centers around the classification of EHG using non-linear techniques and features like Fast FourierTransform. A comparison of linear, non-linear and FFT is also discussed in this study. The ultimate classification is achieved by comparing various machine-learning classifiers against an open dataset, containing 300 records) [12].

The rest of the paper is classified as follows:
Section II provides the information about the data acquisition, preprocessing, extracted features and SVM method. The results and discussion are presented in section III and a final conclusion is made in section IV.

II. METHODS

A. Records

The Term-Preterm EHG Database included in this research contains the EHG records performed from 1997 until 2006 at the Department of Obstetrics and Gynecology, Medical Centre Ljubljana, Ljubljana [6]. The records were obtained from the general population as well as the patients admitted to the hospital, including both term and pre-term cases. Each patient was recorded only once, with the record duration of 30 minutes and the sampling frequency (f_s)of 20 Hz. The scanning system had a resolution of 16 bits with the amplitude range of 2.5 mV. Each record was obtained using four $AgCl_2$ electrodes, which were placed on the abdominal surface, with their potential differences forming three channels [6].The first electrode (E1) was placed 3.5 cm to the left and 3.5 cm above the navel; the second electrode (E2) was placed 3.5 cm to the right and 3.5 cm above the navel; the third electrode (E3) was placed 3.5 cm to the right and 3.5 cm below the navel; the fourth electrode (E4) was placed 3.5 cm to left and 3.5 cm below the navel. I.e. The electrodes were placed such that they are 7 cm apart, centered at the navel (fig.1). Three channels were produced by recording the differences in the potential electrodes: S1 = E2 – E1 (first channel); S2 = E2 – E3 (second channel); S3 = E4 – E3 (third channel) [5]. The signals were filtered before sampling using analog three-pole Butterworth filter having a bandwidth from 0 to 5 Hz.

A total of 300 EHG records were used in this research, which were divided in two groups:

1.Term Records: (pregnancy duration 37 weeks)
A total of 262 records were term, of which 143 were early (obtained before the 26th week of pregnancy) and 119 were later (obtained after the 26th week of pregnancy)
2.Pre-Term Records: (pregnancy duration 37 weeks)
A total of 38 records were term, of which 19 were early (obtained before the 26th week of pregnancy) and 19 were later (obtained after the 26th week of pregnancy)

Among these, the early records showed a relatively low frequency of contraction [13]. So these records were given more importance, as they had lesser noise levels.

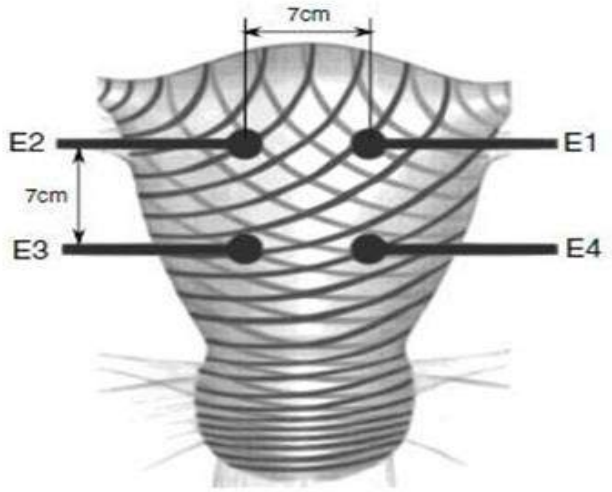

Fig. 1 The placement of the electrodes on the abdomen, above the uterine surface. Signal 1: *E2–E1*, signal 2: *E2–E3*, signal 3: *E4–E3*

B. Preprocessing

The lower frequencies of the EHG signals contain noise due to skin stretching and breathing. Thus, the recorded signals are first preprocessed using Butterworth digital filters of different frequency bands, i.e. 0.08 – 4 Hz [14], 0.05 – 4 Hz [16]. 0.2 – 4 Hz [15]. The beginning and ending part of 90 seconds was also removed from the records because of the presence of transient effects of the filters. The EHG signal records before preprocessing are shown in fig. 2 and after preprocessing are shown in fig. 3. Afterwards, various linear, non-linear and statistical features were then used to classify to records.

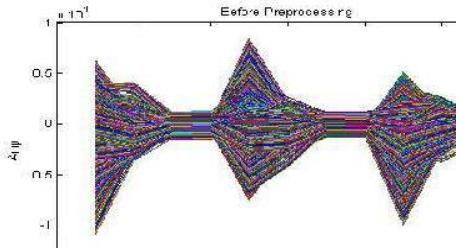

Fig. 2 EHG Record (before preprocessing)

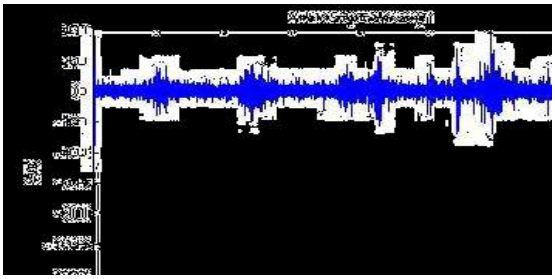

Fig. 3 EHG Record (after preprocessing)

C. Feature Extraction

This research includes 3 linear, 1 non-linear and 3statistical features extracted from the EHG signals in order to differentiate between term and pre-term records.

1. Root Mean Square

RMS value of each signal was calculated as the root of the mean of the square if all samples in a signal, i.e.

$$RMS = \sqrt{\frac{1}{N}\sum_{t=0}^{N-1} x(t)^2}$$

Where;
x(t)**:** A time-series Signal t = 0, 1, 2 … N – 1

2. Peak Frequency of the Power Spectrum

The fast discrete Fourier transform was used to calculate the power spectrum P for each signal x(t) Then, the peak frequency f_{max} was calculated as follows:

$$f_{max} = \arg\left(\frac{f_s}{N} max_{i=0}^{N-1} P(i)\right)$$

3. Median Frequency

The median frequency was calculated using:

$$\sum_{i=0}^{i=i_{m_x}} P(i) = \sum_{i=i_{m_x}}^{i=N-1} P(i)$$

4. Sample Entropy

The sample entropy sampEn is defined as:

$$sampEn_{m,r}(x) = \begin{cases} -\log\left(\frac{c_m}{c_{(m-1)}}\right) & ; \quad c_m \neq 0 \wedge c_{(m-1)} \neq 0 \\ -\log\left(\frac{N-m}{N-m-1}\right) & ; \quad c_m = 0 \vee c_{(m-1)} = 0 \end{cases}$$

5. Mean

The mean value of a signal was calculated using:

$$\bar{x} = \frac{1}{N}\sum_{i=1}^{N} x(i)$$

6. Variance

The variance of a signal was calculated as follows:

$$s^2 = \frac{\sum_{i=1}^{N}(x(i) - \bar{x})^2}{N-1}$$

7. Standard Deviation

The standard deviation of a signal was calculated as follows:

$$s = \sqrt{\frac{\sum_{i=1}^{N}(x(i) - \bar{x})^2}{N-1}}$$

D. Support Vector Machine

The Machine Learning classifier used in this research was an SVM (Support Vector Machine) classifier. Given a set of training examples, each marked for belonging to one of two categories, an SVM training algorithm builds a model that assigns new examples into one category or the other, making it a plausible classifier.

It is basically a two layer neural network, employing hidden layer of radial units and one output neuron. The procedure of creating this network and learning its parameters is organized in the way in which we deal only with kernel functions instead of direct processing of hidden unit signals. Basic SVM is linear but it can be used for nonlinear data by using kernel function to first indirectly map non-linear data into linear feature space. Basic SVM is also a two-class classifier however; with some modification, multiclass classifier can be obtained. The SVM works with a construction of optimal separating hyper-plane which can separate data from two classes which in our case is Term data and Preterm data. It seeks to find a hyper-plane by focusing on the training cases that are placed at the edge of the class descriptors [17].

The distance between the hyper-plane and the nearest data points is called the margin of the SVM classifier, which is mathematically stated as:

$$D(x) = (w.x) + b$$

Where x is a vector of the dataset, and w and b are parameters of the hyper-plane that the SVM has to estimate.

III. RESULTS AND DISCUSSION

For the classification of Term and Preterm records, linear and non-linear features have been extracted and applied to binary classifier (SVM). To improve the accuracy of the results a combination of all the extracted features have been applied to the classifier. As already mentioned, 3 channels have been used to

record EHG signals, thus features extraction and classification process have been performed based on all 3 channels. As evident from the graphs and tables, statistical features from channel 1 can be more effective for diagnosing term and pre-term labor. It is also clear that the prediction becomes relatively easily with the classification using non-linear features and FFT, however SVM being a linear classifier requires a kernel function for implementation and promising results.

These results indicate that with the correct selection of features, SVM can positively predict premature birth and with EHG measurement and classification being a non-invasive and inexpensive method, the study can practically be implemented in hospitals for successful prediction of premature birth as opposed to the conventional methods of detection.

IV. CONCLUSION

The main idea of this research was to classify pre-term and term birth using EHG signals. For the said purpose statistical and non-linear features had been extracted and had been applied for classification with SVM based algorithm. The obtained results show that features from channel 1 can be more effective for diagnosis of pre-term labor. Also FFT is an important feature which greatly improves the accuracy of the classifier when applied with a kernel function.

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Fabrication of Grain Refining Machine

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ABSTRACT

Food grains are the primary need of living beings. To obtain grain in the purest form i.e. (Without any impurities). The food grains which comes after threshing contains lot of impurities such as ferrous materials, straw, dust and dirt. We are designed a machine which can segregate these impurities from the grains with the help of magnetic roller and blower. The hopper is especially design to control the flow rate of grains. The variable type motor is used to rotate the magnetic roller or conveyor belt and also increase and decrease the mass flow rate of grains. In addition to motor a separate blower is used to remove the light density particles such as straw, dust etc. As it is relevant from the research facility that the grains impurities are more ferrous in nature which is easily attracted by magnetic field.

Keywords : Food Grains, Magnetic Roller, Motor, Blower, Impurities Segregate.

I. INTRODUCTION

The process of segregation of magnetically attracted particle from the non-magnetic particle is achieved by creating a magnetic field and passing the mixture over magnetic roller. As the grain coming out from hopper to conveyor belt through the adjustable feeder, which can control the flow rate. The conveyor system and magnetic roller is run by variable type electric motor which can control the velocity gain by grain or discharge rate. The magnetic nature particle will get attracted by magnetic roller and this particle will get demagnetized as it pass away from magnetic roller. The velocity gain by non-magnetic particle help it to flow away from magnetic roller. This is the process of separation of ferrous and non-ferrous material from their mixture, but in addition to this there is a special arrangement provided to segregate the light density impurities with the help of blower. The flow rate is so adjusted to provide the best outcomes. The flow rate is so adjusted to provide the best outcomes. The blower is run by the arrangement of reduction gear box in the motor or separate power connection is incorporated.

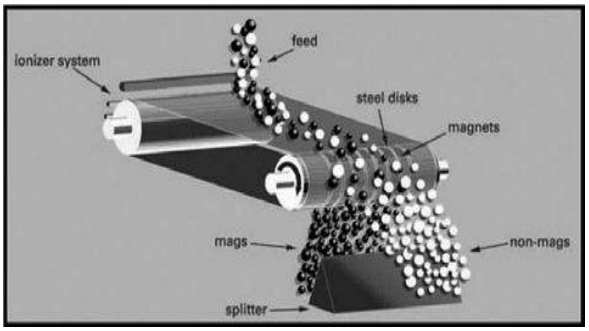
II. OBJECTIVE

To design and fabricate the machine which is capable of segregating the impurities in grain and is also suitable for the consumer to buy this product in a very reasonable cost and also for domestic as well as industrial purpose. The machine is a magnetic bed specially designed to separate under constraints operational and environment conditions. An innovative addition to the setup will be a blower to take care of any residues with light density along the bed. The speed of the blower will be potentially controlled accordingly. The already machine available in market for this purpose has too much cost and can be able to segregate only magnetic impurities but our project machine has the capability of

segregating both magnetic and light density impurities with minimum cost.

III. PRINCIPLE OF OPERATION

The principle of segregation of magnetic and non-magnetic particle from their mixture by creating field and mass flow rate of air. This is achieved by gravity feed hopper which has adjustable discharge area, through the conveyor belt and magnetic roller which is driven by electric motor of variable speed controller to adjust the discharge flow. Also the blower take care of light density particles to provide the grains in purest form



IV. APPLICATION

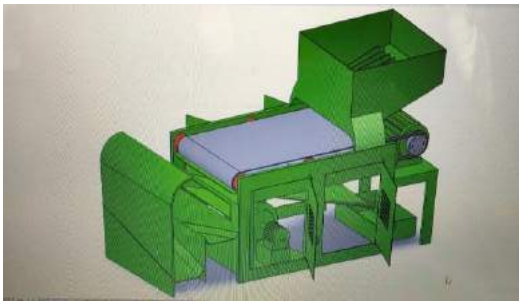
As grains are staple food for the human being and can be used in a daily basis. There is huge demand to obtain this product in the purest form and with minimum cost and time. To satisfy this need our machine will play a vital role for various domestic as well as industrial potential buyer. The product has enough demand in farming industries and the major wheat, rice, cereals, and mustard producing area are Uttar Pradesh, Punjab, Haryana, Madhya Pradesh, Tamil Nadu, Maharashtra, etc.

V. FABRICATION PROCESS

The various processes involved in fabrication of this machine are:

1) Cutting of sheets and pipes
2) Drilling
3) Welding
4) Grinding
5) Fastening
6) Coating
7) Assembly

According to the design of hopper, the G.I. sheet are to be cut and welded to form the hopper. The base of the machine is to be made from cast iron as it is hard and capable of handling vibration and load. The rigid structure is to be welded and motor, blower, are to be fastened to get easy removal if needed. The conveyor belt, roller are to be aligned properly with the motor for proper flow of material. The blower is mounted below and slightly backward to magnetic roller for proper and efficient working. Effective partition is to be done between purified grains, light density impurities and ferrous material, for segregation and handling of grains and impurities.



The various components used in fabrication are

1) Hopper
2) Motor
3) Magnet

4) Conveyor belt
5) Bearing
6) Roller
7) Blower

VI. RESULT

The fabrication of grain refining machine has been done which enables the segregation of impurities from the grains in the most efficient and well organized manner. The machine is capable for using in domestic as well as industrial based by varying its size. The speed of motor and discharge rate from hopper is controlled as per need. All the process of fabrication has been done efficiently to get the best result.

VII. CONCLUSION

Grain refining machine play a vital role in present as well as in future, to meet the ever increasing demand of obtaining the grains in purified form. Also this machine is asset for domestic as well as farming industry.

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Degree of Freedom and Synthesis of 3D Printer

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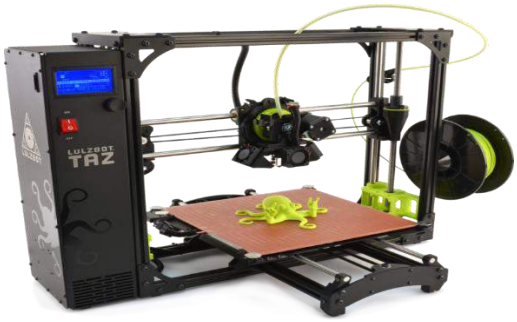
ABSTRACT

In this paper we propose a DOF (degree of freedom) 3D printing system with synthesis. Common 3D printer with only three translational axes. The input model is first segmented such that each part can be printed in direction with less supporting material. We demonstrated that the proposed system could save most of the supporting material compared to existing 2D diection works. Now study of synstheis of 3D printer can give us the exact knowledge and the dimenstional accuracy comparision of the exsisting of previous design.

Keywords : Degree of Freedom, 3D Printing System, FDM Printers

I. INTRODUCTION

The 3D printing technique has been developed rapidly in recent years. it's been wisely utilized in various fields like industry medicine, bioscience, etc. Most of the prevailing 3D printers (e. g fused deposition modelling – FDM printers) can only prints within the vertical direction. However only the models with a tree like structure are often prirnted directly, while the opposite sorts of models need additional construction during the printing procees which require to be removed in a very post processing step. Such printing scheme involves the waste of printing materials and also the cleanup step also has the infulence on the apperiance of the printed object which needs to be performed very carefully.

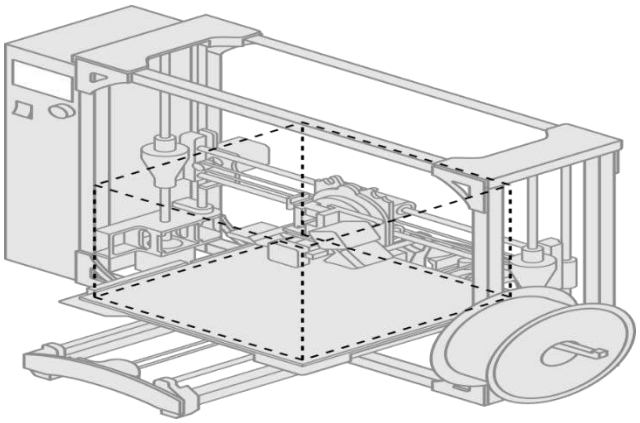


To enhance the flexibleness of the printer ,several multi DOF 3D Printing system are designed. of these multi DOF printers are blindly controlled the printing accuracy depends only on tyhe precision of the system . however if there's a error occurred during the printing procees it's difficult to locate and solve such problem. during this paper ,multi-DOF 3D printing system, which uses a 3 axis system to regulate the printer.

Given a 3D model to be printed, it id first segmented into several components such each component are often printed in its own printable direction with as little as additional support. Then the printing path is planned automatically, by which the components are

printed following the planned order. Once certain components is printed the thing is rotated automatically so the supporting plane for the subsequent component is horizontally aligned. Furthermore, a visible surveiliance module is employed to make sure the accuracy of the printing, which helps to correct and calibrate the step of printing and ensures the standard of the printing.

Printing control: This module is intended to regulate the full printing. It includes the printing program planning, the component printing and also the platform rotation parts. The printing program is planned by using the breadth first traversing scheme.during he printing, once a component is prinited , the platform is rotated so the bisecting plane between the printed part and also the next part to be printed is horizontal.



2.Degree of movement: PART 1- X-AXIS
PART 2- Y-AXIS
PART 3- Z-AXIS
PART 4- BUILT PLATFORM

II. SYNTHESIS OF 3D PRINTER

In general 3D printers are compact and smaller than RP machine. they're ideal to be used in offices. They use less energy and take less space. They are designed for low volume reproduction of real object made from nylon or other plastics. That also means 3D printers makes smaller parts. Rapid prototyping machines have builds chambers atleast 10 inches on a side a 3d printer has but 8 inches on a side . however a 3d printer isb capable of all the function of rapid prototyping remote sharing of knowledge etc.

Consequently 3d printer are easy to handle and cheap to take care of. 3D printer are less accurate than rapid prototyping machines. due to its simplicity the fabric choices are limited. many alternative material is used for 3D printing. like ABS plastics, PLA polymide (nylon), glass filled polymide, stereo lithography materials (epoxy resins), silver, titanium, steel, wax, photopolymers, and polycarbonate.

A 3D printer is unlike your standard, 2D inkjet printer. On a 3D printer the thing is printed in three dimensions. A 3D model is constructed up layer by layer. Therefore the full process is termed rapid prototyping, or 3D printing.

The resolution of the present printers is around 250 x 250 x 230 (xyz) in ultra-HD resolution. The accuracy is 0.025 mm - 0.05 mm per inch. The model size is up to 737 mm x 1257 mm x 1504 mm.

The biggest drawback for the individual home user continues to be the high cost of 3D printer. Another drawback is that it takes hours or maybe days to print a 3D model (depending on the complexity and determination of the model). Besides above, the professional 3D software and 3D model design is additionally in an exceedingly high cost range.

Alternatively there are already simplified 3D printers for hobbyist which are less expensive. and also the materials it uses is additionally more cost-effective. These 3D printers for home use aren't as accurate as commercial 3D printer.

One of the foremost important applications of 3D printing is within the medical industry. With 3D printing, surgeons can produce patient-specific 3D printed models of patients' body parts or organs. they'll use these models to plan and practice surgeries, potentially saving lives.

3D printing makes it possible to form an element from scratch in mere hours. It allows designers and developers to travel from flat screen to exact, physical part.

Nowadays almost everything from aerospace components to toys are being built with the assistance of 3D printers. 3D printing is additionally used for jewelry and art, architecture, fashion design, art, architecture and interior design.

III. FUTURE WORK

Creating models on the basis of 5 degrees of freedom along with the study of different material used.

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A Review on Crime Analysis and Prediction Using Dbscan Algorithm

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ABSTRACT

Crime is one of the biggest violations that have been not yet completely solved ever since the evolution of human race. The threat will be reduced if a crime prediction and analysis is concerned on particular areas to find if crime is about to happen or not. The existing system is having trouble about data access speed and it is less efficient so to overcome this problem, we proposed a system in which analysis of crime is done also we use DBSCAN algorithm to find out different cluster of crimes. It shows high accuracy for the given dataset and forms effective cluster. Data mining is an approach that can handle large voluminous datasets and used to predict desired patterns. This aspect will be beneficial for both law enforcement and police organization of our country and to give more correct decision also help in safeguarding an area. This application is useful for police and enforcement of law organizations in order to detect crime and for applying preventive measures.

Keywords : Analysis, Crime, DBSCAN, Existing System, Law Enforcement.

I. INTRODUCTION

Today, time is a concerning factor for sentencing criminals. Many a times criminal is released on bail may yet be a potential threat to the society, even after they have served their sentence. As we all know the rate of crimes is increasing adequately and modern technologies are helping them without knowing such as chatting, videos, news, apps, websites, etc. Criminals cannot be predicted easily so as per the criminals mind not only the persons but also crimes cannot be predicted, so we are analysing the data we have as a dummy dataset and we are going to conclude these data for future awareness for crime records, it includes city(where it has done), number of crimes happens like these crimes, etc. Analysing the data is difficult because there are no sufficient data is available about a particular crime or there may be inconsistent of data availability.

As the crime rates are increasing we be properly analysed and stored. In this paper, we look at the use of frequent pattern mining with association rule mining to analyse the various crimes done by a criminal and predict the chance of each crime that can again be performed by that criminal. This analysis may help the law enforcement of the country to take a more accurate decision or may help in safeguarding an area if a criminal released on bail is very much likely to perform crime. In this paper we look at the use of missing value and clustering algorithm for a data mining approach to help predict the crimes patterns and fast up the process of solving crime. We are going apply these techniques to real crime data. We also use semi supervised learning technique in this paper for knowledge discovery from the crime records and to help increase the predictive accuracy.

II. MAJOR CHALLENGES:

In the present scenario, following major challenges are encountered:

- The crime data is increasing day by day.
- Problem of identifying techniques that can accurately and efficiently analyze this growing volumes of crime data.
- To record crime data different methods and structures are used.
- The data available is redundant and there are too many missing values which makes analysis process more difficult.
- Due to complexity of crime issues investigation of the crime takes longer duration.

III. AIM AND OBJECTIVE

- Aim: Our aim is to develop a user friendly website which can predict regions which have high probability of crime occurrence and can visualize crime prone areas on map.
- Objectives: 1. Performing data mining algorithm on available dataset to find required result.2. System can predict areas where there is high possibility and probability for crime occurrence. 3. Visualizing crime prone regions in specific areas.

IV. LITERATURE REVIEW

In the study and analysis of criminology data mining can be categorized into two main areas, crime control and crime suppression. In crime control, we use knowledge from the analyzed dataset. And crime suppression used to catch criminal by using his/her history records.

As per the literature survey, crime data is growing very fast and in large amount(running into zota bytes). So we need advanced and efficient techniques for analysis.

According to [1] , the crime alert areas can be represented graphically using maps ,which indicates the crime alert in respective area.

The clustering methods are implemented and their performance is tested based on accuracy.
According to the conclusion given in [8], we obtain a result that the DBSCAN clustering algorithm is more accurate than K-means algorithm. DBSCAN algorithm forms effective clusters.

The Experimental setup [6]describes complete setup and steps to manipulate data and change it into useful information. Also result is shown on maps using Google map.

So, according to survey we are having problem statement as, **"**Existing system do not have provision to predict crime prone regions, less efficiency of algorithm causes trouble in analysis process**".**

V. CLUSTRING TECHNIQUE

Clustering is the process of partitioning the data into similar classes. It can also formulate a multi-objectives optimization problem. We are considering two clustering techniques, K- means and DBSCAN algorithm for this purpose.

The performance of two clustering techniques was tested based on their accuracy, speed of creating clusters, and identifying crime patterns and crime regions. Henceforth we have found that the DBSCAN algorithm shows improved results than the k-means

algorithm and therefore we are using the DBSCAN algorithm for further study.

VI. PROPOSED WORK

We propose a system which can analyze, classify and predict various crimes, find probability of crime occurrences in a given region. Our system is effective in terms of analysis, speed of crime, classify crime according to their type and show probability of crime occurrences in nearby location.

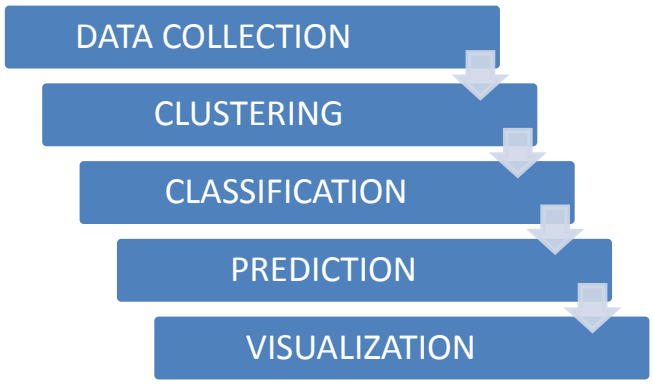

Fig1: Proposed Architecture

Following are steps in doing crime analysis:-

1) DATA COLLECTIONR:
We use dummy dataset because of limitation in getting crime data records from Law Enforcement department. The collected data is stored into database for further process. Since the collected data is unstructured data we use mango DB. Crime data is an unstructured data since the no of field, content, and size of the document can differ from one document to another the better option is to have a scheme less database.

2) CRIME CLUSTURE:
For clustering data we are using DBSCAN clustering algorithm. The DBSCAN algorithm is basically based on clustering points within the distance of epsilon with some initial minimum number of points. On comparing with K-means the DBSCAN clustering has high accuracy for the given dataset and forms effective clusters.

3) CLASSIFICATION:
For classification we are using an algorithm called Naïve Bayes which is a supervised learning method as well as a statistical method for classification. The algorithm classifies crime based on given training dataset. It is simple, and converges quicker than logistic regression

4) PREDICTION:
For prediction we are using the decision tree concept. A decision tree is similar to a graph in which internal node represents test on an attribute, and each branch represents outcome of a test. Corresponding to each place we build a model. So for getting the crime prone areas we pass current date and current attributes into the prediction software.

5) VISUALIZE:
The crime prone areas can be graphically represented using a map also predicted regions are also shown in another map view. Visualization helps to get more accuracy in performance.

VII. MODULES

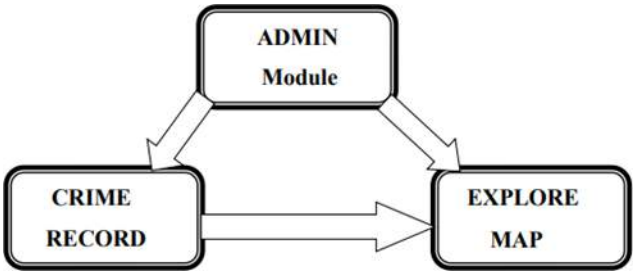

Fig 2:- Project Module

1. ADMIN MODULE: Admin will register into the system first to generate User ID and Password. As an admin he/she has authorization to register new crime, update information of crime. Admin can also edit his/her profile and reset password only if he/she is logged in to the system.

2.CRIME RECORD MODULE: This module contains detailed information about crime, Such as criminal name, victim gender, crime location (map), crime type, date and time of crime, for e.g. Crime happens at Night. All the necessary information will be stored in this module and the classification and clustering algorithm will apply on this dataset.

3. EXPLORE MAP: It contains two map view, and one list view. Where, in one map cluster view of crime is shown which helps to find out number of crime register in a particular area and another map view shows predicted region or area of crime. List view where description of crime is given along with date and time registered for that crime. We can use the filters like crime date and time and according to type of crime we can fetch crime from dataset.

VIII. CONCLUSION

In this paper, an innovative and fast solution is presented for Crime analysis and prediction. We use DBSCAN data mining algorithm instead of K-means to get more efficient result. Our website predicts crime prone regions, we will use a dummy dataset from **kaggel.com** website, preprocess that data and apply prediction algorithm to obtain result.

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Improvement In Centrifugal Pipe Casting Machine

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ABSTRACT

As the name suggested, the operation of a centrifugal casting machine is mainly based on the principle of centrifugal force. The mold which is rotated at a moderate speed based on the diameter of the pipe to be casted. A large diameter of pipe requires high speed. The action of rotation of mold or machine forces the molten metal against the inner periphery of the mold. This machine is used for casting pipes of various dimensions. This machine operates on such a mechanism in which even if it stops, the mold rotates freely for a large amount of time as compared to the time in which the pipe is casted. To tackle this disadvantage, a brake system is applied to the machine.

Keywords : Casting, Centrifugal Pipe Casting Machine , Differential Brake

I. INTRODUCTION

Casting can be defined as the process of producing metal shapes by pouring hot molten metal into redeveloped molds where it is allowed to get solid & cool down in the required time. The solid metal output product is called as cast. Casting is an old technique it is as old as the Roman Empire. The roman craftsman started casting by making two half molds, that was wedge together & the molten bronze carefully poured inside it. This molten bronze solidified on cooling & the solid cast was removed from the mold. This method was taken into action to make swards in large numbers. Casting hence has been a method by which important metal parts are made in large quantities cheaply.

In today's date casting comes under one of the largest industries in manufacturing. 50% of the total weight of an average tractor consists of casted metal parts & an automobile engine consists of 90% of its total weight as casted parts. The reason for which casting is tremendously carried out lies wholly in its economy & time factor in terms of time it is the quickest method for producing components, as the process is so easy.

The main focus of our project is on centrifugal casting & removing its disadvantages. So the centrifugal casting of number of processes in which the centrifugal force is taken into action to give the shape of casting by filling the mold & wait till casting is solidified & strengthens.

There are two types of centrifugal casting process.

1) Vertical centrifugal casting
2) Horizontal centrifugal casting.

Vertical Centrifugal Casting: - It is a pressure casting technique that employs rotation about a vertical axis. It produces good filling of the mold & gives high dimensionally accurate products. This method is used for casting products like gears, piston rings & impellers.

Our project's main focus is on the horizontal centrifugal casting process & it is used for making long & hollow casings such as pipes, gun barrels, sleeves, rods, etc.

Horizontal Centrifugal Casting:-In horizontal type the mold rotates at high speed about the horizontal axis, the molten metal is fed into the interior section of the mold & distributed uniformly around due to centrifugal action rotation continued until solidification is completed But here even after the product is fully formed & the VFD is closed the mold still rotates for very long time. To reduce this rotating time differential band brake is applied to the system.

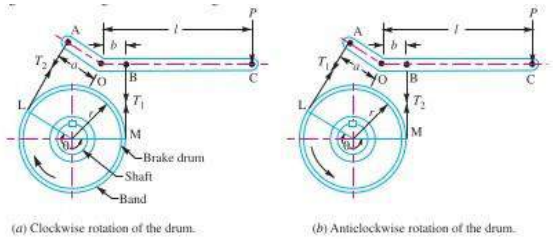
II. MATERIAL AND METHODS

The previous system installed fails to provide efficiency in production. The efficiency can be achieved by applying braking system on the machine . In our new system with the help of differential braking system we are going to increase the rate of production.

III. PROPOSED SYSTEM

The proposed system will be an additional of brake system in the traditional horizontal pipe casting mechanism. A differential band brake is used to stop the free-running mold to save 55% of the time. in traditional system, after stopping VFD & even after the pipe is cooled & solidified, the mold rotates for at least 60secs, which after applying differential band brake will stop in half of the time as compared to the original time, which will results in saving of the useful time & increasing the production of pipes.

A band brake consists of a flexible band of leather, one or more ropes, or steel lined with friction material, which embraces a part of the circumference of the drum. A differential band brake issued to control the speed of a drum which rotates at a constant speed. As compared to simple band brake, in a differential band brake neither ends of the band is attached to the fulcrum of the lever. The two ends of the bands are attached to the two points on the opposite side of the fulc



(a) Clockwise rotation of the drum. (b) Anticlockwise rotation of the drum.

IV. Design of Brake

M=3000x9.81

M=29430 kg

u=0.3

D=0.75m

R=0.375m

w= V/R =1450/0.375

w=3866.66 rad/sec

$K.E=1/2xIW_o^2$

$K.E=1/2x\ (1/2MR^2)\ (W_o)^2$

$K.E=1/4xMR^2xW_o^2$

$K.E=1/4x29430x0.375^2x3866.66^2$

$K.E=1.547x10^{10}$ J

$E_o=E_f$

$W + Pf + KEo=P^f + K_{ef} +$ heat loss

KE_o=heat loss

$KE_o=Ffq\ (2\pi r)$ (no.of rotations)

No.of rotations= 1440/60 x 15

No.of rotations=363 rotations to stop

No.of rotations= $KE_o/F_{fr}x\ (2\pi R)$

$363=1.547x10^{10}/F_{fr}x\ (2\pi x0.375)$

$F_{fr}=18.087x10^3$KN

V. BENEFITS TO THE COMPANY

The main purpose of applying brakes in the traditional system is to inculcate the best uses of mechanical technology available to humankind & get it in use for the betterment of the industry.

1) This mechanism of band brake will help in saving production time
2) Workers will not have to wait for such a long time, resulting in reducing boredom
3) Saved time can be utilized in other productive works.

VI. RESULT AND DISCUSSION

Casting of pipes is done in less time as a differential braking system is applied. The efficiency of the machine is increased resulting in increasing the numbers of pipes produced per hour.

VII. CONCLUSION

Casting of pipes now in a horizontal pipe casting machine is done in less time as a differential braking system is applied. The efficiency of the machine is increased resulting in increasing the numbers of pipes produced per hour without applying the brake, the production rate was 12-14 pipes per hour, but after applying the brake system the production rate is increased up to 14-17 pipes per hour.

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Reduction of Blow Holes Defects in Foundry

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ABSTRACT

This paper presents a study of defects in casting. Foundry industries suffer from poor quality and productivity cast product due to casting defects. It is very difficult to produce castings without any defects. Defects in casting are observed. In order to identify the problem related to casting the study is aimed in the research work. This will help to enhance the yield of casting. In this paper a attempt has been made to list cause and their possible remedies of the casting defects majorly due to blow holes as seen in C.P. FOPUNDRY.

Keywords : Metal Casting, Casting Defects, Blow Holes, Foundry Defects.

I. INTRODUCTION

Casting is the economical manufacturing process used in industries. Which involves considerable metallurgical and mechanical aspects. It is a complicated production process which carries risk of failures occurrence during all the process of accomplishment of the finished products. Hence, it is needed to take action while manufacturing the casting so that defect is less in cast product.

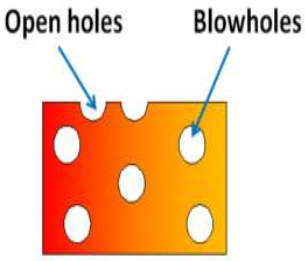
For the research work we have visited C.P. Foundry. And found various defects occurring in cast products like blow holes, shrinkage, sand drop, poor dimensional accuracy and surface finish. But the defects which are causing major rejection is blowhole due to which the productivity of the foundry was decreasing and they were facing financial loss as the castings were being rejected by Clint.

The defects occurring in the cast products are because of the process parameter, sand quality, moulding process etc. to overcome the defects, in this paper we will suggest changes like proses parameters sand quality, sand grain, mould design or gating system respectively.

Different types of blowholes defects are as follows:-

1.1.1 Blow Holes:-

Blow holes are entrapped bubbles of air/steam/gas and beneath (under) the surface of the casting. The casting material that is cast iron contains carbon, this carbon reacts with slag and produces and liberates CO. this gas gets entrapped in the mould, due to this blow holes are produced



1.1.2 Open blows :

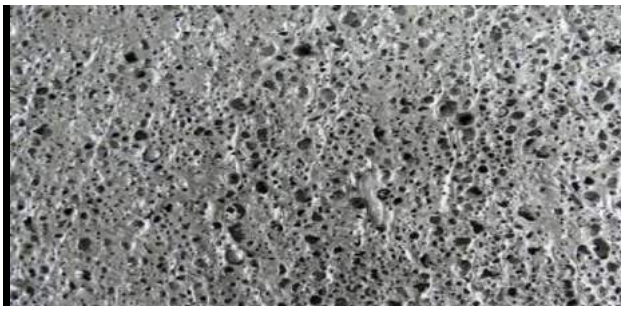
Open blows are the types of blow holes which is causess by entrapped gasses on the surface of mould are have smooth surface.

1.1.3 Pin holes:

Pin holes are the types of blow holes which are very tiny holes on the surface of cast product. These are caused because the exhaust gasses can not escape the mould cavity because of a high cohesiveness, improper venting, etc.

1.1.4 Porosity:

Porosity is caused due to the absorption of gases like hydrogen, oxygen or nitrogen in the molten metal pool which is then released on solidification to become trapped in the solodified metal. This defect caused because of very high pouring temperature.



1.2 Causes of Blow Hole defect

The various causes of blow-holes defects are as follows:

- Improper Venting.
- Hard Ramming.
- Fine Grain Size of Moulding Sand.
- Very High Pouring Temperature of Molten Metal.
- High Moisture Content in Moulding Sand.
- Low Permeability of Moulding Sand.
- Excessive Use of Organic Binder.
- Improperly Backed Cores.

II. METHODOLOGY

The various test performed to find the properties of moulding sand like moisture content, green compression, grain size and permeability.

2.1 Moisture content test:

The water content affects every property of grain moulding sand, with the exception of grain fineness number of base sand. Excess water produces an oxidising atmosphere in the mould, excess gas evolution, lower permeability, high dry and hot strength, low mould hardness, excessive steam generation and poor flow ability. The moisture content of green sand must be maintained within a narrow range

Procedure:-

The percent moisture is determined by completely drying a given amount of sand (100g). The sand and the drying container area weighed before and after drying. The weight loss is doubled to arise at the percent moisture. The amount of moisture content present in the given sample is found to 8% which is not ideal.

For effective casting it is suggested that the moisture content should be 3% to 4%.

2.2 Permeability test:

The permeability is an important property of mould, which hep in escaping of evolved gases away from the mould. The mould material should be porous enough so as to allow the gases to escape freely.

