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4th NATIONAL CONFERENCE
ON
GREEN TECHNOLOGY & SCIENCE FOR
SUSTAINABLE DEVELOPMENT (NCGTSD-2023)
7th May 2020

Organised by
Internal Quality Assurance Cell (IQAC),
Anuradha Engineering College, Sakegaon Road,Chikhli,
Dist Buldana Maharashtra, India

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH IN SCIENCE & TECHNOLOGY

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Activities for green economy and green growth open doors for a more extensive debate, thus creating a chance to reactivate the universal objective, that is, sustainable development. By reorienting the economy to ensure a mutual synergy of economic growth and environmental protection, green growth strategies aim to support the conventional paths of economic development in a better adaptation to implement the objectives of sustainable development. Such strategies can help build green economy characterized by a significant increase in investment in the areas of economic activity based on and increasing the Earth's natural capital, at the same time reducing ecological and environmental deficiencies. The key advantage of the emergence of the concepts of green initiatives/growth and green economy is the fact that they stimulated international attention and renewed global efforts for transforming our present non-sustainable economic model in the direction consistent with the imperative objectives of sustainable development. This highly exciting and challenging 3rd National Conference on Green Technology & Science for Sustainable Development under IQAC is intended to be a forum, discussion and networking place for academics, researchers, professionals, administrators, educational leaders, policy makers, industry representatives, advanced students, and others.

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A Module Fingerprint Based Voting Machine with Arduino Using Machine Learning Techniques

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ABSTRACT

In this paper, proposed system is a fingerprint-based voting machine using Arduino Uno. Biometric Fingerprint devices are used in the Electronic Voting machine for voter verification. This proposed designed a finger print based voting machine where there is no need for the user to carry his ID which contains his required details. The person at the polling booth only needs to place his/her Finger on the device, thus allowing the acquisition of an on-spot fingerprint from the voter which serves as an identification. This Fingerprint reader reads the details from the tag. This data is passed onto the controlling unit for the verification. The controller fetches the data from the reader and compares this data with the already existing data stored during the registration of the voters. If the data matches with the pre-stored information of the registered fingerprint, the person is allowed to cast his vote. If not, a warning message is displayed on LCD and the person is barred from polling his vote. The vote casting mechanism is carried out manually using the push buttons. LCD is used to display the related messages, warnings and ensuing results. [1]

Keywords: - Voter ID, Finger Print Module, Biometric, LCD etc.

I. INTRODUCTION

A fingerprint based voting machine is an electronic device that allows voters to cast their votes by placing their fingerprints on a scanner. This system aims to eliminate issues like duplicate voting, voter impersonation, and electoral fraud that are commonly encountered in traditional voting systems. The Arduino is a popular microcontroller board that provides an easy-to-use platform for developing various types of electronics projects, including fingerprint-based voting machines. By combining Arduino technology with machine learning techniques, it is possible to develop a highly accurate and efficient voting machine. Machine learning techniques can help to improve the accuracy of fingerprint recognition and reduce the number of false positives and negatives. These techniques can also help to identify potential instances of fraud or tampering by monitoring voter behaviour and identifying patterns that may indicate suspicious activity. Overall, a fingerprint-based voting machine with Arduino using machine learning techniques can provide a secure, reliable, and efficient way to conduct elections, ensuring that the results are accurate and representative of the voters' preferences.

Machine learning techniques can be used to improve the accuracy and reliability of fingerprint recognition in voting machines. By analyzing patterns in a voter's fingerprint, machine learning algorithms can accurately

identify and verify their identity, reducing the risk of false positives and negatives. Additionally, machine learning can be used to detect and prevent potential instances of fraud or tampering. By monitoring voter behaviour and identifying patterns that may indicate suspicious activity, machine learning algorithms can alert election officials to potential issues and ensure that the voting process remains fair and transparent.[3][4]

II. PROPOSED SYSTEM

A proposed system for a fingerprint-based voting machine using machine learning could include the following components:

- Fingerprint scanner: The system would include a high-quality fingerprint scanner capable of capturing and processing the unique patterns and features of a voter's fingerprint.
- Machine learning algorithm: The system would use a machine learning algorithm, such as a neural network or decision tree, to analyze and identify patterns in the voter's fingerprint data, ensuring accurate identification and verification.
- Database management system: A database management system would be used to store and manage voter registration information, including fingerprints, personal details, and voting history.
- User interface: The system would feature a user-friendly interface, allowing voters to easily register, verify their identity, and cast their vote using their fingerprint.
- Fraud detection system: A fraud detection system would be integrated into the machine learning algorithm, allowing it to detect and prevent potential instances of fraud or tampering by monitoring voter behaviour and identifying patterns that may indicate suspicious activity.

Overall, this proposed system would provide a secure and efficient way to conduct elections, ensuring that the results are accurate and representative of the voters' preferences. Machine learning techniques would help to improve the accuracy and reliability of the system, reducing the risk of errors, and ensuring a fair and transparent election process.[5][8]

III. ARCHITECTURE
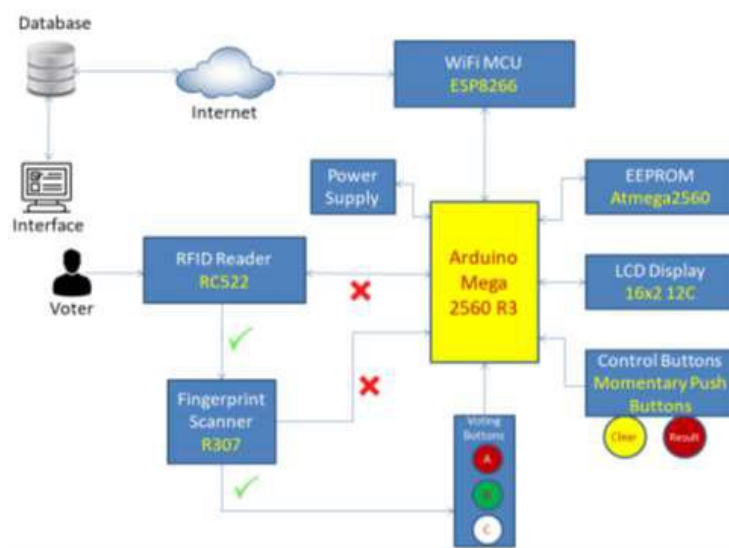
Fig. 1 Architecture of proposed system

IV. COMPONENT USED

- ### RFID module

Every RFID tag is unique and stores a student's details. Such information regarding the RFID tag is already stored in this reader. To identify the voter, the system is using a contactless communication MFRC522RFID reader/writer module. This highly integrated RFID transmission module communicates at 13.56MHZ and uses a serial peripheral interface to communicate with the microcontroller.

- ### Fingerprint module

R307 Fingerprint Module consists of optical fingerprint sensors, a fast DSP processor, a high performance algorithm for aligning fingerprints, high-capacity FLASH fingerprints, and other composition of hardware and software, stability, simple layout, fingerprint entry, image processing, fingerprint matching, searching for and storage template and other functions. It is used to detect and verification of fingerprints. The fingerprint of the voter is already stored in the database which is matched at the time of voting using this module. High powered DSP chip is used for detection and verification by connecting it to the microcontroller with TTL serial. It sends data packets of fingerprints for detection.

- ### WIFI module

To establish communication between the EVM and external data sources, the ESP8266 WiFi module is used. It allows microcontrollers to connect to a Wi-Fi network and to make simple, Haye-style TCP / IP connections. This system on a chip (SoP) module is commonly developed and used for IoT embedded applications. A set of AT commands are needed by microcontrollers to communicate with this ESP8266 module

- ### Switch module

The switch module includes an LCD crystal display, a Buzzer, and buttons. In this case, LCD is used to show messages. The vote is cast individually by the voters. The 12C liquid crystal display consists of four connections, which are GND, VCC, SDA, and SLC. It is capable of displaying 16 characters per row in two lines. This LCD screen bridges the gap between user and Arduino by showing the appropriate programmed message such as when to show id card, when t place finger, what is the status etc. When the authentication completes the system will allow the voter to cast his/her vote by pressing one of the three candidate buttons. If LED blinks once, the message of the successful vote will be displayed on the same LCD.[7][9]

V. MACHINE LEARNING TECHNIQUES

There are several machine learning techniques that can be used for a fingerprint-based voting system, including:
- Convolutional Neural Networks (CNNs): CNNs can be used for fingerprint recognition and identification, as they are capable of detecting complex patterns and features in large datasets.
- Decision Trees: Decision trees can be used to classify and group voter data based on their fingerprint patterns, enabling accurate and efficient identification and verification.

- Support Vector Machines (SVMs): SVMs can be used to classify and distinguish between genuine and fake fingerprints, reducing the risk of fraud and ensuring accurate identification.
- Random Forests: Random forests can be used to analyze and classify large datasets, enabling accurate identification and verification of voters.
- Deep Learning: Deep learning techniques, such as autoencoders, can be used to improve the accuracy and reliability of fingerprint recognition and identification, reducing the risk of false positives and negatives.

Overall, the use of machine learning techniques in a fingerprint-based voting system can help to improve the accuracy, reliability, and security of the system, ensuring a fair and transparent election process.[10]

VI. EXPECTED RESULT

Fig. 2 Expected result after hardware implementation

VII. CONCLUSION

In this paper, the authors presented an intelligent and secure authenticated voting system based on Arduino flat-form IoT technology for college elections. To ensure the security of the voter and preserve the sanctity of the method, a two-layer security scheme is introduced. We assume this method is useful in conducting fair and open Student Council elections for schools. Although the system produces the expected performance and efficiency, it is not 100% perfect. Some limitations of the system have been found. The system is supporting only three candidates at a time as it has only three voting switches. This can be addressed in our future work. Further, the system enables the election to only one post at a time. We can design the system such that it can be used to conduct elections to any number of posts at the time. One more point is that Arduino mega board has limited memory. In our future work, we are planning to use Raspberry Pi based board of the AVM. The devices built into this project can be updated, and the data can be stored in the cloud server and automated voting to speed up the voting process. As the system is in its infancy, more work is necessary to make it versatile and more adaptable. It is in beta; we will present a device that is upgraded, error-free, stable, and scalable in our future work.[2]

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Automatic Attendance Management System Using Face Recognition

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ABSTRACT

Being one of the most successful applications of the image processing, face recognition has a vital role in technical field especially in the field of security purpose. Human face recognition is an important field for verification purpose especially in the case of student's attendance. This paper is aimed at implementing a digitized system for attendance recording. Current attendance marking methods are monotonous & time consuming. Manually recorded attendance can be easily manipulated. Hence the paper is proposed to tackle all these issues.

Keywords— Image processing, Face recognition, PCA, Eigen Face, Microcontroller, LBPH and Camera

I. INTRODUCTION

Face recognition has becoming as the active area of research in recent years, it is mainly used to increase the security demands. The last century has shows a striking progress in this area, with attention on such applications as Human-computer interaction (HCI), biometric analysis, content-based coding of images and videos, and surveillance. Even-though it is a superficial task for the human brain, face recognition has proved that it is extremely difficult to replicate artificially, since although commonalities do exist between faces, they vary in terms of age, skin-tone, color, glow and gender. The problem is further complicated by differing image qualities, facial expressions, facial furniture, background, and illumination conditions. This paper presents a peaceful approach for face recognition that derives from an idea suggested. In our survey, we describe a preprocessing step that attempts to identify pixels associated with skin independently of face related features.

Facial recognition or face recognition as it is often referred to as, analyses characteristics of a person's face image input through a camera. It measures overall facial structure, distances between eyes, nose, mouth, and jaw edges. These measurements are retained in a database and used as a comparison when a user stands before the camera. One of the strongest positive aspects of facial recognition is that it is non-intrusive. Verification or identification can be accomplished from two feet away or more, without requiring the user to wait for long periods of time or do anything more than look at the camera.