Process: -

First keep the lever on the right of the equipment on d position and ensuring D positon, lift the air-drum till "0" marking. Also ensure that, water level in manometer on the test of the equipment is a zero (0). Keep holding the drum and rotate the lever to "0" position, this will hold the drum in place. Fix the tube with permeability testing specimen on the Rubber Boss firmly then rotate the lever to "p" position. The water in the manometer has risen to 6.3 cm level eyesight with the water and observe lower meniscus. Look up the chart on the equipment, depending upon the orifice that we have chosen (1.5 mm being large and 0.5 mm being small). The reading in the last column to be "300" permeability. Now move the lever to "D" position that shall lower the air drum, remove the specimen tube and clean the equipment. So the permeability of given sample has found to be"300".

2.3 Green compression test:

Green compression has been most widely used as control tool to measure the rate of clay addition to a sand moulding. Clay content, compatibility range and types of additives have significant effect on green compression. The compression reading should be read at comparable compatibility range. Moulding sand at higher or lower compatibility will produce varying green compression strength.

Procedure:-

The green compressive strength of the moulding sand is the maximum compressive stress of the sand. When prepared, rammed and broken under standard conditions. The rammed cylindrical specimen (2 in. diameter and 2 in. long) which is formed by placing a weighed amount of sand in a tube and ramming the sand three times. The instrument used to brake the specimen must continuously register the increasing load until the specimen fractures. The green compressive strength is found to be 250 N/mm2..

2.4 Grain size test:

AFS clay indicates the amount of fineness and water-absorbing material in the sample of sand. AFS Clay may contain active clay, dead clay, silt, sea coal, cellulose, cereal, ash, fines and all materials that float in water.

Procedure:-

A known amount of moulding sand which is first dried and weighed on a weighing scale. Then it is placed in the sieve shaker apparatus. Then the apparatus is ON and allowed to shake the sample for 5 minutes. The apparatus have various sieves according to different sizes. After 5 minute the apparatus is OFF and the sand settles in different sieves. The sand is weighed according to the sieves respectively and the weight are noted down.

.

The readings are shown in the table below.
Size of sample: 100 grams

U.S. Sieve Number	Sand A	Sand B
20	0.0	0.0
30	1.0	0.0
30	24.0	1.0
40	22.0	24.0
50	16.0	41.0
70	17.0	24.0
100	14.0	7.0
140	4.0	2.0
200	1.7	0.0
270	0.3	1.0
Pan total	100.0	100.0
AFS grain Fineness number	28.0	28.0

The Grain size of moulding is found to be 28.0 AFS.

III. RESULTS AND DISCUSSION

The study performed in the foundry and the problem identified as casting defect which is majorly due to 'blow holes in casting'. For this various tests were performed on the sand for which the results are mentioned below.

SR. NO	**Title of test**	**Test outcome**
1	Moisture content test	8%
2	Permeability test	300 mm/sec
3	Green compression strength test	250 N/m^2
4	Grain size test	28 AFS

By the study we have found that the cast product are having 80% blow hole defect in them. To overcome this the foundry first grind the finished product, than fill the material on the defected area, than they again grind it and then it goes for the short blasting. This consumes a lot of time, material, labour and resources. Many parts were rejected by the Client. Because of this the profit of the foundry is low. Therefore it is needed to reduce the defect to increase the profit of the foundry.

IV. CONCLUSION

The particular study for this paper was done in C.P. Foundry, Nagpur, Maharashtra. The main objective of the study was to find the problems being faced by the foundry industry, especially about the casting defects which is majorly due to blow hole defect and to suggest possible remedies to reduce the blow hole defect in the casting.

The results of the tests that were performed are mentioned in the above table. Suggestions and remedies to reduce the blow hole defect are as follows.

- The moisture content found to be 8% is very high, which is the major cause of the defect. For optimum casting it should be 3% to 4%.
- Venting should be done properly.
- Grain size should be 30-60 AFS.
- Permeability should be high.
- Ramming should be done properly.
- The pouring temperature of molten metal should not be very high. It should be 100^0 to 200^0 C higher than the melting temperature so as it should not solidify before pouring.
- Controlled use of organic binders.

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Design and Implementation of Smart Energy Management System

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ABSTRACT

This paper primarily discusses the monitoring of system of an integrated wind and solar energy system. This is achieved using the Internet of things. Wind and solar energy have become popular options for energy conversions over the past few years. So has increased the need for monitoring them over long distances. So this hybrid system can be utilized more efficiently. This increase in efficiency can lead to proper usage of the energy produced.

Keywords : Solar energy, wind energy, IoT, WiFi, Hybrid system.

I. INTRODUCTION

Energy crisis is the main problem on a day to day basis. Though there has been a great advancement in the energy field, perhaps there is still more which can be achieved to make it more efficient for its utilization .Here we make an attempt to provide monitoring to a power generation system using the internet of things. The IoT helps in monitoring the system by providing the detailed values of different parameters of plant over a dedicated IP address. This helps to maintain the plant over large distances by getting to know the values and thus maintain it to the desired levels. Since solar and wind are the most abundantly available forms of renewable energy. On an average ,India receives a solar radiation of 200mW.So there is plenty of opportunity to utilize this resource. Also , wind is available in abundance with solar in major parts of the country, making both an essential sources of energy ,which can be utilized together. Since both the energy sources are available in abundance ,they can be used in rural areas by people for generating lights in their homes. The initial cost might be high, but the running cost is low.

II. LITERATURE SURVEY

The paper presents a valuation of contradictory arrangements of Hybrid Energy Systems (HES) in islanding mode for isolated areas with a focus on explanations for isolated electrification which are mostly composed by one or a mixed of dissimilar energy bases and storage schemes. The paper analysis the widely used mathematical approaches for optimization, sizing and modeling of HES for quarantined electrification areas including the role of loading system. This paper also analysis the benefits and drawbacks of dissimilar solutions planned[1].

Renewable energy resources, energy has always been an main factor for socio-economic growth of humans. Most of the energy is produced from fossil fuels in the world. On the other hand ecological aspects and exhausting of fossil fuels causes increase of renewable energy operation. The produced energy from renewable energy resources are shifted to grid are used in separate systems. As energy generation depends on ecological conditions, efficiency and this energy possible of renewable energy systems changes

according to region of connection. Here overview of the solar-wind-battery hybrid system. Solar energy is becoming progressively popular day by day, so are grid-connected solar power generation schemes. This paper advises a solar power generation system with a seven-level inverter. DC-DC power converter is used to boost the output voltage of the solar panel. The capacitors of the capacitor selection circuit are charged with multiple relationships by the DC-DC power converter. These capacitors serve as input voltage sources for the seven level inverter. The output of the seven level inverter is fed into the utility grid such that the output current is sinusoidal and in phase with grid voltage.

The paper presents the design, execution, and estimation of a fuzzy logic (FL) organizer to control an alternating current (AC) synchronous motor's distributed reactive power (VAr), thereby refining the power factor (PF) of an manufacturing plant. The FL controller mimics the act that would be passed out by a human operator when altering the synchronous motor to supply the required VAr to accomplish the desired PF value. The controller provides elasticity with its nonlinear gain representative and adaptive action. The FL controller implements adequately under all test situations. The FL controller was sensed to perform successfully under both quickly and gradually fluctuating load situations. The FL controller show was extremely reasonable in tracking and refining the plant PF to reach the set point in a sensible time frame and motivated by the proportional integral derivative (PID) concept. The FL controller in mixture with a synchronous motor represents an innovative new method to the problem of PF development in manufacturing plants.

Reactive power to carry the entire scheme to the optimum working point is existing. The FL controller performs adequately together fast and slow changing load situation. The FL controller performance was extremely appropriate in chasing and refining the plant PF to succeed the set point. The FL controller in blend with a synchronous motor denotes a new practical method to take benefit of Renewable Energy Sources by vigorously testing plant electrical limits and automatically carrying the scheme to the finest effective point, and could some day be implemented in an manufacturing plant environment that may need PF improvement with a high degree of precision.

A power factor correction (PFC) topology with fuzzy logic controller (FLC) for light-emitting diode (LED) lighting uses is accessible in this paper. Nowadays, high illumination white LEDs becomes reasonable in domestic, manufacturing and commercial applications to exchange the incandescent bulbs, halogen bulbs and even compact fluorescent light (CFL) bulbs. Since LED lighting denotes a green technology, the issue of power factor is very significant. The performance of the proposed design will be analyzed in terms of power factor using the Matlab/Simulink simulation results.The paper presents a two-stage, single-phase power converter scheme fed from PV and Wind Turbine energy sources, and a new control methodology for moving the output power to the grid, leading to reduce harmonics in the grid current, and controlled power factor. The projected control depends on equating the total power from the renewable energy sources with the power required to supply the nonlinear load, leading to a controlled distribution of power requirement from the sources. A key outcome of the paper is that brilliant power factor and decent harmonic reduction is obtained from the view of the grid, with no condition for an intermediate battery due to the essential ability to provide leading reactive power to the grid when required. Simulation and experimental consequences are used to support the suggested control methodology.

This investigation is to formulate a pattern that will use Fuzzy Logic as a tool to control Synchronous

motor that will track and correct Power Factor of a plant. in the United States, Power Factor improvement is commonly done at the local (equipment) level or through the use of a huge capacitor bank, but this effort will address the solution using and suitably sized Asynchronous motor to match the plant in question. Several plant use synchronous motors in different areas of action, hence eliminating the cost of buying extra hardware. The synchronous motor will provide a smooth transitory and more exact proper value compared to capacitor bank when modifying the power factor. T he feasibility of three renewable sources has been studied. These three sources produce the power in dissimilar form such as AC or DC form. This power may not be steady due to environmental situations, but it's operation in proper way is done through hybrid charge controller. Energy generated by every separate source is important in hybrid energy systems, and combination of existing energy from these sources employed to drive load in very effective method.

III. OBJECTIVES

As per the load requirement so that it should justify the necessity of load. For calculating the battery bank size, we want to study the two factors. (a) Find total daily use in watt-hour (Wh) (b) Find total back up time of the battery.

The projected multi- Hybrid energy structure is the combination of two or more than two energy sources for giving power to the load. In other term it can defined as "Energy system which is planned to extract power by using two or more energy sources is called as the hybrid energy system." Hybrid energy system has good consistency, productivity, less production, and lower cost. Solar and wind are more beneficial than any other non-conventional energy sources. Both the energy sources have more availability in all zones. It needs lower cost. There is no requirement to find superior location to connect this system. The figure 1 shows the block diagram of the hybrid renewable energy scheme using wind, solar power and biogas plant. This block diagram contains dissimilar blocks such as: Solar PV, Wind turbine, Biogas Plant, Hybrid Charge Controller, Battery Bank, Inverter, AC Load, DC Load, etc.

IV. CONCLUSION

Hybrid renewable energy generation based on Solar PV and Wind lens. Here we had deliberated work described on hybrid renewable energy systems and their related controls founded on the survey of accessible literature. Because the output form wind and solar systems occur at diverse times of the day and year, hybrid structures are more probable to create power when we want it. According to many renewable energy specialists, a small "hybrid" electric scheme that combines wind, solar PV (photovoltaic) technology offer several benefits over either single system. The main benefit of hybrid system is that they create clean energy. Thus hybrid energy systems will meet the necessity of different energy sources in most operative, effective and cheap means.

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Electrical Vehicle Charging Using Solar Technology

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ABSTRACT

This paper is about charging process for electric vehicle (EV) by solar energy. Thus, the renewable charging technology for electric vehicle will be consist of the solar panel and also the grid connection. This will help in charging when cloudy climatic condition occurs. The vehicle can be charge by solar energy using photovoltaic (PV) cell-based charging facilities, thus the solar panel will trap the energy from the sun that will charge the battery and thus battery will store the charge that to be readily available to charge an electrical vehicle. This solar charging technology charged electrical vehicle rapidly. It saves the electricity and it is ecofriendly to environment. Thus, the charging unit to be located at parking area, also as a business modal and has a residential installation. Thus, charging model consist of solar panel, charging circuit, battery, connector and also the car model consist of the charging circuit, motor1, motor2 and switches. Thus, obtaining result that shows electrical vehicle will be charge by renewable source of energy that could be help to reduce the pollution and make pollution free environment.

Keywords : Solar energy, charging circuit, charge storage battery, EV.

I. INTRODUCTION

Now a days the automobile sector increases day by day. Thus, it affect on the vehicle's economy and fuel. Thus, the increases in the number of vehicles are mostly affect on the fuel. Thus, the cost of fuel will be increases and the storage of fuel will be reduce day by day, and entirely disappear in future. It may cause global warming and climatic change. For reducing such problems the automobile sector will move towards electrical vehicles. These vehicles are ecofriendly. The electrical vehicles manufacture by many industries but there is lack of charging station. The time required for charging is more. Electric vehicles. So, the demand of this vehicle Therefore people are not move towards the is less in India as compared to other country.

Electrical charging unit is an element in infrastructure that supplies electric energy for the recharging of vehicles, such as plug in electric vehicles including electrical car, plug in hybrid, etc. The charging electrical vehicles have fundamental and practical applications for sustainability.

The solar charging stations utilize solar PV modules to generate the electrical energy to charging vehicles thus the solar charging unit consist of charging circuit, battery, switch board, etc. thus the solar panel will convert sun energy into electrical energy which stored in battery via battery charging circuit this

circuit protect battery from over charging. This circuit disconnected battery automatically when battery is fully charged. The battery is lead acid battery which acts as energy sources for charging electric vehicles plug is connected in electric vehicles for charging the battery.

II. DESCRIPTION

A. Solar Panel:

Photovoltaic modules used light energy (photon) from the sun to generate electricity through the photovoltaic effect. The PV module is an assembly of photovoltaic cells mounted in a from work for installation.

The polycrystalline solar panel is lower efficiencies than monocrystalline solar panel. Polycrystalline solar panel are made from silicon. Their advantage is a lower price point. The polycrystalline solar panel are also referred to as "multicrystalline", or many – crystal silicon. Because this are many crystals in each cell, there is to less freedom for the electrons to move. As a result, polycrystalline solar panel have lower efficiency rating than monocrystalline panel. Polycrystalline tend to have slightly lower heat tolerance than monocrystalline solar panel. The heat can affect not only the performance of polycrystalline solar panels but it projected to substantially shorten their life span. Thus, panel also less efficient in low light condition.

B. Battery Charging System:

The battery charging circuit is use to protect the battery from excessive charging. It disconnects automatically when battery is fully charge. We use the lead acid battery act as an energy source for charging electrical vehicles. the plug is provided for to connect the battery to electrical vehicle for charge the electrical vehicles.

C. Battery:

The purpose of the battery is to supply the necessary current to the starter motor and the ignition system while cranking to start the engine. Lead-acid battery is an electrochemical that produces voltage and delivers current to start the vehicles. When automobile is running the battery, electrochemical action is reversed, recharging the battery and allowing it to have many years of service. The battery is charged up to the limit. through the battery charging system. Thus, the battery also be use in the car (electrical vehicles).

D. Motor:

Motor is connected to drive the car. Motor converts electrical energy from solar panel to mechanical energy. In this model dc motor is used which is of rating.

III. BLOCK DIAGRAM

a) Block Diagram of Charging Station:

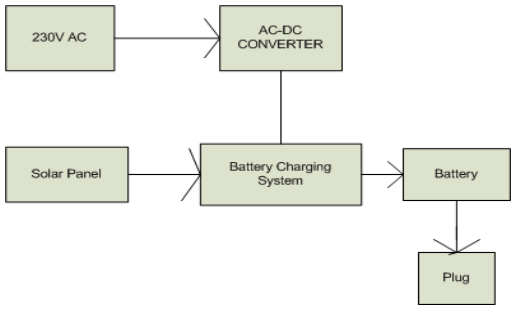


Figure (a). Block Diagram of Charging Station

The EV charging system path diagram shown in below fig.(a). thus, the charging the electrical vehicle through the solar panel and battery thus the solar panel and battery will connected through the medium which will be charging unit.

The main objective of this system is to charge the electrical vehicle through the sun light, and storing

energy to the battery and for the backup we provide the grid supply to the battery. The solar panel will work by absorbing the sunlight with photovoltaic cell, generating direct current energy then thus the energy supply towards the battery charging circuit for to charge the battery. The battery charging circuit is use to protect the battery from excessive charging. It disconnects automatically when battery is fully charge. We use the lead acid battery act as an energy source for charging electrical vehicles. the plug is provided for to connect the battery to electrical vehicle for charge the electrical vehicles.

In the case of absence of sunlight, we provide grid connection as a backup source thus the grid provides the 230V AC supply for charging the battery. Thus, the AC supply will be converted into DC for the charging circuit through the AC to DC convertor that provide the DC source to charging circuit for charge the battery.

b) Block Diagram of Electrical Vehicle:

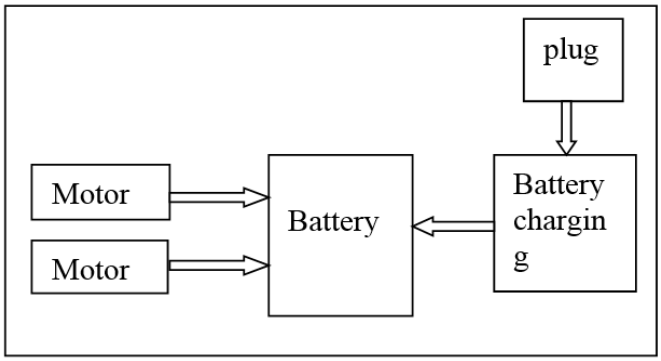
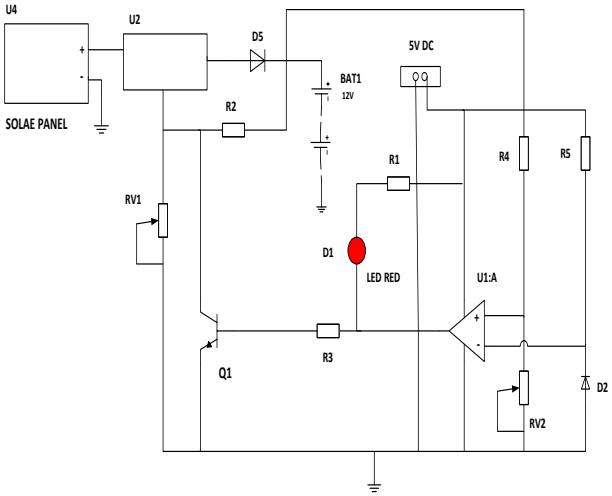


Figure (a). Block Diagram of Electrical Vehicle

Figure (b). Shows the block diagram of electric car using solar technology. It consists of plug, battery, battery charging circuit and motor which drive car.
The battery in charging circuit of charging station is connected to plug, plug in electric vehicle is connected with battery charging circuit in electric car. The battery is charged through battery charging circuit available in electric car whenever the battery is fully charged it disconnect the energy flow to avoid the overcharging of battery. Battery is connected to motors which drives the vehicle. An EV charging system can provide even faster charging during the day when few solar panels are producing electricity.

c) Circuit Diagram:



IV. OPERATION

The circuit diagram is given as above. It consists of solar panel, voltage regulator, diode, transistor, op-amp, LED, transistor, variable resistor, Zener diode, battery, connector. A solar panel used to convert solar energy to electrical energy it has two terminal one is ground and other is connected to voltage regulator LM 317T which is used to adjust the voltage for battery charging circuit. Diode is connected in series with voltage regulator in forward bias to avoid returning path for current for protect battery from overcharging. Whenever desired supply is supplied from op-amp LED glows and transistor act as a cut-off region and the power is passes to voltage regulator it continued the supply to battery. If the desired supply is not given from op-amp LED does not glow and transistor act as saturation region. The Voltage

regulator stop the supply to avoid overcharging of battery. Since battery is fully charged it connected to motor which drives the car.

V. CONCLUSION

Solar power is a renewable source of directly useable energy and ultimately creates other energy resources: wind, biomass, hydro power and wave energy. Efficient utilization of solar energy involved choosing proper component that provide the required energy capacity to charge electric vehicles. Since the solar generation and charging occurs during day time thus the cars are charged during working hours. Car is charged using photovoltaic module thus it is eco-friendly. Since the requirement of fuel and vehicles increases as population increases gradually. Hence due to this requirement of solar energy dependent vehicle is increased which will have significant effect on decreasing carbon emission during the day which is main human concern.

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Proud-Crowd - A College Social Network

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ABSTRACT

PROUD CROWD " is a website which has been implemented on the idea of well-connected people that belongs to technical field. This website is for multiple purposes like technical, education and connectivity between every person of their following department. The growing demand of engineers in the industry makes it very important for the students to know about the practical use of technologies that are taught in the college and also to know about the forth-coming technology that the industry works with. Thus, a platform where students can interact with the industry professionals would prove to be a great benefit for them. Anyone can post and share their ideas like videos, research papers.Every individual whether it may be a student or a teaching staff or an alumni , can share their knowledge with the person they want. Here ,the meaning of socializing is not related to only sharing posts, we are creating a bridge of communication that will enhance and create a basic awareness of the technologies developing all around. Every person will have their personal profiles for sharing posts. Students will have a major advantage of getting all the social as well as professional information. Faculty will get a advantage of sharing their information

Keywords : PROUD CROWD, Micro-Blogs, Wikis, Social Networking

I. INTRODUCTION

Social media is an internet-based form of communication. We all know about the increasing use of social networking sites, people use various social media platforms counting on their requirements and interest. College social network helps us in creating a communicating bridge among all. There are many varieties of social media, including blogs, micro-blogs, wikis, social networking sites, photo-sharing sites, instant messaging, video-sharing sites, podcasts, widgets, virtual worlds, and more. Student usually waste their time scrolling posts and feeds which does not help them in gaining knowledge and information but when such kind of platform is modified for the student's academic purpose it can be of great use. Social media is a dynamic platform that can be used in so many ways to share news, knowledge, teaching, learning and connected to students of other universities as well. We are developing this app to create a connectivity between the teachers-students and students of different engineering colleges/universities. This application is to notify a student about various college events and placement opportunities along with all credential notices. Students would be able to post and receive any important notifications regarding to various activities ,subject related queries and official updates. The user can be able to view the research conducted by teachers and department of their college as well as of others. It will promote teaching and learning through a more transforming platform. This sites provide a vast amount of information useful for educators and

thus make students learn dexterously discriminate between what information is useful for them and what is not. Thus, college social network not only play a vital role in connecting students and teachers but also play an escalating role in education.

II. LITERATURE REVIEW

2.1 EXISTING SYSTEM

College Social Network. This is a college and university messaging app. Principle and head of departments can send messages, notices, event-details, images, videos, links, to a single student, group of student, department wise or entire college. Attendance management , new sounds in liked posts, Colour introduce for student attendance.

Facebook is an American online social media and social networking service company based in Menlo Park, California. [1] It was founded by Mark Zuckerberg, along with fellow Harvard College

students and roommates Eduardo Saverin, Andrew McCollum, Dustin Moskovitz and Chris Hughes. It is considered one of the Big Four technology companies along with Amazon, Apple, and Google. Facebook relies on its users to generate the content that bonds its users to the service. The company has come under criticism both for allowing objectionable content, including conspiracy theories and fringe discourse, and for prohibiting other content that it deems inappropriate.

[2]**Instagram** is a photo and video-sharing social networking service owned by Facebook, Inc.[3] It was created by Kevin Systrom and Mike Krieger, and launched in October 2010 exclusively on iOS. [4]A version for Android devices was released a year and half later, in April 2012, followed by a feature-limited website interface in November 2012, and apps for Windows 10 Mobile and Windows 10 in April 2016 and October 2016 respectively. The app allows users to upload photos and videos to the service, which can be edited with various filters, and organized with tags and location information. [5]An account's posts can be shared publicly or with pre-approved followers.[6] Users can browse other users' content by tags and locations, and view trending content. Users can likes photos, and follow other users to add their content to a feed. It is a Social Network Focussing on Sharing pictures ,innovative ideas that students wish to see.

2.5 SUMMARY

The overall description of our project is that PROUD-CROWD (a social networking site) has designed for the comfort of students as well as faculty of the college. This project is being implemented on the core idea of socially connecting every person who belongs to technical field. This application is for multiple purposes like technical, education and connectivity between every person of their department. It is the platform where students can interact with teachers and can easily clear their doubts by chatting. Every individual whether it may be a student or a teaching staff or an alumni, can share their knowledge and experience with the person they want. Here, the meaning of socializing is not related to only sharing posts, we have created a bridge of communication that will enhance and create a basic awareness of the technologies developing all around. Every person will have their personal profiles for sharing posts. Students will have a major advantage of getting all the social as well as professional information. Faculty will get an advantage of sharing their information. This application is to notify a student about various college events and placement opportunities along with all credential notices. Students would be able to post and receive any important notifications regarding to various activities , subject related queries and official updates.

III. PROPOSED WORK

3.1 Proposed system

Modules divided:

1 Signup/Registration: Primarily the user has to register in this app. Student can register into the system once their registration is approved by the admin, they can login into the system.

2 Login: After registration user will login for entering inside the portal.

3 Home page: Once the student logged in into the system, various submodules get opened the submodules are search bar, post, timeline, notification, profile and chatbot. Students can write and post an article on various educational related topics and they can also upload images with their post.

Students from various college connect with the students of another college and

also, they can chat with other students. All the students can view news feed posted by individual student.

2.2 TECHNOLOGY USED

2.2.1 Angular7

Angular7 is a JavaScript (actually a TypeScript based open-source full-stack web application) framework which makes you able to create reactive Single Page Applications (SPAs). Angular 7 is completely based on components. It consists of several components which forms a tree structure with parent and child components. Angular's versions beyond 2+ are generally known as **Angular** only. The very first version Angular 1.0 is known as **AngularJS.** **For Example :** import { BrowserModule } from '@angular/platform-browser';

```
import { NgModule } from '@angular/core';
import { AppRoutingModule } from './app-routing.module';
import { AppComponent } from './app.component';

@NgModule({
  declarations: [
    AppComponent
],
imports: [
BrowserModule,
AppRoutingModule
],
providers: [],
bootstrap: [AppComponent]
})
export class AppModule { }
```

2.2.2 CSS language:

CSS stands for **Cascading Style Sheets.**

- CSS describes **how HTML elements are to be displayed on screen, paper, or in other media**
- CSS **saves a lot of work**. It can control the layout of multiple web pages all at once
- External style sheets are stored in CSS files

For Example:

```
StyleUrls: ['. /hero-app.component.css']})
template: `
```

```
<h1>Tour of Heroes</h1>
    <app-hero-main [hero] ="hero">
    </app-hero main>
Export class HeroAppComponent {/* . . . */ }
```

2.3 Supporting Technology 1 (MySQL)

2.3.1 MySQL:

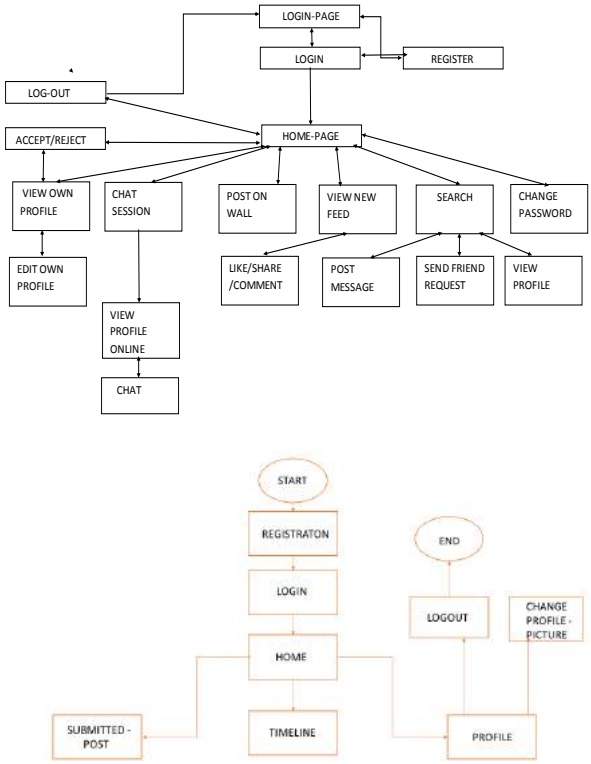
MySQL is free and open-source software under the terms of the GNU General Public License, and is also available under a variety of proprietary licenses. MySQL was owned and sponsored by the Swedish company MySQL AB, which was bought by Sun Microsystems (now Oracle Corporation). In 2010, when Oracle acquired Sun, Widenius forked the open-source MySQL project to create MariaDB. MySQL is an open-source relational database management system (RDBMS). Its name is a combination of "My", the name of co-founder Michael Widenius's daughter and "SQL", the abbreviation for Structured Query Language. MySQL is also used by many popular websites, including Facebook.

2.4 Supporting Technology 2 (MVS)

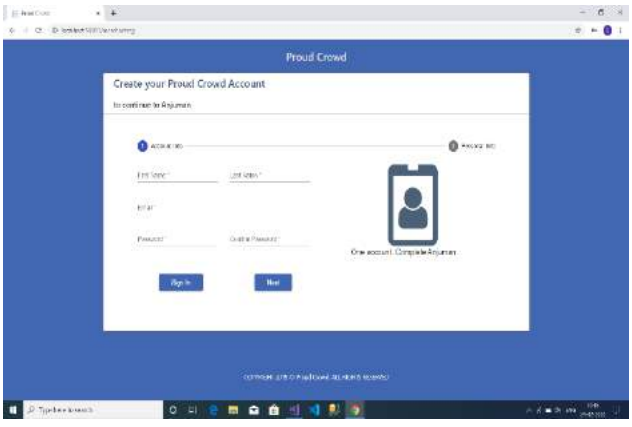
Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs, as well as websites, web apps, web services and mobile apps. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code. Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works both as a source-level debugger and a machine-level debugger. Other built-in tools include a code profiler, forms designer for building GUI applications, web designer, class designer, and database schema designer.

IV. IMPLEMENTATION DETAILS

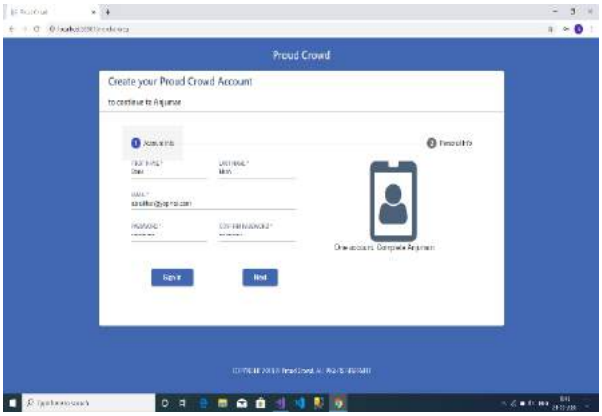
4.1 DIAGRAM



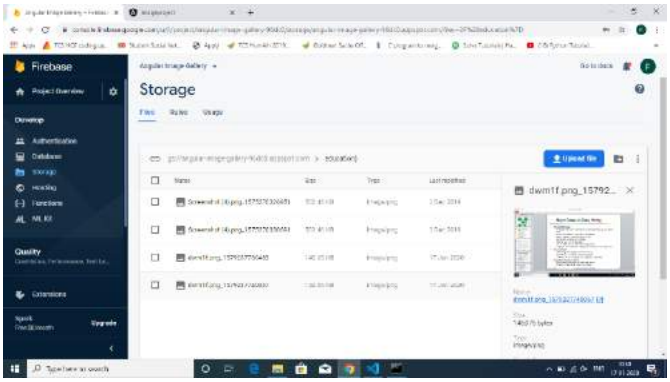
4.2 MODULE -1



Fig(a)

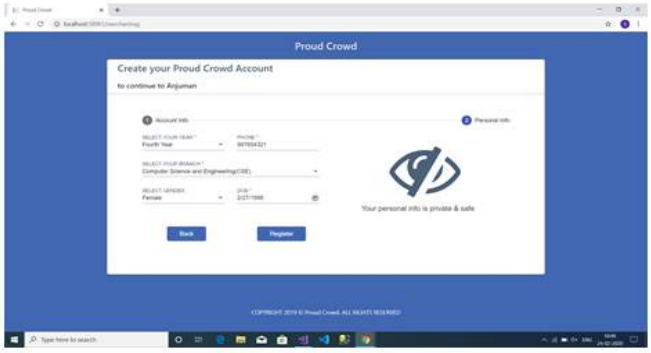


Fig(b)



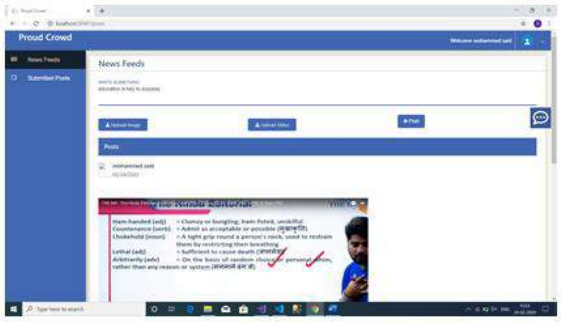
Fig(g)

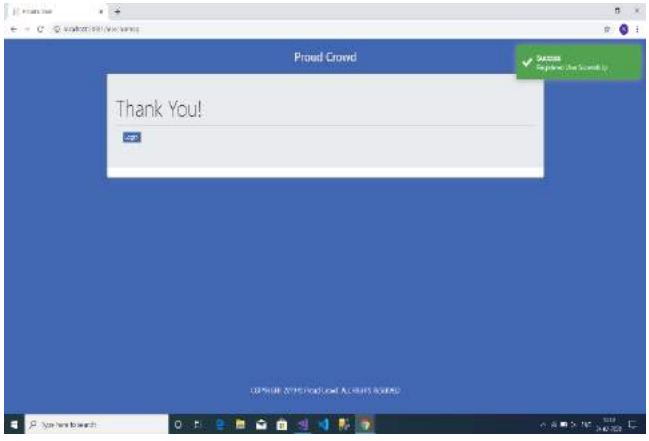
4.3 MODULE-2



Fig(c)

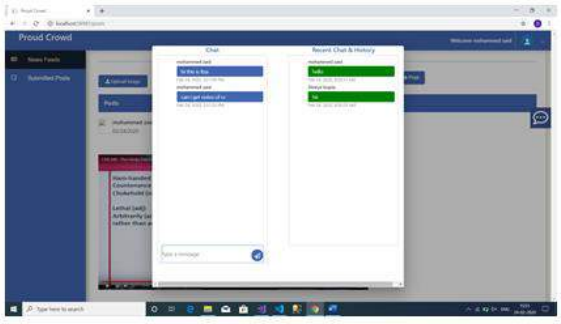
Post:



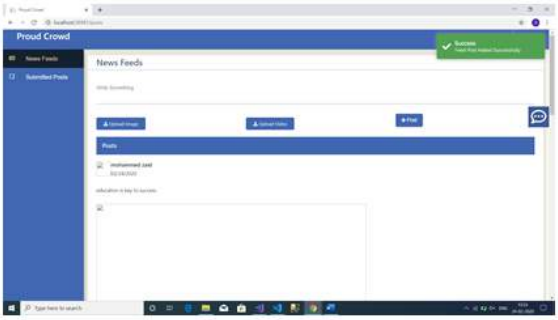


Fig(d)

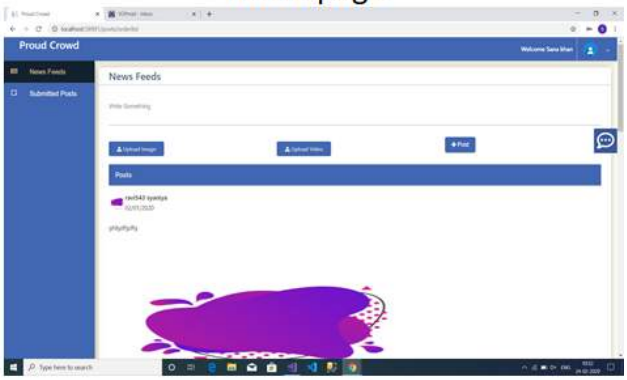
Chat:



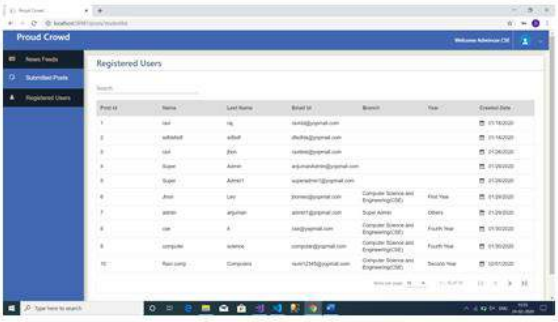
Timeline:



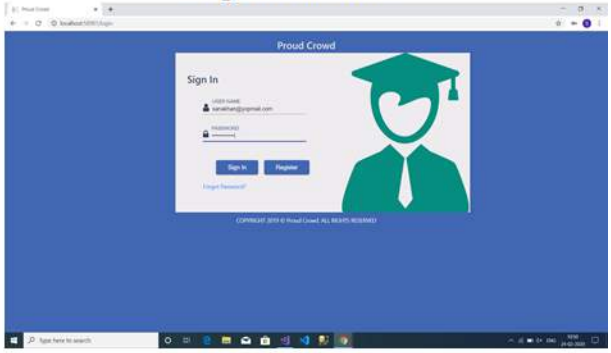
Home page:



Admin module:

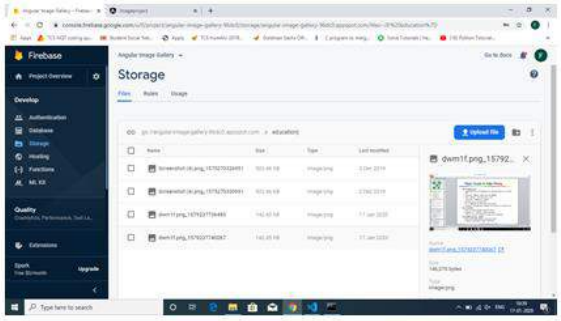


Sign In module:



Departments

Backend



V. CONCLUSION

Throughout this project our aim is to develop a web application that provides maximum resources to the students at one time. This will allow student to interact with other students of their department as well as this will also allow to interact with teachers. The project objective is to build the application which would beneficial for college as well as students. This application serves according to the basic needs of the students related to their education purpose. This system is based on social, educational and professional awareness among everyone. We are spreading knowledge by using this social platform. This will be useful for every person, as they will get to post their ideas and information. This social network is very secure and informative for every person. Students can make more friends within short span of time. Students and Faculties will be updated with new thoughts and views.

Faculties can share information and useful knowledge by using this application. This will provide connectivity between all the college members and students. It will also be enhanced learning management systems and also provides access to information. Increase in the exposure of diverse views. Allows the users to post their course material, quizzes, assignments and other sources related to education and also give them permission to access the posted content.