The first attempts to use face recognition began in the 1960's with a semi-automated system. Marks were made on photographs to locate the major features; it used features such as eyes, ears, noses, and mouths. Then distances and ratios were computed from these marks to a common reference point and compared to reference data. In the early 1970's Goldstein, Harmon and Lesk [2] created a system of 21 subjective markers such as hair colour and lip thickness. This proved even harder to automate due to the subjective nature of many of the measurements still made completely by hand. Fisher and Elschlagerb [3] approaches to measure different pieces

of the face and mapped them all onto a global template, which was found that these features do not contain enough unique data to represent an adult face. Another approach is the Connectionist approach [4], which seeks to classify the human face using a combination of both range of gestures and a set of identifying markers. This is usually implemented using 2-dimensional pattern recognition and neural net principles. Most of the time this approach requires a huge number of training faces to achieve decent accuracy; for that reason it has yet to be implemented on a large scale. The first fully automated system [5] to be developed utilized very general pattern recognition. It compared faces to a generic face model of expected features and created a series of patters for an image relative to this model. This approach is mainly statistical and relies on histograms and the gray scale value.

II. EASE OF USE

Traditionally, student's attendances are taken manually by using attendance sheet given by the faculty members in class, which is a time consuming event. Moreover, it is very difficult to verify one by one student in a large classroom environment with distributed branches whether the authenticated students are actually responding or not. The present authors demonstrate in this paper how face recognition can be used for an effective attendance system to automatically record the presence of an enrolled individual within the respective venue. Proposed system also maintains a log file to keep records of the entry of every individual with respect to a universal system time.

III. SYSTEM OVERVIEW

In this paper we have reviewed a face recognition method based on feature extraction. By using extensive geometry, it is possible to find the contours of the eye, eyebrow, nose, mouth, and even the face itself. Principal component analysis for face recognition is based on the information theory approach. Here, the relevant information in a face image extracted and encoded as efficiently as possible.

First, the system needs to be initialized by feeding it a set of training images of faces. This is used to define the face space which is set of images that are face like. Next, when a face is encountered it calculates an eigenface for it. By comparing it with known faces and using some statistical analysis it can be determined whether the image presented is a face at all. Then, if an image is determined to be a face the system will determine whether it knows the identity of it or not. The optional final step is that if an unknown face is seen repeatedly, the system can learn to recognize it.

The two main components used in the implementation approach are open source computer vision library (OpenCV) and Light Tool Kit (FLTK). One of OpenCV's goals is to provide a simple-to-use computer vision infrastructure that helps people build fairly sophisticated vision applications quickly.

OpenCV library contains over 500 functions that span many areas in vision. The primary technology behind Face recognition is OpenCV; the interface is designed using FLTK.

The user stands in front of the camera keeping a minimum distance of 50cm and his image is taken as an input. The frontal face is extracted from the image then converted to gray scale and stored. The Principal component Analysis (PCA) algorithm [7] is performed on the images and the eigen values are stored in an xml file. When a

user requests for recognition the frontal face is extracted from the captured video frame through the camera. The eigen value is re-calculated for the test face and it is matched with the stored data for the closest neighbour.

A. PCA (Principal Component Analysis)

PCA method has been widely used in applications such as face recognition and image compression. PCA is a common technique for finding patterns in data, and expressing the data as eigenvector to highlight the similarities and differences between different data [6].

The following steps summarize the PCA process.
1. Let {D1,D2,…DM} be the training data set.
2. Each element in the training data set differs from Avg by the vector Yi=Di-Avg.
3. Choose M' significant eigenvectors of Cov as EK's, andcompute the weight vectors Wik for each element in the training data set.

IV. SYSTEM IMPLEMENTATION

The present authors used the eigenface approach for face recognition which was introduced by Kirby and Sirovich in 1988 at Brown University. The method works by analyzing face images and computing eigenface [8] which are faces composed of eigenvectors. The comparison of eigenface is used to identify the presence of a face and its identity. There is a five step process involved with the system developed by Turk and Pentland [1]. First, the system needs to be initialized by feeding it a set of training images of faces. This is used to define the face space which is set of images that are face like. Next, when a face is encountered it calculates an eigenface for it. By comparing it with known faces and using some statistical analysis it can be determined whether the image presented is a face at all. Then, if an image is determined to be a face the system will determine whether it knows the identity of it or not. The optional final step is that if an unknown face is seen repeatedly, the system can learn to recognize it.

The proposed system has been implemented with the help of three basic steps: A. detect and extract face image and save the face information in an xml file for future references. B. Learn and train the face image and calculate eigen value and eigen vector of that image.

C. Recognise and match face images with existing face images information stored in xml file.

A. Face Detection and Extract

At first, openCAM_CB() is called to open the camera for image capture. Next the frontal face [2] is extracted from the video frame by calling the function ExtractFace().

The ExtractFace() function uses the OpenCv HaarCascade method to load the haarcascade_ frontalface_alt_tree.xml as the classifier. The classifier outputs a "1" if the region is likely to show the object (i.e., face), and "0" otherwise.

To search for the object in the whole image one can move the search window across the image and check every location using the classifier.

The classifier is designed such a manner that it can be easily "resized" in order to be able to find the objects of interest at different sizes, which is more efficient than resizing the image itself. So, to find an object of an

unknown size in the image the scan procedure is done several times at different scales. After the face is detected it is clipped into a gray scale image of 50x50 pixels.

B. Learn and Train Face Images

Learn() function which performs the PCA algorithm on the training set. The learn() function implementation is done in four steps:

1. Load the training data.
2. Do PCA on it to find a subspace.
3. Project the training faces onto the PCA subspace.
4. Save all the training information.
   a. Eigenvalues
   b. Eigenvectors
   c. The average training face image
   d. Projected face image
   e. Person ID numbers

C. Recognise and Identification

Recognize() function, which implements the recognition phase of the Eigenface program [5].

It has just three steps. Two of them - loading the face images and projecting them onto the subspace - are already familiar.

The call to loadFaceImgArray() loads the face images, listed in the train.txt, into the faceImgArr and stores the ground truth for person ID number in personNumTruthMat. Here, the number of face images is stored in the local variable, n TestFaces.

We also need to load the global variable n TrainFaces as well as most of the other training data - nEigens, EigenVectArr, pAvgTrainImg, and so on. The functionloadTrainingData() does that for us. OpenCV locates and loads each data value in the XML file by name.

(nEigens), and the array of eigenvectors (eigenVectArr). This time, however, we pass a test image, instead of a training image, as the first parameter. The output from cvEigenDecomposite() is stored in a local variable - projectedTestFace.

Because there's no need to store the projected test image, we used a C array for projectedTestFace, rather than an OpenCV matrix.

The findNearestNeighbor() function computes distance from the projected test image to each projected training example. The distance basis here is "Squared Euclidean Distance."

To calculate Euclidean distance between two points, we need to add up the squared distance in each dimension, and then take the square root of that sum.

Here, we take the sum, but skip the square root step.

The final result is the same, because the neighbor with the smallest distance also has the smallest squared distance, so we can save some computation time by comparing squared values.

D. Experiment and Result

The step of the experiments process are given below:

1. Face Detection:

Start capturing images through web camera of the client side:

Begin:

//Pre-process the captured image and extract face image

//calculate the eigen value of the captured face image and compared with eigen values of existing faces in the database.

//If eigen value does not matched with existing ones, save the new face image information to the face database (xml file).

//If eigen value matched with existing one then recognition step will done.

End;

2. Face Recognition:

Using PCA algorithm the following steps would be followedin for face recognition:
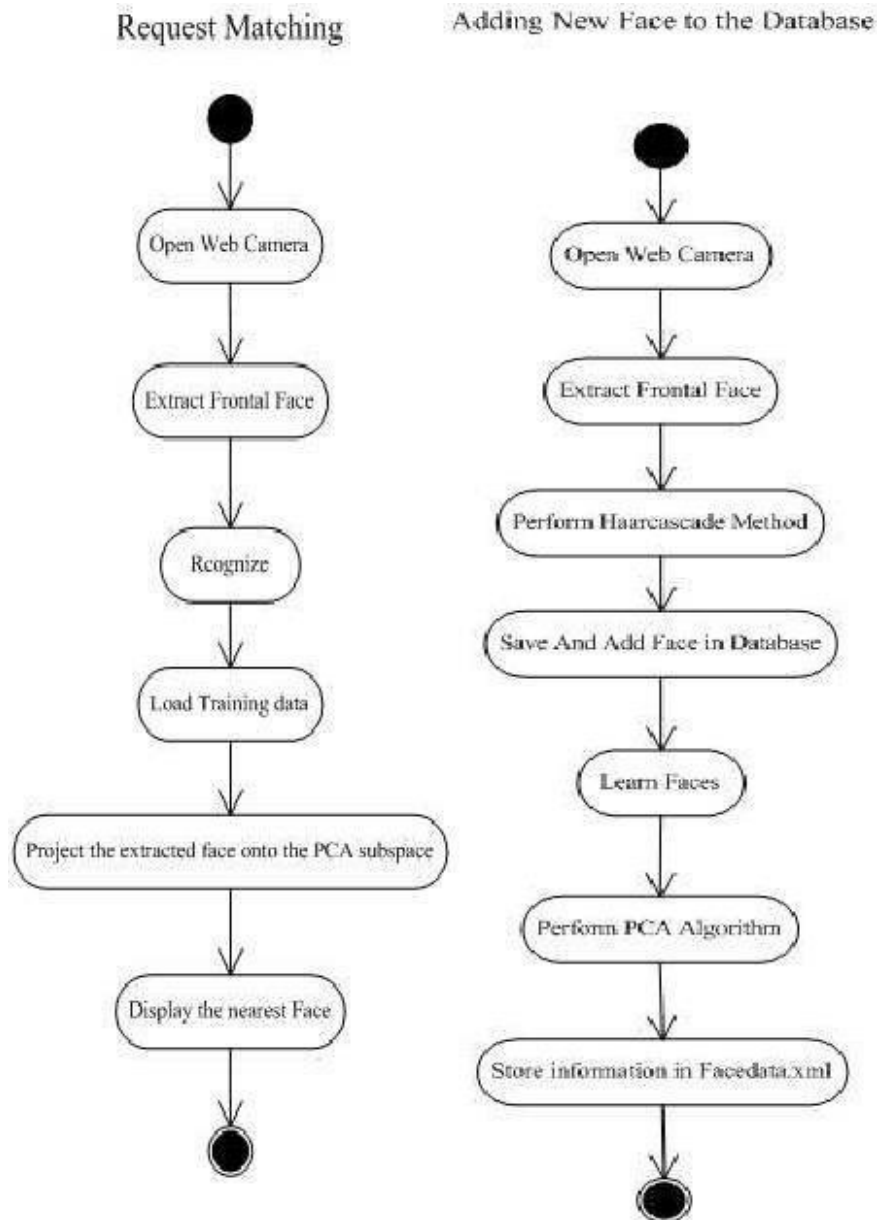
Fig. 1. Architecture of the system

Begin:

// Find the face information of matched face image in fromthe database.

// update the log table with corresponding face image and system time that makes completion of attendance for anindividual students.

end;

This section presents the results of the experiments conducted to capture the face into a grey scale image of 50x50 pixels.

We performed a set of experiments to demonstrate the efficiency of the proposed method. 30 different images of 10 persons are used in training set. Figure 3 shows a sample binary image detected by the ExtractFace() function using Paul-Viola Face extracting Frame work detection method.

TABLE I: DESCRIBES THE OPENCV FUNCTION USED IN THE PROPOSED SYSTEM AND ITS EXECUTION RESULT

Test data	Expected Result	Observed Result	Pass/ Fail
OpenCAM_CB()	Connects with the installed camera and starts playing.	Camera started.	pass
LoadHaar Classifier()	Loads the HaarClassifier Cascade files for frontal face	Gets ready for Extraction.	Pass
ExtractFace()	Initiates the Paul-Viola Face extracting Frame work.	Face extracted	Pass
Learn()	Start the PCA Algorithm	Updates the facedata. xml	Pass
Recognize()	It compares the input face with the saved faces.	Nearest face	Pass

From table 2 it is been observed that with the increasing of face angle with respect to camera face detection and recognition rate is become decreases.

TABLE II: DESCRIBES THE OPENCV FUNCTION USED IN THE PROPOSED SYSTEM AND ITS EXECUTION RESULTS.