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Performance Analysis of Single-Phase Inverter

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ABSTRACT

This paper deals with the simulation and design of 1kw, 230 volt & 50 Hz inverter. The elementary purpose of this device is to transmute 12V DC to 230V AC. We design a low cost inverter circuit using MOSFET motivated by an growing demand due to frequent power shortage. The system is design with microcontroller (ATMEGA 328) for control circuit. A 5 volts regulator (IC 4047) is used to supply fix 5V for biasing the switching and amplifying circuitry. Pure sine wave inverter are demand of modern era whenever it comes to utilization of DC power sources for both low and high power application. These inverters not only increase the efficiency of power system but also prevent the electrical component from damaging. In recent time research has been carried out on producing cost effective and efficient pure sine wave inverter. And the design of the paper proposes highly useful for low power-based application. MATLAB/SIMULINK software is use for simulation & verification of proposed circuit of inverter. The main advantage of this inverter is providing backup up to 1kw load.

Keywords : Mosfet, Zener diode, Square Wave

I. INTRODUCTION

Inverters have taken a prominent role in the modern technological world due to the sudden rise of electric cars and renewable energy technologies. Inverters are used in power system to covert direct current (DC) power from batteries or PV arrays into alternating current (AC) power.

An inverter is a device that changes DC voltages into AC voltages. A direct current is a current that flows in only one direction, while an alternating current is that which flows in both positive and negative directions. Modern inverters use solid-state designs and microprocessor controls to produce high quality AC power very efficiently.

As the technology advances, the hydroelectric generations were developed, gas firing generating station, and weird tubing methods of generating power supply were developed. In spite of all these developments, there was still failure in electrical power generations as a result of obsolete equipment at the generating stations. The electrical inverter is a high-power electronic oscillator. It maintains a continuous supply of electric power to the connected loads or equipment's when the utility power is not available. Inverters are generally used in a host of applications that include variable speed drive, uninterruptible power supplies, flexible AC transmission system (FACTS), high voltage DC transmission systems (HVDC), active filters among the others. It is inserted between the source of power (typically commercially utility power) and the load is

protecting. The inverter performs the opposite function of a rectifier.

For alternative energy systems, inverters are the essential step between a battery's DC power and the AC power needed by standard household electrical systems.

In a grid connected home, an inverter/charger connected to a battery bank can provide an uninterruptible source of backup power in the event of power failures or can be used to sell extra alternative energy power back to the utility company. Batteries produce power in direct current can run at very low voltages but cannot be used to run most modern household appliances. Utility companies and generators produce sine wave alternating current (AC) power, which is used by most commonly available appliances today. Inverters take the DC power supplied by a storage battery bank and electronically convert it to AC power.

An inverter is a device that takes a direct current input and produces a sinusoidal alternating current output. An inverter needs to be designed to handle the requirements of an energy hungry household yet remain efficient during periods of low demand. The efficiency of inverter is highly dependent on the switching device, topology and switching frequency of the inverter. Alternating current (AC) power is used as a power source as well for transmission purpose because it can be generated and converted from one voltage to another. Transmission of AC power over long distance is still in use, however it results in relatively high transmission loses. The types of loses are transient stability problem and operational requirements such as dynamic damping of electrical system may also arise along the transmission line

II. LITERATURE SURVEY

2.1. Inverter

An electrical device that converts DC power into AC power at coveted yield voltage and frequency is called an Inverter. Phase controlled converters when worked in the inverter mode are called line commutated inverters. Be that as it may, line commutated inverters at the yield terminal requires a current AC supply which is utilized for their replacement. This implies line commutated inverters can't work as separated AC voltage sources with DC power. In this way, voltage level, frequency and waveform on the AC side of the line commutated inverters can't be changed. Then again, drive commutated inverters give an autonomous AC yield voltage of movable voltage and movable frequency and have accordingly much more extensive application.

Inverters can be comprehensively characterized into two sorts in view of their operation:

- Voltage Source Inverters (VSI)
- Current Source Inverters (CSI)

Voltage Source Inverters is one in which the DC source has little or immaterial impedance. At the end of the day VSI has firm DC voltage source at its information terminals. A present source inverter is bolstered with movable current from a DC wellspring of high impedance, i.e. from a firm DC current source. In a CSI encouraged with firm current source, yield current waves are not influenced by the load. From view purpose of associations of semiconductor gadgets, inverters are named under

- Bridge Inverters
- Series Inverters
- Parallel Inverters

2.2 Single Phase Half Bridge

It comprises of two semiconductor switches T1 and T2. These switches might be BJT, Thyristor, and IGBT and so on, with a recompense circuit. D1 and D2 are called Freewheeling diode as they criticism the load reactive power.

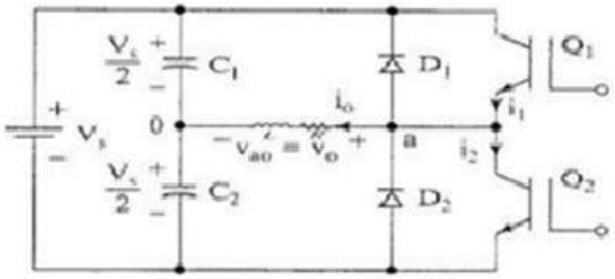

Figure 1. Circuit Diagram of Single-Phase Half Bridge Inverter

2.3 Full Bridge VSI Inverter

The S1-S4 are solid state component that can be used in inverter are transistor, IGBT, MOSFET or SCR.

When S1 and S2 are ON current flow from S1-Load-S2.

When S3 and S2 are ON current flow from S3-Load-S4.

This is the basic technique that produces a square AC. We all know the frequency of available power supply is 50Hz. This means that we need to turn the switch ON and OFF 100 times in a second. For this we have semiconductor switches such as MOSFET, they can turn ON and OFF several times with the help of control signals easily.

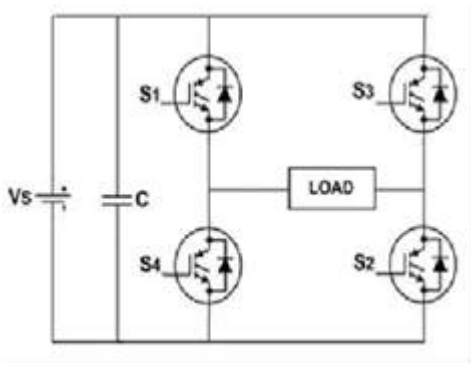

Figure 2. Circuit Diagram of Single-Phase Full Bridge Inverter

III. BLOCK DIAGRAM

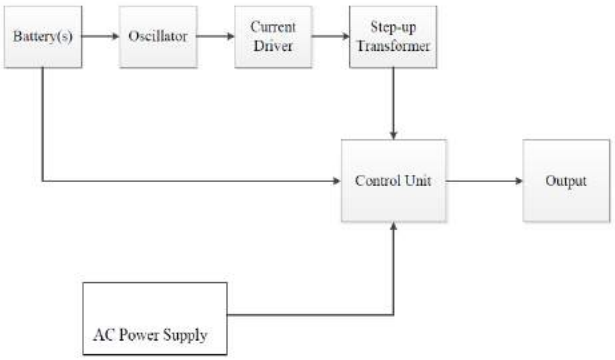

Figure 3. Block Diagram

IV. CIRCUIT DIAGRAM

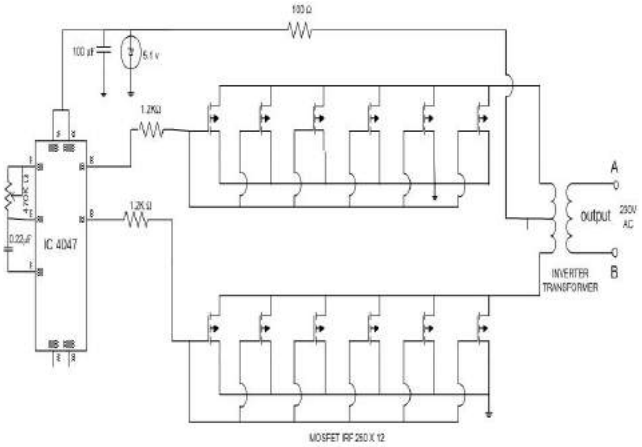

Figure 4. Circuit Diagram

V. SYSTEM SPECIFICATION

Inverter and switching devices specification are illustrated below;

INPUT VOLTAGE	12 VOLT (DC)
INPUT CURRENT	25 AMP
MAXIMUM OUTPUT POWER	1000 WATT
OUTPUT VOLTAGE	230 VOLT (AC)
OUTPUT CURRENT	4.34 A(AC)
INPUT FREQUENCY	NIL
OUTPUT FREQUENCY	50HZ

VI. DESIGN PROCESS

We had done both software simulation and hardware implementation of this inverter. Both are illustrated below

(1) Software simulation design
We have used MATLAB software for simulation of inverter circuit

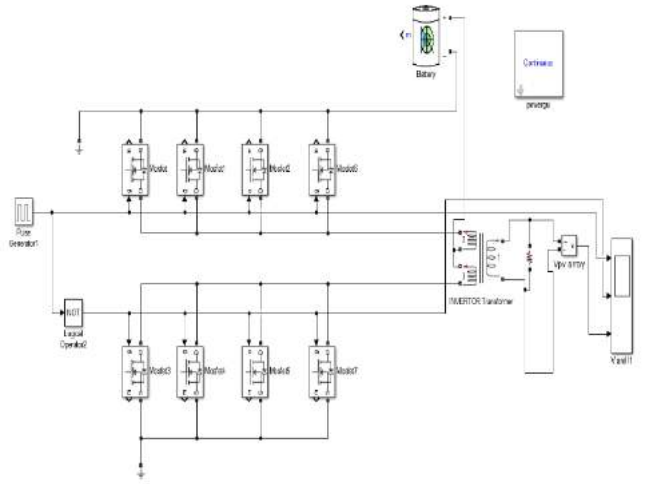

Figure 5. MATLAB Simulation design of proposed inverter circuit

(2) Hardware design

- 12-volt DC battery (for testing purpose we are using DC battery).
- Zener diode is used for regulating 5V for biasing the IC4047
- IC 4047 for the drive circuit and for generating and triggering switching pulse.
- 12 volt/230volt centre-tapped transformer for implementing the inverter.
- Microcontroller Arduino ATMEGA328 was used for charging the battery.

VII. OUTPUT WAVEFORM

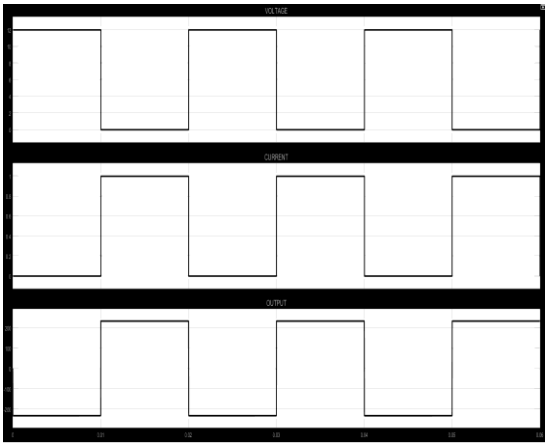

Figure 6. Final output for inverter pure AC signal

VIII. CONCLUSION

This paper discusses the simulation and hardware implementation of single-phase inverter. This paper has presented a single phase 230-volt 1000 W inverter. The main objective of this paper was to simulate the inverter circuit and fabricate the inverter. AC can't be stored for future use whereas DC can be stored in battery & it can be converted back to AC by using power inverters when require. It is optimal solution of converting AC to DC. The harmonics can be reduced by selecting the appropriate modulation indices. By increasing the levels, we can reduce harmonics in output voltage waveform.

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Loom Automation and Monitoring System : A Review

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ABSTRACT

A loom is a device used to weave cloth and tapestry. The basic purpose of any loom is to hold the warp threads under tension so that the interweaving of the weft threads can be done. A power loom is a mechanized loom powered by a line shaft and alcohol. Power Loom played a key role in developments of weaving industries during the early Industrial Revolution. There are number problems that affect the quality of loom. This includes problems like empty bobbin, weft cut etc. and to solve these problems many methodologies have been proposed. In this article we have tried to review the various available techniques as far as loom automation is concerned .We have tried to focus on the methodologies used and on the basis of the review carried out we propose to develop a weft end detection techniques based on microcontroller which will be useful in determining the end of the weft before it finishes off and thus would help in quick replacement of the weft thereby saving a lot of crucial time leading to improvement in efficiency of the system.

Keywords : Loom Automation, Data Transmission (Bluetooth, Wi-Fi), Intelligent Monitoring, Laser Based Feature Detection, Convolution code, Adaptive Slicing Method

I. INTRODUCTION

The history of weaving shows that men have been continuously working on problems which occur during production in textiles and through these many inventive techniques have been brought into account to reduce these problems. There are not enough weavers in the industries, and the in- take of new recruits is insufficient. Wages in the textile industry have altered a great deal since the war and this has increased the wages of the weaving operative. Manufacturers are obtaining a very much' better price for the cloth which they produce, and, although we are supposed to be approaching a buyer's market, these prices will probably hold for some time. The chief results of these three reasons for increased interest are that it becomes essential for one operator to handle more number of machines at the same time in order to maintain proper volume of output it is essential on account of higher wages that each operator should produce more fabric, and lastly, because cloth is selling at a better price, the manufacturer is in a better position to pay more for new machinery. For rapid industrialization, it is necessary to concentrate more on small scale industries. As a result the basic problems like unemployment, shortage of foreign exchange and paucity of capital will be made more noticeable or prominent. Under such circumstances, small scale industries are undoubtedly better suited, since they are labour intensive and capital saving.

II. Literature Survey

Kunal Joarder and Daniel Raviv have proposed that the concept of visual looming can be used as a powerful tool for autonomous obstacle avoidance. They have also proposed the concept of avoiding collision and to calculate the thread hence the visual looming is related to an increased projected size of an object on a viewer's retina as the relative distance between the viewer and the object decreases. Mark. Hassel has proposed that the concept of the thread detection including the feature detection system. Jurgen Freudenberg, Martin Bossert, Victor V. Zyablov, and Sergo Shavgulidze have proposed that the variations of the woven codes of outer warp can be done by means of a convolution codes and block code.[11]

Below table shows some references proposed to solve various problems which occur in automatic loom

Sr. No.	Topic	Author`s	Conclusion
1.	Automation Power Loom System	Ms.S.Sharmila, A.Imran, T.Karthick, R.Saravana Pandi, A.Sriprabhu	The Monitoring and controlling the design operation of a microcontroller based weaving system can be done with help of automation. Automation Replaces the old conventional methods and takes a step forward towards mechatronics and automation applications.
2.	Loom Data Monitoring using Wireless Technology	M. H. Shenassa	Data transmission using wireless technology can be done with use of Bluetooth Or Wi-Fi technology. Data Transmission is quite often necessary in industries to transmit time-critical control signals between sensors, actuators and the automation network.[9]
3.	Intelligent Monitoring System for Production Management in Power loom	E.Prasanna Kumar, P.Karuppusamy, D.Santhosh Kumar, C.Sowndharsekar, S.Venugopal	For proper management the system should always be under the surveillance of the manager. This can be done with the use of intelligent monitoring system where the information related to production and running time of machine is send to the manager through which the system can be properly managed.

4.	Automated de-manufacturing studies in detecting and destroying, threaded connections for processing electronic waste	Michael Bailey-Van Kuren	With the help of automated de manufacturing the electronic waste can be detected and destroyed automatically. Feature detection is performed through the use of stereo machine vision with a simple search algorithm.[6]
5.	The development of a new adaptive slicing algorithm for layered manufacturing system.	Jyh Hwa Tzou, R.C. Luo, Yi Cheng Chang	According to this algorithm, the 3D CAD model can be sliced with different thickness automatically by comparing the contour circumference or the centre of gravity of the contour with those of the adjacent layer. Thus we can conclude that the fabrication in adaptive slicing method can requires less time than fabrication through uniform slicing method.
6.	Laser based feature detection system including internal thread detection	M. Hassel	Laser-based inspection to check the presence of threads can be done by presenting the components to the inspection system on a moving conveyor belt. As the component passes the laser inspection station, if threads are present, laser light is scattered back from the threads and into a laser detector. If no thread is present, the laser light continues on its path, and will reflect off the component at its normal incident angle.[3]
7.	Woven codes with outer warp: variations, design, and distance properties	Jurgen Freudenberger, Martin Bossert, Victor V.Zyablov, Sergo Shavgulidze	With the help of the lower limits of the analytical delimitation technique at the minimum distance of the convolutional codes of the fabric, interlaced block codes, series chained codes and interlaced turbo codes can be derived. With the help of simulations, it is possible to derive the upper limits of the minimum distance for some particular codes.[4]

8.	A Numerical Model of the weft yarn filling insertion process in rapier looms	Fabio Previdi, Sergio M. Savaresi	This method is used for predicting weft yarn breakage and to design tension control systems by weft braking action. Each element can interact only with the nearest neighbours by a viscoelastic interaction. The resulting model has lumped parameters and it is completely described by a set of ordinary differential equations.[8]

We have tried to focus on the methodologies used and on the basis of the review carried out we propose to develop a weft end detection techniques based on microcontroller which will be useful in determining the end of the weft before it finishes off and thus would help in quick replacement of the weft thereby saving a lot of crucial time leading to improvement in efficiency of the system.

III.CONCLUSION

Thus we conclude that we have been able to carry out the review of various techniques which have been implemented for loom automation and weft cut detection. On the basis of literature survey we also conclude that there is a need to develop a technique base on microcontroller which can detect the weft cut automatically thereby helping to improve the efficiency of the system

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Strengthening Women Empowerment through Governmental Policies in India

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ABSTRACT

Women empowerment has been one of the most debated issues which called attention from the various sections of the modern world. The paper aims at analyzing whether women empowerment in India will gain momentum through governmental policies. Women empowerment simply means confident and stronger to claim ones right i.e. when it comes to addressing human rights and development. In India governmental policies has been launched to focus on education to women, gender discrimination and discrimination of caste, creed and religion. Today society opinion towards women empowerment depends upon the involvement of women in various fields. The changing attitude of male towards women shows positive growth. India being the largest democratic country in the world needs women empowerment to take its momentum to the global platform. The aim of this paper is to present that what are the various policies implemented by the government to empower women from all sections of the society.

Keywords : Women Empowerment, India, Governmental Policies, Society, Law.

I. INTRODUCTION

The concept of power is indispensible for conceptualization the empowerment of women. Power may be viewed as an ability to exert influence. But the concept of power and empowerment are two different terms and should be dealt diligently. Today the force of power is a big question dealing with women empowerment in a descriptive method. On the other hand policies have become perspective. Empowerment is only the procedural concerns when it comes to addressing human rights and development. When it comes to women empowerment in India, there is a need of a strong framework which will be used in order to analyze it. The framework of gain and control over individual assets as well as societal resources, control over political sphere, understanding law and able to redress legal structures and control their income and labour.

II. REVIEW OF LITERATURE

Empowerment is a process which relates to the power of an individual to redefine her possibilities and options and to have the ability to act upon them (Eyben et al 2008:5). Kabeer (2001:19) defines empowerment as "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them." Jejeebhoy and Sathar (2001) compare women's autonomy in India and Pakistan, looking at the influence of region and religion. In their study women's autonomy includes four dimensions: economic decision-making, mobility, freedom from threat from husband and access to and control over resources, to create a summary index of autonomy. Jejeebhoy and Sathar find that there is a large variation in the levels and determinants of women's autonomy in South Asia. They find that region plays a greater part in shaping women's autonomy than religion or nationality. Jejeebhoy (2002) studies the convergence and divergence in spouses' perspectives on women's autonomy in India and investigates the influence of these perspectives on reproductive outcomes, such as contraception, unmet need, recent fertility and spousal communication. Women's autonomy is divided up into an index of mobility, an index of decision-making and an index of access to economic resources. She finds only a loose agreement between spouses when it comes to women's autonomy and that husband's are more likely to express a relatively liberal picture of their wives' autonomy. The results show a clear regional divide in the influence of the spouses' perspectives on reproductive health outcomes. Mohanty (1995) identified that the following factors affecting women empowerment in India are-

1. Patriarchal value system.
2. Social attitudes and practices
3. Power level of political participation of women
4. Lack of legal awareness.
5. Poor economic status.

A brief review of recent literature on women empowerment provides an interesting expose to the diverse ideological strategies followed by the scholars to analyze the women's issues. These approaches can broadly be classified as-

III. LIBERAL APPROACH

In this approach economic opportunity and property right, participation in decision making both in family and in public sphere, participation in production process, control over productive resources, right to reproductive health, equal access to institutionalized credit, etc. the adverse condition at workplace both in the developed and developing industrial societies have their adverse effects on the women workers (Desai & Krishnaraj 1987, Schuler & Sayed 1991, Kabir, Sen & Caren; Caroline 1996, Banerji, 1991).

RADICAL FEMINIST APPROACH

This approach is based on the belief that, the main cause of women's subordination is rooted in sexual difference. In India, the concept of reproductive technology has however invited a mixed reaction. But the use of scientific rationality that can serve to generate critical stance for self identities of women in modern times cannot be ruled out (Firestone 1970, M.Manorama and Shah 1996, Gelner 1992).

ANDROGYNOUS APPROACH-

It is posed as an alternative to gender polarity. It is meant to overcome the conventional typecasting of each gender. Though androgyny has cultural roots in Indian (Gokhale, S.1990). This approach however ignores the phenomena of deep rooted gender inequalities.

ORGANIZATIONAL APPROACH

This approach has been felt that there can be no possible empowerment of women until dependency relation of the woman is reduced men and women are brought to equal and similar footing.

WELFARE APPROACH

It intends to strengthen primary role of the women in terms of those of child bearing and motherhood. This approach is status-quoits and does not challenge the dominant patriarchal culture as it sees the women as housekeepers, wives, mothers alone and as such does not challenge the gender ideology inherent in it.

The process of women empowerment has not followed a logical sequence of thought and action. It needs a deliberate process of organization and mobilization of the women. The role of the state in empowering women through affirmative action is crucial to accelerate the process towards gender equality. The state has a positive role to play in institutionalizing the participation of women. The affirmative action by the state has played a crucial role in drawing into public politics and local administration in Uganda (Firestone, Sulamith 1970). (Mohanty,1995) stated if reservation for women in panchayat raj institutions are to lead their empowerment in real terms the social, economic and political conditions which facilitate and encourage their participation, need to be created. Ghuman et al (2004) also measure women's autonomy according to women and their husbands, however in five Asian countries. They find that there is a difficulty of measuring gender relations, since the level of women's autonomy depends on if the husbands or wives answer the questions. The disagreement in perspectives between men and women differ between countries, which is not easy to explain.

IV. METHODOLOGY OF THE STUDY

The present study of women empowerment is descriptive. The objectives are:

1. To know the concept of women empowerment.
2. To analyze the programmes for empowerment of women.
3. To identify factors leading to empowerment of women.

TOOLS AND TECHNIQUES OF DATA COLLECTION

Data was gathered from literature and documents of the organization as well as through personal discussions. The library study and literature review was extremely helpful to understand and concretize the concept of women empowerment and the major indicators to reflect the change in the status of women.

GOVERNMENTAL POLICIES AND PROGRAMMES

Within the broad goals laid down by the five year plans, the government consciously fostered an enabling policy environment in which women's concerns are properly reflected, articulated and seriously addressed.

National Perspective Plan for Women (1988) - It was drawn up to facilitate main streaming of women's issues in policies and programme. It aimed at the welfare and development of women, guided by principles and directives to existing development parameters.

Shramshakti-The report of the national commission of self employed women and women in the informal sector (1988) was for the marginalized poor women in both rural and urban areas, to the growth of formal economy.

Report of the National Expert Committee on Women Prisoners (1986)- It studied the condition of women prisoners in the criminal correctional welfare justice system and made a series of recommendation

suggesting legislation, custodial, correctional and prison reforms relating to women prisoners.

The National Plan of Action for the Girl Child (1991-2000) - India is a signatory to the world declaration on the survival, protection and development of children and has drawn up the plan of action implementing it in the 1990s plan of action exclusive for the girl child was prepared in 1992 to take care of her gender specific needs.

Reservation for Women at grass root level in Democratic Institutions (1993) - In 1993 marks historic events in the advancement of Indian women as they ensure 1/3 of total seats for women in all elected bodies in rural and urban areas.

Mahila Samriddhi Yojna (MSY) 1993- The major initiative to empower women by raising their economic status. It aims to promote amongst rural women the habit to save and improve their financial assets and control over their household resources.

National Credit Fund for Women- the ultimate objective of the fund is to help and develop a national network of credit services for women in the informal sector to boost self employment, micro enterprises and small businesses. It benefitted 60,000 women.

Socio Economic Programme (SEP) - It was implemented by central social welfare board (CSWB)the programme of training and employment caters to needy women such as widows, deserted wives, economically backward and handicap women's. 70,000 were assisted through the programme.

Condensed Courses of Education and Vocational Training for Adult Women (CCE&VT) - This scheme also started in 1958 to create opportunities for women in employment through continuing education and vocational training for those who are school dropouts.

V. RECENT INITIATIVES BY INDIAN GOVERNMENT

Recently the Indian Government has also recognized women issues and their contribution to the country's economy. Here are some of the women empowerment initiatives available to women in India.

Seven Indian Government schemes for women empowerment-

1. Mahila E- Haat

It is a direct online marketing where women can register themselves at www.mahilaehaat-rmmk.gov.in and leverage technology for showcasing their work to a broader market.

2. Beti Bachao, Beti Padhao

It is a special campaign to eradicate female foeticide and raising awareness of welfare services intended for young Indian girls.

3. One Stop Centre Scheme

Popularly known as Sakhi, it is established at various locations in India for providing shelter, police desk, legal, medical and counseling services to victims of violence under one roof integrated with 24 hours helpline.

4. Working Women Hostels

The objective of this scheme is to promote the availability of safe and conveniently located accommodation for working women, day care facility for their children, where employment opportunities for women exist.

5. Swadhar Greh

The scheme was launched for rehabilitation of women in difficult circumstances. The scheme provides food, clothing, shelter and care to the marginalized women/girls who are in need. The beneficiaries include widows deserted by their families, women prisoners released from jail and without family support, women survivors of natural disasters, victims of terrorist violence, etc.

6. S T E P

The support to training and employment programme for women scheme aims to provide skills that give

employability to women and provide competencies and skills to become self employed. According to the eight five year plan 50,000 women were benefitted.

7. Nari Shakti Puruskars

Nari Shakti Puruskars are national level awards recognizing the efforts made by women and institutions in rendering distinguish services for the cause of women, especially vulnerable and marginalized women.

VI. CONCLUSION

Based on several analysis it is found that in India poor level of political participation, lack of legal awareness, poor economic status, patriarchal system, culture and practice which affects women empowerment. In rural areas of India that dowry system still exists in form of bride price. The lowest caste confines women from outdoor activities/work. It is also revealed that after so many efforts by the government women lack access to land and assets which is further curtailed by the male relative with the use of brutal physical force. It might be observed that India has enacted many constitutional and legislative provisions for empowerment of women. Many development schemes especially for women have also been launched for improving their fortune. Such measures have started giving positive outcomes relating to women's problems. But the position of women in our country still leaves much to be desired. Top priority should be given in our developmental plans for improving female literacy and creating skills and capability among women for enabling them to stand on their own feet. Unless the process of development is properly engendered, it shall remain endangered. Therefore, our efforts should be directed towards the all- around development of each and every section of Indian women, not confining the benefit to a particular section of women in society, by giving them their due share. It is a must to protect their chastity, modesty and dignity and ensure their dignified position in society. It must be accounted that the primary foundation of women empowerment begins at home. Without removing social stigma, enduring progress and development could not be achieved. For this, the governmental and non-governmental organizations including media and masses should come forward and play an active role in creating awareness in society.

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Hybrid Energy Generation and Power Monitoring Over IOT

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ABSTRACT

Among the race in the countries of the world, Energy consumptions & power requirement is one of the most vital things in the world. Due to increase in the power consumption , conventional energy resources depleting day by day. Owing to considering this and also issue of the global warming and pollution, important of the non-conventional energy resources is increasing . The principal objective of this project is Rural Electrification via hybrid system which includes wind and solar energy. Our intension is to design a wind turbine compact enough to be installed on roof tops. So, we decided to design a vertical axis wind turbine (VAWT) over horizontal axis wind turbine (HAWT). Advantages of VAWT over HAWT are compact for same electricity generation, less noise, easy for installation and maintenance and reacts to wind from all directions .The motto of the project is to produce the energy in an eco-friendly way by using renewable sources of energy and to gain maximum intensity with solar and vertical axis wind turbine for maximum power generation.

Keywords : Wind Turbine, Inverter, DC Genrator, Charge Controller

I. INTRODUCTION

Energy is the basic need for development and the requirement of energy is more due to the rapid increase in world population, technology and other political and economic condition, now a days electrical energy is generated by the conventional energy resource like coal, diesel and nuclear etc. And these are depleting day by day .So, there is an urgent need to switch on to non- conventional energy resources. Solar and wind are easily available in all condition can be good alternative source .With the rise in the demand of renewable energy resources the need of better utilization of these system has aroused. This in turn has given rise to the hybrid energy system, Hybrid Energy System is the combination of the two or more energysystems. Here, two sources are used solar and wind energy .In order to control the hybrid system IOT can be used, IOT(Internet of things) is the inter-networking of physical device embedded with electronic ,software ,sensors and network connectivity that enable objects to collect and exchange data .IOT is used to switch the power supply i.e., wind energy and solar energy of a house through secure website when the grid supply is off, A prototype is designed to control the switching between these two sources of energy. With the advancement in technology provide sensors, metering, transmission, Distribution, and flexibility to consumers of electricity, it can be possible to control the sources of energy of a house by this prototype.

Hybrid renewable energy sources can be used as standalone for supplying power to the load and or as grid-connected for supplying power to the load and selling power to the utility company .Because of the variable nature of the resources, sometimes, renewable systems are used in conjunction with

storage systems .In general, standalone systems require battery and advanced energy management strategies but grid connected systems do not require battery and advanced energy management strategies.

II. CLEANING METHODS AND MATERIAL

Solar Energy and wind Energy:-

Solar energy is widely available throughout the world and can contribute to minimize the dependence on energy imports. In 90 minutes, enough sunlight strikes the earth to provide the entire planet's energy need for one year .Solar PV entails no greenhouse gas (GHG) emissions during operation and does not emit other pollutants. Solar has many benefits like system –friendly deployment, improved operating strategies, like advanced renewable energy forecasting and enhanced scheduling of power plants and also investment in additional flexible resources, comprising demand-side resources ,electricity storage, grid infrastructure and flexible generation.

1.3 Internet of Things and power monitoring:-

The internet of things (IOT) is a system of related computing devices, mechanical and digital machines, objects, people or animals that are provided with unique identifiers and also the potential to transfer data over a network without requiring human - to-human or human-to-computer interaction. Physical items are no longer disconnected from the virtual world, but can be controlled remotely through internet services. In fact –due to their diminishing size, constantly falling price and declining energy consumption – processors, communications modules and other electronic components are being increasingly integrated into everyday objects today.

The monitoring is used to monitor the power with the help of the wifi-module .If any fault can occurs in the solar cell or wind turbines then they can give signal to the cloude and with the help of Wi-Fi module it can be display at LCD. Applications of the monitoring system are in the rooftop solar ,Solar street lights. Consumer products like solar water heating systems; Solar home lighting systems; solar lanterns; solar pumps; solar mobile chargers; solar cookers ; LED solar torch; solar RO plant; solar fan, solar inverters ,etc .can be monitor through this project. Commercial products like solar traffic signals, solar road studs/blinkers and also be monitor through the proposed system. India, where frequent power cut is very common. Due to which it is important to use renewable energy and monitoring it.by monitoring the energy forecast, households and communication and consumption during good weather.

. Component:-

1. ATmega16
2. Potentiometer
3. LCD.
4. Solar Panel
5. Wind mill generator
6. MPPT charge controller.
7. Battery.
8. Wi-Fi module
9. Breakout board.
10. Relay module.
11. Copper clad.
12. Resistors.
13. Capacitor.

III. RESULTS AND DISCUSSION

Solar panel:-

Solar panels are the medium to convert solar energy into the electrical energy. Solar panels can convert the energy directly or heat the water with the induced energy. PV (Photo-voltaic) cells are made up from semiconductor structures as in the computer technologies. Sun rays are absorbed with this material and electrons are emitted from the atoms .This release activates a current. Photovoltaic is known as the

process between radiation absorbed and the electricity induced. Solar power is converted into the electric power by a common principle called photo electric effect. The solar cell array or panel consists of an appropriate number of solar cell modules connected in series or parallel based on the required current and voltage. In fact, direct tapping of solar radiation may be made, either by the generation of electricity from photovoltaic effect of incident solar radiation – using solar cells, or utilizing the heating effect of the solar insolation

Wind turbine:-

The wind energy is a renewable source of energy. Wind turbines are used to convert the wind power into electric power. Electric generator inside the turbine converts the mechanical power into the electric power. Wind turbine systems are available ranging from 50W to 3-4 MW. The energy production by wind turbines depends on the wind velocity acting on the turbine. Wind power is able to feed both energy production and demand in the rural areas. It is used to run a windmill which in turn drives a wind generator or wind turbine to produce electricity.

In fact, the availability of wind is the most important criterion that would determine the deployment of wind turbine in a certain place. By availability it means the wind speed due to which it will rotate the wind turbine so that mechanical energy of the wind is converted into electrical energy through generator. The wind speed decides the efficiency and economy of wind energy application for creating wind farms.

MPPT Charge Controller:-

The maximum power point tracking (MPPT) is a higher efficient DC-DC converter technology compared to "shunt controller" and "pulse width modulation (PWM)" technologies.

Using a non-MPPT charge controller is like connecting the battery directly to the solar module. A traditional charge controller may charge a battery with the voltage that is dictated by the battery. By nature, the voltage of a fully-charged battery is higher than that of a discharged-battery. Consequently, the power drawn by an empty battery is usually lower than that of a full battery.

Wi-Fi Module:-

Wi-Fi is a high speed internet connection and network connection without use of any cables or wires. The wireless network is operating three essential elements that are radio signals, antenna and router. The radio waves are keys which make the Wi-Fi networking possible. The computers and cell phones are ready with Wi-Fi cards. Wi-Fi compatibility has been using a new creation to constituent within the ground connected with community network. The actual broadcast is connected with in sequence in fact it is completed by way of stereo system surf as well as the worth of wires with monitor to classification prone. Wi-Fi allows the person in order to get access to web any place in the actual provided area. You can now generate a system within Resorts, library, schools, colleges, campus, personal institutes, as well as espresso stores as well as on the open public spot to help to make your company much more lucrative as well as interact with their own customer whenever. Wi-Fi compatibility can make surf with stare to company using their inspiring cable television much a smaller amount force down.

Battery:-

The batteries in the system provide to store the electricity that is generated from the wind or the solar power. Any required capacity can be obtained by serial or parallel connections of the batteries. The battery that provides the most advantageous

operation in the solar and wind power systems are maintenance free dry type and utilizes the special electrolytes. These batteries provide a perfect performance for long discharges.

Display:-

It is used to display stored voltage in battery.

Inverter:-

Energy stored in the battery is drawn by electrical loads through the inverter, which converts DC power into AC power. The inverter has in-built protection for Short-Circuit, Reverse Polarity, Low Battery Voltage and Over Load. An **inverter can be defined as** it is a compact and rectangular shaped electrical equipment used to convert direct current (DC) voltage to alternating current (AC) voltage in common appliances. The **applications of DC** involves several small types of equipment like solar power systems. **Direct current** is used in many of the small electrical equipment such as solar power systems, power batteries, power-sources, fuel cells because these are simply produced direct currentand these devices never generate any kind of power because the power is generated by the DC source. In some situations like when the DC voltage is low then we cannot use the low DC voltage in a home appliance. So due to this reason, an inverter can be used whenever we utilize solar power panel.

Microcontroller:-

The microcontroller compares the input of both Power system and gives the signal to the particular relay and charges the DC Battery. The DC voltage is converted into AC Supply by Inverter Circuit. The MOSFET (IRF 540) is connected to the Secondary of the centre tapped transformer. By triggering of MOSFET alternatively, the current flow in the Primary winding is also alternative in nature and we get the AC supply in the primary winding of the transformer. Depending on the environmental conditions, required energy for the system can be supplied either separately from the wind or solar systems or using these two resources at the same time.

Result:-

SOLAR PANEL OUTPUT = 12.5 V
WIND TURBINE OUTPUT = 5 V
TOTAL OUTPUT VOLTAGE

Figure

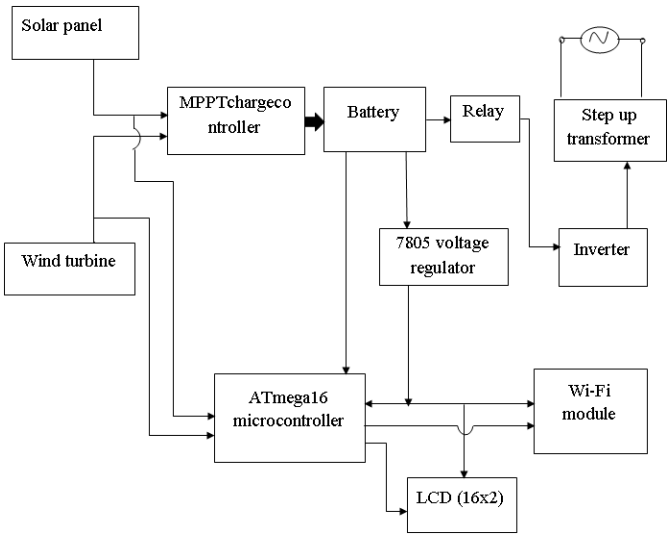

Figure 1: b*lock diagram* of hybrid energy generation and power monitoring over iot''

IV. CONCLUSION

This Paper focused on controlling of hybrid energy system using IOT. There is various combination of energy and all of them are alternative to each other like solar energy, wind energy, bio fuel, fuel cell, etc. But the need of controlling of hybrid energy system arises when it is installed for domestic or commercial purpose. At this point IOT plays an important role in controlling system. The main criteria being switching between the two sources of energy i.e. solar and wind energy without any inconvenience through a website

using NODEMCU Wi-Fi module. The data is transmitted wirelessly through website to NODEMCU module which controls the sources of energy. The transmitted data is controlled remotely using IOT. This enables user to have flexible control mechanism remotely through a secured internet web connection. This system helps the user to control the sources of energy, manually and remotely using smart phone or personal computer. This system is very efficient, cheaper and flexible in operation.

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3D Printer and It's Application

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ABSTRACT

Three-dimensional (3D) printing, also known as additive manufacturing (AM) and rapid prototying, is a process of jointing materials to make objects from 3D model data usually layer-by-layer, as opposed to subtractive manufacturing methodologies. 3D printing is a versatile technique to fabricate a variety types of materials including polymers, ceramics, metals and composites, with customized shapes and dense or macro/micro porous architecture 3D printed objects can be used in many sectors for applications such as manufacturing of knuckle joint cotter joint mould making, cone solid cone etc. Our present paper is focused on a brief overview of bnefits and limitations of 3D priting applications in field of mechanical engineering.