Face Orientations	Detection Rate	Recognition Rate
O0 (Frontal face)	98.7 %	95%
18º	80.0 %	78%
54º	59.2 %	58%
72º	0.00 %	0.00%
90º (Profile face)	0.00 %	0.00%

The scheme is based on an information theory approach that decomposes face images into a small set of characteristic feature images called eigenfaces, which may be thought of as the principal components of the initial training set of face images. Recognition is performed by projecting a new image onto the subspace spanned by the Eigen faces and then classifying the face by comparing its position in the face space with the positions of known individuals. Actual system is capable of both recognizing known individuals and learning to recognize new face images. The Eigenfaces approach used in this scheme has advantages over other face recognition methods in its speed, simplicity, learning capability and robustness to small changes in the face image. FACE-PRO, the actual face recognition software based on the Eigen faces approach was developed in C programming language on a personal computer. Although no optimizations were performed for matrix operations, during the tests on a Intel 80486 based personal computer, it was remarkable that the system could build a training set that had 14 members with 7 eigen faces over a 58 member demo face library by updating all the feature vectors of the library members in around one minute. Once the training set has been built, recognitions were done near real time over this demo face library in less than one second. Much of the previous work on automated face recognition has ignored the issue of just what aspects of the face stimulus are important for face recognition. This suggests the use of an information theory approach of coding and decoding of Face images, emphasizing the significant local and global features. Such features may or may not be directly related to our intuitive notion of face features such as the eyes, nose, lips, and hair. In the language of information theory, the relevant information in a face image is extracted, encoded as efficiently as possible, and then compared with a database of models encoded similarly. A simple approach to extracting the information contained in an image of a face is to somehow capture the variation in a collection of face images, independent of any judgment of features, and use this information to encode and compare individual face images. In mathematical terms, the principal components of the distribution of faces, or the eigenvectors of the covariance matrix of the set of face images, treating an image as point (or vector) in a very high dimensional space is sought. The eigenvectors are ordered, each one accounting for a different amount of the variation among the face images

V. CONCLUSION AND FUTURE WORK

Experimental results have shown that, the proposed face recognition method was very sensitive to face background and head orientations. Changes in the illumination did not cause a major problem to the system. Besides, presence of small detail such as dark glasses or masks was too far from being a real challenge to the system. There exists a trade off between the correct recognition rate and the threshold value. As the threshold value increases, numbers of misses begin to decrease, possibly resulting in misclassifications. On the contrary, when the number of eigenfaces involved in the recognition process increases misclassification rate begins to decrease, possibly resulting in misses. The eigenface method is very sensitive to head orientations, and most of the mismatches occur for the images with large head orientations.

A program has been suggested to ensure attendance. This replaces the manual system with a simple, reliable, cost-effective, time-saving automated system as it eliminates the stationary material and paper work. It is therefore predicted that this method would produce desired results and could be applied for logout in the future. In the near future, other strategies could also improve efficiency. We can say that a safe, stable, rapid and efficient class attendance management system was developed to replace a manual and inefficient system. The

face recognition program saves time, reduces administration work and replaces obsolete electronic equipment for the currently in use stationery content. The device must not be mounted by specialized equipment, because it requires only a computer and a camera. The picture quality and performance must be tested in the real time scenario, particularly when the systems are operated from a live camera supply, and thus the camera plays a decisive role in the system's work. The mechanism can also be used for permission-based access control systems and for safe access uthentication (restricted installations). The greatest threat to the system is spoofing. Anti-spotting techniques like eye twitch detection can be used in the event that the face recognition is provided by grabbed images for possible improvements to separate live from static images. A feature can therefore be added that lists all unidentified faces and can be manually checked by the user. Automatic attendance system has been developed to popularize errors. The efficient and reliable system of the attendance that can replace the old manual methods in the office environment. This method is sufficiently stable, accurate and ready for use.

There is no need for specialized equipment in the office to mount the device. It can be designed with a camera and a computer.

Authors intend to improve the effectiveness of face recognition by using the interaction between our system, users, and administrators in further work. On the other hand, our system can be used in a completely new face recognition application dimension, mobile face recognition, which can help ordinary people to know about any person being photographed by cell phone camera, including proper authorization to access a centralized database.

The current recognition system has been designed for frontal views of face images. Camera and scanner support should be implemented for greater flexibility. In order to obtain the attendance of individuals and to record the entry and exit, the proposed system can be used. The system can widely be used in the institutions/organizations. The proposed system takes attendance of each student by continuous observation at the entry and exit points. The result of our preliminary experiment shows improved performance in the estimation of the attendance compared to the traditional attendance marking systems.

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Billing Management System

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ABSTRACT

Billing Management System is an automated software application that helps businesses manage their billing process efficiently. The system automates the billing process, allowing companies to create invoices, payments, and manage customer accounts easily.

The Billing Management System provides a user-friendly interface that allows businesses to manage their billing process with ease. The system allows businesses to create and manage invoices, set up payment reminders, and generate reports to track revenue and expenses.

The system is designed to be flexible and can be customized to meet the specific needs of a business. The software can integrate with existing accounting systems to ensure accurate financial reporting.

The Billing Management System also provides a secure platform for businesses to manage customer information and financial data. The system is designed with security features such as encryption, firewalls, and access controls to ensure the confidentiality and integrity of data.

The implementation of the Billing Management System can help businesses streamline their billing process and improve their overall financial management. The system can save time and reduce errors associated with manual billing processes, allowing businesses to focus on core activities and improve their bottom line.

Keywords— Billing System, bill payment, Authentication, Security.

I.   INTRODUCTION

A bill serves as a record of a statement and monetary transaction. A bill is used to document transactions when someone buys products or anything of value. We require a billing system to maintain efficient use of the bill from creation to analysis to printing to handle the entire process. When people first started buying products in the mediaeval era, the billing system was established. The store owner used to keep track of all the products that were sold to the customer and how much inventory they had on hand. All the records must be manually entered in a record book [3]. The bill serves a variety of different functions in addition to serving as a record of transactions. They use the information from the bills to reduce unnecessary spending, allocate funds more wisely, and enhance their companies.

As technology advanced, written bill management began to transition to digital. They started off by introducing a straightforward billing management system.The bill was created and printed using software on computers. Only the administrator is permitted to use database features   to record and bill for all purchased items,

personnel information, and change prices. In the database, the products are categorised [1]. Software was created to manage time and bill tracking and to inform clients of their purchases of products and services. The amount of things produced, the number of hours worked by personnel, and any costs associated with customers or projects can all be tracked by billing software.

Most billing software applications are capable of creating billing reports. These reports can display information such as hours worked, expenses incurred, how much to bill customers, and which customers owe how much money for which goods, totalinvestment, and total income of the month.

Few examples of the billing management systems are: -

1. Sage Time slips
2. QuickBooks Time by Intuit
3. Billing and Billing Tracker.

II. BILLING SYSTEM WITH GST

This System is aimed to provide information to the customer about the product, its GST values & its calculation of the country. [4]

2.1. Proposed System: -

The proposed system is intended to provide the facility of automating the inventory tasks such as Item management and customer billing with GST for the Shop or market. To reduce the bottlenecks of the existing system there is a need to develop a new system. The new system should concern the requirements of the customer and the sellers. This project is designed with a goal to making the existing system more informative, reliable, fast and easier. There are many reasons for the starting of the project because in the selling of items through the manual system of salesperson faces a lot of inefficiencies. It requires handling of large items that consist of both irrelevant and important information's thus making it difficult to find out the required information as per necessity. To overcome these problems in existing system we develop "Inventory Maintenance & Billing with GST".

III. IMPLEMENTATION

This project is based on the sales transaction and billing of items in a supermarket. The first activity is based on adding the items to the system along with the rate which are present in the supermarket and the name of the items which the supermarket will agree to sell [2]. The models provide four basic types of functionality, that is, create, read, update, and delete the resources.

We use Java to build the functionality of the application and graphics user interface (GUI). We use the SQLite database to store the application data and transaction data. Using this database, we add, update, delete, and keep track of the transactions. We make use of different libraries of java, like Itextpdf-5.4.0.jar, rs2xml.jar, Sqlite-jdbc-3.21.0.jar Sqlite to Build the Application

Overview of steps Using Libraries and Tools

- First, the layout of the system is made by netbeans framework.
- Then, the store's database is created using SQLite

- Connection between database and the GUI is created using Java.
- Using the security first we login the system.
- Using Java, we created cart module where we add products.
- Then we want to add gst we can add gst on bill.
- Then, we create module to generate the bill.

A. Working of System

- First, the user can login the module.
- Then, we can add product, rate, price, Quantity, etc
- Upadte the product details in update product module.
- Then, the products get added to the product list.
- Add regular buyer details, to get esay to create bill.
- Then, we create the the bill on billing module.
- Then we can create the bill then they can print
- We can see the Bill history.
- Create PDF to show the Bill.
- Creation of bill then send the message to the Registered customer

B. Architecture and Modules

a. Modules

1) **Login:** First login the System we can Secure The databse on the System.

Figure 1. Login Page

2) **Add New product:** These Module is Use to add new Product to store the database.User needs to enter the data about the Product before adding, and then add it to the database. For Ex.price,Rate,Description,Quantity,Activaton.

Figure:New Product

3) **Update new product:** these module is usxed to update the new product.

Figure:Update Proiduct

4) Show added Buyer: A buyer details to access a data easily,and we can create a bill invoice.

Figure:Buyer Details

5) Billing: we can create a bill to print a product amount, quantity,GST,etc

*Figure.*Billing

6) **Bill History:** We can see a bill history in Bill History.
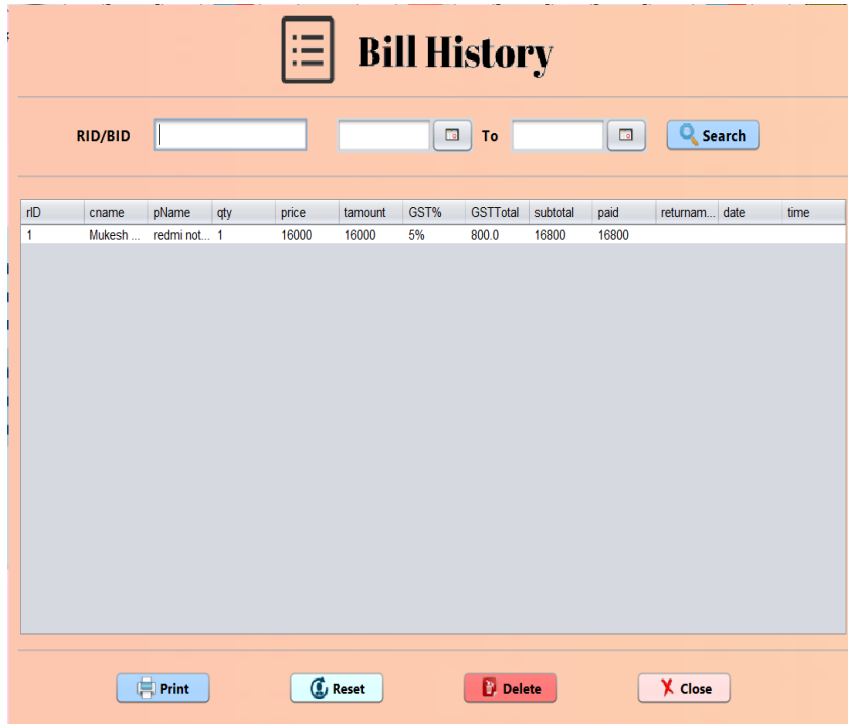
7)

Figure:Bill History

8) **PDF: -** To show the saved bill in our PC. These is the Final result of the System.

Figure:PDF(invoice)

9) show the bill in the from of message on the customer mobile.it will be use third party gate-way twilio is a free trail version now.
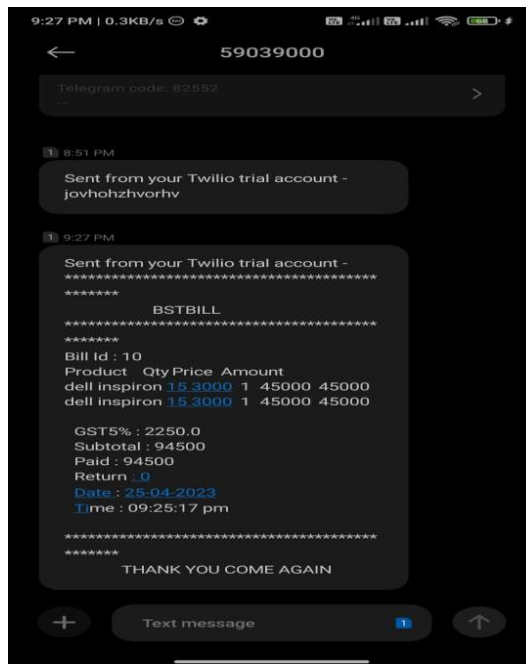
Fig:-Bill in the form of message