Keywords : Three-dimensional, layer-by-layer

I. INTRODUCTION

3D printing, additionally mentioned as additive manufacturing, could also be a way of basically making a three-dimensional object from a package model. The thing could also be of almost any form. the tactic of creating these objects in largely additive. Within the additive method, an object to be written is made from the base-up by successively adding it to layers of the development material. The additive method could also be contrasted with the subtractive process, where material is removed from a block by methods like sculpting or drilling. the most material utilized within the development of 3D objects is plastic, though recently, there has additionally been a slew of innovation toward using alternative materials like metals of various sorts and additionally organic matter like carbon and its varied derivatives.

II. PRINCIPLE OF 3D PRINTING

The main principle of 3D printing is stereolithography, outlined by Charles Hull during a 1984 patent as “a system for generating three-dimensional objects by making a cross-sectional pattern of the thing to be formed”. This means that any 3D object generated employing a 3D drawing software is first split into layers and these layers are then successively printed by the machine on top if one another.

Step one of 3D printing is that the generation of a 3D printable model. This model is generated using a computer aided design software or via a 3D scanner. A real life object are often set to be 3D printed by scanning it to get a 3D model that's realistically within the bounds of the 3D printer’s capability. Then the STL file is generated by running the planning through a converting software. You can customize various aspects of the design like the layer thickness, temperature, and outer finish, etc. Once the STL file is generated, then the thing is prepared

to be printed. After the designing step comes the printing part. The converted STL file is fed into the printer and consistent with the layers we've anything starting from liquid, powder, paper or sheet material. The layers are automatically fused to urge the ultimate shape. Its advantage over conventional machining techniques is that it are often wont to create almost any geometric shape.

3D PRINTERS

Although most 3D printers are expensive, recently there has been a steep decline within the prices of 3D printers. This has led to it going from being a niche industry novelty to a hobbyist's item. There are many affordable 3D printers that are available for much less than they are worth, if we take all its production capabilities into account. Companies have alsorealized the potential of a consumer marketplace for 3D printers and intrinsically are aggressively courting enthusiasts with cheaper and better models. There are many communities formed around these enthusiast groups which are active on the internet set up to share projects and ideas and new possibilities.

THE APPLICATIONS OF 3D PRINTING

AEROSPACE INDUSTRY

3D printing technology provides unparallel freedom design in production. In aerospace industry, 3D printing technology is using to make lightweight parts, improved and complex geometries, which can reduce energy requirement and resources. by using 3D printing technology, it can lead to fuel savings because it can reduce the material used to produce aerospace's parts. Furthermore, 3D printing technology has been widely applied to produce the spare parts of some aerospace components such as engines. The engine's part is easily damaged, which require regular replacement. Therefore, 3D printing technology is a good solution to the procurement of such spare parts. In aerospace industry, nickel-based alloys is more preferred due to the tensile properties, oxidation/corrosion resistance and damage tolerance.

obtained, the machine starts out laying the plastic out layer by layer. The material needn't be plastic but it are often

AUTOMOTIVE INDUSTRY

3D printing technology have quickly changed our industry to design, and manufacture new things. In the automotive industry, 3D Printing method have made phenomena to bring new shines. For instance, Local Motor had printed the first 3D printed electric car in 2014. Not only cars, Local Motors also extended the wide range application of 3D printing technology by manufacturer a 3D-printed bus called OLLI. OLLI is the driverless, electric, recyclable and smart 3D printed bus. Furthermore, Ford is the leader in the use of 3D printing technology also apply 3D printing technology to produce prototype and engine parts. In addition, BMW uses 3D printing technology to produce hand tools for automobile testing and assembly. Meanwhile, in 2017, AUDI was collaborated with SLM Solution Group to produce spare parts and prototype.

By using 3D printing technology in automotive industry enable company to try various alternatives and emphasize right in the improvement stages, prompting ideal and effective automotive design. At the same time, 3D printing technology can reduce the wastage and consumption of the materials. 3D printing technology can reduce costs and time, and it allows to test new designs in a very fast time.

III. FOOD INDUSTRY

3D printing technology opens the doors not only for aerospace industry, but also for food industry etc. Now there is a growing demand for the development of customized food for such as athletes, children, pregnant woman, and so on which requires a different amount of nutrients by reducing a amount of unnecessary ingredients and enhancing the presence of healthy ingredients. However, the development of customized foods must be conducted in a very detailed and inventive way, which is where the adoption of 3D-food printing appears. Food layer manufacture also known as 3D-food printing

fabricated through the deposition of successive layers by layer derived directly from computer-aided design data. By using 3D printing technology, specific materials can be mixed and processes into various complicated structures and shape. Sugar, chocolate, pureed food and flat food such as pasta, pizza and crackers can be used to create new food items with complex and interesting designs and shape

IV. MEDICAL INDUSTRY

The technique has been applied to (and utilised by) many various industries, including medical technology. Often medical imaging techniques, like X-rays, computerized tomography (CT) scans, resonance imaging (MRI) scans and ultrasounds are wont to produce the first digital model, which is subsequently fed into the 3D printer.

BOI *PRINTING TISSUES AND ORGANOIDS*

One of the various types of 3D printing that utilized in the medical field is bioprinting. instead of printing using plastic or metal, bio printers use a computer-guided pipette to layer living cells, mentioned as bio-ink, on top of 1 another to make artificial living tissue during a laboratory.

These tissue constructs or organoids are often used for medical research as they mimic organs on a miniature scale. they're also being trialled as cheaper alternatives to human transplant.

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Stabilization of Soil Using Polyacrylamide (PAM) Polymer and its Application in Civil Engineering

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ABSTRACT

To enhance the properties of soil and reduce the cost of project, polymer was used as an additive for the improvement of a base material of the road work. Polyacrylamide (PAM) is one such polymer which have many advantages including reduction in permeability, an increase in durability and its provision of strength characteristics. It is very cheap and easily available. In the progress of work, 0.02% of polyacrylamide (PAM) polymer is added to the dry weight of black cotton soil. Soil has been collected from Lonara Village (15 km away for Nagpur city). Various index & engineering properties have been tested on treated and untreated samples. The result obtained on both the samples are compared and we get appreciable enhancement in the property of soil. Our main objective is to test the soil on two parameters i.e. improvement in strength and improvement in CBR value of the soil sample. These type of improvement have allow to use the polymer in road construction work.

Keywords: Black cotton soil, Atterberg limits, Consistency, Polymer, In-situ, Polyacrylamide.

I. INTRODUCTION

The quality of material used in road construction and the grain size distribution of the material are very important factor for the work. Soil stabilization is an alteration of soil to enhance their properties. Stabilization can increase the shear strength of soil and control the swell-shrink properties of soil. Black cotton soil is spread in all Nagpur region and is very difficult to deal with the pavement construction work. The base coarse below the pavement should sustain the weight of pavement and reduce the stress due to wheel load to a bearable value. Among other traditional and non-traditional polymers, polyacrylamide have shown an efficient performance in the field work and improve sustainability. The study of polyacrylamide polymer has shown great importance in many construction and industrial projects. The polymer polyacrylamide have very good properties and specific amount of PAM that can increase the strength of soil in the base coarse. Using polyacrylamide on index properties of soil and carrying out two different soil samples and the result is compared. The main objective of this study is to investigate the use of polyacrylamide (PAM) in rural road and evaluate the effects of polyacrylamide on black cotton soil. The outcome of this study will contribute to

improving the knowledge regarding the behavior of PAM treated and help to promote soil for wider adoption by road authorities.

II. Actual work and theory used

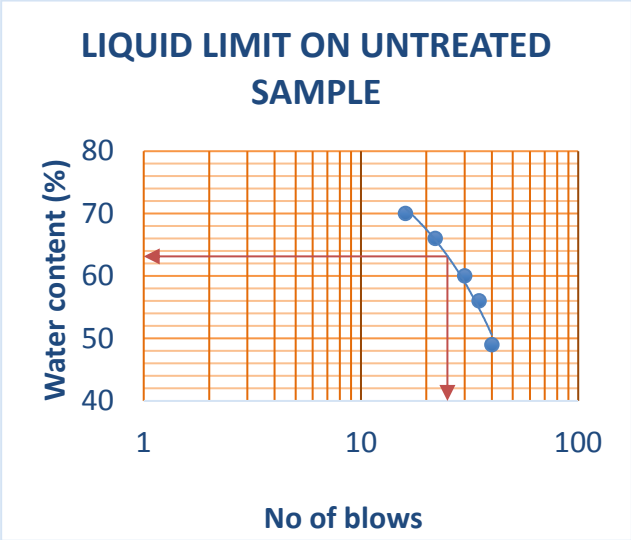
The main aim of any stabilization process is to enhance the product on hand so that it performs better than how it would have in its normal state. In case of soil the stabilization is a very peculiar process, as the soil itself shows a varied degree of properties from place to place. The soil being studied in this particular project is Black Cotton Soil. This soil is considered particularly dangerous for construction purposes due to its tendency to expand and shrink under various environmental conditions. As such, the need for stabilizing it is more pronounced. Though there are various materials available that have been used to stabilize this soil, we have decided to focus on POLYACRYLAMIDE as the stabilizing material and its effects. This material is very cheap and easily available. Besides, the quantity required is also bare minimum. As such it proves to be a good option for undertaking this stabilization process. Preliminary test on the untreated soil sample are conducted to examine its index properties, as the main motive of this paper is to find out whether the addition on PAM in the soil is effective in stabilizing the soil for rural road formation. The index properties of the soil was determined. The determination of water content was carried out by the oven drying method. This method is the most accurate method of determining moisture content if soil. The specific gravity of soil solids may be determined either by a density bottle method or by a pycnometer method. The density bottle method is the most accurate and is suitable for all types of soils, the pycnometer method is used only for coarse grained soils. The determination of particle size of soil grains was done by sieve analysis. Determination of consistency of soil, this term is mostly used for fine grained soils of which the consistency is related to a large extent to water content. The Atterberg limits which are most useful for engineering purposes are liquid limit, plastic limit and shrinkage limit. The maximum dry density and optimum moisture content were determined using proctor test. According to the standards, samples are compacted which involved compacting specimen in five layers using 25 blows per layer. However, based on the results of a previous study on soils treated with PAM as a stabilizing agent, the optimum number of blows was found to be 35 and 45 BPL for these soil type. The CBR test was also conducted in accordance. All this tests were carried out in the laboratory and the results of the same were recorded. Afterwards, the same tests were carried out in the treated soil sample. The PAM was first fixed with water in sealed container at a rate of 2gm per 1liter which created a polymer rate concentration higher than the recommended rate. The amount of PAM to be added was calculated to be as 0.02% of dry weight of soil, as suggested by the supplier. Henceforth, 2gm of PAM was added as solution to 8kg of soil and was properly mixed. The sample was covered so as to allow proper distribution of moisture for 24 hrs. Thereafter the test was performed on this treated sample. The

results obtained are compared to the test result of the earlier soil sample in the natural state.

III. Result

A. Soil in-situ:

The various properties of soil present at the selected site is studied accordingly. Soil shows greater variation enhancement in its strength

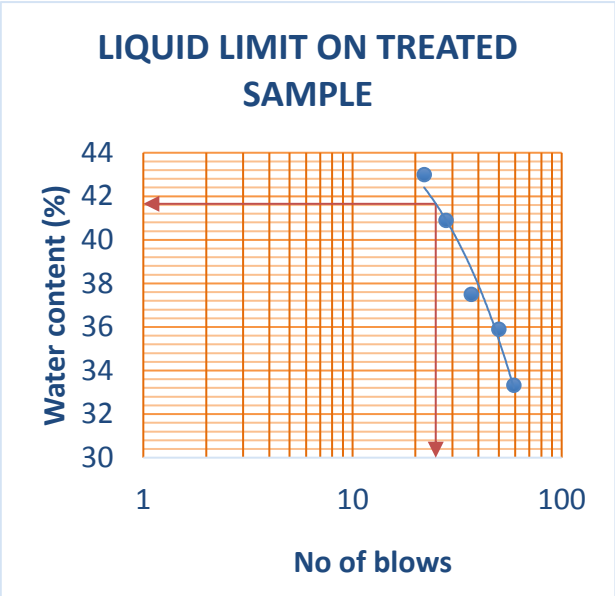


characteristics by the addition of polymer additives. To determine this, various index and engineering properties of soil have been studied and tested as well. The basic in-situ soil is tested in a laboratory without addition of polymer. The test results were as follows:-

Liquid limit of the untreated sample comes out to be 63.15%.

B. Soil after addition of PAM:

Again, we have collected the fresh sample from the same location of the site selected .The excavated soil is sieved from 4.75mm IS sieve. On the other hand, the PAM was first diluted with water in a sealed container at a rate of 2gm per 1liter which created a polymer rate concentration higher than the recommend rate. The treated sample was prepared keeping in mind the concentration used in the research paper we referred (strength and permeability of granular pavement material treated with PAM based additive – Romel N Gargees, Rayya A Hassan, Robert P Evans) to as well as the amount as prescribed by the seller. Hence 2gm of PAM solution was added to the sieved 8kg of soil and mixed properly. The sample was then kept for naturally drying and the test were conducted. The assess to the level of improvement of the fundamental properties of soil were tested by using PAM additive as a stabilizing agent. The sample was covered for 24hrs so as to allow proper distribution of moisture. Finally, after the preparation of treated sample, same index properties and engineering properties were conducted. The test results obtained were as follows:-



The liquid limit of soil comes out to be 41.655% with treated sample.

We set out to test the soil on two parameters to check the effects of the polymer on the soil properties and we successfully established that the soil was stabilized on addition of PAM in the dosage of 0.02% of its dry weight. The next step involves establishing the feasibility of this polymer stabilized soil as a sub-grade material, to conduct engineering test on the sample.

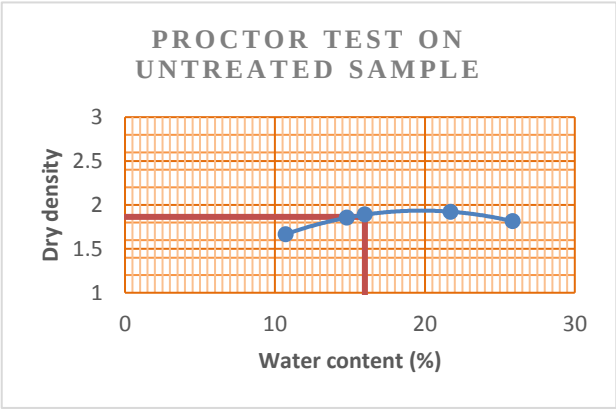
C. Engineering test performed

i. Unconfined compression test

Unconfined compression strength testing was performed to assess the effect of using PAM on the UCS of the stabilized sample of soil. The test was performed using hydraulic loading machine for treated as well as untreated soil sample. At least five Specimen were prepared in order to ensure reliable results. The UCS values of treated and untreated sample are presented in figure. It is to be noted that the strength of sample both untreated and treated presented in the figure below is the average UCS value of 5 specimen per sample. A systematic increase in the strength value was observed for all 5 soils treated with PAM when compared to their untreated counterparts. Fig shows that the level of improvement is influenced by soil type. The increase in UCS strength of the soil would significantly influence pavement design thickness and ultimately increases pavement capacity to load distribution.

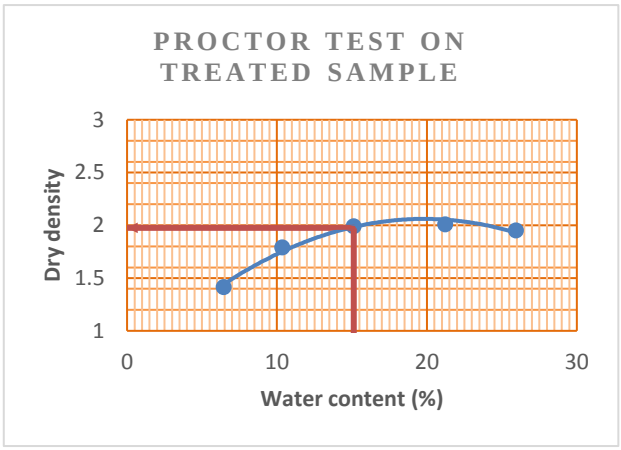
ii. Standard proctor test

The value of maximum dry density (MDD) and optimum moisture content (OMC) on the treated and untreated soil sample were obtained. At least five specimen were prepared and tested under



light compaction. The average of the observation were taken and the results were recorded as below:-

Result:- The MDD= 1.864 and OMC =16.0%

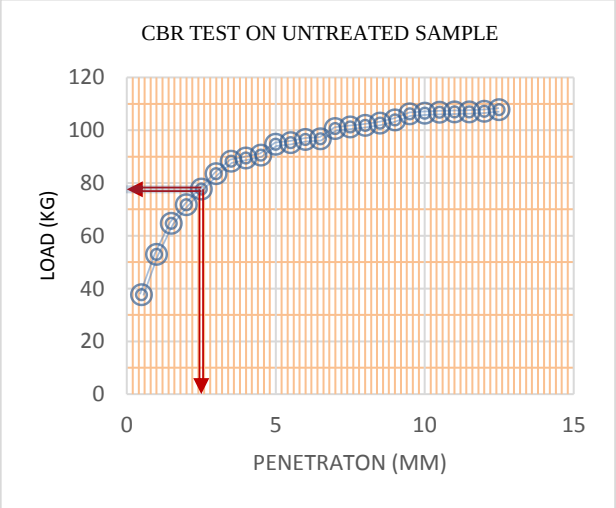


Result:- The MDD=1.976 and OMC=15.12%

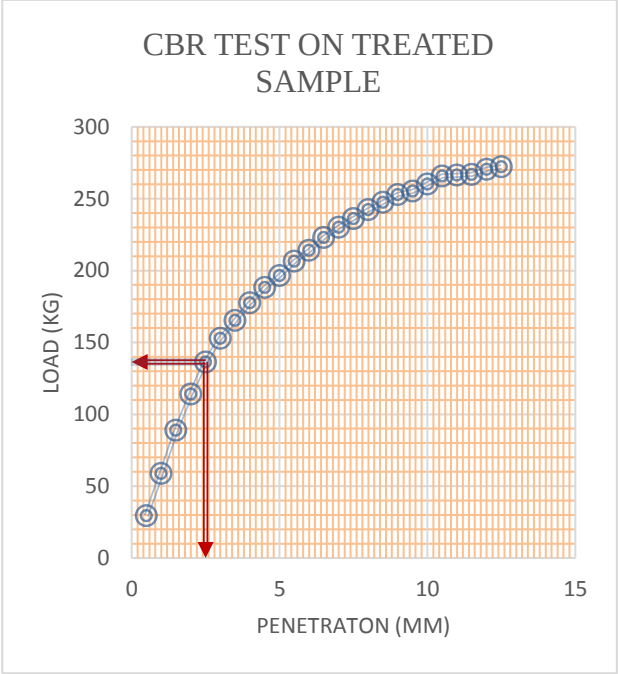
The MDD & OMC value were ploted on the graph and the vast comparative results were observed .PAM significantly enhances and rapidly increases the density and shear strength bearing capacity of the soil. The compaction curve graph of the treated and untreated value of the sample were ploted as follows:-ss

iii. CBR test

This study used CBR testing to evaluate the effects of using PAM on the bearing capacity of the stabilized sample of soil. This was conducted using a hydraulic loading machine for all treated and untreated samples. Three samples were prepared per sample i.e untreated and treated in order to ensure reliable results. The average specimen value were shown in fig:-



The CBR of untreated sample is 5.23%.



The CBR of treated sample is 9.9%.

D. Comparative Results

After performing, the atterberg's limit and various engineering test on the treated and untreated soil sample, we observe drastic increase in the properties of soil. Soil strength increases which is very beneficial for black cotton soil. These increase in characteristics prone to use PAM as an additive which give successful results. The comparative results between the treated and untreated samples whereas follow:-

SR.NO	TEST PERFORMED	UNTREATED SAMPLE	TREATED SAMPLE
1	Water content	6.53%	7.61%
2	Permeability	2.56%	5.55%
3	Liquid limit	56.69%	41.655%

4	Plastic limit	20.3 6%	21.9%
5	Optimum moisture content	16.0%	15.12%
6	Maximum dry density	1.864	1.976
7	CBR value	5.23%	9.9%

IV. Conclusion

Based on the experimental investigations on stabilization of soil we conclude that the sub – base strength of the rural roads is increased by addition of PAM in the soil. By practically adopting this proportion of polymer in the soil in the construction of rural road techniques subsequent results can be obtained. Due to this the construction activity cost of the rural road construction will be reduced with the increased life.

Hence we conclude that the soil mixed with 0.02% by dry weight of the soil can be used as a good subgrade stabilization agent, to enhance the performance of the flexible pavement, which can be beneficial in the formation of rural roads.

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Grid Interfaced Solar Photovoltaic Array Based Water Pumping System

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ABSTRACT

This study proposes design of grid interfaced solar photovoltaic array-based water pumping system. DC-DC boost converter is used to step up Solar Photovoltaic Array. Single phase inverter is implemented to convert DC output into AC. Single phase induction motor is coupled with centrifugal pump. The proposed system is simulated in MATLAB and results are to be verified.

Keywords : SPV Array, DC-DC Boost Converter, Single Phase Inverter

I. INTRODUCTION

Indian economy is mostly based on agriculture sector, due to this reason water pumping is very important aspect. In many of the rural area of our country i.e. remote and tribal areas are not facilitated with electric power supply. Also, in many areas electric power supply is not reliable for agriculture sector. Thus, agriculture is mostly affected due to frequent power cuts.

To overcome these problems, there should be a particular solution which will satisfy the reliability of electric power supply. For such scenario the best alternative for conventional sources is Solar Energy. Solar energy is available in ample and it is environment-friendly. But in order to trap this solar energy in terms of electric energy there is need of designing power electronic circuits. This energy is sensitive to environmental condition like temperature, sun rays, etc. This solar system can be used in two ways i.e. stand alone and grid interface, due to the certain disadvantages of standalone system, grid interfaced based system is preferred. Still in grid interfaced system research work is going on in order to utilize more solar energy effectively. Hence in this project, work is focused on grid interfaced system for solar water pumping application.

II. METHODS AND MATERIAL

The system configuration of PV array based water pumping system is depicted in fig 1.

In the proposed system 0.5hp induction motor is used. Considering all the losses, 600W solar PV panel is used. Using MPPT system when operated at maximum power point, we get 104 as output voltage at 600W as output power. This output voltage is fed to DC-DC boost converter, which steps up this output voltage to 350V. By using proportional integral controller ripples in the output voltage of converter are controlled. Single phase inverter is used to convert DC to AC; this square wave output is passed through the LC filter to obtain the sinusoidal output, which is fed to single phase induction motor.

A. Solar array design

The panels in the array can be electrically connected together in series, parallel, or a mixture of two, but generally a series connection is chosen to give an increased output voltage. Modules are connected in series to form PV (photovoltaic) array of 600 Watt. In this system6 solar panels are used of 100Watt. The specification of the solar panel are as follows:

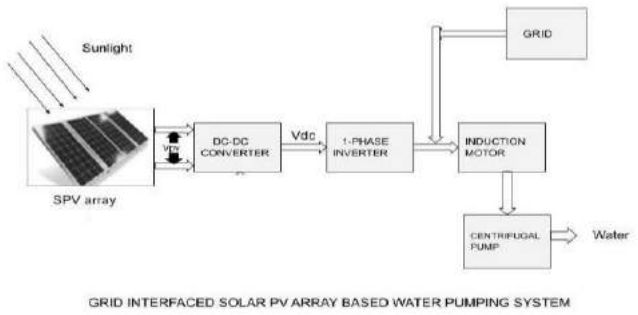


Fig.1 Grid Interfaced Solar PV Array Based Water Pumping System.

Table 1

Maximum Power (Pmax)	100 W
Open circuit voltage (V_{oc})	21.6V
Short circuit current (Isc)	6.588 A
Voltage at maximum power (Vmp)	17.4 V
Current at maximum power(Imp)	5.747 A
Maximum system voltage	1000 VDC
Maximum reverse current	7 A

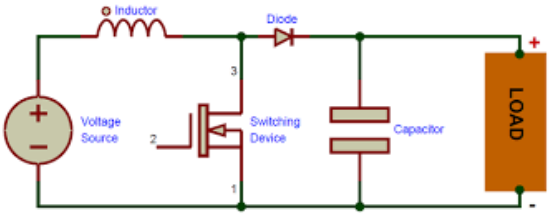
B. DC link voltage

The DC link is selected higher than peak amplitude of phase voltage of the motor for proper control as,

$$V_{dc} < \sqrt{2} \times V_L = \sqrt{2} \times 220 = 311\,V$$

Hence, 350 is selected as DC link voltage.

C. DC-DC boost converter



The output voltage from the PV array is 104V at maximum power point and this voltage is boosted to the DC link voltage equal to 350V.

The duty ratio for the boost converter is calculated as,

$$D = \frac{V_{dc} - V_{in}}{V_{dc}} = \frac{350 - 104}{350} = 0.70$$

The value of the inductor can be calculated as,

$$L = \frac{V_{in} D}{\Delta I f_s} = \frac{104 \times 0.70}{0.2 \times 2.6 \times 20000}$$
$$= 7.0 \times 10^{-3}\,H$$

Where, f_s is the switching frequency and ΔI is the ripple allowed in the current, which is taken as 20% of rated load current. Hence the value of inductor is selected as 8×10^{-3} H.

D. Single phase inverter

The desired voltage to drive the induction motor is 230V in form of AC voltage, so the DC output of DC-DC converter is to be converted into AC and hence the single-phase inverter is used and this AC signal is then filtered to get the sinusoidal AC wave.

To filter out this AC signal LC filter is used to get smooth sinusoidal AC wave. The inductor and capacitor is designed as per the designed equation given here,

$$L_1 > \frac{V_{dc}}{\sqrt{2}\pi f_{sw} 3\Delta I}$$

$\boldsymbol{V_{dc}}$ is input DC voltage which is 350V,
switching frequency ($\boldsymbol{f_{sw}}$)is 20000 Hz,
Hence $\boldsymbol{L_1}$ is selected as 0.025 H.
The frequency for capacitor can be selected as,

$$10 \times f_o < f_{res} < \frac{1}{2} f_{sw}$$

$$\boldsymbol{C_1 = \frac{1}{4\pi^2 f_{res}^2 L_1}}$$

The value of resultant frequency is selected as 750 Hz.
The value of capacitor is calculated as $2\mu F$.

E. Parameter for pump:

For water pump proportionality constant is estimated as,

$$\boldsymbol{k = \frac{\tau}{\omega_r^2}}$$

Where, τ is the load torque of the pump,
ω_r is the speed of the motor in rad/sec.
The rated torque of selected induction motor is taken as 2.5 Nm.

$\boldsymbol{k = \frac{\tau}{\omega_r^2} = \frac{2.5}{(2\pi \times \frac{1430}{60})^2} = 1.11 \times 10^{-4}}$

So, proportionality constant is taken as 1.11×10^{-4}.

III. CONTROL SCHEME FOR PROPOSED SYSTEM

A. Proportional integral (PI)controller

The proportional integral mode controller is commonly used in slow to moderate speed process. The use of an integral controller always reduce the relative stability of the system. This can be overcome to some extend by adding a proportional controller. Therefore, the integral mode is frequently combined with the proportional mode to provide the automatic next action that eliminates the proportional offset.
The integral term is given by

$$I_{out} = K_i$$

The controller output is given by

$$K_P \Delta + K_i \int \Delta \, dt$$

Where Δ is the error or derivative of actual measured value (PV) from the set point (SP).
Δ= SP-PV
Where, $K_P$is proportional gain and K_i is integral gain .
The combination of proportional and integral term is important to increase the speed of the response and also to eliminate the steady state error.

B. Sinusoidal pulse width controller

PWM is the technique to control the output voltage of the inverter. In this method the reference sinusoidal wave is compared with carrier triangular wave to produce pulses at intersection points. The output voltage of inverter and its frequency is controlled by the reference signal. The ratio of the reference wave to the carrier wave is termed as modulation index. The modulation index ranges from 0 to 1. Higher the value of modulation index lesser is the total harmonic distortion content of output voltage waveform. The ratio of carrier frequency to that of the frequency of the reference is termed as frequency modulation rate.

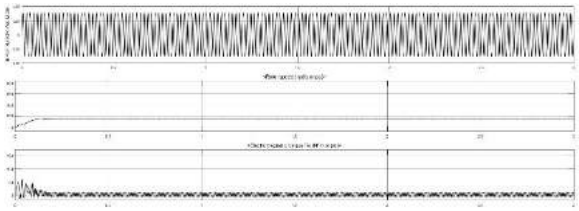
IV. RESULT AND DISCUSSION

Simulation is used to evaluate the performance of grid interfaced solar PV array-based water pumping system. Using MATLAB/Simulink proposed system is designed, modelled and simulated. The simulation result are as follows

A. Performance of grid connected water pumping system

GRID CONNECTED WATER PUMPING SYSTEM

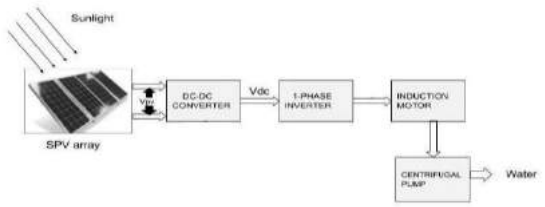
When induction motor is connected directly to grid, output waveform obtained as follows



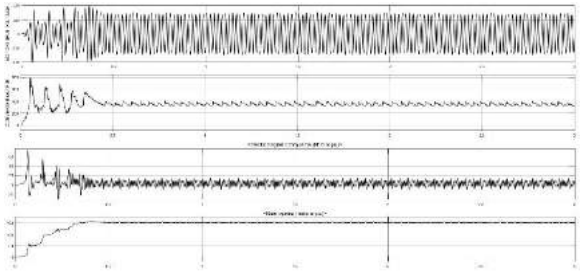
After initial variation in torque and speed, constant value of torque and speed is obtained giving required value of voltage for driving the induction motor.

B. Performance of solar PV array-based water pumping system

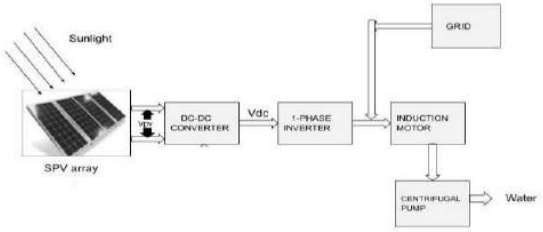
In this case, initially the value of DC-DC converter output voltage is not constant. When the torque and rotor speed value stabilize, DC output voltage become constant .Also, the required voltage of inverter is obtained.



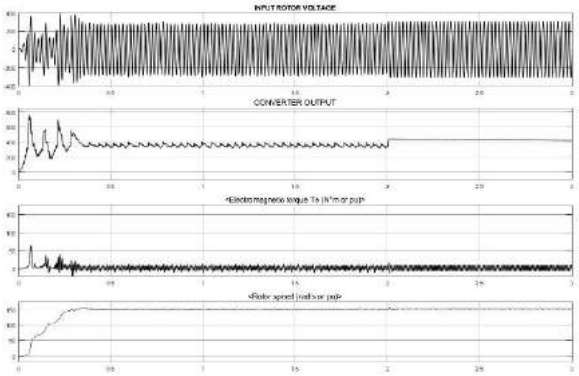
Solar PV Array based water pumping system



C. Performance of grid interfaced solar PV array based water pumping system



GRID INTERFACED SOLAR PV ARRAY BASED WATER PUMPING SYSTEM



When grid and solar PV array is interfaced initially solar PV array is operating. In this state, torque and DC output is having minor instabilities. When solar PV array is disabled then grid gets connected to the induction motor. Relatively, outputs of the grid connected system are more stable.

V. CONCLUSION

For driving the pump, the PV powered single phase induction motor can be used. The voltage obtained from PV panel is boosted using DC-DC converter and then converted to AC signal using single phase voltage source inverter (VSI) with the help of sinusoidal pulse width modulation (SPWM) technique. Single phase motor is driven by the output of VSI.

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Determination of Contamination Level in Water Using Ardunio

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ABSTRACT

This article investigates water quality monitoring systems through wireless sensor networks. Due to rapid development and urbanization, water quality affects year after year, leading to water shortages, and creating negative effects. Water plays an important role in human society and in India. 65% of drinking water comes from underground sources, so it is mandatory to verify the water quality. Monitoring water standards is a complex process as it has several laboratory testing methods and is time consuming. To overcome this difficulty, real-time monitoring of water wellness through the use of IoT has been proposed. Internet of Things along with GSM water meter and Sensor for efficiency, control water quality. Here we run a system to monitor water quality through different sensors - turbidity, pH, temperature, conductivity and water level as well. The controller accesses the information controlled by using sensors. The data accessed is controlled by the use of the Arduino controller. Using IoT, information gathered and water pollution can be considered, through strict mechanisms. In addition, the system alerts the public and their respective divisions or units about water. The environment can have good water adaptation.

Keywords: pH Sensor, Turbidity Sensor, Temperature Sensor, Ardunio Uno Module, GSM Module.

I. INTRODUCTION

Water is the fuel for all life and no life can be tested without water on this earth. Hazardous materials of various types are disposed of by drinking water and industrialization, globalization, urbanization, agriculture, and more. It is necessary to monitor water regularly using agile technologies. Based on our project, we ensure that water quality measurement is done automatically. The Central Pollution Control Board (CPCB) has put in place many monitoring bodies of water bodies in the country, which monitor the amount of water every month or year.

This is to ensure that the amount of water is stored at the desired level. And again, it is important that it be monitored daily. The requirements for pollution control and effective water pollution control measures are eliminated using water quality monitoring. The CPCB plans to improve the water quality monitoring network in the Ganga river basin. Both networks operate in real time and the central location can receive data from a number of channels

above using GPRS / GSM or 3G cellular processing. And the cost of the system varies depending on the components used.

Our described model includes different sensors that calculate the amount of water in real-time for action, and it is rich, transparent and requires effort. In this article, Part 2 focuses on the search for water quality monitoring while Section 3 discusses the Internet of Things. Section four discusses the procedure for the normal water monitoring system, and the results obtained through the system are discussed in Section 5. Section 6 concludes the document.

Tot there are 50 lakh public water wells in our country. Including unsigned water, total at 60 lakh Tested twice / year for bacterial tests. And once a year for chemical tests. According to NRDWP 120 lakh water samples for inspection / year. And a water analysis method was introduced in 1982, from 1988 to 1991 The substrate method was used to characterize the viral load. And in 1996, the epidemiological method was used to determine water quality, but in this way, many water-borne diseases were missing. And from 1995 to 2007, the prevalence estimated by BOD values below 3 mg / I was between 57 and 69%.

II. LITERATURA SURVEY

Rapid population growth will lead to depletion of available water resources and water quality. In addition, groundwater quality is contaminated with pesticides and fungicides. Indian rivers are polluted by industrial waste and untreated waste water discharges.

In 2013, Nivit Yadav, "CPCB Real Time Water Quality Monitoring Maintenance". In this method the quality of water in Ganges and Yamuna river is tested by using sensors. since they are the most polluted river in our country CPCB plans for analysing the water standards. And this method is more expensive

In 2007, Tuan Le Dinh, Wen Hu, Pavan Sikka, Peter Corke, L. Overs, Stephen Brosman, [4] "Design and Deployment of a Remote Robust Sensor" which gives a brief explain about the specialities and designing's of sensors.

In 2010, Quio Tie-Zhn [5] briefed the quality monitoring system based on GPRS/GSM. module collects and sends the data to monitoring centre through GPRS. It is an artificial method collection of data and other process will be done slowly

In 2003, Pavlos Papa Georgiou, [7] "Literature Survey on Wireless Sensor Networks", has analysed about the various wireless modes, configurations and networks. It analyses the protocols and layers in Wireless networks.

In 2011, Satish Turken, Amruta Kulkarni, [8] "Solar Powered Water Quality Monitoring System using Wireless Sensor Network", The Base station (BS) gathered information from distant remote sensors. The BS associated with ZigBee module was powered by sunlight baseboard (Energy harvesting).

In 2015, Liang Hu, Feng Wang, Jin Zhou and Kuo Zhao [9] "A Survey from the Perspective of Evolutionary Process in the Internet of Things", in this the new arrival and evolution in the internet is made clear to use the internet of things and the different techniques were explained.

In 2016, M N Barabde, [11] the System is used for determining the physiochemical factors of water quality such as motion, temperature, PH, conductivity, and oxidation lowering potential using ZigBee.

In 2016, Pavana N R, Dr. M.C. composed the water quality factors by investigating Wireless sensor networks(WSN) and by using the raspberry Pi module which is used with the Linux version.

III. BLOCK DIAGRAM

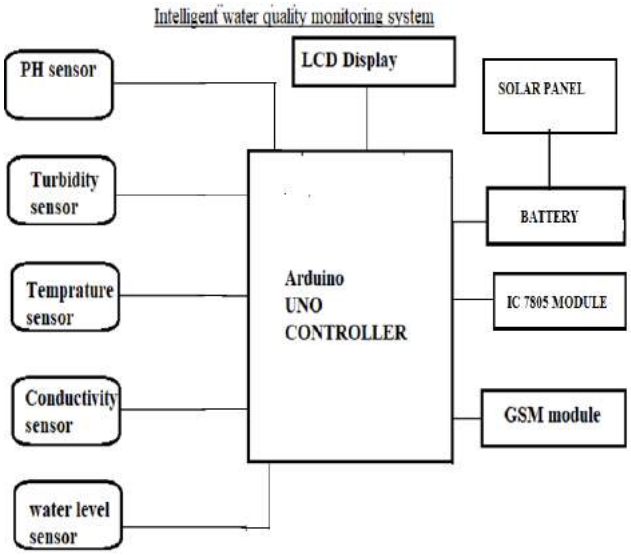

Fig 1. Block Diagram

A. *Implementation*

In this system, it uses four sensors (turbidity, temperature, pH, conductivity, water level) and an Arduino controller connected to the Internet of Things. Processor microcontroller model and GSM transfer drive. These four sensors capture data in analogue signals.

ADC converter that converts four signal data into digital format. The digital signals are transmitted to the Arduino controller, which is supplied with the transmission unit. The Arduino microcontroller looks at itself and executes digital information and the GSM module here is for the next channel communication, the GSM model sends the water quality factors to the smartphone as a text message. In this SMS, all the measured parameters are present in the application connection. Clicking on the link will get us all real-time parameter metrics. The LCD screen connected to the arduino also displays the same parameter measurements on each sensor. This way, the smart water quality control system works easily from a distance.

The Arduino microcontroller receives the data and processes the data that the sensors collect on the web through the GSM drive. The coding is used to perform the transmission.

This 12v 10w solar panel uses a complete solar system. The main purpose of this solar power is that it works in all remote environmental areas. And you send information remotely.

B. *System Design*

The water quality control system uses data such as pH, temperature, electrical conductivity (EC) and turbidity to obtain parameters. These water-based sensors analyse the quality of water resources. Certified content is used to predict water quality.