C. Architecture

The software architecture of an application or system is an illustration of the system application that helps in understanding how it works and behaves. The architecture is presented as the blueprint for the system and the project developed in the system, defining how the work must be carried through designing and implementation of project. The architecture is the first carrier of system qualities. These qualities are performance, modifiability and security [5]. These cannot be achieved without combining the architectural vision of system and team. Architecture is a useful way of early analysis to make sure that a design approach will produce a welldesigned and acceptable system. By building an effective architecture, you can find out design risks and eliminate them early in the development process of system.
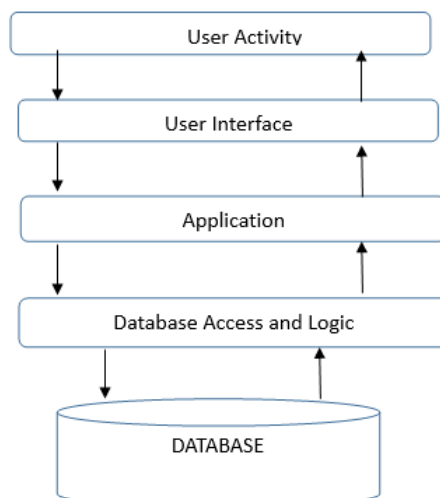
Figure: General architecture

IV. CONCLUSION

- Benefits of implementing a Billing Management System
- Improved accuracy and efficiency of billing processes
- Reduction in billing errors and disputes
- Enhanced customer satisfaction
- Streamlined financial reporting and analysis
- Increased revenue and profitability
- Improved compliance with regulatory requirements
- Cost savings and return on investment
- Future scope and potential for scalability
- Key considerations for successful implementation of a Billing Management System

V. FUTURE SCOPE

- Integration with advanced analytics tools to provide more detailed insights into billing data and customer behavior.
- Integration with emerging technologies like artificial intelligence and machine learning to automate billing processes and improve accuracy and efficiency.
- Incorporation of blockchain technology to enhance security and transparency in billing transactions.
- Expansion into new markets and industries, such as healthcare, utilities, and telecommunications, where billing management is a critical function.
- Development of mobile and cloud-based billing systems to provide greater flexibility and accessibility to users.
- Integration with customer relationship management (CRM) systems to provide a more comprehensive view of customer interactions and billing history.
- Adoption of new payment methods, such as cryptocurrencies and digital wallets, to provide more convenient and secure billing options for customers.

Overall, the future scope of a Billing Management System is vast, and its potential for innovation and growth is significant. As businesses continue to prioritize efficiency, accuracy, and customer satisfaction, the demand for advanced billing management solutions will only continue to increase.

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Blockchain Technology

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ABSTRACT

Blockchain technology is the new world technology which going to change the working of world. Because it is technology which care about personal data security which is missing in today's world of Internet. Blockchain technology will impact the future of following sector which can be the application of blockchain technology Education, FinTech Economy, Agriculture, Health and Insurance, Real Estate all this sector and to Identify Crisis. In this paper we try to implement the blockchain technology for education sector.

Keyword: - Blockchain, decentralized distributed platform, Ethereum, smart contract

I. INTRODUCTION

Blockchain technology has gained a lot of attention in recent years due to its potential to revolutionize industries as diverse as finance, supply chain management, and healthcare. One of the key features of blockchain technology is its ability to create secure and transparent networks that can be used to transfer and store digital assets. Blockchain technology is in its early stage of development. During the first half of 2017 , over one billion dollars was directed to the funding of blockchain startups. In 2009, as the world was going through tough financial crisis and financial sector and politicians were musing about what could and should be done, a project called Bitcoin quietly comes in front of global world. Within this technology, however, the seeds of somethings much bigger lie. The core nucleus of Bitcoin architecture, a structure is known as "blockchain". Blockchains is result of research of distributed systems, cryptography, computer security, and game theory, to deliver a new type of shared database. A blockchain driven database is replicated on multiple computers across many jurisdictions.[1] Blockchain technology is an advanced type of database system that allows transparent information sharing within a business network. A database blockchain stores data in blocks that are connected or linked together in a chain. The data is chronologically consistent because anyone cannot delete or modify the chain without consensus from the network, by this advantage we can use blockchain technology to create an unalterable or immutable ledger for tracking orders, payments, accounts, and other transactions. The system has its built in mechanisms that protect unauthorized entries and create consistency in the shared view of these transactions. Traditional database technologies present several challenges for recording financial transactions. For example, consider sale of a property. Once the money get exchanged, ownership of the property is transferred to the buyer. Both the buyer and the seller can easily claim they have not received the money even though they have, and the buyer can equally argue that they have paid the money even if they don't paid. To avoid this legal problems, a well known trusted third party has to supervise and validate

transactions. The presence of this central authority not only make complicates the transaction but also creates vulnerability. Blockchain solve this issues by creating a decentralized, tamper-proof system to record transactions. In the property transaction example, blockchain will creates one ledger each of the buyer and the seller. All transactions must be approved by both parties and automatically updated in both of their ledgers in real time.[2]

II. BLOCKCHAIN

Blockchain is a sequence of block, that keeps a complete transaction records like conventional public ledger.
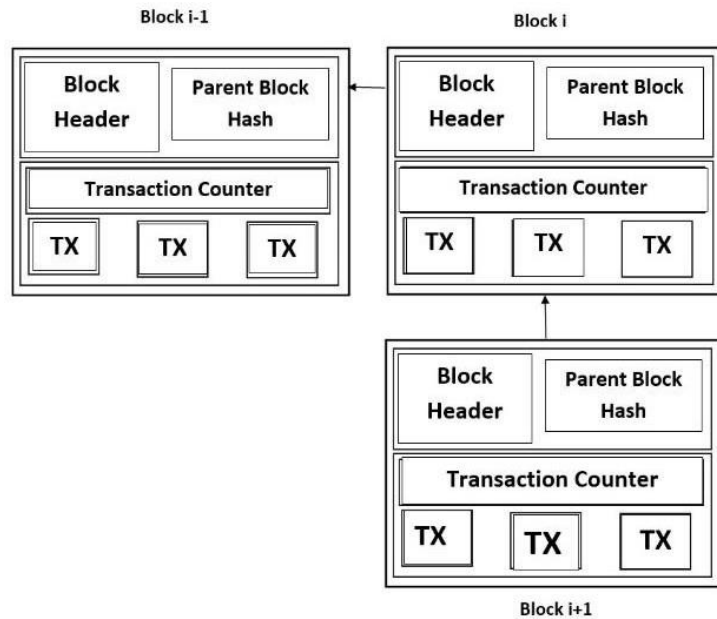
Fig. 1: An example of blockchain which consists of a continuous sequence of blocks.