The analysed data is processed via the Arduino microcontroller and transmitted via the GSM / Wi-Fi module via the communication unit to the central server. By entering a user ID and a password, the user can view the information collected, processed, sent and analysed.

The data collected is displayed in real time. The Arduino microcontroller relies on real-time support for built-in track and simulation.

It also supports fast flash memory for the embedded system. Therefore, size is considered to be the most important requirement for using scalable applications and controlling access for consumers, so it is a good idea to use and consume less energy.

Solar energy is also used to coordinate the entire system in remote areas. That's why the idea is an intelligent water quality control system that uses solar energy.

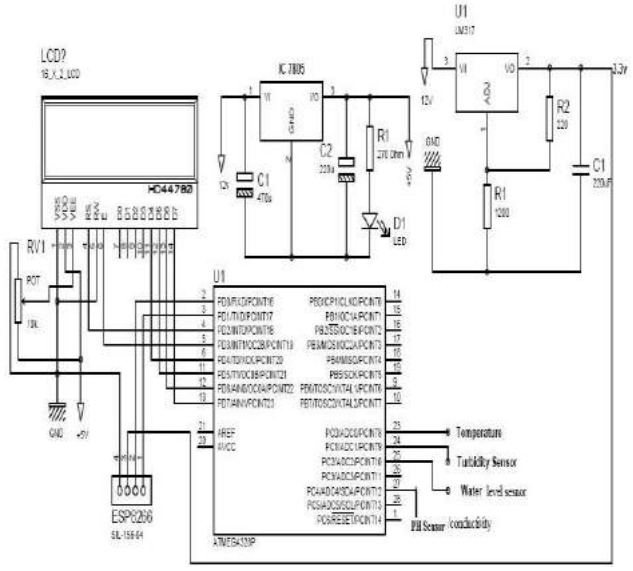

Fig 2. Schematic Circuit

IV. TECHNICAL DETAILS

In this proposed block diagram, several sensors (temperature, pH, turbidity, flow) are connected to the central controller. The central controller uses sensor values and processes them to transmit information over the Internet. Ardunio is used as a central controller. Sensor data can be viewed on the wi-fi Internet system.

A. *pH Sensor*

The pH of a solution is a measure of the acidity or alkalinity of a solution. The pH range is a logarithmic scale with a range from 0 to 14 and a neutral point of 7. Values greater than 7 indicate a basic or alkaline solution and values less than 7 indicate an acidic solution. It operates at 5V power and is easy to connect to an arduino. The normal pH range is 6 to 8.5.

B. *Turbidity Sensor*

The turbidity is a measure of the turbidity of the water. Cloudiness has shown the extent to which water loses its transparency. It is considered a good indicator of water quality. The turbidity prevents the light required for vegetation underwater. It can also raise the temperature of surface water above normal, because floating particles near the surface facilitate the absorption of heat by sunlight.

C. *Temperature Sensor*

The water temperature indicates that the water is hot or cold. The temperature sensor has a range of -55 to +125 ° C. This temperature sensor is digital and provides accurate reading.

D. *Electric Conductivity Sensor*

The salts dissolve in water in positive and negative ions. Dissolved ions are conductors and the ability of water to conduct a conductive current. The main positively charged ions are sodium, calcium, potassium, and magnesium, and the main negatively charged ions are chloride, sulphate, carbonate, and bicarbonate. Nitrates and phosphates are small charge ions for conductivity. The electrical conductivity is measured using a probe and a meter. The probe consists of two centimetres of electrodes 3 cm apart. (Units: millimetres - or micro-Siemens per cm). The concentration of the dissolved salt is directly proportional to the electrical conductivity. TDS conductivity in water is determined by multiplying by a factor of 0.67.

E. *Water Level Sensor*

Water level is one of the four parameters that the proposed system begins to value. To achieve this, we made a water level sensor to level connector wire, to the depth of the water. It can measure from 2 cm to

400 cm with a precision of can mm. There are 4 pins that can be connected in a different position. These are VCC (trigger), trigger (trigger), echo (receive) and GND (ground) pin. Like other sensors in the system, it requires V power. The amount of water and the level of water in the vessel are measured by the time taken to receive and electromagnetic signals from the trigger and the velocity (speed of light) of the electromagnetic waves. The velocity and time calculated by the microcontroller indicate the water level in the vessel.

F. *Solar Panel*

A solar panel is a collection of solar cells that can convert light directly into electricity. By combining the capacity of several solar panels, it is possible to cover part of the family.

Depending on the type of panel, between 5 and 19% of light energy can currently be converted into electricity. This is called the panel exit. As this technology is constantly improving, production should further increase.

With solar panels, you can convert free and inexhaustible sunlight into electricity. This conversion is carried out by the so-called "semiconductor" material from which each solar cell is produced.

A 12V-10w solar panel is used in this project. It can easily power the water quality monitoring system in remote areas of water resources.

V. ARDUNIO UNO AND GSM MODEM

Arduino Uno is a microcontroller based on ATmega 328. It has 14 digital I / O pins (6 of which can be used as PWM outputs), 6 analog inputs, 16 MHz crystal oscillator, socket, ICSP header and sleep button. It contains everything necessary to support the microcontroller; To get started, simply connect it to your computer with a USB cable, power it with an AC / DC adapter or battery. USB chip to serial controller. Instead, the Atmega 8U2 is programmed as a USB to serial converter. NOU and version 1.0 will be Arduino reference versions that will move forward. UNO is the latest in the Arduino USB family and the Arduino platform reference model. It manages the whole project activity.

A GSM modem is a type of specialized modem that receives a SIM card and acts as a subscription to a mobile operator, just like a mobile phone. A new version of SMS is available that supports the ability to use Android phones as a GSM modem to send and receive SMS and MMS messages. GSM is an open and digital cellular technology used to transmit mobile voice and data services that operate in the 850 MHz, 900 MHz, 1800 MHz and 1900 MHz frequency bands. Sends all information on the entry sensor to the primary authority. All sensor information is sent by SMS. This SMS contains a web link, if you click on this link, we will get the same information on the web page.

VI. CONCLUSION

The monitoring of turbidity, pH and water temperature uses a water detection sensor with a unique advantage and an existing GSM network. The system can automatically monitor water quality, is inexpensive and does not require service personnel. Water quality tests are therefore likely to be more economical, practical and faster. The system has good flexibility. This system can only be used to replace the corresponding sensors and modify the appropriate software programs to monitor other water quality parameters. The operation is simple. The system can be extended to include monitoring of hydrological pollution, atmospheric pollution, industrial and agricultural production, etc. It has wide application and extension value.

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Performance Analysis of Four Stroke Four Cylinder Petrol Engine Using PLC and SCADA Program

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ABSTRACT

As we know that now a day's research is going on engines to reduce pollution and emissions of harmful gas like carbon monoxide and to find alternative petroleum product this requires regular monitoring and control of automobile engine. So we need to calculate various parameters like brake power, torque, engine speed, indicated power etc. Manually which takes too much time and effort if we integrate PLC (Programmable Logic Control) and SCADA (Supervisory Control and Data Acquisition) with our test rig? The PLC will calculate all this parameter and convert it into digital signals and SCADA shows all this on a single screen and also compare results with previous results. This paper present information on PLC and SCADA.

Keywords : SCADA, PLC

I. INTRODUCTION

INTERNAL COMBUSTION ENGINE

The internal combustion engine (IC Engine) is a reciprocating heat engine in which fuel mixed with correct amount of air is burnt inside a cylinder. The spark-ignition engine usually runs on a liquid fuel. The fuel must be highly volatile so that it vaporizes quickly. The fuel vapour mixes with air before entering the engine cylinders. This forms the highly combustible air-fuel mixture that burns easily. The mixture then enters the cylinders and is compressed. Heat from an electric spark produced by the ignition system sets fire to, or ignites, the fuel mixture. As the mixture burns (combustion), high temperature and pressure are produced in the cylinder. This high pressure, applied to the top of the piston, forces it to move down the cylinder. The motion is carried by gears and shafts to the wheels that drive the automobile.

We are using the engine with the following specifications:

Ambassador (Engine No. 6EHHA10842)

Max. Power	72. 5 hp @ 5000 rpm
Max. Torque	65 n-m @ 1500 rpm
Cylinder	04
Displacementnt	1489 cc
Bore	79. 00 mm
Stroke	89.00 mm
Compression Ratio	8: 3: 1
Cooling	Water cooled
Ignition	Battery
Fuel	Petrol

II. COMPONENT

MEASUREMENT OF AIR FLOW

Air box method

An airbox is an empty chamber on the inlet of most combustion engines. It collects air from outside and feeds it to the intake hoses of each cylinder. Also instruments that measures airflow such as an airflow meter. Anemometers are also used to measure wind speed and indoor airflow

VANE ANEMOMETER

A vane anemometer thus combines a propeller and a tail on the same axis to obtain accurate and precise wind speed and direction measurements from the same instrument. The speed of the fan is measured by a rev counter and converted to a windspeed by an electronic chip. Hence, volumetric flow rate may be calculated if the cross-sectional area is known.

In cases where the direction of the air motion is always the same, as in ventilating shafts of mines and buildings, wind vanes known as air meters are employed, and give satisfactory results.

Fuel level measurement:

Types of way use for level measurement

- Glass Level Gauge
- Floats
- Displacers
- Bubblers
- Differential Pressure Transmitters
- Magnetic Level Gauges
- Capacitance Transmitters
- Photocells

Photocells

Photocells act as light sensors. In-like infrared sensors that are good for line followers or detecting the presence of an object, photocells are good when you just want to detect light. For example, you might want a sensor that detects when a flashlight is on, or when the sun is out. Photocells are used in automatic night lights and in street lamps that turn themselves on at night. Sometimes known as photoresistors, photocells are available from a number of sources. They look like a small (0.5 to 2 inch) disk with two leads out the back. Radio Shack sells a multi-pak of cells for about $2.50 under part number 276-1657. A picture of one of the cells in this pack is shown below.

In operation, a photocell acts like a light sensitive resistor with a high resistance when dark and a low resistance when in the light. Photocell properties vary widely from model to model so you may have to do a lot of experimenting. You can test sensitivity to light by measuring the photocell resistance as you subject it to light and dark.

When using with a Arduino, the photocell is wired up in series with a fixed resistor so that the Arduino can read its output as a voltage. The schematic below shows the basic photocell circuit, except rather than digital I/O pin 1, connect to one of the analog input pins, for example analog pin 1 as shown, on the Arduino. The analog input pins are located on the other side of the board from the digital I/O pins.

Speed Measurement:

Tachometers for Engine Speed measurement:

Tachometers measure the engine speed in revolutions per minute (rpm). This instrument determines the rotational speed (how fast it's spinning) of a shaft or disk in the engine and displays the reading on a

calibrated analog dial display on the dashboard of a car, aircraft or other vehicle. The display indicates a safe rpm range, which is meant to help the driver determine the best gear and throttle settings, and correct traveling speeds. Extended periods of high-speed travel, with excessive engine speeds, can lead to insufficient lubrication, an overheated engine because the cooling system can't keep up, and wear-and-tear on engine parts from going beyond their speed capacity.

The crankshaft, sometimes casually abbreviated to crank, is the part of an engine which translates reciprocating linear piston motion into rotation.

Torque measurement:

The device which are used for the measurement of torque are known as dynamometer.

The type of dynamometer which is used in our system is known as an electric dynamometer.

An electric dynamometer consists of three main components they are as follows.

1. Generator
2. Transformer/variac
3. Power absorbing device

The torque is applied by the engine in order to rotate the rotor of the generator. under off condition of the generator no power is supplied to the rotor winding's which no force or resistance to the rotation of the generator rotor.

In order to apply load on the engine shaft power is supplied to the input winding of the generator via variac/transformer which uses the electrical resistance property of its winding material to control the voltage and current which is being supplied to the input of the generator. the current and voltage which is being supplied is used to induce magnetism in the rotor winding which leads to production of ac current in the stator winding which is supplied to the power absorbing device or to the grid. The more the value of current and voltage is increased the more torque will be required to turn the rotor. The formula which can be derive for the above definition and concerned principle is

4. $$Torque = \frac{V * I}{1000}$$
5. Where,
6. V = DC voltage applied(voltmeter)(volts)
7. I = DC current applied(ammeter)(amperes)
8. Torque in N*M

Alternator Specification:

Kirloskar made AC Generator
Output: 10 KVA
Voltage: 230 volts A/C
Max. Current: 43.5 amps
Unity Power Factor
Frequency: 50 Hz
Rated Speed: 1500 Rpm

Variac (Continually Variable Single-Phase Auto Transformer)

Max. Voltage Input: 240 Volts A/C

Temperature measurement:

RTD (Resistance Temperature Detector)

RTDs work on a basic correlation between metals and temperature. As the temperature of a metal increases, the metal's resistance to the flow of electricity increases. Similarly, as the temperature of the RTD resistance element increases, the electrical resistance, measured in ohms (Ω), increases. RTD elements are

commonly specified according to their resistance in ohms at zero degrees Celsius (0° C). The most common RTD specification is 100 Ω, which means that at 0° C the RTD element should demonstrate 100 Ω of resistance.

Water flow measurement:

Burette method: -

In order to measure the mass flow rate of water, a specific amount of water is measure in a container known as burette. The time for this collection is measured to find out the mass rate in lit/sec or lit/ min which can be converted into kg/ sec 0r kg/ min.

SETUP CONFIGURATION:

- **Float Switch**
  Hall Effect Transducer

- **Solenoid Valves**
  A} Fuel Control,
  Excitation Voltage: 12 V, DC, 8 Watt
  pressure: 10 bar

  B}. Water Control
  Excitation Voltage: 23. 0 V AC, 5 Watt
  Pressure: 12bar
  Input and Output Diameter: 1/4”

  C} Pneumatic Valves
  Excitation Voltage :230 V AC, 5 Watt
  Pressure: 6bar

- **Electro-mechanical Relays**
  Eexcitation voltage: 12 V @250 ma
  Output: 230 V AC @ 10 Amps

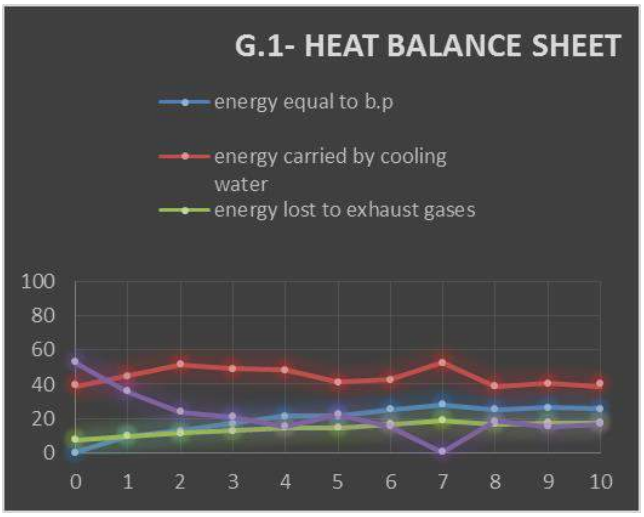
- **Transducers**
  Voltage Transducer
  Input: 0-300 V AC, 50 Hz
  Output: O-V DC
  Current Transducer
  Input: 0-5 Amps A/C, 50 Hz
  Output: O-S V. DC
  Current Transformer
  Ratio: 100 / 5 Amps, 50 Hz
  Anemometer
  Vane Type.
  Diameter: 65 mm
  Range: 0. 1 m/s - 10 m/s
  Opto Slot Sensor
  Type: Open Emitter
  Input: 15 V DC
  Output: 15 V DC

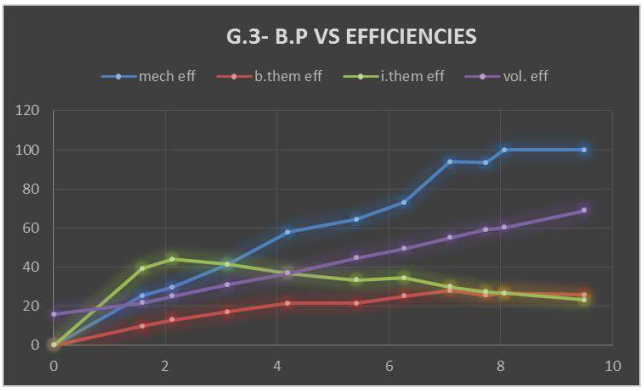
  Max. Voltage Output: 300 volts A/C
  Max. Input Current: 50 amps

- **SMPS**
  24 V 2A2
  12 V 3Amp
- **Relay Card**
  8 output *2 relay cards
- **Input Out Module**
  MODEL: DVP16SP11R
  Provide Extended Input Output PLC
  CPU Model
- **PLC**:
  14 SS2
  8 INPUT 8 OUTPUT
  8 INPUT 6 OUTPUT

TESTING RESULTS

Sr No.	Particulars	No Load	1	2	3	4	5	6	7	8	9	10
1	Speed (RPM)	1508	1505	1505	1500	1496	1508	1505	1507	1502	1496	1500
2	Load KW	0.01	1.56	2.16	3.13	4.09	5.44	6.22	7.15	7.68	8.02	9.47
3	Air Velocity (m/s)	1.32	1.8	2.1	2.58	3.06	3.73	4.12	4.58	4.85	5.01	5.74
4	Time Taken for 30 cc fuel (sec)	62.08	56.8	56.45	50.55	46.06	36.25	36.9	36.33	30.1	30.05	24.39
5	Time Taken for 5 lit. cooling water (sec)	203.81	158.78	140.08	133.14	124.47	113.32	106.66	88.11	98.86	95.41	33.26
6	Current Amp	0.24	18.51	21.83	26.28	29.84	34.19	36.48	39.02	40.44	41.17	40.64
7	Voltage V	0	84.5	98.97	119.02	137.02	159	170.5	183.15	189.87	194.88	212.08
8	Ambient Air Temperature c	27.32	29.04	27.96	28.5	27.01	27.68	27.8	29.04	27.43	28.5	27.22
9	Exhaust gas Temperature c	320.45	340.8	347.44	358.7	371.53	386.7	396.1	406.63	412.99	418.13	434.27
10	Cooling water inlet temperature c	26.29	26.44	25.55	26.12	26.25	26.43	26.01	25.86	25.99	26.37	26.58
11	Cooling water outlet temperature c	82.93	81.42	82.01	82.94	82.63	82.34	80.34	81.86	81.22	82.06	80.98





III. CONCLUSION

A four stroke four cylinder SI engine test rig is developed and experimentation is perform for blends of ethanol (0-10%) in order to determine the performance of engine for each blend. PLC is intergrated with the rig and the resul;t are tabulated.

The results clearly shows that the blend of ethanol with 10% give better engiune performance.

Based on the results it is concluded that increase in ethanol proportion boosted the performance of engine significantly. Further experiment can be carried out to determine the optimum blend of enthanol with the help og PLC and SCADA.

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FPGA Implementation of Filtered Image Using 2D Gaussian Filter

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ABSTRACT

Image filtering is one of the very useful techniques in image processing and computer vision. It is used to eliminate useless details and noise from an image. In this paper, a hardware implementation of image filtered using 2D Gaussian Filter will be present. The Gaussian filter architecture will be described using a different way to implement convolution module. Thus, multiplication is in the heart of convolution module, for this reason, three different ways to implement multiplication operations will be presented. The first way is done using the standard method. The second way uses Field Programmable Gate Array (FPGA) features Digital Signal Processor (DSP) to ensure and make fast the scalability of the effective FPGA resource and then to speed up calculation. The third way uses real multiplier for more precision and a the maximum uses of FPGA resources. In this paper, we compare the image quality of hardware (VHDL) and software (MATLAB) implementation using the Peak Signal-to-Noise Ratio (PSNR). Also, the FPGA resource usage for different sizes of Gaussian kernel will be presented in order to provide a comparison between fixed-point and floating point implementations.

Keywords : Gaussian Filter; convolution; fixed point arithmetic; Floating point arithmetic; FPGA

I. INTRODUCTION

Convolution has been widely used in computer vision and image processing, including object recognition [2] and image matching [3], However, convolution operation typically requires a significant amount of computing resources [4].Image filtering is applied as pre-processing to eliminate useless details and noise from an image. It is produced by convolution between an image and 2D Gaussian mask. In the literature, several efficient FPGA implementations of the 2D convolution operation have been proposed [5]–[9].

Hanumantharaju et al. [10] proposed a hardware architecture suitable for FPGA/ASIC implementation of a 2D Gaussian surround function for image processing application which offers a savings of memory. Barbole et al. [11] implemented steerable Gaussian smoothing filters on an FPGA platform based on a VirtexV ML506 using the pipelined approach and DSP which reduces memory requirements. Talbi et al.[5] developed architecture for separable and two-dimensional Gaussian smoothing filters, which was implemented in the VirtexV FPGA platform. They prove that the first approach is significantly faster than the second one. In the same year, Cabello et al. [2] implemented a 2D Gaussian Filter in FPGA using fixed-point arithmetic and floating point arithmetic, they found that increasing the kernel sizes, they reduced the computational costs using floating point arithmetic

In this paper, a Gaussian filter on an Field Programmable Gate Array (FPGA) platform will be implemented. We will focus in the main bloc which is the convolution module based on the multiplication operation. Thus, the multiplier is in the heart of the proposed design. For this, the standard multiplier will be firstly implemented. Then, in order to accelerate calculus and to minimize resource use, FPGA features will be used which are DSP (Digital Signal Processor) and RAMs. Finally, in order to have more precision in image output, a real multiplier proposed in [13] will be used to implement the entire architecture. It is a new way to do a multiplication between two real numbers. Our application is implemented by two tools such as MATLAB and VHDL, and simulated on the ISE simulator.

The remainder of this paper is as follows. Section 2 introduces the image filtering algorithm. The hardware implementation of image filtering is presented in section 3. In section 4, the hardware optimization of convolution module based on changing the multiplier will be discussed. Experimental results are given in section 5. Finally, a conclusion will be done in section 6.

II. IMAGE FILTERING ALGORITHM

Smoothing filters are widely used in many applications such as object recognition, matching, classification, etc. They are applied as pre-processing for removing useless details and noise [14]. We will focus on image filtering based on Gaussian filter.

A. Gaussian mask

Gaussian filter is one of the most important and widely used filtering algorithms in image processing [5]. Gaussian filter (G) is defined in equation 1.

$$G(x,y) = \frac{1}{2\pi\sigma^2} e^{-(x^2+y^2)/2\sigma^2} \quad (1)$$

where G is the Gaussian mask at the location with coordinates x and y,α is the parameter which defines the standard deviation of the Gaussian. If the value of is large, the image smoothing effect will be higher.

B. Convolution operation

In general, smoothing can be effected by convolve the original image I(x,y) of the size h x w with a Gaussian mask G(x,y) as illustrated in equation 2. It is obtained by computing the sum of products among the input image and a smaller Gaussian matrix of the size(3×3). A 2D convolution using a 3×3mask and 3×3 input image is illustrated in Figure reffig1.

$$f(x,y) = \sum_{i=0}^{h-1} \sum_{j=0}^{w-1} G(i,j) I(x-i, y-j) \quad (2)$$

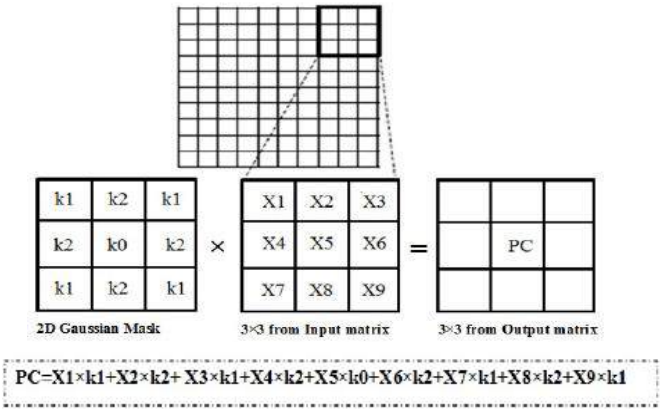

Fig. 1: Convolution operation

III. HARDWARE IMPLEMENTATION OF IMAGE FILTERING

In this section, the proposed architecture design of the Gaussian filter will be presented

A. Block diagram of image filtering

Figure 2 illustrates the block diagram of image filtering. First, the input image and the Gaussian mask are read and saved by MATLAB. Next, These

values are converted into a vector in a text file extension *.coe using the MATLAB tool and loaded the text file in block RAM (BRAM). The text file of Gaussian mask and image is stored respectively in BRAM1 and BRAM2. After that, the convolution operation is effected between these pixel values of two BRAM (1 and 2) using VHDL tool and saving the obtain results in another block (BRAM3). Finally, the text file of BRAM3 is converted by MATLAB tool in order to display the results form an image. The next step, we defined each block of diagram in Figure 2.

B. Synchronous architecture hardware of image filtering

Figure 3 depicts the block diagram of synchronous image filtering which contains a set of modules: Control Module, 3 BRAMs (matrix of input image, matrix of Gaussian mask, matrix of filtered image) and convolution Module.

1) Gaussian Filter

The convolution of an image with a Gaussian mask

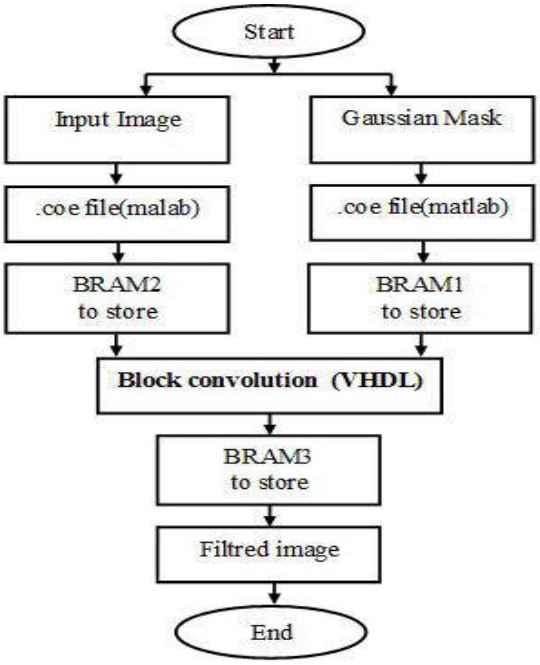

Fig. 2: Block diagram of image filtering

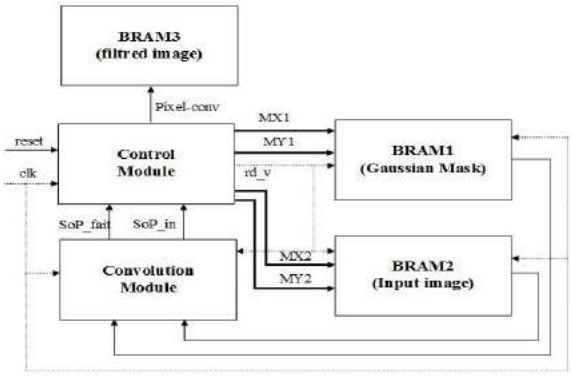

Fig. 3: Synchronous architecture of image filtering

involves floating point multiplications, which consumes considerable hardware resources. The Gaussian mask size (3×3) is presented by the matrix below by choosing the standard deviation equal to 0.5.

$$\begin{bmatrix} 0.0113 & 0.0838 & 0.0113 \\ 0.0838 & 0.6193 & 0.0838 \\ 0.0113 & 0.0838 & 0.0113 \end{bmatrix}$$

Then, it is necessary to convert the floating point coefficients to fixed integer point coefficients for hardware implementation of the Gaussian filter. In the convolution process, each mask values has to be multiplied with each element of the image and then divided by a power of 2 [15], [16]. The approximation of the Gaussian mask is presented by equation below.

$$\begin{cases} G(x,y) = \frac{1}{2^8}\begin{bmatrix} 3 & 21 & 3 \\ 21 & 158 & 21 \\ 3 & 21 & 3 \end{bmatrix} \\ = \begin{bmatrix} 0.0117 & 0.082 & 0.0117 \\ 0.082 & 0.6172 & 0.082 \\ 0.0117 & 0.082 & 0.0117 \end{bmatrix} \end{cases}$$

2) Block RAM

In Xilinx FPGAs, a Block RAM (BRAM) is a dedicated two-port memory that stores up to 36Kb of data. The FPGA contains many of these blocks. Inside of each, small logic block is a configurable lookup table. It is normally used for logic functions, and it can be also reconfigured as a few bits of RAM. Several of them can be combined into a larger RAM which is denoted by a distributed RAM. BRAM is synchronous, this means that the read and write operations from

and to the memory are based on the clock input signal. The read and write operations are also dependent on the read/write enable ports. In our case, BRAM2 is used to store the data test image using .coe file which is generated with Matlab tool, and a BRAM1 is used to store the .coe file of Gaussian mask, which are then read by the control module. BRAM3 will save the data filtered.

3) Control module

The control unit is an important step of the proposed synchronous architecture. It allows to generate the address to BRAMs (1 and 2) and transfers the data from each BRAM to the corresponding convolution module for computing the Sum of Products (SoP) between these values, after that the convoluted value is stored in BRAM3. The control module is designed as a Finite State Machine (FSM) simulated in VHDL. Figure 4 illustrates the Finite State Machine (FSM) of the control module.

In the first state, initialization parameter will be affected. Then in state 1, the signal rd-v will be putted to 1 to access both memories. FSM increments the counter MY1 and MY2 when the MX1 and MX2 counter are finished addressing a line of image pixel block (3 by 3) and the same Gaussian block. This process is repeated the addressing of the blocks, if it is completed then goes to state 2 if not it returns to state 1. States 2 and 3 represent two late cycles to synchronize system signal. After that, it goes to state 4 where the machine puts the rd-v signal to zero in order to stop the addressing of the two memories and goes to state 5. In the state 5, the machine tests the SoP-fait signal, if it is equal to zero then it returns to the same state, if not it stored the value of SoP-in a table. After that, it increments the counter one " i " or " j " in order to read a new block, if " i " is different to the (length of size image -1) and " j "is different (width of size image -1) then returns to state 1. If not goes to state 6 (end process). Where,

X is the length of size image -1) and Y is the width of size image -1.

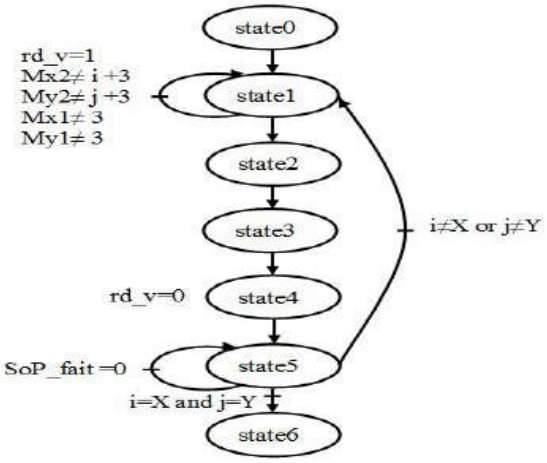

Fig. 4: FSM of the control unit

4) Convolution Module

Convolution module focuses on the calculation of the sum of products (SoP) between pixels in BRAM1 and BRAM2 for a window of 3 by 3. Equation 5 depicts an example of the convolution module between Gaussian mask integer and matrix 3×3 from input image.

A. Performance Measures

The Peak Signal to Noise Ratio (PSNR) is the most used parameter to evaluate image quality in the literature [11], [17]– [20], [22]. PSNR value can be computed by comparing two images which are original image and filtered image. The PSNR was used to measure the image quality. A higher PSNR value indicates that the filtered image contains better image quality. The PSNR has been calculated as follows;

$$PSNR = 10 \log_{10}\left(\frac{2552}{MSE}\right) \quad (3)$$

Where, MSE is the Mean Square Error (equation4)between the original image (I1(m,n)) and the filtered image (I2(m,n)), with, m and n are pixels of image M N.

$$MSE = \frac{1}{M \times N} \sum_{m=1}^{M} \sum_{n=1}^{N} (I_1(m,n) - I_2(m,n))^2 \quad (4)$$

B. Simulation results in MATLAB and VHDL

In this section, simulation and implementation results will be done. Figure 6 presents the filtered image by two tools which are MATLAB and ModelSim-SE (VHDL)

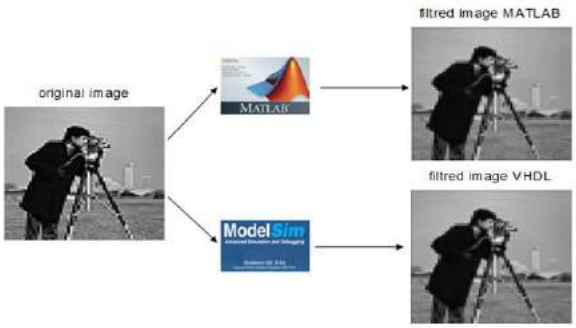

Fig. 6: Resulting filtered image in both MATLAB and VHDL

The kernel size 3×3 will be conserved and sigma values will be changed in order to see their impact in the filtered image. Figure 7, 8 and 9 illustrate the filtered image by the software (MATLAB) and hardware (VHDL) implementations. We can deduce that the blurring effect increases proportional to the sigma value (respectively 0.5, 1 and 1.5).

For different sigma values, Table I resumes the corresponding PSNR of images (in both VHDL and MATLAB).

For sigma equal 0.5, we observe that the PSNR (VHDL)obtains better result compared to PSNR (MATLAB). So, when increase sigma, the PSNR value of MATLAB and VHDL are decreased. Figure 10 shows the comparison between PSNR values both resulting image in MATLAB and VHDL.

Normally, if PSNR value is more than 40 dB, this is an indication that the quality of the image is good. But, if the image is mean quality, the PSNR value is less than 30 db which is the case of our selected image. We note that when we vary the sigma value the effect of smoothing increase and the PSNR decrease.

TABLE I: PSNR values for different output images in VHDL and MATLAB

	PSNR (MATLAB)	PSNR (VHDL)
Sigma = 0.5	25. 2236	27.3294
Sigma = 1	19.8879	20.3760
Sigma = 1.5	18. 0441	19.6098

IV. CONCLUSION

Hardware implementation of the Gaussian filter is faster than software one. Thus, using FPGA we are able to process the filtering at the same time of reading the image. In this paper, we have presented the implementation of two-dimensional convolution on a Xilinx VirtexV FPGA platform based on a state machine. We implemented Gaussian filters with different sigma values. Then we optimized the proposed architecture using different multipliers. At the first, we used the standard multiplication "" used in VHDL language. Then we explored FPGA features and DSP blocks. Finally, we introduced floating point arithmetic. Performances and results show that area and resources utilization decrease specially when using DSP and BRAM of FPGA. Also, speed increase comparing to the other solutions. By using floating point arithmetic the image has more precision and result seems to be is better.

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IoT Based Secure and Authenticated Vehicle Navigation System

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ABSTRACT

A secure and authenticated vehicle navigation system has been developed which provides security and authenticity for vehicle navigation system. This novel architecture is designed with the help of existing cryptography algorithms and fault tolerance technique. A fault tolerance based mathematical model is used for system analysis. The inputs for the system are geographical location like latitude, longitude and digested engine number. It has been observed that the designed system is able to provide the correct information despite of corrupted signal sensed at destination end(at server side). It reduces server overhead using message digest concept and improves fault tolerance by applying fault tolerance techniques on digested information A vehicle tracking system combines the installation of an electronic device which is mounted in a vehicle, or inside of vehicles, with purpose designed computer software to allow the owner or a user to track the vehicle's location, collecting data in the process. Today vehicle tracking systems commonly use Global Positioning System (GPS) technology for locating the vehicle, but other types of automatic vehicle location technology can also be used. Vehicle information can be viewed and located on the electronic google maps via the Internet or specialized software.

Keyword : IoT, security, GPS, GSM, Tracking

I. INTRODUCTION

It is a field of study that focuses on tracking the movement2 of a vehicle from one place to other. The term Global Navigation Satellite System (GNSS) is used for satellite navigation3 . The satellite navigation is divided in three parts: US NAVSTAR Global Positioning System (GPS)• Russian Global Navigation Satellite System (GLONASS)• Galileo• Nowadays GPS and GLONASS are the two operational satellite navigation systems. GPS is the most used navigation system which is based on satellite. It is developed by US Department of Defense (DoD) and US department of transportation whereas GLONASS is developed by Russian federation. proposes a vehicle tracking system for tracking vehicle theft using GPS and GSM technology. The GPS receiver and GSM modem utilizes Arduino MEGA2560. The system is affixed to the vehicle. A GSM mobile phone can be used to send and receive the information. Therefore, the Gps system will send the longitudinal and latitudinal values corresponding to the position of vehicle to the GSM Modem. If for example, an individual forgets where their vehicle is parked, an SMS can be sent to the vehicle GPS, The SMS sent would be transmitted through the GSM service provider, thereby reaching the vehicle. The vehicle will have a GSM device installed, which includes a SIM card. Through the GMS modem, the SMS will be received and sent to the Arduino MEGA2560 in the vehicle. Upon receipt

of the message, the Arduino MEGA2560 checks the password and the request. If everything matches then it will perform the request required by the owner by sending a link that has longitude & latitude through Google Maps, showing the location of the vehicle

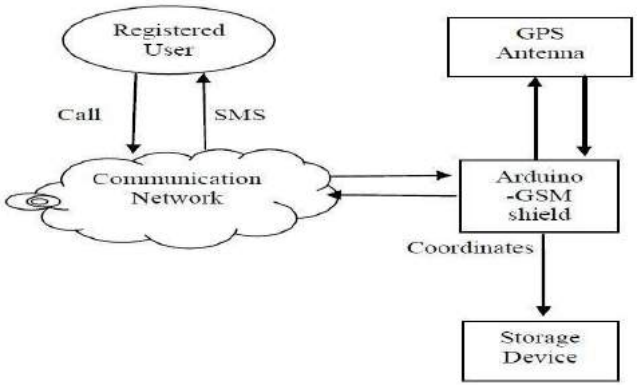

Figure 1. Architecture of Real-time GPS tracking system

II. LITERATURE SURVEY

Nilesh Dubey et al. designed a system named VLRD to overcome the drawbacks of GPS and SMS based vehicle tracking systems, which is cost effective and highly reliable, works without using GPS technology. Iman M. Almomani et al. proposed a system which is accessible at anytime, anywhere and allows system users to track down their vehicle position, speed, Stop, and movement. It also allows monitoring of the vehicle when other person is driving it. It prevents the vehicle theft by using vehicle alarm and displays the location of theft vehicle on Google map. The major concern of Wen-hai Cai et al. was to promote the usages of cloud computing in the field of transportation. This research also presented the procedure for making the cloud transportation system and an intelligent new generation transportation system which is based on cloud computing. A hybrid GPS-GSM system was proposed by Mohammad A. Al-Khedher and Montaser N. Ramadan et al. for tracking the vehicle using Google earth, it also increases the accuracy of measured location by using Kalman filter and displays the current location and status of the vehicle on Google earth. Intelligent anti-theft tracking system is very efficient and safe in emergency situation and engine failure. Zhengzhong Li et al. designeda Vehicle Tracking Data Recorder (VTDR) for recording vehicle speed, real time, mileage and other status information. The hardware and software architecture of this system includes Radio Frequency Identification (RFID) authentication for driver, data collection, data storage, data printing, serial and USB communication and LCD display. The main goal of Daniel K. Schrader et al. research was to design a more accurate and reliable system117 using inexpensive GPS receivers only for vehicle tracking applications. A GPS, GIS, GPRS and RFID based bus monitoring system118 was implemented in 2012. A new theoretical and rule based framework was designed for this system. This system was able to reduce man power which is required on monitoring center. Muhammad Ridhwan Ahmad Fuad et al. also gave GPS, GSM and Goolge119 earth based vehicle location tracking system. This system was used in many applications including vehicle security and fleet management. An integrated cost effective public vehicle tracking120 system, which is combination of both technologies GPS and RFID is designed by Apurav Vasal et al. It provides public vehicle arrival information at predefined Stops and improves public vehicle occupancy.

Vehicle navigation is one of the most important applications in the field of navigation which is mostly used by drivers. The mapsgiven to the driver in the system plays most important role in this field. When large object or vehicles were spread out over ground, the owner corporations often found it difficult to keep track of what was happening[8]. They required some type of system todetermine where each object was at any given time and for how long it travelled.

Also the need of tracking in consumer's vehicle use to prevent any kind of theft because police can use tracking reports to locate stolen vehicle. GSM and GPS based tracking system will provide effective, real time vehicle location, and reporting. [7] A GPS- GSM based tracking system will inform where your vehicle is and where it has been, how long it has been. The system fetches the geographic location and time information from the Global Positioning Satellites. During vehicle motion, its real-time parameters such as location are reported by SMS message [9]. The system takes advantage of wireless technology in providing powerful management transportation engine.

III. DESIGN OF TRACKING SYSTEM

The In this paper, it is proposed to design an embedded system that is used for tracking and positioning of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). In this Device ARDIUNO microcontroller is used for interfacing with various hardware peripherals. The current design is an embedded application, which will continuously monitor a moving Vehicle and report the status of the Vehicle on demand. For doing so an ARDIUNO microcontroller is interfaced serially to a GSM Modem and GPS Receiver. A GSM modem is used to send the position (Latitude and Longitude) of the vehicle from a remote place. The GPS modem will continuously give the data i.e. the latitude and longitude indicating the position of the vehicle. The GPS modem gives many parameters as the output, but only the NMEA data coming out and sent to the mobile at the other end from where the position of the vehicle is demanded. When the request by the user is sent to the number at the modem, the system automatically sends a return reply to that mobile indicating the position of the vehicle in terms of latitude and longitude.

The block diagram of a tracking system using GPS and GSM technology is presented in figure 3. The project is vehicle positioning and navigation system we can locate the vehicle around the globe with a microcontroller, GPS receiver, GSM modem. The microcontroller used is ARDIUNO. The code is written in the internal memory of Microcontroller i.e. ROM. With the help of the instruction set, it processes the instructions and it acts as an interface between GSM and GPS with the help of serial communication of ARDIUNO. GPS always transmits the data and GSM transmits and receives the data.

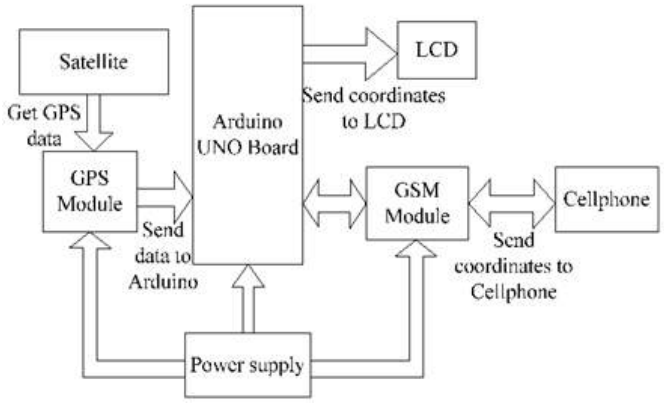

Figure 2. Block Diagram Proposed System

GSM and GPS, TX pins of the court are connected to each other, TX RX series Microcontroller. See the microcontroller which communicates with the help of your contribution. First, it gives and receives information, information about the GPS receiver with the help of using the SMS phone. The use of the GPS receiver (9) 600 transmission speed works to receive data from the space segment (satellites a) values is different from the GPS microcontroller satellites ARDIUNO they are, where they are processed and transmitted to the phone. GPS processing time only accepts GPRMC $ values. From these values, it only

takes the time to eliminate the values and the width and the length of the microcontroller, and the height, the name of the satellite, the authentication, etc., for example, the cause of the LAT : 1728, 2470
LOG: 7843.3089 GSM modem with a baud rate 57600.GSM is a Global system for mobile communication in this device it acts as a SMS Receiver and SMS sender. The power is supplied to components like GSM, GPS and Micro control circuitry using a 12V/3.2A battery .GSM requires 12v,GPS and microcontroller requires 5v .with the help of regulators we regulate the power between three components.

IV. CONCLUSION

In this article, we have proposed an anti-theft system that can be used to track a vehicle equipped with the proposed device. It can also be used for tracking wildlife, tracking assets and recovering stolen vehicles. In the future, we may be able to integrate other related devices into a vehicle such as sensors. We can create a server to see the vehicle route and other information on our computer and we can record the trajectory of it. The sensors installed in our vehicle can report vehicle information to our server and it can form an intelligent tracking system. There are various reasons why car owners and public vehicle operators prefer to use GPS. You can determine your location, whether you are traveling locally or abroad, having a GPS is really an advantage. If you think you are lost, you can use your GPS receiver to find out your exact location. Vehicle tracking systems are commonly used by fleet operators for fleet management functions such as routing, dispatch, on-board information and safety. Other applications include monitoring driving behavior, such as an employee's employer or a parent with a teenage driver.

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Implementation of Chatting Application – Chatbox

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ABSTRACT

Chatting is a method of using technology to bring people and ideas together despite the geographical barriers. This is Chatbox application; this project is based on local area network(LAN). It is a client server application program developed in PHP. Here the individual can chat with one-to-one or one-to-many through LAN connection. Even they can exchange files from one computer to another. Administrator can view logs through server. This application is helpful in submitting information and to connect with workplace staff. The objective of Chatbox application is to facilitate text messaging, data transfer without size restriction which is commonly seen in most of the messaging applications.

Keywords : Client, Server, text messaging, file transfer, session, LAN.

I. INTRODUCTION

Communication is a mean for people to exchange messages. It has started since the beginning of human creation. Distant communication began as early 1800 century with the introduction of television, telegraph and many more. Telephone communication stands out as the fastest growing technology, from fixed line to wireless. Chatting is a method of using technology to bring people and ideas together. The technology has been available for years but the acceptance is quit recent. Our project is an example of offline chat. It consists of 2 applications, the client application and Server application. To start chatting client should get connected to server.

II. RELATED RESEARCH

Pooja Purohit, Sakhare Shital, Kothari Rasika and Jadhav Dipali proposed LAN messanger application which is a client-server application program developed in visual studio 2005(VB.NET). Ms. Rakshanda.V.Chate, Ms. Meghana Shivshankar, Ms. Jyothi B provides the implementation of chatting application ICHAT in which chatting over a LAN Network is done[1]. Ibrahim Muhammed Abba, Mia Torres-Dela Cruz, Umapathy Eaganathan, Janet Gabriel developed a LAN chat messenger (LCM) using rational unified process (RUP) methodology with object oriented programming[4].

III. THE PROPOSED SYSTEM

This project is to create a chat application with a server and clients to enable the clients to chat with

many other clients in the same common chat group. It is a centralized system with centralized database server. It allows admin to fine logs of other users. Existing system requires Internet connection whereas in proposed system only intranet connection is required. This project is to simulate the multicast chatting. The main purpose of this project is to provide multiple chatting functionality through network. This project can plays an important role in organizational field where employees can connect together through LAN. This system is useful for those who can not afford to have an internet connection. This makes communication possible among number of LAN users simultaneously. Any message, files or other documents remains the same until the user deletes from the chat.

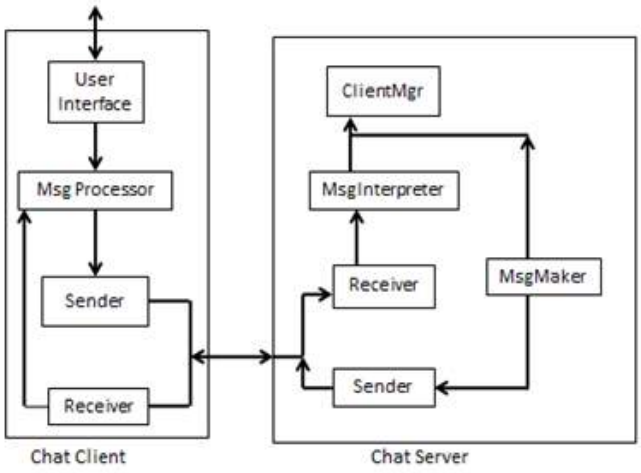

Fig 1 : Client-Server Architecture

IV. SYSTEM REQUIREMENTS

Software :

Front End: PHP 7 & 5 Language, HTML, CSS

Back End: My SQL I

Tool: XAMP

Hardware :

LAN System Connection

OperatingSystem:Windows XP

RAM :1 GB

Processor: Intel Core i3

V. FINAL PRODUCT

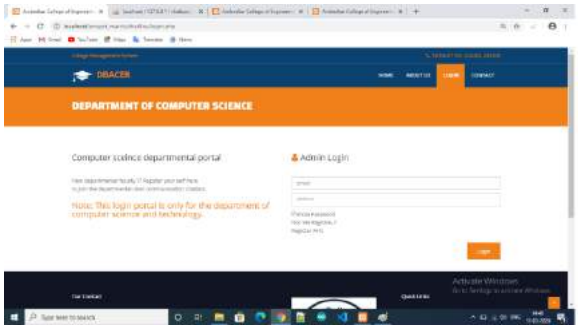

Fig 2 : Login Page

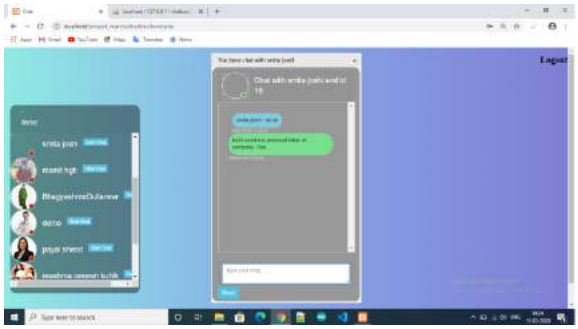

Fig 3 : Admin Chatbox

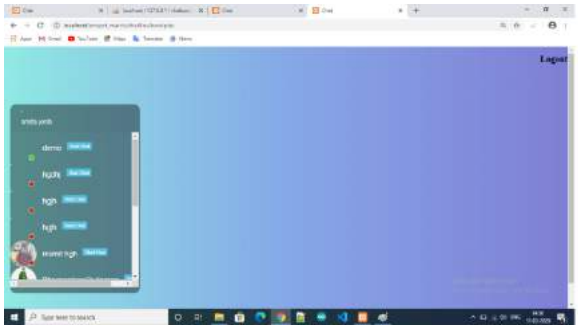

Fig 4 : Online Notifications

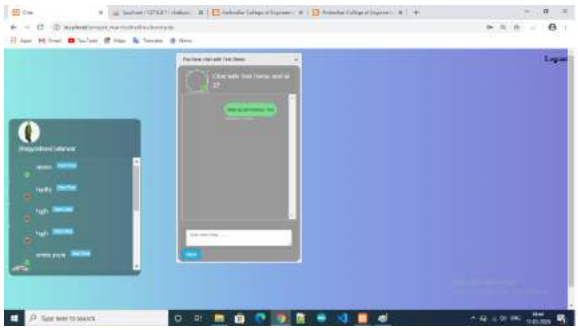

Fig 4 : Multiple User Shown Online

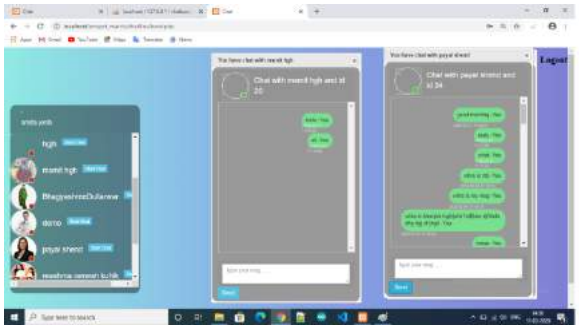

Fig 5 : Multiple Chat

VI. CONCLUSION AND FUTURE ENHANCEMENT

We have completed our project work using system analysis and design approach. We have done work with preplanned scheduling related with time constraints and result oriented progress in project development. We experienced that developing this software helped enhance our technical skills of programming.

In future, voice and video calling can be implemented in this application. If any organization having a vast LAN network then we can add encryption algorithms to provide data security.

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Home Automation and Security System Using IoT

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ABSTRACT

In this paper we used the IOT platform for our system. In IOT application has becomes the state of the technology among the researcher to the internet available anywhere. This system related to the smart home automation and friendly for people. The Multi-modal application is based in home automation system operate voice recongnition command to user using Google assistant or any web application. This system can be controlled by our smart phone or web. This system is helpfully for security purpose. This concept can be incorporated to make smarter, automated and safe. Home security is very useful application based on IOT and We using to create inexpensive security system for home as well as industry. This system will inform the owner about any unauthorized entry or whenever the door is opened by sending the notification , then owner will take the action. Our main objective the work is to make the home automation system more secure and intelligent.

Keywords: Home-Automation, Relay, Node MCU(ESP8266), IFTTT, Adafruit , Internet of Things (IOT), Google Assistance, Voice Control, Smart-phone.

I. INTRODUCTION

India, share about the 18% of the world population has Limited energy resources and share roughly 0.6%, 0.4% and 6%, for world gas, oil and coal reserves respectively. However, in India, the electricity consumption due to Information and Communication Technologies (ICT) Usage has increased from 24TWh to 31TWh in the last few years. Automation makes not only an efficient but also an economical use of the electricity and reduce much more wastage. The main target is the application is to connect anything through the internet that can be accessible from anywhere.This system is wireless home automation system using IOT platform is a system that user computer or mobile devices to control basic home function and feature automatically through internet form anywhere around the world. It is meant to save the electrical power and human energy also save time. The IOT platform will be used for minimize the electricity. IOT is not limit for any particular field or platform. The system will provides the safe and secure home automation also home security for protection. It will reduce the time consumption. In IOT technologies are different application so, home automation is one of the application using IOT technology. This system can be controlled by mobile phone using Google assistant or web application.

II. SMART HOME AUTOMATION AND SECURITY SYSTEM

In smart home automation the system is more secure and friendly. As per the demand of electricity is increase the day-to-day life, so will provide the smart home automation is upcoming area of research will provide the remote access to controlling using IOT for home appliance. The IOT platform will provided

the old aged people and handicapped people to safely use this technologies. This devices can controlled the electrical appliances like fan, light etc, without using any physical connection. In home automation research conducted report are the previous system based on this technology like Bluetooth system . This Bluetooth system is use for short range communication that require the appliances in range.

In home automation for sending/receiving data used the MQTT for the sensor. in this system to measure the temperature and humidity of room to used the DHT11 sensor. In another method is based on raspberry pi is to control by home appliances using web-based interfaces. In home automation using mobile the system will be designed by Zigbee. IOT will provided the electrical appliances to the non-smart device into smart device, which allows the user the device through the internet.

The home will converted into smart home and also provide the more strong method for controlling the electrical appliances. We also installed the camera for security purpose in home automation with the help of internet. The user will monitor the home and turn ON/OFF appliances to save the electricity and electric bills. In this system will also add the sensor for fire alarm and smoke sensor for air filter. For the security will be used for protection the home can prevent the intruder form enter the home and system is more intelligent, that can be light easy on/off and fan of the room as possible to detect the presence of person.

This system will develop the IOT based home automation system will used the voice command as well as web-based services for control the electrical appliances. Also security the user define the command will set for the operate the system.

III. DESIGN AND IMPLEMENTATION

In system the most important input is speech for man-to-machine interaction therefore, the system make smart home more friendly. We used the Google assistance with the help of web based application for control the home automation.

The main advantage of this system is multimodal in presence of noisy background surrounding the performance of the Google assistance doesn't interrupt .so, the web based application can be helpful to controlling the home appliances for the system. The proposed model is more flexibility and the system more secure.

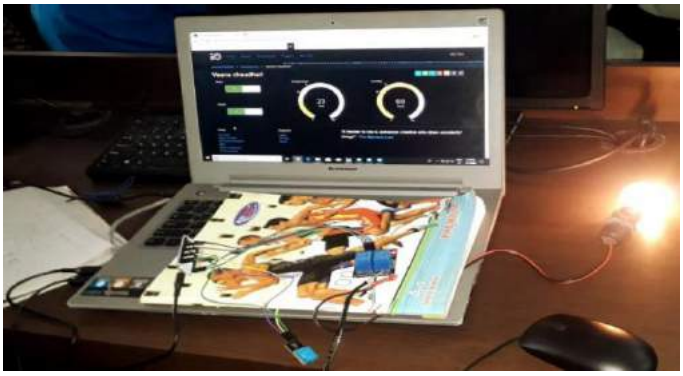

Fig 1 : IOT home automation dashboard developed on adafruit

The smart home automation can be implement with the help of controller unit that can be connected with the Wi-Fi network is available for 24-hours. The main controller is programmed to accepted the condition and automatically connect the available network and also connect the power backup.

The user can be assure and controlled the smart home appliances using Google assistance and web based service using IOT platform that can use the Adafruit and IFTTT to maintain the communication website or links.

IV. SYSTEM REQUIREMENT

- Node MCU
- IFTTT
- Adafruit
- Google assistance
- Arduino software(IDE)
- Relay

1.NODUMCU :

NODUMCU is a low-cost open source IOT platform . The firmware run on the ESP8266 Wi-Fi form the system . The hardware which based on the ESP-12. Memory of NODEMCU is 128 bytes. This software will be leading the platform for the various modules and developing board including NODEMCU. Thus making the devices to operates much faster and making it as first choices for IOT application. It also require less computation time to perform the task and use Lua script[2].

Fig 1 : NODEMCU

The ESP8266 in low cost Wi-Fi chip with full TCP\IP stack and micro-controller unit.
The different feature of ESP8266 WIFI module are follows:-

1. 64 KB of instruction RAM, 96 KB of data RAM
2. External QSPI flash:512KB to 4MB
3. WPA\WPA2 authentication or open network.
4. 16 General purpose input\output pins.
5. Serial peripheral Interface Bus.
6. Inter Integrated circuit.
7. Inter IC sound interface with sharing pins with general purpose input output pins.
8. 10 bits Analog to Digital converter.

2 .IFTTT:

IFTTT stand for “if this then that”, is an interface which provide the web based service in which device are connect with the mobile app . Thus, making it much easier for the device to work based on mobile application using conditional statements[3].

3. ADAFRUIT:

Adafruit is a library that supports the MQTT (message queue telemetry transport). It acts an MQTT broker. MQTT is based on protocol services that can provides the sending and receiving data for feed. The main advantage of MQTT is that provides a faster rate of transmission of data and require less data byte for connectivity. It require 80 byte for connection between the device to server and 20 byte from server to device. Arduino IDE software is used for the complete the code from[3].

4 .Google assistant:

The Google Assistant is a software which allows its users to control all apps in there device to be controlled directly through it. It allows users to

control and command most of the apps in their devices using voice command. This provides more conveniences,to the people as they only have to command the Google assistant through voice command using smart phones.

5 .Arduino software(IDE):

In this system we used the arduino integrated development environment (IDE) is cross platform application. This software is usually use for c and c++ programming. The arduino IDE supplies a software library from the wiring project which provide many provide many common input and output procedure we written code for function or command arduino board by a loader program in the board's firmware[4]. The IOT platform is not support only arduino board but many other board using raspberry, ESP32, ESP8266 and many other. The IDE support all features you would expect like code completion and so on.

6. Relay:

A Relay is electrically operated switch. It consist of a set of input terminals for single or multiple control signals, and set of operating contact terminal . A relay is generally used for the control high voltage using very low voltage as an input. The relay is a fundamental device which used for on off conditions, much like a toggle switch or a limit switch. But a relay is operated based on an electrical control signal, as opposed to a hand or a limit switch triggered by equipment contact or condition.IOT power relay is a controllable power relay equipped with output that can help to create the internet of thing can safe or reliable power control. The IOT relay can be used the easily control the power going to a devices with arduino. Relay were the used to expensively in telephone change in computer to perform the logical operation.

Fig: Relay

V. CONCLUSION

Home automation converted into smart and intelligent device using IOT. In home automation different technologies used to implement the system.but we used the IOT platform . We conclude that the simplicity, low cost and reliability home automation system is marking its position in day to day market .

This system will be controlled by mobile for secure and friendly approach for home automation . With the help of this system we can increase the efficiency of appliances and we can the complete control over the home appliances form a long distance. This increase the comfortability of human being and it will reduce the human effect.

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Online Management of Police Work

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ABSTRACT

The project titled as "Online Management of Police Work" is an android based application. It will provides facility for reporting online crimes, complaints, missing person FIR's. Along with these, the system will also be useful for traffic police for challan generation where they will be able to get complete information about vehicle only by scanning QR code on that particular vehicle and after that traffic police can be able to generate challan with fix values for violation of rules then user will get detailed sms on registered mobile number. Due to this paper work will reduce as well as people can save themselves from fraud in challan system which make complete system online and Barrier free.

Keywords : Online receipt, E challan, Online Complaints.

I. INTRODUCTION

In this project, there are three modules i.e. user module, traffic department module and police department module.

In user module, firstly user have to register themselves on FIR application and then they will able to submit their FIR online and get their FIR related updates on their mobile. Along with this if any domestic violence get occur around the user then he/she can submit the picture of violence to the police station and from this image police can immediately identify the location by checking coordinates of that image where it is happen and can take quick action against this act.

In police station module, police can get online FIR submitted by the user and then they can do their further processes regarding the complaints. Data of complaints, records stored in their database so that it can be used in future if required.

In Traffic department module, we will provide a QR code to vehicles so that when Traffic police scan their code they will directly get complete information about this vehicle and they only need to enter which traffic rule have been broken by the driver then an E-challan for traffic violation will be sent to driver through SMS on their registered number and after getting challan details we can save users from frauds.

II. METHODS AND MATERIAL

2.1 The following diagram shows the flow of user module:
2.2 The below diagram shows the flow of traffic department module:
1.3 The below diagram shows the flow of Police station module:

III. RESULTS AND DISCUSSION

3.1 FIR Admin panel

This is the server dashboard on the police station site were police can handle the FIR and take action over them. Registration of police will be takes place so that other can do their work according to authentication given to them. This panel will provides all details about registerd officers as well as registered crimes.

3.2 Traffic Admin panel:

Sample screenshots is the demonstration of admin panel for traffic department which will provide all information of registered vehicles and their violations, From this panel admin will able to generate QR code when new user will be registered on it.

3.4 FIR /Domestic user panel:

Sample screenshot shows the android application page for user for submitting their FIR after registration.

This is another page of android application from which user is able to submit domestic violence to the police station.

IV. CONCLUSION

The project titled as "Online Management of Police Work" is an android based application. This software provides facility for reporting online crimes, complaints, missing persons, show most wanted person details. This software is developed with scalability in mind. Additional modules can be easily added when necessary. This system is very flexible and versatile. It has a user-friendly screen that enables the user to use without any inconvenience.

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International Journal of Scientific Research in Science and Technology

Helmet Operated Smart E-Bike

Prof. Mohammad Safique Memon, Akshay Landge, Adnan Ali, Suraj Puri, Nitin Parate, Shoheb Sheikh

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ABSTRACT

This system is specially designed for the safety & security of the two-wheeler riders. According to the world health organization, India is inclinable for road accident and most of the cases are of two-wheeler accidents. Hence for the safety of the rider, we came up with an idea of the smart helmet. So the main aim of the system is to reduce the possibility of a two-wheeler accident and drunk drive case. This system is implemented using microcontroller kit which consists of RF transmitter and RF receiver system. The bike will not get started without wearing the helmet by the rider this condition is sensed by the helmet press button which is used as a sensor. Similarly alcohol sensor is also implanted for the drunk drive case. This alcohol sensor is placed near the mouth of the rider in the helmet. If the breath of the order is alcoholic then the bike will not get started.

We have also implemented in the system so that when the rider gets crashes and whenever helmet hits the ground, the sensor gets the sense the signal from the magnetic sensor and giving to the microcontroller by using GSM module and these then GSM module automatically send the message to the registered mobile number.

Keywords : Helmet Press Button, Alcohol Sensor, Magnetic Sensor, Microcontroller, GSM Module.

I. INTRODUCTION

The thought of developing the project comes to do some good things toward society. Day by day the two-wheeler accidents are increasing and leads to the loss of many lives. The reason may be such as no fitness of bike, the fast riding of the bike, drunken and drive, etc. This is a situation we observe our day to day life, a thought of finding some resolve this problem come up with this idea that is Helmet Operated Smart E-Bike. So this system gives information about the rider wearing the helmet or not, whether the rider drunken or not and also rider met with accident it gives the information about the accident. Basically there are two major units in the system that is helmet unit and bike unit. Smart helmet focusing on three major applications that are helpful in our day to day life. At first and most one is the ignition of the bike will not on if rider is not wearing the helmet. Secondly alcoholic driving is not possible by using this smart helmet. If the rider is alcoholic, the bike will not start. The third application is accident detection. If person met with an accident, in such situation informing to ambulance or family members through mobile to rescue him for an extent. The helmet press button and alcohol sensor is placed inside the helmet. RF transmitter a circuit and battery are placed backside of the helmet. Bike unit consists of RF receiver circuit relay circuit ignition circuit and buzzer and LED module circuit

the bike unit is placed on actual E-bike. LCD is used for showing the various types of output after wearing the helmet. The 12v battery is used for giving the supply to the circuit.

II. METHODS AND MATERIAL

Power and LED Display Circuit

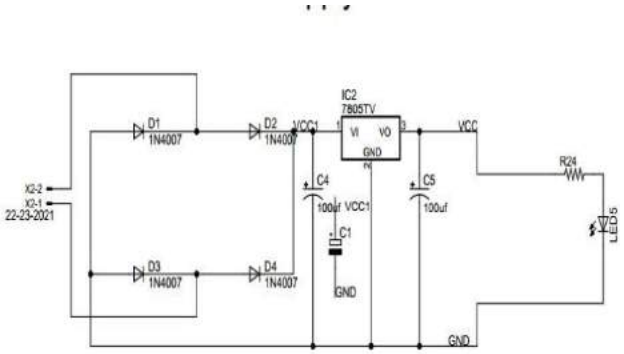

Fig.: 2.1 power and LED Display Circuit

A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. The rectifier efficiency of a bridge rectifier is almost equal to the center-tapped full-wave rectifier. The only advantage of bridge rectifier over center tapped full wave rectifier is the reduction in cost. In a bridge rectifier, instead of using the center-tapped transformer, four diodes are used. The 12v Ac supply is converted into the 12DC by this rectifier. It mainly consists of four diodes. The simple capacitor filter is the most basic type of power supply filter. The application of the simple capacitor filter is very limited. The capacitor filter is also used where the power- supply ripple frequency is not critical; this frequency can be relatively high. The capacitor is a simple filter connected across the output of the rectifier in parallel with the load. The capacitor acts as a filter for each circuit. Due to the use of this capacitor the ac components blocked and dc components are bypassed. 7805 provides +5V regulated power supply. IC 7805 is a voltage regulator integrated circuit. Microcontroller ATMEGA328 is used for the operation of the circuit. 16*2 LCD display is used for monitoring the output. All the outputs are displayed on the LCD screen.

Ignition and Relay Circuit

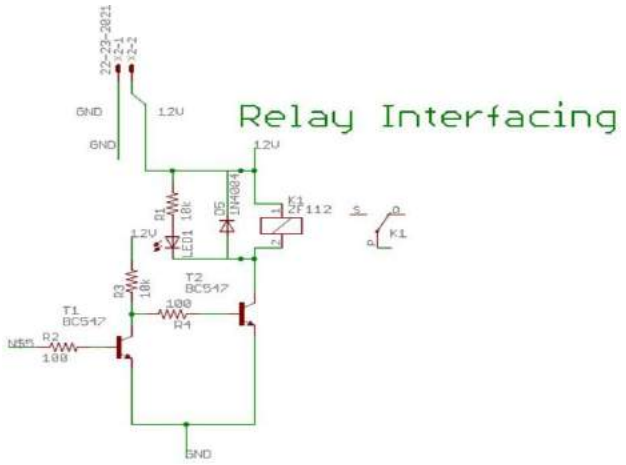

Fig :-2.2 Ignition and Relay Circuit

Relay is an electromagnetic device which is used to isolate two circuits electrically and connect them magnetically. They are very useful devices and allow one circuit to switch another one while they are completely separate A relay can make a 5V DC battery circuit to switch a 230V AC mains circuit. In this project, the relay is used as an ignition relay. Transistor BC574 is mainly used for amplification and switching purposes. The transistor terminal requires a fixed DC voltage to operate in the desired region.

RF Transmitter and RF Receiver

An RF transceiver module will always work in a pair that is it needs a transmitter and receiver to send and receive the data. A transmitter can only send information and receiver can only receive it, so data

can always be sent from one end to another end and not the other way around. The transmitter module consists of three pins namely Vcc, Din, and ground. It consists of encoder IC and in RF receiver module consists of decoder IC. The battery required for this module is 5v DC to 9v DC

III. WORKING AND BLOCK

DIAGRAM

There are two features of this project it won't allow starting the bike if riders don't put the helmet on the head and if the rider is consumed alcohol then also it won't allow them to start the bike. There is the control circuit which is the backside of the helmet. The power is supply by the battery which is replaceable if it gets a discharge. In control circuit there is an RF transmitter which is 433MHz. Whenever the rider puts the helmet on the head this press button is automatically pressed. Secondly the alcohol sensor is also implemented inside the helmet which is sense the alcohol if rider has consumed the alcohol then it automatically sends the signal to the transmitter unit and then this transmitter unit sends the signal to the RF receiver. In bike control unit the engine of the bike is turned ON using the ignition relay. The ignition relay which is used in the circuit cannot be controlled directly so there is two-transistor used as an amplifier that will get the signal from the microcontroller and drives the relay. The microcontroller which is used in bike control circuit is ATMEGA328. 16*2 LCD display is used for monitoring the output. All the outputs are displayed on the LCD screen. RF receiver receives the signal from the RF transmitter this operation is identified by the LED which is also used for the communication purpose. There are the four diodes are also connected in the circuit which is acting as a bridge rectifier If the transformer is for the supply instant of the battery then these diode is converted 12v AC supply of the transformer into 12v DC supply. As we know the output of the rectifier is not pure dc it has ripple as well as fluctuation so that there are two capacitors is used as a filter circuit which will filter out the ripple and fluctuation. IC 7805 voltage regulator which converts 12v dc into 5v dc. This 5v dc which will utilize by RF receiver, microcontroller, indicators. At the time of the accident, the glass tube inside the magnetic sensor will break and give the notification through the LCD screen and mobile which is connected through sim card by GSM module.

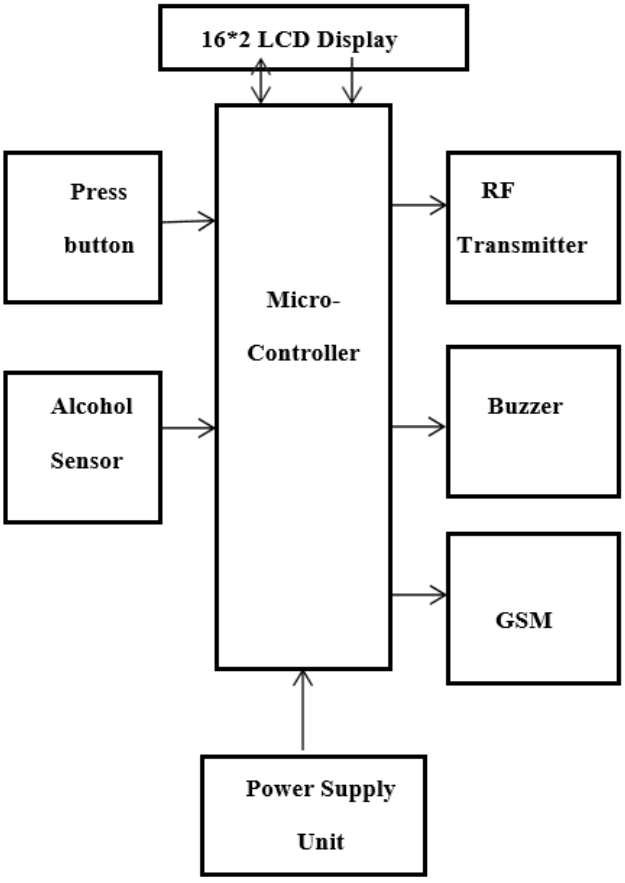

Fig :-3.1 Helmet Unit

If a rider does not wear a proper helmet then LCD display shows the "NO HELMET" shown in fig no 4.3

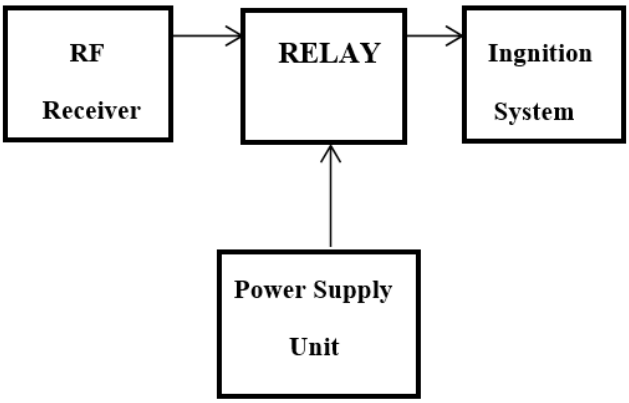

Fig :-3.2 Bike Unit

IV. EXPERIMENTAL RESULT

When the rider wears the helmet then press button which is placed inside the helmet is press by the rider head then transmitter transmits the signal to receiver and LCD display show the "IGNITION ON" as shown in fig no 4.1

Fig no:- 4.1 Ignition On

Illegal consumption of alcohol during driving as per the government act but for demonstration purpose, it is programmed as if alcohol in a breath then the helmet until will communicates with vehicle unit and show "ALCOHOL DETECTED" thereafter the ignition system gets switched off as shown if fig no 4.2

Fig :- 4.2 Alcohol Detected

Fig :-4.3 No Helmet

V. CONCLUSION

This paper has a good real-life scope if it is implemented by the government. It can help to reduce the road accident of two-wheeler. The designed smart helmet ensures the safety of the rider by making it necessary to wear a helmet and also ensures that the rider hasn't consumed alcohol. If any of these prime safety rules are violated, the proposed system will prevent the biker from starting the bike. Also, the helmet is being made user friendly with the help of GSM. In case of accident it sends message to the registration number. By implementing this system will reduce the accident rate due to drunken driving.

VI. ADVANTAGE

The bike will not get the start if the helmet is not worn by the rider. If rider consumed alcohol, it can be easily detected by the alcohol sensor. An accident can be easily detected by a magnetic sensor and thus medical service can be provided easily. Hence reduces the road accident. Easy to implemented. There are various sensors are used, which can be easily replaceable.

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A Review on Smart Traffic Management Using Emerging Technology

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ABSTRACT

Vehicular traffic density has increased all over the world and new techniques have been time and again employed to cater to this ongoing problem. Different traffic management strategies have been put forward and most of them focus on managing traffic density on the road. Some authors suggested the utilization of sensors to determine conveyance count while several others suggested the utilization of video cameras to capture moving vehicles and perform preprocessing on the videos to obtain conveyance count. This paper summarizes a review on the methods that were utilized for the development of a keenly intellective traffic management system. A detailed comparison of all the Methods are provided in this paper along with the pros and cons of every method.

Keywords : Traffic Density, Sensors, Traffic Management.

I. INTRODUCTION

Traffic density has increased all over the world and there are many techniques evolved in managing it which are in terms of changed infrastructure or addition of some more modules to design a traffic management system which can be dynamic enough to change the signal timings according to increased or decreased vehicular flow in any direction at any particular time. CCTV has been installed in many countries to monitor smooth traffic operations as well as punish the traffic violators. Image processing algorithms have been used to identify traffic violators but when it comes to identifying traffic density, not much work has been proven in this regard hence research work is on but it has not been implemented for real time operations. Also if it is used to identify traffic density and control signal timings at each side dynamically, another major concern regarding this process shall be the emergency vehicles that may get stuck at signals. The system designed should have an availability to dynamically cater to the need of emergency vehicles, normal vehicular traffic and higher traffic density. Traffic violations should be stopped as only punishing the offenders with fines has not proven to be an effective way to stop it. Apart from that there have been many cases of traffic accidents caused due to red light jumping by traffic violators. Rash driving or other negligent violations are the ones which happen all over the roads and highways, this is a problem statement that can also be discussed and solutions to stop it can be found. But this problem is not fully related to traffic signals. Hence the main problem statements that can be focused are traffic density, traffic signal management, emergency vehicle systems and curbing traffic violations at signal. This paper shall discuss the techniques of identifying traffic density, communication technique, controlling parameters, emergency vehicle system modules.

II. LITERATURE REVIEW

This paper is divided into reviewing following techniques

A. Working of traffic signals
B. Emergency vehicle systems
C. Traffic density measurement.

A. Working of traffic signals

The traffic signals generally have four sides and in India adaptive traffic density have not been employed due to infrastructural changes and challenges associated to employing sensor based networks at a large scale. Many countries at present are using the conventional technique of traffic signals i.e. each lane is served for a predetermined time and all the lanes get a chance sequentially. In cases where the traffic density is high, an approach of variation in time is taken into consideration i.e. increasing the signal timings, to allow more vehicular flow. This approach has the following disadvantages.

i. It has no facility for emergency vehicles.
ii. If traffic density at all the sides is low, still each side has to wait for the specified duration.

Fig (i): A 4 lane traffic signal

B. Emergency vehicle systems

There are cases where ambulances have not been given way and lead to loss of life of patient although it is a moral duty to give way to ambulance or emergency vehicles but in case an individual fails his/her moral duty it shouldn't lead to loss of lives. Hence there has been much research in finding a way out to eliminate this problem. One main method that has been proposed by many papers is the use of RF module transmitters and receiver sets which shall help the ambulance or emergency vehicle drivers to send request signals to traffic light control section for granting a green signal once they arrive at the signal. But it leads to mis-cordination in timing of transmission and reception apart from that there is no specified distance from which the request should be placed. Image processing algorithm has been used to detect the siren or ambulance sign but it is not a feasible option as the size of ambulance is not fixed and there are high chances that a bigger vehicle in front of it shall block the ambulance and hence it won't be detected. Another approach is to use voice detection of ambulance sound and then grant access but it is not a feasible option as it can also grant access in cases where fake sound is played by any other user, also it shall lead to non detection of emergency vehicles when there is heavy traffic sound and horn sounds [3]. The feasible option can be the use of RFID cards in ambulances which shall detect the card and grant access. Bluetooth module is proposed as an approach for detection of emergency vehicle systems [2].

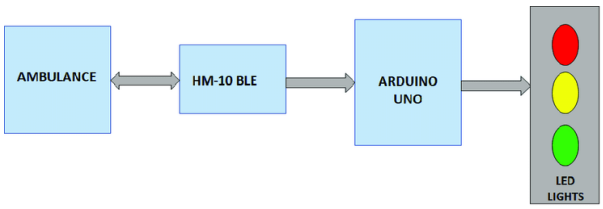

Fig (ii) Bluetooth module based ambulance detection system [2]

C. Traffic density measurement

Traffic density measurement is an important parameter because it shall help to manage the traffic easily and allow smooth flow of traffic. Traffic jams has become a problem for majority of the countries as it wastes time and fuel of the people stuck in these traffic jams. Majority of times this problem can be avoided by dynamically changing the duration of individual signal but the biggest problem associated to it is the detection and measurement of traffic density at each side. Image processing algorithms have been proposed where the already installed CCTV systems are modified to detect traffic density at each lane [2]. It cannot be combined with emergency vehicle systems as it shall make use of extra hardware hence the author has proposed the use of Bluetooth module for emergency vehicle systems. If there are parked vehicles in any lane it cannot identify it as a static object rather it will continue to keep it in count for traffic density measurement. Sensors can be used to detect the traffic density and then accordingly signals can be sent to the controller for changing the traffic signal timings.

An array of IR sensors is employed at each lane and the number of vehicles is counted by checking the number of obstacle IR sensor detects. This is not employed because as a prototype it shall be very easy to implement but at large scale this system shall fail because it is not technologically feasible to use IR arrays in huge numbers as an ideal sensing element [4

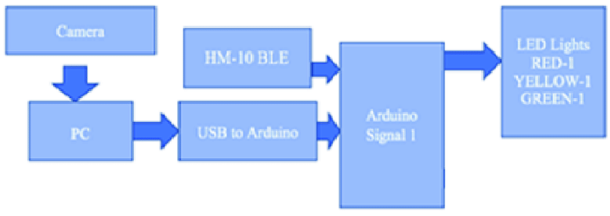

Fig (iii) Traffic density measurement using camera system [2]

An intelligent traffic system using VANET was proposed in [2]. The function of these ITL [intelligent traffic light] is to collect the traffic information such as traffic density, traffic statistics etc. Every vehicle will transmit its exact location which is will be used to calculate the traffic density. The system architecture consists of three modules as shown in fig.

1) *Warning Message Module:* This module determines if any traffic accidents have occurred and warns the driver about the same.

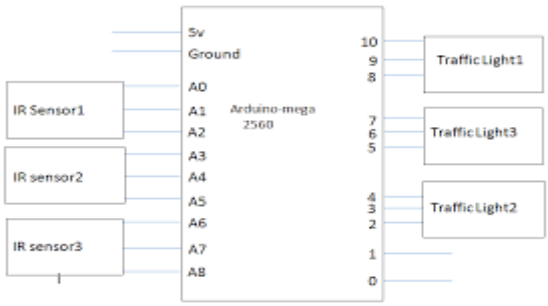

Fig (iv) traffic density measurement using IR sensors [4]

2) *Traffic Density Calculation Module:* This module calculates the traffic density on each road.

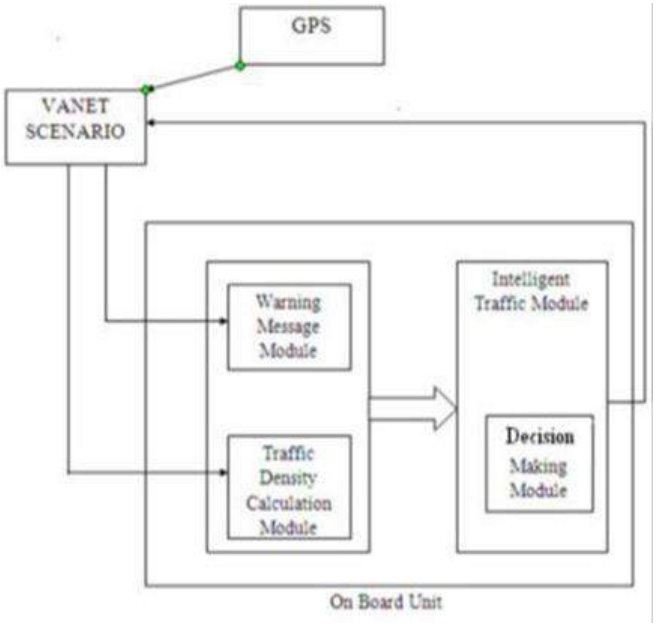

Fig (v) traffic density measurement using GPS module [5]

3)*Decision Making Module:* The above two modules gather their information and send it to the Decision Making Module where appropriate decision is made to provide a congestion free path to vehicles.

The disadvantages associated with the above system are

i. GPS modules: it is not technologically feasible to control, traffic signal dynamically due to real time constraints of heavy vehicular traffic during rush hours and cost of installing extra hardware module.
ii. Bluetooth modules: pairing with the receiver fails many a times
iii. IR sensors: placing these sensors on road is not a feasible option and static or parked vehicles shall fail traffic density calculations.
iv. CCTV: It can monitor traffic violations but also require manual intervention. Image processing algorithms used for traffic density can fail when there is a major traffic jam apart from this; it also faces problems related to detection of vehicles of varying sizes.

III. CONCLUSION

This paper provides a review on various techniques employed for traffic density measurement and designing of smart traffic light controllers. This review has also mentioned the disadvantages associated to the use of these techniques during real time operations. As the smart traffic light system is still a part of research, it is not implemented in urban cities following the disadvantages associated to the discussed systems.

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Design and Development of Solar Tracker and Cleaning of PV System

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ABSTRACT

Solar energy is a form of renewable energy source and in the present scenario; it is the desideratum of the hour to efficiently utilize this energy source. The proposed work fixates on two mechanisms which can increase the efficiency of rooftop solar panels assembly. The two mechanisms employed are Solar tracker assembly and solar panel cleaning mechanism. Solar tracker assembly uses Light dependent resistor (LDR) to track and monitor the kineticism of sun. It sends the signal to arduino controller which then provides out signal to the tracker mechanism. It consists of a dc motor; the arrangement of tracker is predicated on a rope pulley mechanism which ascertains correct kineticism of the solar panel. Solar tracking mechanism ascertains maximum solar energy is absorbed by the solar panels. The solar panels are installed on rooftops or ascended platforms, there is no routine cleaning of these panels and dust gets accumulated over the time which decreases the absorption capacity of solar panels. Solar panel installation requires high initial investments and if these are not maintained it shall abbreviate the overall efficiency of solar panel systems. The proposed work presents a cleaning mechanism which ascertains the panels are cleaned routinely thus eschewing the accumulation of dust and minimization in Efficiency. These two mechanisms are employed in the project to have congruous utilization of renewable energy resource.

Keywords : Solar Tracker, Arduino, Solar Panel Cleaning.

I. INTRODUCTION

In very rudimental terms, a solar panel (PV module) is a contrivance that will engender a flow of electricity under sunlight. This electricity can be acclimated to charge batteries and, with the avail of an inverter, it can power mundane household electrical contrivances, or "loads". PV modules can withal be utilized in systems without batteries. Most solar panels (felicitously called "modules") are framed in aluminium, topped with tempered glass, and sealed by a waterproof backing. Sandwiched between the glass and backing layers are the photo-reactive cells themselves, often composed of silicon. On the back of the module is a junction box that may or may not have two cables emerging from it. If the junction box has no cables, it can be opened to access the electrical terminals where wires can be annexed to conduct the engendered electricity away from the module. If there are cables already in place, the junction box is customarily sealed and not utilizer-accessible. This paper presents solar panel cleaning and solar racking technique, hence paper is divided into two sections: namely solar panel racking mechanism and solar tracking mechanism. Solar panel tracking is an essential mechanism to absorb maximum power as sun does no remain static at one place. Earlier research works were limited to scope of using solar

energy but as solar energy has become a popular energy source and its usage has increased over the ears, it has become necessary to employ novel techniques that are suitable in the long run and also systems which increase the overall efficiency.

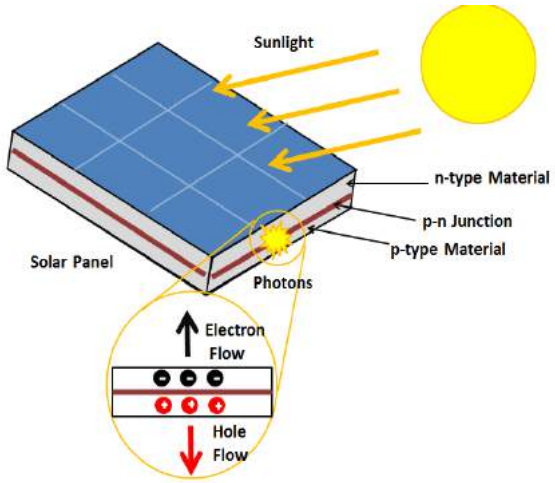


Figure 1 : Principle of Working

II. LITERATURE SURVEY

A) Solar Panel tracking:

There are two broad types of solar trackers:

i.Single axis

The single axis trackers can either have a horizontal or a vertical axis. The horizontal type is utilized in tropical regions where the sun gets very high at noon, but the days are short. The vertical type is utilized in high latitudes where the sun does not get very high, but summer days can be very long.

ii.Dual axis

The dual axis trackers have both a horizontal and a vertical axis and thus they have a wide range of tracking, which makes them utilizable in corner of the world. Dual axis tracking is profoundly paramount in solar tower applications.

Basic techniques employed for solar tracking mechanism with controller are as follows:

Tracking circuit using stepper motor

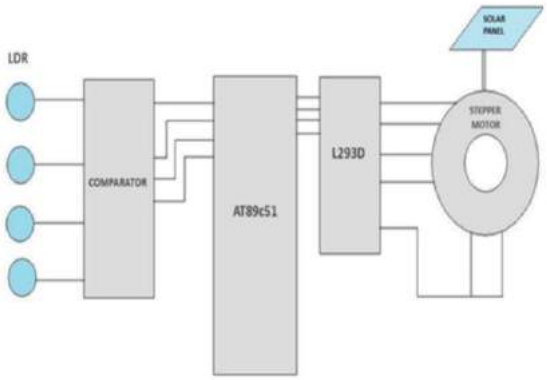


Figure 2 : Tracking circuit using stepper motor

In this mechanism, LDR provides signal to the controller and controller sends the signal to tracking mechanism accordingly to move the solar panel assembly.

Tracking circuit using DC motor

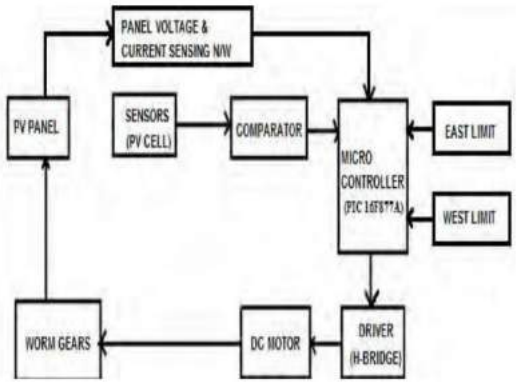


Figure 3 : Tracking circuit using DC motor

In this mechanism, solar panel is used as sensing element and provides signal to the controller and controller sends the signal to tracking mechanism accordingly to move the solar panel assembly [1].

B) Solar Panel Cleaning Mechanism

Solar panels are installed on heighted or elevated areas hence dust starts to get accumulated on it; in the long run it will cover the solar panel and affect its efficiency. Some of the mechanism employed to clean

the panels are using brushes, water sprinkles, roller heads etc [2]

Figure 4 : solar panel cleaning using roller brush.

III. METHODOLOGY

The working of this project is divided in two functionalities namely as solar panel tracking mechanism and solar panel cleaning mechanism

a) Solar panel tracking mechanism

The proposed design implements a fabricated design structure which helps to move the panel in two directions i.e., east & west direction.

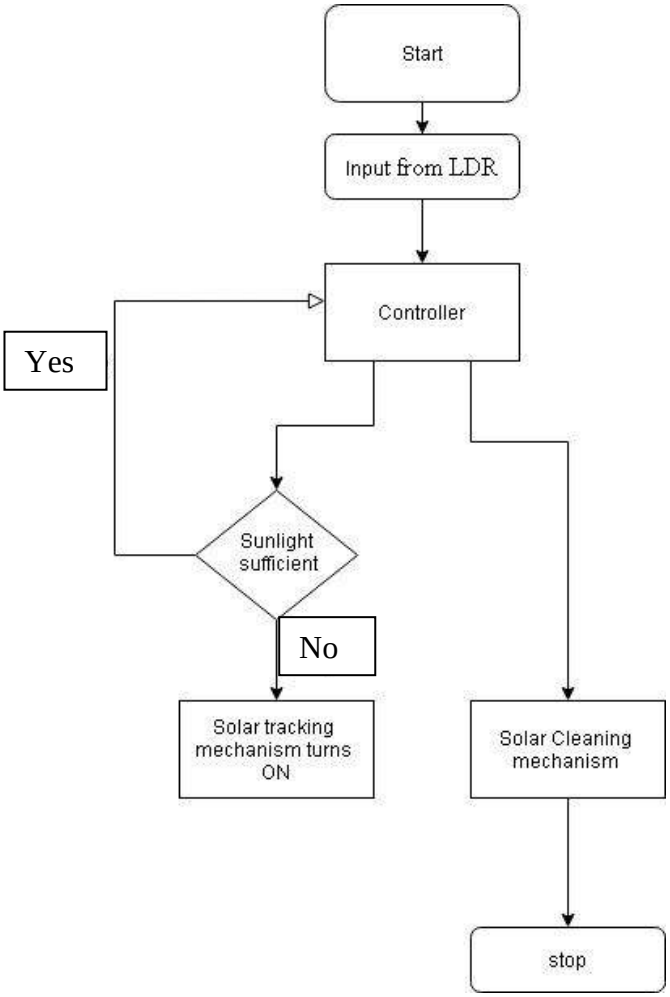
Figure 5 : solar panel tracking implementation

Figure 5 : Solar panel tracking using dc motor.

The pinion and gear system is used for the movement of solar panel assembly through dc motor. The sensing element used is LDR which shall check the intensity of light falling on it. Two LDR's are used for two directions; the signal of LDR is connected to the arduino controller and it provides signal to the dc motor for its movement in either of the directions according to the LDR values.

Flowchart:

The system is turned on and initially it will take input from LDR and depending on the values, controller will provide the signals to dc motor for its movement in either direction using rope pulley mechanism with the help of pinion and gear system. On a routine basis as programmed, the cleaning mechanism will turn on and clean the solar panels on routine basis which will help to clear out the dust accumulation and will help to improve the efficiency of system.



b) Solar panel cleaning mechanism

Stepper motor is used to clean the solar panels on a routine basis. The controller provides signal to the motor driver for stepper motor movement which is attached with a cleaning head.

Hardware & Software Description

A. Hardware Details

Components used are

- Arduino UNO
- LDR
- Motor driver
- Pinion & gear assembly
- Stepper motor
- Dc motor
- Frame design.

LDR: it is used as a sensing element for light detection to track the sun movements. Two LDRs are used for two directions. The change in light intensity gives a change in resistance.

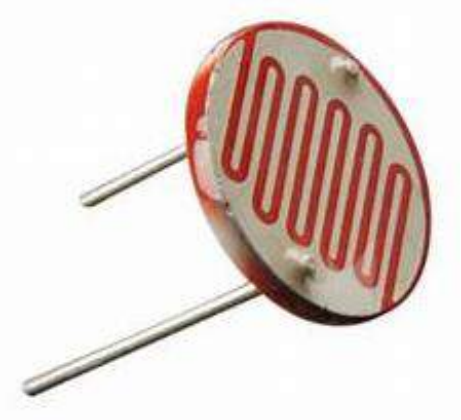


Figure 6 : LDR

Arduino UNO: the controller is needed to take input from sensor and according to the values provide output signal to dc motor for solar racking purpose and also to stepper motor for routine cleaning of the solar panels. It is programmed using Arduino IDE.

DC motor: the dc motor is used for tracking purpose which can be rotated in either direction. It receives signal from motor driver for its operation in either direction. Generally a 12V motor is used for such applications.

Figure 6 : dc motor

L293D motor driver: to control the dc motor, a motor driver must be used which works on the basic principle of H bridge section which helps to control the direction of rotation of the motor in two directions.

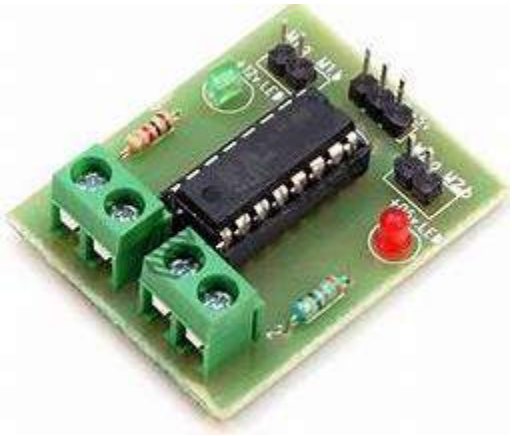


Figure 6 : motor driver L293D

Stepper Motor: the cleaning mechanism in this project is based on routine cleaning which includes providing signal to the motor to rotate in steps to perform the particular task.

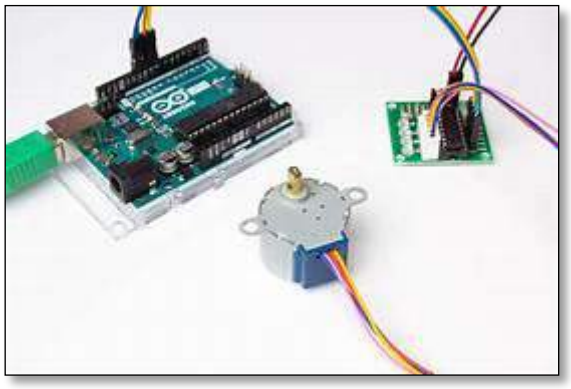


Figure 7 : stepper motor

Software

Arduino IDE: the arduino Uno is programmed using an open source software provided b arduino. It is integrated development environment which is compatible with all arduino boards.

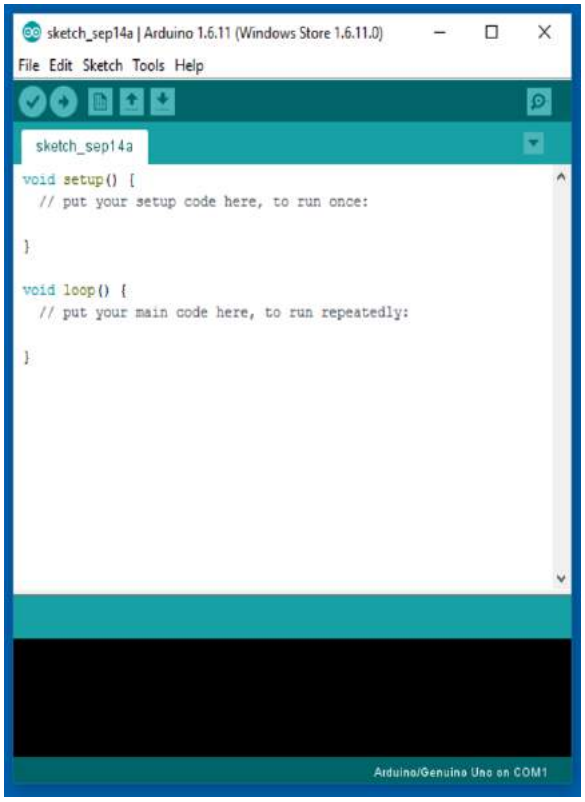


Figure 8 : arduino IDE

IV. RESULTS AND CONCLUSION

The project is designed as a novel approach to achieve two functionalities of solar panel tracking and solar panel cleaning. Solar panels are cleaned on a routine basis whereas the tracking process is carried out to achieve greater efficiency. LDR acts as the sensing element of the project. The fabrication part of this project is designed accordingly where the movement of dc motor helps to track the sun movements and absorption efficiency is increased thereby. Two figure below shows the ready design of project which ensures both functions are achieved efficiently. The LDR module is designed according to the three main positions of centre, east and west.

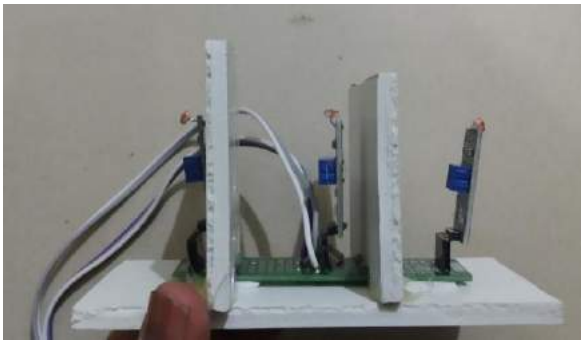


Figure 9 : LDR Module design

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Weather Forecasting System

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ABSTRACT

The Meteorological Department is an agency that takes readings of meteorological observations, weather forecasting and seismology. Universally, there are three types of weather prediction techniques, namely, synoptic weather prediction, numerical weather prediction, statistical weather prediction. The presented paper focuses on statistical weather prediction using the concept of artificial neural networks and regression algorithms. Recurrent Neural Network (RNN), Long Short Term Memory (LSTM), Gated Recurrent Unit (GRU), Linear Regression and Random Forest Regression, are the algorithms that are used in the study, where the first three are categorized as ANN algorithms and remaining two are regression algorithms that do not include neural networks. A comparison is shown between all the five algorithms and their predicted value of relative humidity, with date and time as input values. This paper is used as a study of which algorithm provides best accuracy with the limited time and resource constraints.

Keywords : Artificial Neural Network, Recurrent Neural Network, Long Short Term Memory, Gated Recurrent Unit, Linear Regression, Random Forest Regression, Deep Neural Networks.

I. INTRODUCTION

Weather Forecasting is an important application in meteorology department that predicts the weather conditions in the specified date and hour. In the last century, prediction of weather condition has been a very difficult task. To make an accurate prediction is one of the major challenges faced by meteorologist all over the world. From ancient times scientists have been trying different methods for predicting weather conditions some of those methods have been more accurate compared to others.

Weather forecasting predicts that how a present atmosphere will change. Present weather conditions are obtained by ground observations, observations from ships and aircraft, Doppler radar, and satellites. This information is sent to meteorological centres where the data is collected, analysed, and made into a variety of charts, maps, and graphs.

There are several weather prediction techniques such as numerical weather prediction, statistical weather prediction and. Meteorologists predicts the changes in weather patterns by using several tools such as radar, satellite and surface maps that measure temperature, air pressure, wind speed, and wind direction. This is a cycle that trains computer for weather forecasting.

We have used different techniques as Neural Network, it takes input and processes it using its hidden layers and produces the output. The Neural Network algorithms used are Recurrent Neural Network (RNN), Long Short-Term Memory (LSTM), Gated Recurrent Unit (GRU). Also regression algorithms used are Linear Regression, and Random Forest Regression. We have analysed through all the

techniques and found out the best results that gives the best accuracy.

II. Methods and Material

A.Methodology

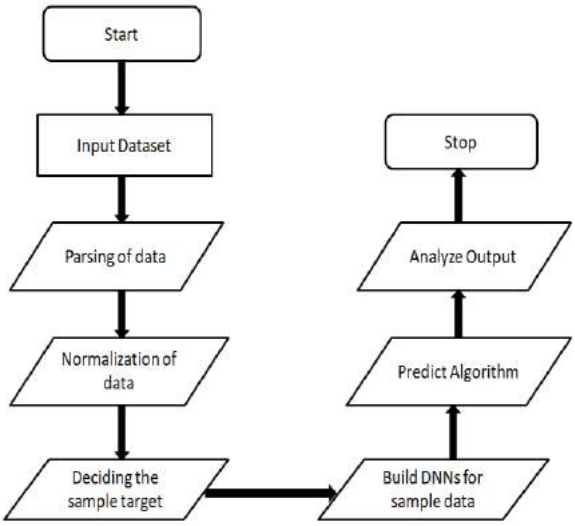

Fig 1. Methodology of the system

i) Input dataset:

Model to be trained, it needs to have some prior knowledge about the changes in the weather. The dataset has to be decided as per the training requirement of the neural network. Hence a large amount of dataset has to be given to the system on which it would be trained, validated and tested. Data will be processed to form the cycle to give accuracy of the output.

ii)Parsing of data:

Parsing the data means pre-processing the data. The raw data that was taken as an input can be a messed-up data, to separate out the data in particular category parsing is done so that the output data is a cleaner and simplified version of the input data. Parsing can be done at simple as well as large scale.

iii)Build DNNs for sample data:

The artificial neural network is derived from the biological neural network. A neural network recognises patterns, that includes minimum three layers i.e. input layer, processing layer and output layer. It trains itself by using these layers to give the accuracy in output.

Similarly, deep neural network is an advanced version of neural network. It has more depth because it has more hidden layers for processing.

iv)Normalization of the data:

The machine learning technique often applied as a part of data preparation is called as Normalization. The goal of normalization is to change the values of numeric columns in the dataset to a common scale, without distorting differences in the ranges of values. For machine learning, every dataset does not require normalization. It is required only when features have different ranges.

v)Deciding the sample target:

After pre-processing has been done, the data will be ready to be analysed. The data will be analysed on the basis of which weather parameter can be used; various parameters of weather can be max temperature, min temperature, humidity, rainfall etc. These are some parameters that are mostly worked on.

Deciding the parameter play a vital role in later on designing the network and predicting the algorithm. When the dataset has been analysed and parameters are decided, the next step will be to build the DNN.

vi)Predict Algorithm:

Data mining consist of various prediction algorithms used to predict someof future conditions. These algorithms are classified into clustering (Simple k

Means, Mean Shift, DBSCAN, etc.), And classifying (Logistic Regression, Naïve Bayes, KNN, etc.) and decision tree algorithms. (ID3, CART, C5, C4.5, etc.)

For these systems, algorithm will be decided based on the decided parameters and built neural network. Various combinations of algorithms will be tested and the algorithm with highest accuracy will be selected. The accuracy can be calculated by comparing the predicted weather condition with the actual weather.

The various prediction algorithm used for the weather forecasting is

- Recurrent Neural Network.
- Long Short-Term Memory.
- Gated Recurrent Units
- Random Forest Regression.
- Linear Regression.

vii)Analyse Output:

After building, training and testing have been done, the network will be ready to generate output. But the output has to be accurate for the system to be useful. Hence the accuracy has to be verified by comparing the outputs with other sources.

B. PREDICTION ALGORITHMS

Prediction algorithms are those that helps in predicting the output in future using algorithms. Some of the algorithms used are –

i)Recurrent Neural Network:

RNN is a neural network that takes input as raw data processes it in the hidden layers and gives output. Then obtained output is compared to the expected output and the difference is found out, called loss. And then the cycle repeats until we obtain the least loss.

ii)Long – Short Term Memory:

LSTM is a Neural Network that can process single data as well as sequence of data. It is composed of a cell, an input gate, and a forget gate. LSTM network is best suited for classifying, processing and making predictions based on time series data.

$$\tilde{c_t} = tanh(w_c[h_{t-1}, x_t] + b_c)$$
$$c_t = f_t * c_{t-1} + i_t * \tilde{c_t}$$
$$h_t = o_t * tanh(c^t)$$

iii)Gated Recurrent Unit:

GRU is a recurrent neural network that use connections through a sequence of nodes to perform machine learning tasks. It overcomes the problem of vanishing gradient. It has two gates update gate and reset gate that are used for controlling the flow of information over a period of time.

iv)Linear Regressor:

Linear Regressor is a data analysis technique that is used to determine the relationship between a dependent variable and independent variable using a straight line. It is useful while prediction or forecasting or reduction. It uses regression equation that is used for finding out relationship between sets of data.

v)Random Forest Regressor:

Random Forest Regressor is a meta estimator that built multiple decision trees and merge their predictions together to get more accurate and stable output. While training each tree gets trained from random samples of training observations.

C. Material

The Dataset istaken from city Jena, of Germany. The duration of the dataset is from 1st of January 2009 to

31st December 2016 at the time interval of the dataset to working of weather forecasting is 10 min.

III. Result and Discussion

In this paper, results are shown on how various algorithms have worked after training, testing and predicting. The result section contains line graph which shows the difference between expected and predicted value. Another graph shows the loss value decreasing during the training period and a graph that shows final prediction values of relative humidity.

1. Long Short Term Memory

a. Line Graph

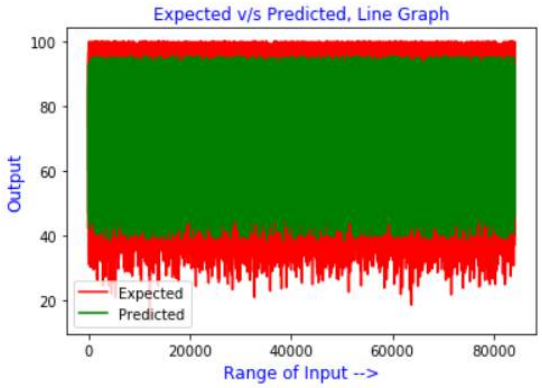

Fig. LSTM Expected v/s Predicted Line Graph

The graph shows expected values in red and predicted values in green colour line with x axis as range of input and y axis as output. The range of predicted value expands from 35 to 95 whereas the expected value ranges from 20 to 100.

b. Loss Graph

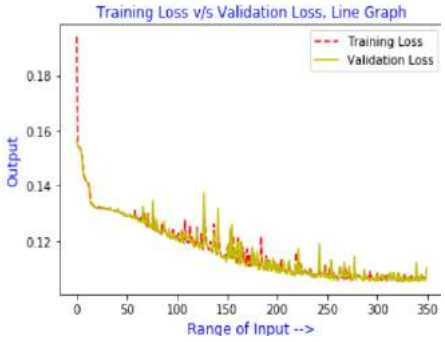

Fig. Loss Graph

The graph shows the downfall of loss function while the model was in its training process. Loss function used in the LSTM model is 'mean absolute error'.

c. Humidity Graph

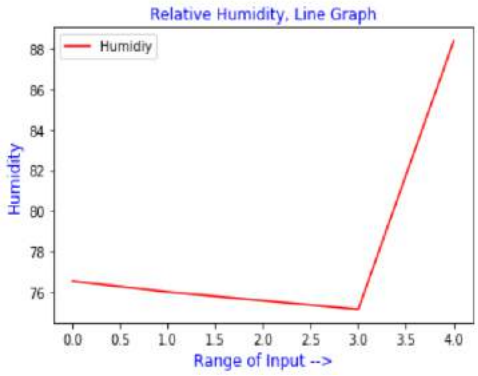

Fig. Humidity Predicted Graph

The final graph shows the variation in the predicted values of relative humidity. These values are of same day with the difference of timestamp.

d. Predicted Values

	rh (%)
0	76.528214
1	75.982452
2	75.556137
3	75.120827
4	88.416725

Fig. Predicted Values by LSTM

Above table shows the predicted values of relative humidity given after training of LSTM algorithm.

2. Recurrent Neural Network

a. Line Graph

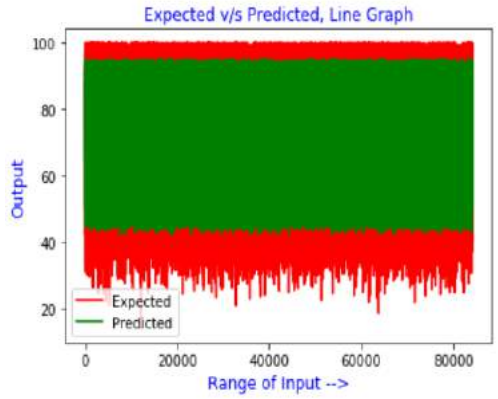

Fig.RNN Expected v/s Predicted Line Graph

The line graph shows various values when passed through the neural network and results produced by it v/s the expected results. As per the results, the lower values are a little less accurate as compared to the upper values.

b. Loss Graph

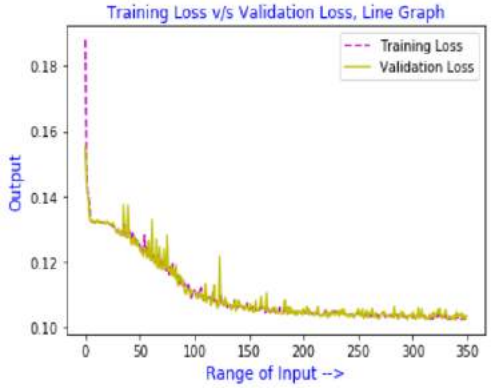

Fig. Loss Graph

The decreasing loss graph of RNN shows fluctuations as the model gets more accurate. Training and testing loss has been plotted in the above graph.

c. Humidity Graph

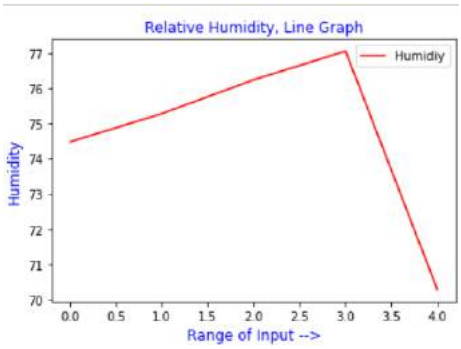

Fig. Humidity Predicted Graph

The humidity graph shows the predicted values of humidity for RNN network.

d. Predicted Values

	rh (%)
0	74.477776
1	75.280373
2	76.242119
3	77.058464
4	70.277946

The table above contains the final predicted values of humidity by RNN network.

3. Gated Recurrent Unit

a. Line Graph

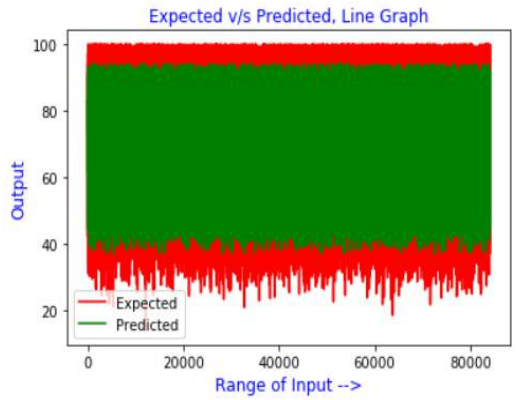

Fig. GRU Line Graph

GRU line graph shows the difference between predicted and expected output where the range of expected data is a little larger than that of predicted data.

b. Loss Graph

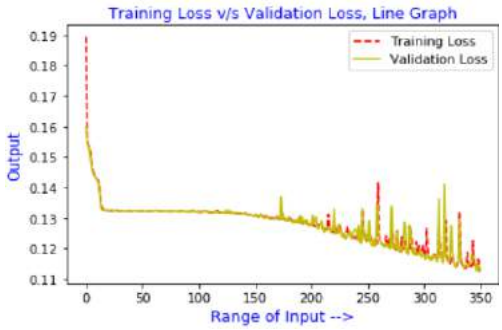

Fig. Loss Graph

The loss graph shows more fluctuation in terms of validation loss, which is shown by yellow solid line whereas the training data is shown in red dashed line.

c. Humidity Graph

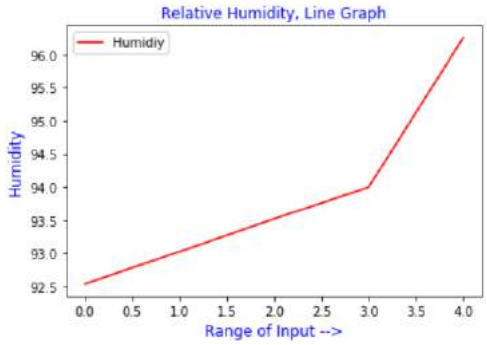

Fig. Humidity Graph

The final humidity graph shows predicted values of relative humidity by GRU algorithm. Final values ranges from 92 to 96.

d. Predicted Values

	rh (%)
0	92.537308
1	93.024559
2	93.519508
3	93.998741
4	96.257019

Fig. Predicted Values

The table above shows the final predicted values of relative humidity by GRU at different timestamps.

4. Random Forest Regression

a. Scatter Graph

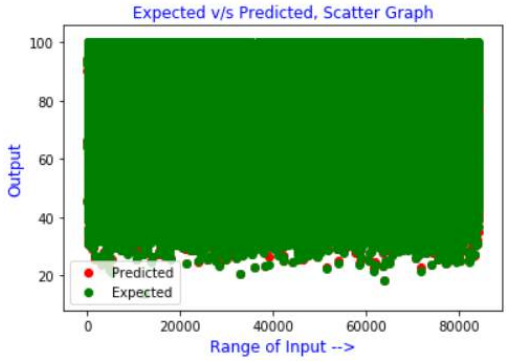

Fig. Random Forest Scatter Graph

The given scatter graph shows red dots as predicted values and green dots as expected values.

b. Humidity Graph

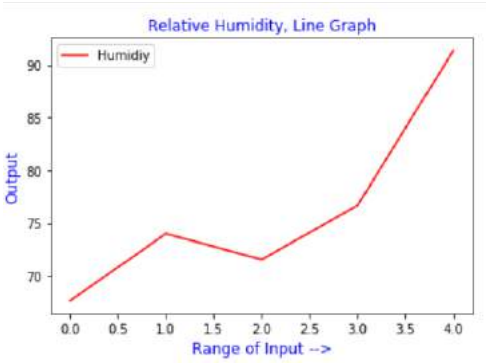

Fig. Humidity Graph

The final graph above depicts predicted values of humidity as per random forest regression algorithm.

c. Predicted Values

	rh (%)
0	67.652467
1	74.009333
2	71.561667
3	76.672767
4	91.354333

Fig. Predicted Values

The table shows the values predicted by Random Forest Regression algorithm.

5. Linear Regression

a. Line Graph

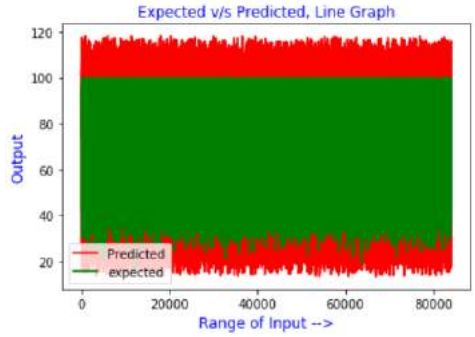

Fig.LSTM Expected v/s Predicted Line Graph

The graph shows expected values in red and predicted values in green colour line with x axis as range of input and y axis as output.

b. Humidity Graph

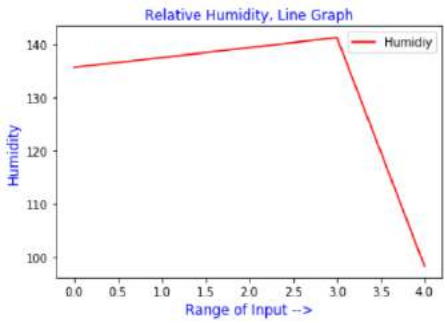

Fig. Humidity Graph

The final graph shows the predicted values of relative humidity which ranges from 98 to 135.

c. Predicted Values

	rh (%)
0	135.598584
1	137.468458
2	139.338333
3	141.208208
4	98.221987

Fig. Predicted Values

The values predicted by Linear Regression algorithm.

IV. CONCLUSION

To conclude, below is the actual reading of relative humidity that was actually required while prediction.

	Relative Humidity
0	74
1	80
2	84
3	86
4	90

Fig. Expected Values

1. LSTM has proved to be the best working algorithm while prediction with a Mean Absolute Error (MAE) rate of 0.0958
2. The test graph is somewhat very close of LSTM and GRU, but here too LSTM graph has proven to be better than GRU, where GRU has an error rate of 0.1134
3. Random Forest Regression has shown a loss

rate of 0.099

4. Whereas, RNN has a loss rate of 0.112

LSTM has proven to be best for prediction of relative humidity after model has been properly trained and tested.

V. REFERENCES

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Smart Room Control using IOT

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ABSTRACT

A Smart Room automation is a technique which reduces the human hard work by using electronic devices. This system controls the home appliances during android application based on Node MCU. A Room automation system have a two main apparatus; First one is android app which control by locally as well as remotely and next is Node MCU that has interface to sensors and appliances of an Smart Room automation system. It also saves the energy consumed by domicile appliances.

Keywords : IOT, Node MCU, Android Application, Sensors.

I. INTRODUCTION

IOT means Internet of Things, which connects the devices and things to the internet. The devices is nothing but smart-phones, TV, sensors etc. At the edge of the IOT are the appliance and apparatus we use day after day. These devices and thing are connected across an infrastructure using ZigBee, Node MCU, arduinoIDE ,Wi-Fi etc to provide bi-directional communications link with relatively long range, low power and a enough data rate to cumulative information from many linked devices. Home automation or Smart Room can be described as prologue of technology within the home atmosphere to provide expediency, relieve, protection and power efficiency to its occupant. Adding brainpower to home environment can afford improved quality of living. Now a day via give the opening of the Internet of Things (IOT), the survey and performance of Smart Room computerization system are being paid further in demand.

What is Smart Room Control?

Home/room automation is the manage of some or every Electrical objects in our home, apart from of whether we are here or left. Home automation is be clear surrounded by of the mainly refreshing renovtion in innovation for the home that has gone along in decades. There are quite a lot of substance easy to get to today that allow us control over the objects automatically, either by remote control or even by voice charge.

Inspiration

The inspiration of our method is to get concern of some domicile appliances that may in general be tough for those who are educated bodily disabled and Senior Citizens to turn into self-determining.

The predictable method is to allow a client with any android enabled gadget to run downloadable software on every mobile device such as a smart phones or mobiles. This room mechanization method will allow the client to handle or run a apparatus that is attached

to any domestic device with a Node MCU. The intention of this function will be to straight a protection method with webcam observation, door sensor notification and a light control system. Sensors will be associated to the domicile appliances with Node MCU so that they can be watched and controlled.

II. Literature Review

The automatic control of Home/Room appliances (On/Off) with the help of Mobile/Smart Phone and Node MCU (ESP8266).This is a wired system and every appliance must be connected with the help of cables. The new module which are used that one may complete our preferred target are Dallas Timer, Relays. This article present the drawing and execution of APPLIANCES CONTROLLING USING Internet. Basically by via this home/Room automation we can accumulate time, wealth, man power. plus as well we can have rule, protection and expediency on controlling appliances [1].

Khusvinder Gill and Shuang-Hua Yang[2] produced a familiar home gateway for ZigBee and Wi-Fi. This authorised remote control using a effortless user interface. The method was rate valuable and had excellent protection within the residence.

Smart domicile/Room is not a latest term for skill the world, it is been used from decapods. As electronic technology are moving on, the field of home automation is getting higher rapid. There were different smart system have been projected where the organize is through Bluetooth [7], internet etc. A telephone and PIC microcontroller appliance for controlling the procedure .pin check conclusion was used to execute the method where it was with wires system but not wireless contact.

R.Piyare has bring in propose and execution of a little cost, elastic and wireless way out to the Room automation [9]

Significance of the Work

A smart Room can be built on large region by using diversity of expertise floor or agreement. every skill consists, its own words. Each verbal communication is used to attach the different devices and give commands to execute a job. This system consist the automation of the home or a single Room, housework or domestic movement.

The smart home/Room system is used for far-off area is nothing but conservatory of structure automation and it involve the manage and automation of turn on bulbs, rotation of fan , freshening, air conditioning (AC), appliance. In upcoming the bazaar value of the Room/home automation system is over US$11 billion.

III. Proposed Work

In 1970s the overture of home/Room automation is unsuccessful to get better the lifestyles of users for more than a few reasons. Firstly, these system is costly that's why the economical benefits of Room automation system is difficult. Secondly, the costs of implementing smart home technology must be depends on their installation and hardware cost.

In this system we will use some sensors like gas detector sensor and temperature sensor which help to create a home as a smart home. We are implementing a scheduling mechanism in this system.

The Node MCU is act as minicomputer and is connected with Wi-Fi. Home Automation structure can be access from the web browser by using some locally, or vaguely from any PC or mobile handled device associated to the internet with proper web browser, Google Assistance through server real IP.

Wi-Fi technology is used to select the network road and rail network that connects sensors and the servers. There is a require for home automation structure is to be cost efficient, stretchy and easy to set up with many network infrastructures and home appliances. The proposed home automation system has the capabilities to control the Temperature and humidity, Motion detection, Fire and smoke detection, Light level etc.

IV. HW /SW Requirement

S/W Requirement:
1. Node MCU ESP8266 operating System
2.Blynk
3.Webhook
4. Android Google Assistance

H/W Requirement
1.Node MCU
2.Relays
3.Connecting Wires
4. DC Motor Driver L293D
5.IR Sensors
6. DC Motors

V. Architecture

The structure Architecture of the system is given below :

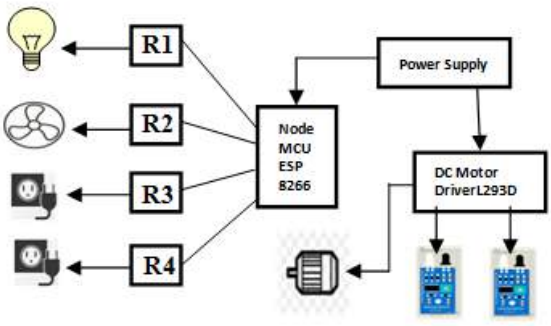

Fig1: System Architecture.

In above system architecture the neighbourhood equipment includes Node MCU and Arduino IDE. Arduino IDE is associated with MCUs and relay. Arduino IDE gathering information and all the home appliances are associated with the relay circuit. Relay is utilized to change over the power supply from low to high. Node MCU goes about as master and the arduino IDEs are go about as slaves. The server interfaces the system with the neighbourhood equipment and mobile smart devices. The final fraction is the mobile smart device operation Android operating system, such as smart superior mobile phone or tablet, on which the Android function software of the method is introduce to arrive at and agreement with the in home devices by way of the server. The Android application on the mobile smart device similarly gives its users an easy to use graphical crossing point to efficiently control the automatic at home appliances.

VI. Experiment Results: Hardware Implementation

Here, we first give 12v power supply to the IC 7805 through Adapter which provide 5v power to the Node MCU. The Node MCU is connected to the Relay Circuit through connecting wires for glowing the LED bulb and Rotating Fan. (2 Relay in use) From below fig.

Again Here, we give AC power supply to the remaining 2 relays of Relays Circuit. This 2 relays Are Connected to the External Socket 1 & Socket 2.

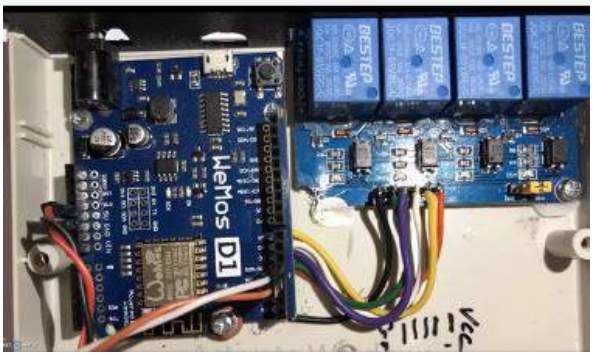

Fig 2 Android Google Assistance:

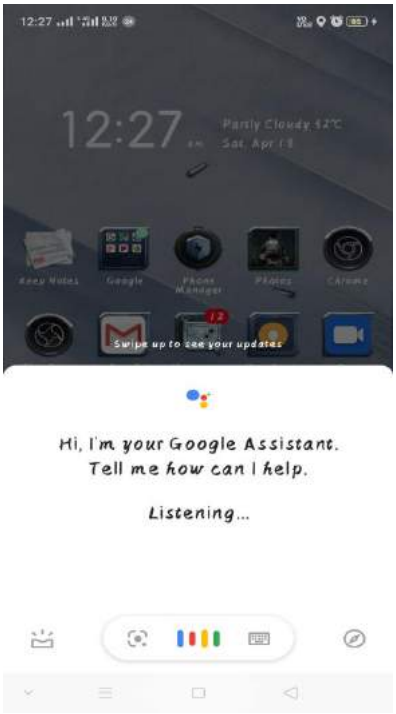

Fig 3 : Long Press Home Button For Google Assistant from Android mobile

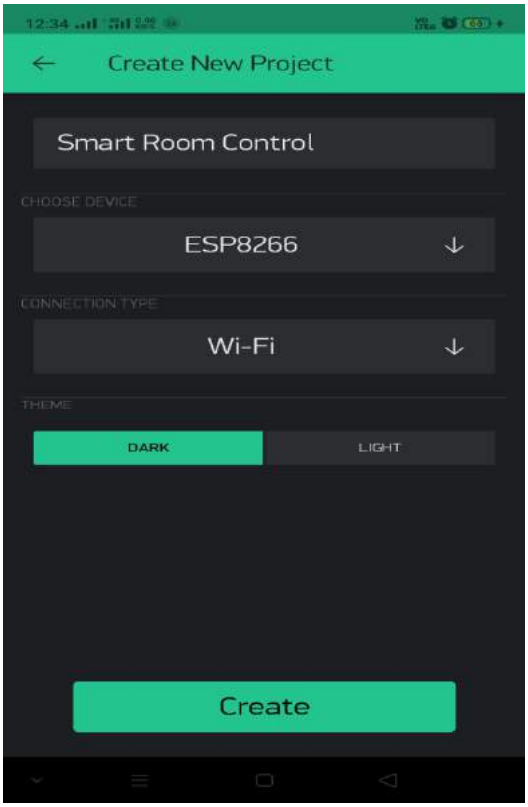

Fig 4: Smart Room Control using Node MCU. Blynk Mobile App which is use to interface Google assistant with Node MCU. Here we Create New Project with Available Devide and Connection Type

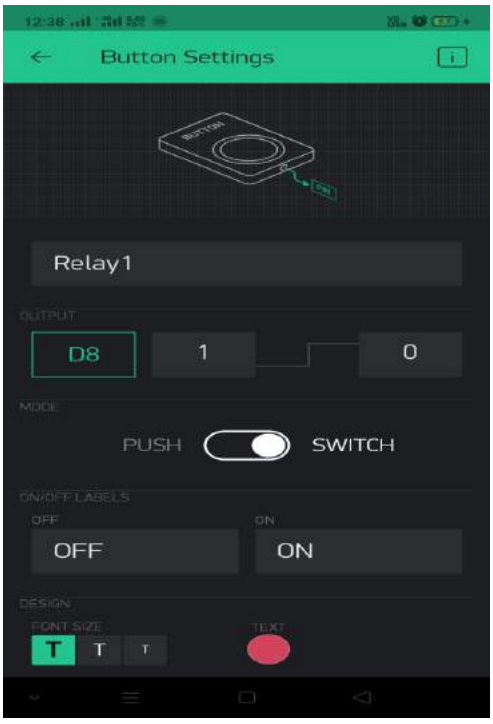

Fig 5: Here we Assign Button With Respect to Relay we use for eg Light, Fan & Sockets

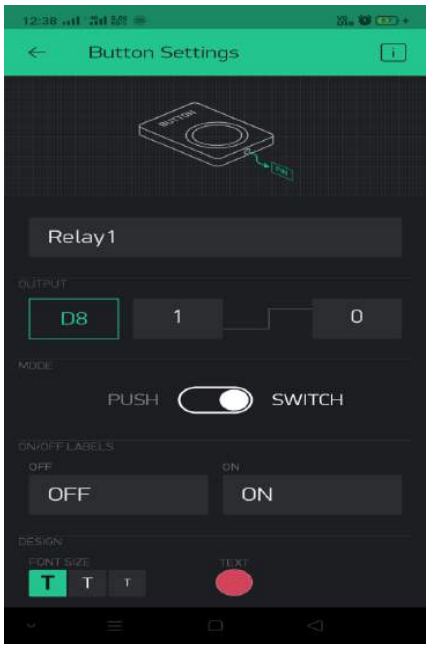

Fig 6: Final Operating Board for Smart Room Control using Node MCU

VII. CONCLUSION

IOT established smart home system will bring more handiness and easy to public lives. The android based smart home application communicates with the Node MCU via an internet. Any android promoted gadget can be used to set up the smart home application. Using android function as well as by Voice Command through Google Assistant user can control and monitor the smart home environment.

These home/Room automation systems are mandatory because sometimes human can forgot to switch off the appliances when there is no need to use and in this situation, the home automation structure is used to trim down the consumption of electrical energy.

VIII. ACKNOWLEDGMENT

Apart from the pains of our personality, the victory of any task depends mainly on the back-up and guiding principle of many others. We sincerely express our deep sense of gratitude towards our respected guide Prof. Ms. Chanchal Dahat. For her helpful direction, thoughtful suggestion, continual support and facilitate through the conclusion of this job. Her remote time cooperative propositions upgrade us to whole this duty effectively. She has advised us in all feasible ways precise from get-together the resources to details groundwork.

The faith & confidence shown by her to motivate us, to perform better in this project. We convey our sincere thanks to Prof. Ms. C. Dahat for her timely co-operation. Finally, thanks to all Staff Members and all friends and colleagues who support us in the development of project.

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Smart Collins - Receptionist

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ABSTRACT

We seems to be entering the golden era of knowledge engineering and machine learning, where tech giants like Google and Apple are introducing AI into everything like Amazon echo, which are both conventional and affordable. We are trying to depict the same functionality in our project which will work on "Smart Collins (Receptionist)" eliminate the need of manual receptionist. Reception simply means the place inside the hospital, hotel or office building where guest or visitor arrives. The paper attempt to describe the face detection, speech recognition, faces recognition and database. When this software is implemented the data about the person who checked at the receptionist is recorded either, it is the manual information such as name, appointment Categories or voice and image of the person hence, this help to improve the forensic investigation anytime if the unlawful act happen.

Keywords : Face Detection, Speech Recognition, Face Recognition

I. INTRODUCTION

The main objective of this paper is to light on the emerging topic of today. Sphere such as face detection focuses on the detection of human faces. There are multiple methods in which facial recognition system works, here in this paper we are discussing our algorithms of how our face and speech recognition are going to work.

The database or dataset is the heart of project, implementing a data management system promotes an integrated picture of an organization operation. It is easy to see how processes are one segment of organization affect entire segment. We are not presenting detailed description of system or mathematical formulation but, rather we are presenting the unique and novel features of selected system and related pros and cons. Smart Collins (receptionist) is software, which combines the concept of Face Recognition, Speech Recognition and providing the facility to book an appointment of patient by interacting with them automatically. This idea will help to emerge the general concept of AI in day to day life. Practically, this idea can be implemented in large places to provide smart receptionist. Here 'Digital Forensic' is a process of uncovering and interpreting the electronic data. Electronic data is about the suspected person that is accused for the crime; this can be any contact log of the person, recorded video, images and voice. When this software is implemented the data about the person who checked at the receptionist is recorded either, it is the manual information such as name and an appointment categories or voice and image of the person, hence this is help to improve the forensic investigation anytime if the unlawful act happens .Computer-based, face detection and recognition systems are rapidly spreading in various sectors such as malls, universities, ministries and

medical field. The goal of this project is to build software that can detect and recognize faces of people using image-processing techniques and book an appointment of people by communicating with them. Speech recognition play an important role in this project by asking basic question to patient and the more important task is to listen the patient and process their voice properly and convert it into textual form. The software will create a text file that contains basic detail of patient and record of all appointment and store it in the database. Working principle of Speech Recognition is based on, the algorithm of Acoustic and language modelling.

II. METHODS AND MATERIAL

This system have Python-Face recognition technique which is used to recognition face for identifying the person who visited to the hospital. It uses camera to capture image that image after capturing the system will ask question for fixing an appointment. This will use speech recognition and store the information of the person in database.

For the implementation of this software we use different modules, they are given below:

Module 1: Face Detection

Face detection is technology used to identifies the human face and convert it into digital face. For this module we use opencv library. Opencv (open source computer vision) library which perform the operation related to image.

Module 2: Speech Recognition

Speech recognition is process in which computer record the voice of human understands that for the further process. (Conversion into text)

Module 3: Face Recognition

Face recognition is capable of identifying or verifying the person form digital image, they work by comparing the facial feature.

Module 4: Database

Data store very large no of record efficiently. It is very easy to find information whenever necessary.

Module 5: TkInter:

This module is use for making graphic user interface (GUI).It is a standard python interface to the TK GUI toolkit shipped with python.

III. RESULT AND DISCUSSION

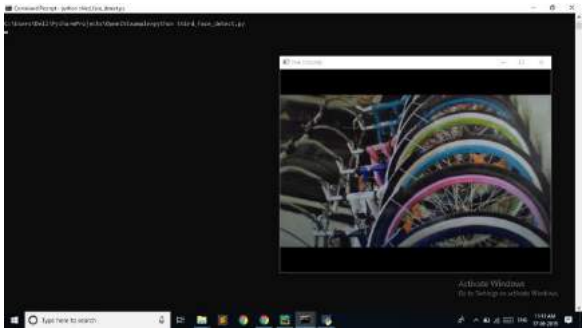

Figure (1)

Figure (1) shows the condition which is applied on our project. If no one is present in front of camera, then will not capture anything until and unless a human face is detected.

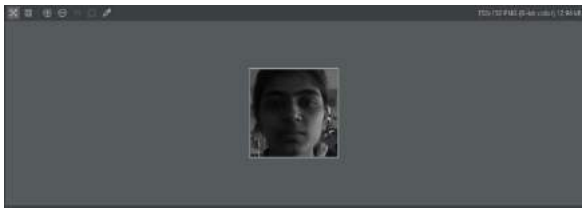

Figure (2)

Figure (2) shows the satisfaction of the condition in which if human face is detected then it will capture the image and show it on the screen.

Figure (3)

Figure (3) shows the multiple images of a single person to verify the facial feature of the person and store the images in the database for the further use.

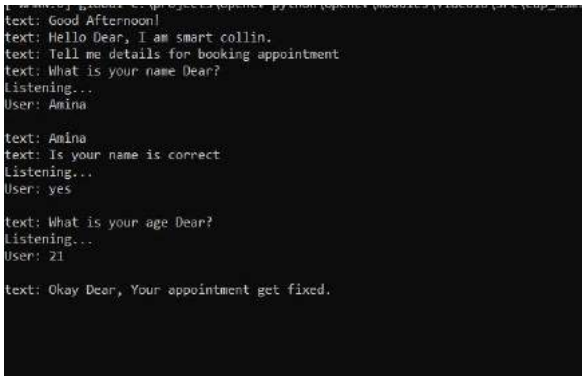

Figure (4)

Figure (4) shows that once the image is captured it will ask the detail of that person for booking of an appointment.

IV. CONCLUSION

In this paper, the image recognition and speech recognition are discussed which are important in real time system, while the project is based on block chain technology, which is comprehensively discussed in this paper. The main aim of receptionist by the AI based system can be achieved by python opencv services and in depth knowledge of general theories. Thus in future, the hospital appointment system and other offices where appointment system are needed automation will be completely based on the reference of our piece of work

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Instant Ice Making Machine

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ABSTRACT

The aim of this paper is to give an idea of instant ice making machine. Nowadays hotels, resort and bar required more ice in very less time. So to solve this problem we construct an ice cube making machine. In present days, this machine is available with very high cost in the market. So we are trying to make that at optimum price. Ice making machine consists of four key components; the evaporator, the condenser, the compressor and the throttle valve. The compressor is to compress low pressure refrigerant vapor into high pressure vapor and deliver it to the condenser. The vapor with high pressure is condensed into high pressure liquid and passed through the throttle valve to become low pressure liquid. At this instant the liquid is passed to the evaporator where heat exchanging occurs and ice is created. This is one complete cycle of refrigeration. Ice making machine works on vapour compression refrigeration cycle. A field study of an ice cube machines in restaurants confirms that the ice production was always coincident with utility peak periods. The measured duty cycles, combined with the actual electric load profiles, demonstrated the potential for off- peak operation in addition to energy saving by using more efficient machines.

Keywords : Ice Making Machine, CFC, HFC

I. INTRODUCTION

Refrigeration and cooling is important in our day today life situation. It also as various industrial application too. Refrigeration is used in manufacturing of ice, domestic and commercial , large scale ware house for storage and preservation of foods beverages and medicines. Refrigeration is the process of maintaining a temperature of a system lower than the temperature of surrounding by continuous removal of heat. It work on the vapour compression refrigeration cycle. The main component of the system are compressor, condenser, evaporator, expansion valve, receiver. Due to the phase out of CFC which was responsible for major ozone depletion and global warming are now being replaced by substitutes which are friendly to the environment. R134a is Zeotropic refrigerant which can be a suitable alternate for R404a, R410a and CFC R502 Zeotropic refrigerants therefore do not boil at constant temperatures unlike azeotropic refrigerants. Any substitute should generally possess some ideal properties like non flammability, non toxic, friendly to the natural environment, stable at all operating conditions and have similar characteristics of the refrigerant for which Hydro Flouro Carbons (HFC's) and its blends of refrigerants such as zeotropes are finding its applications in most of the commercial refrigeration sector as alternate substitutes and are cost effective. In old refrigeration system CFCs and HFC refrigerant such as R-22 was widely used . The HFCs are fully accepted because they contain

basically zero ozone depletion potential (ODP). They also have an assigned global warming potential (GWP) factor which is drastically lower than that of HCFCs. CFCs refrigerant should be replaced due to main reason 1) Due to harmful effect on ozone layer 2) Need of improvement in efficiency of system to conserves resources. Therefore the requirement for eco friendly, working refrigerants necessitated the invention of refrigerant R-404A. Refrigerant R-404A was developed to replace CFC R-502 and HCFC R-22. Refrigerant R-404 A is already known as a suitable replacement for R -22 in low temperature applications. Refrigerant R- 404a is blended product of 44% R125+ 52% R143A+4%R134A.

II. Problem Statement

There are many requirements in food industries to make instant ice to reduce long ice forming time in objective to increase production time of industry. In local economy it very useful for ice candy for the production of kulfi which has good Indian market for this many problem it become essential to come up with an solution for instant ice making.

III. Construction & Working

The construction of our project is as simple as a regular VCRS System but with some extra parts Some of the main components are compressor, condenser, expansion device, evaporator, and a chiller Tank with Slots in the shape of ice candy.

In our Project we are using two different refrigerants Primary and Secondary. Primary refrigerant is R134a and Secondary is a Solution of water and ethylene glycol.

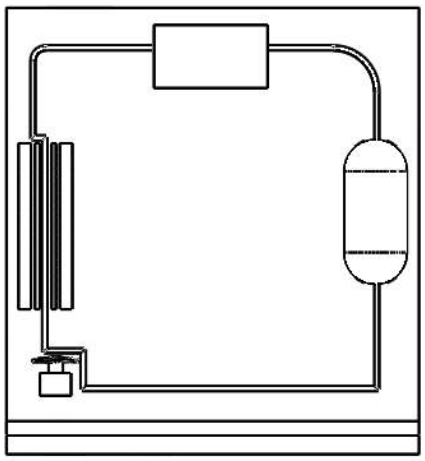
Whole ice making system is divided into two circuits , in first circuit VCRS system working with r134a as refrigerant, low pressure refrigerant enters the compressor where its temperature and pressure rises and then it passes to the condenser

In the condenser high pressurehigh temperature vapor refrigerant losses heat and condenses and leaves as liquid form then this refrigerant passes through expension valve where its pressure falls and temperature also decreases then the low temperature low pressure liquid refrigerant enters the evaporator , the evaporator is situated in the chiller tank and the secondary refrigerant is circulated around the evaporator .

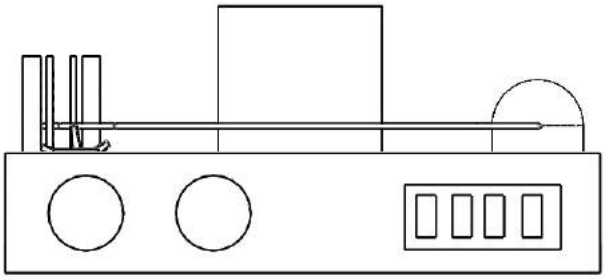
In the chiller tank secondary refrigerant is circulated around evaporator and the ice cans, primary refrigerant in the evaporator absorbs the heat from secondary refrigerant. This cycle repeats several times until temperature of secondary refrigerant reaches a stable temperature around -10 to -12 , the secondary refrigerant is continuously removing heat from the water in the ice candy can .

Reason why the solution of water and ethylene glycol is the secondary refrigerant is that when ethylene glyol is mixed with water, the mixture freezes at very low temperature. For example, mixture of 60% ethylene glycol and 40% water freezes at –45 °C (–49 °F).

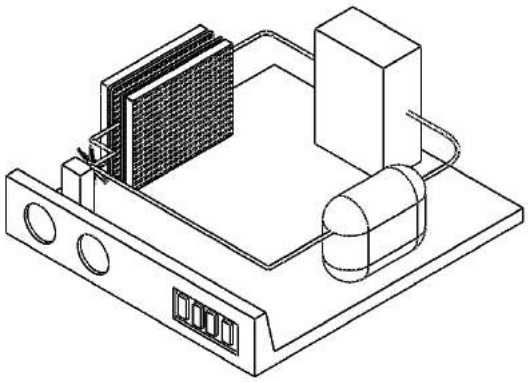
Diagrams



TOP VIEW



SIDE VIEW



ISOMETRIC VIEW

III. CONCLUSION

The Ice making machine will produce a specified quantity of ice cube by dispensing water into ice cube cavities in the evaporator which is coupled with cooling coils that are in turn coupled with a refrigeration system. Evaporator contains ice cube tray which has number of indentations on its surface where water flowing over the surface can collect. Typically the indentations are die formed recesses within a metal plate having high thermal conductivity. As water flows over the indentations or cavities, it freezes into ice after completion of refrigeration cycle.

The system Design of Ice Making Machine will produce two ice cubes for each cycle using vapor compression cycle and water dispensing system with six nozzles; system takes approximately 5 to 6 minutes to complete each cycle. The evaporator is heated by hot vapor flowing through the evaporator coils.

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Solar Panel Support System in Moveable Cabin

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ABSTRACT

This paper presents a new design concept for an inexpensive solar panel support system on top of flat roof cabin in sunny region. The design aims to reduce cost of such system while mitigating the unique challenges in sunny region such as heat, and dust by introducing a moveable design concept with manual system. The system also includes a basic mechanical bearing mechanism to improve the performance of the circuit while minimizing the overhead in terms of cost and power consumption. We discuss the benefits of our design and how it meets the challenges in sunny regions.

Keywords : Moveable Cabin, Solar Panel

I. INTRODUCTION

It is design of a cabin operated by solar energy panel. In this the roof of the cabin is made by solar panels which can be adjusted as required depending upon the wheather condition. Inside the cabin the fans and lights are provided which totally operates on Solar Energy. The cabin is made portable and can be handled as per requirement with the help of wheels. Folding table is also provided inside the cabin as per space requirement.

II. METHODS AND MATERIAL

In many countries solar panel has seen a increased in adoption. Due to this power resources can be doubled and achieved to a new level. The huge initial investment cost is definitely one of the primary source which affect the adoption of solar power system. The return on investment of solar panel, without government incentives, is often in the range of 10+ years. The risk associated with the solar power system is also quite high compare to other investment method. This is because the system must be placed in an open area which can be subjected to theft and other natural elements. In fact, theft is probably the primary concern that people in the sunny region consider before deploying such an expensive

III. RESULTS AND DISCUSSION

Solar Panels,Light, Fans ,Folding Table Built in Type Panel Build, Site Offices, Cabin Door Size 6.5 ft x 2.5 ft Panel Thickness 9 mm Dimensions (Feet) 6ft x 8ft

IV. CONCLUSION

An affordable mechanical single-axis sun tracking support system is proposed. The design addresses unique challenges associated with sunny regions, including dust particles and security . Troposed system is very affordable as compared to commercial products. The unit issimple to understand and install on any flat rooftops. The equation that will determine how the tracking system tracks the sun is also

provided. The system remains to be tested to determine the reliability and the functionality in practice. The efficiency of the unit as compared to a fixed-mount unit should be investigated as well. Nevertheless, our proposed design concept should be viable and significantly affordable to other commercial products. Countries from sunny regions can benefit from this design.

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Automated Muscle Fatigue Diagnosis using EMG Signal

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ABSTRACT

One of the major causes of injuries in athletes is related to muscle fatigue and is normally detected after the muscle is already injured. To prevent future injuries it is important to detect muscular fatigue before it is visible, so that the athletes' performance is improved. The main objective of this thesis is to detect and characterize muscular fatigue. The signals under study are electrical impulses produced by the muscle (electromyography). Analysing these signals allows us to evaluate if fatigue is present. The amplitude of EMG signals increases progressively as a function of time when the fatigue increases. EMG signal will be acquired from clinical database. Signal generated the main muscles during particular task will be analysed for fatigue assessment. In recent research paper many EMG indices have been suggested and compared in muscle fatigue assessment, including root mean square (RMS), the median (MF), and mean power frequencies (MPF) based on Fourier Transform. Feature obtained from the signal is given to Classifier which is identified category or class Label of EMG signal, two different class labels used is Fatigue and non-fatigue.

Keywords: Muscle Fatigue Analysis, Electromyography, Support Vector Machine (SVM), K-nearest Neighborhood (KNN)

I. INTRODUCTION

Muscle fatigue is a condition in which muscle' ability to perform decreases over time. It is a common non-specified health symptom experienced by many people and is associated with many health conditions. It is associated with a state of exhaustion, often following strenuous activity or exercise. When fatigue is experienced, the force behind the muscles' movements decreases resulting a neuromuscular symptom in which the muscle fails to maintain the required or expected force. To overcome this problem Electromyography is used. To evaluate and record the electrical activity produced by the skeletal muscles, Electromyography commonly known as EMG technique is used. When muscle cells are electrically or neurologically activated, the electrical potential generated by muscle cell is detected by an EMG.

Electromyography (EMG) recordings can be divided into two types depending on the place of the recording electrodes; if the electrodes are placed on the skin, the procedure is considered surface electromyography (sEMG), and if the electrodes are inserted in the muscle, it is referred to as intramuscular electromyography. The results obtained from both techniques may differ in some aspects. For example, the evolution of the amplitude of the recording during fatigue differs because the

RMS value of intramuscular EMGs decreases, whereas the RMS of the sEMG increases. Both these techniques are useful for studying muscle fatigue. The invasiveness of the Intramuscular EMG results in discomfort of the subject, therefore surface EMG is more preferred.

In this work, surface electromyography is performed for analysing muscle fatigue. Due to the non-invasiveness and real time applicability surface EMG or sEMG is widely used for muscle fatigue diagnosis, sEMG signal is a non-stationary and weak bioelectrical signal and is ranges from 20Hz to 500Hz. EMG signals contains motor unit action potentials (MUAPs) from several Motor Units (MU). The characteristics and shape of the motor unit action potential (MUAPs) is affected with the changes in neuromuscular diseases. For the classification of fatigue muscle and non-fatigue muscle, the DWT based feature extraction scheme is used in this procedure. The DWT of the dominant motor unit action potential (MUAP) gives the statistical features. SVM is used as base classifier for designing the multi classifier. The base classifiers consist of different kinds of classifiers such as adaptive certainty-based, the adaptive fuzzy k-NN, and the adaptive matched template filter classifiers. here in this work the K-nearest neighbourhood (KNN) is employed. The comparative analysis of EMG signals presents the experimental result for muscle fatigue analysis.

II. METHODS AND MATERIAL

2.1 Signal Acquisition and Pre-processing

The EMG signals obtained from the sensor contains noise or unwanted electrical signal. It is important to filter the signal taken from EMG sensor to attenuate unwanted electrical signal. First of all, the EMG signal of 10Hz to 3KHz is filtered by a band pass filter in MATLAB. The filtered signal contains inactive and active segments with motor unit action potentials (MUAPs). For the extraction of MUAPs around this inactive segment, window function is used. The threshold parameter ($\pm\lambda$) is been set around baseline of the sample between $+\lambda$ and $-\lambda$ for removing the inactive segment. At the identified peak of MUAPs, a window of 180 sampling points is centered where the size of window depends on the sampling rate. Depending upon the temporal energy of the dominant MUAP, MUAPs is been extracted from the EMG signal. When the dominant MUAPs for different datasets are acquired then they are used for the feature extraction.

2.2 Feature Extraction

Feature extraction converts the input data to a set of features for extracting the information relevant from the data. The changes in EMG parameters shown by the sEMG signal analysis helps to detect muscle fatigue. The morphological features of the MUAPs for the Time Domain extraction used for visual assessment.

2.2.1 Time and frequency domain analysis

The obtained signal is analyzed in time domain where the amplitude/voltage of signal is represented as a function of time. The frequency of signal having greater value should be analyzed using frequency domain. The morphological features for representing each MUAP are as follows:

1. Within the main spike, rise time between the positive peak to the negative peak.
2. Ratio of Peak to Peak magnitude to RMS value
3. From first to the last positive peak, the spike duration.
4. ascending to descending slope positive spike of MUAP.
5. Positive to negative area of spike MUAP.
6. Phases: The number of baseline crossings where amplitude exceeds ±25 μV, plus one.
7. Thickness: The ratio of the area to the peak-to-peak amplitude.

8. Total samples between the minimum positive and the maximum negative peak called as peak-to-peak samples number.

2.2.2 DWT Based Feature Extraction

The wavelet transform decomposes signal into number of multi resolution components using wavelet function. The detection and classification of short time component within a non-stationary signal is performed using this function. For extracting the features from EMG signal, DWT is used because this technique offers localisation in both time and frequency.

Number of 'Mother Wavelets' are used for the purpose of signal decomposition. The properties of wavelet function and characteristics should be matched so that the most appropriate mother wavelet is selected for the particular application. Db4 is suitable for the signals using feature extraction with more than 4 samples.

2.3 feature selection

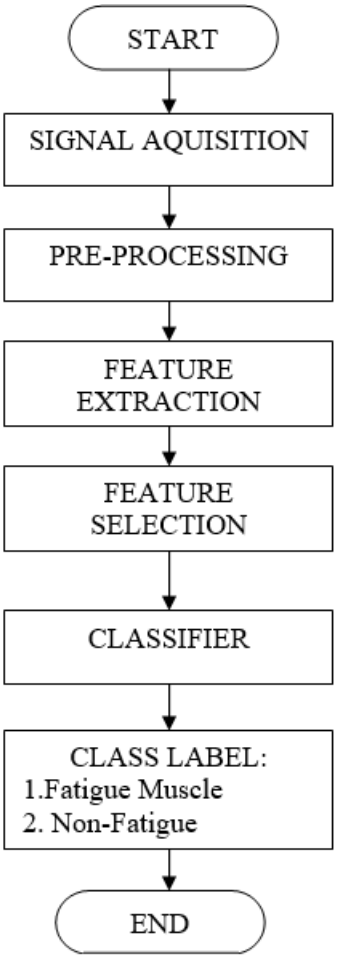
It is important to ensure the selected features should contain class relevant information as most features does not include such information. Therefore, feature selection is used for selecting the features of the required information. To enhance the comprehension of the produced classifier model, feature selection creates a model of generalised unseen dimensions. Feature selection is categorized into two types such as the wrapper approach and filter approach.

The evaluation of most optimal feature or sub-set is carried by the wrapper approach. This model is widely used in machine learning for improving the performance of the classifier. When classifier cannot be directly linked with the data set then the filtering approach is employed. It is linked with the data mining where data reduction is required.

2.4 Classification

In solving the statistics and computational problem where the individuals are grouped according to their characteristics, classification methods are used. In this method individuals having same characteristics are labelled in the same sets. There are many ways for classifying the sEMG signals. One of the popular methods is to measure the Euclidean distance among the waveform and MUAP.

FLOWCHART



Multi-Classifiers Majority Voting (MCMV) classification strategy is used in the presented work.
It contains two groups parallel to each other. The two non-parametric methods, k-nearest neighbour (kNN) and support vector machine (SVM) are used for classifying the signals of fatigue and Non-fatigue conditions. Using the predefined MATLAB functions, the classification is performed. The built in MATLAB function with radial basis function kernel is used for performing the classification with SVM. For better accuracy, all other parameters must be set to default.

III. RESULT AND DISCUSSION

It is seen that in the same class, the classification accuracy is high. In all the groups, the second highest accuracy for base classifier is taken from classification strategy one against all class label. For time-frequency feature, the multi-classifier provides an average accuracy of 97% whereas WKNN classifier achieves the accuracy of 95%. The data of 100 EMG signal, with 50 samples each has been tested for both the classes. The use of window function gives simple approach for MUAPs extraction. By removing the inactive region segmentation of EMG is carried out. The time and time-frequency domain selects the dominant MUAPs for feature extraction. The time domain feature fails to map spectrum behaviour therefore the time-frequency domain feature is selected. A number of changes occurring at both central and peripheral level are represented by the muscle fatigue phenomenon.

IV. CONCLUSION

This review paper focuses on classifying MUAPs into fatigue and non-fatigue class. Several base classifiers such as time domain features, time-frequency features are used for taking different MUAPs features. The limitation of single stage classifier with complexity and processing time is overcome with Multi-classifier. As it allows to segment big decision into many detailed decisions, this strategy can be used in other pattern recognition applications. This review paper shows that the approach to muscular fatigue diagnosis using sEMG is successful for getting the information about the skeletal muscles. Both types of time-frequency and time domain features gives promising results (97%) for the two classes. This research can be further extended if the influence of recording conditions on the classification accuracy is investigated.

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