Figure 1 illustrates an example of a blockchain. With a previous hash of block present in the block header, a block has only one parent block. The first block of a blockchain is known as genesis block. Genesis block has no parent block.
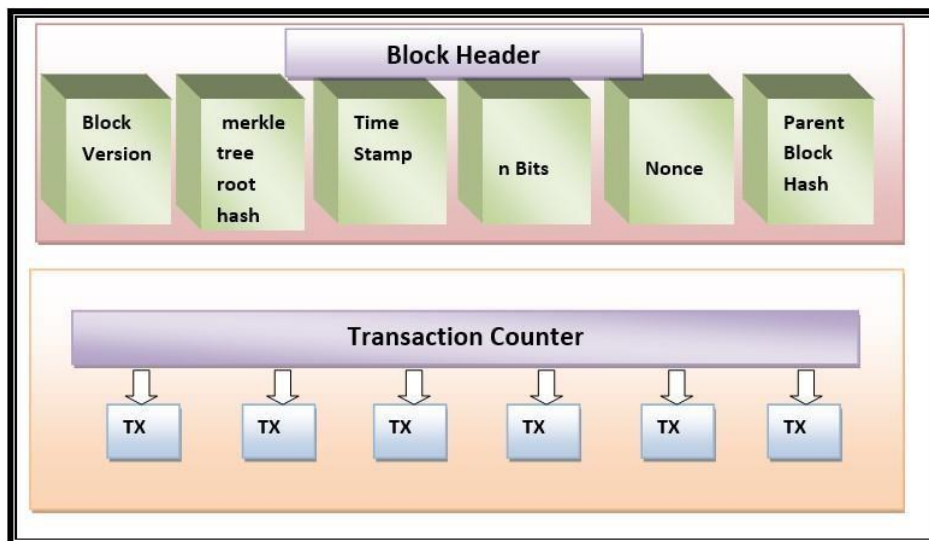
Fig.1 Block

A Block has the block header and the block body as shown in Figure 2.

Block header includes: -
i).   Block version: shows which set of block validation rules to follow.
ii).   Merkle tree root hash: the hash value of all the transactions in the block.
iii). Timestamp: current time as seconds
iv).   nBits: target threshold of a valid block hash.
v).   Nonce: an 4-byte field, which generally start with 0 and increases for every hash calculation
vi).   Parent block hash: a 256-bit hash value that points to previous block.

The block body is made of a transaction counter and transactions. The maximum number of transactions that a block has depends on the block size and the size of each transaction. Blockchain uses asymmetric cryptography mechanism to validate the authentication of transactions. 3 Asymmetric cryptography, also known as public-key cryptography, is a process of that uses a pair of related keys—one public key and one private key – to encrypt and decrypt a message and protect it from unauthorized access or use. A public key is a cryptographic key that can be used by any person to encrypt a message so that it can only be decrypted by the intended recipient with private key. A private key known as a secret key. If when someone wants to send an encrypted message, they can pull the intended recipient's public key from a public directory and use it to encrypt the message before sending it. The recipient of the message can then decrypt the message using their related private key. If the sender encrypts the message using their private key, then the message can be decrypted only using that sender's public key, thus authenticating the sender. These encryption and decryption processes happen automatically; users do not need to physically lock and unlock the message. Asymmetric encryption uses a mathematically related pair of keys for encryption and decryption: a public key and a private key. If the public key is used for encryption, then the related private key is used for decryption. If the private key is used for encryption, then the related public key is used for decryption.[4]

A. Digital Signature

Each user has a pair of private key and public key. The private key must be kept confidential and used to sign the transactions. The normally digital signature is involved with two phases: signing phase and verification phase. For instance, an user Rohit wants to send another user Nitesh a message. First Phase- the signing phase, Rohit encrypts his data with his private key and sends Nitesh the encrypted result and original data. Second Phase- Verification phase, Nitesh validates the value with Rohit's public key. In this way, Nitesh could easily check if the data has been tampered or not. Generally digital signature algorithm used in blockchains is the elliptic curve digital signature algorithm (ECDSA).

B. Key Characteristics of Blockchain
*   Decentralization:

In traditional centralized transaction systems, each transaction needs to be verify through the central trusted agency (e.g., the central bank), it is resulting to the cost and the performance bottle-necks at the central servers. In blockchain no needed third party. Consensus algorithms in blockchain are used to maintain data consistency in distributed network.

- Persistency:

Transactions can be validated quickly and invalid transactions not be admitted by honest miners. It is nearly impossible to delete or rollback transactions once they are included in the blockchain. The block which has invalid transactions could be discovered immediately.

- Anonymity:

Each user can interact with the blockchain with a generated address, which kept secret real identity of the user.

C. Types of Blockchain

There are three types of blockchains – Public Blockchain, Private Blockchain and Consortium Blockchain.[3]
In this paper we are going to see Public blockchain and its application. Popular public Blockchain names-Ethereum, Bitcoin, Litecoin etc. Now we are going to see what is Ethereum blockchain.

Property	Public Blockchain
Consensus determination	All Miner
Read permission	Public
Immutability	Nearly impossible to tamper
Efficiency	Low
Centralized	No
Consensus process	Permissionless

Property	Consortium Blockchain
Consensus determination	Selected set of nodes
Read permission	Could be public or restricted
Immutability	Could be tampered
Efficiency	High
Centralized	Partial
Consensus process	Permissioned

Property	Private Blockchain
Consensus determination	One Organization
Read permission	Could be public or restricted
Immutability	Could be tampered
Efficiency	High
Centralized	Yes
Consensus process	Permissioned

Table I: Comparisons among public blockchain, consortium blockchain and private blockchain.

III. ETHEREUM BLOCKCHAIN
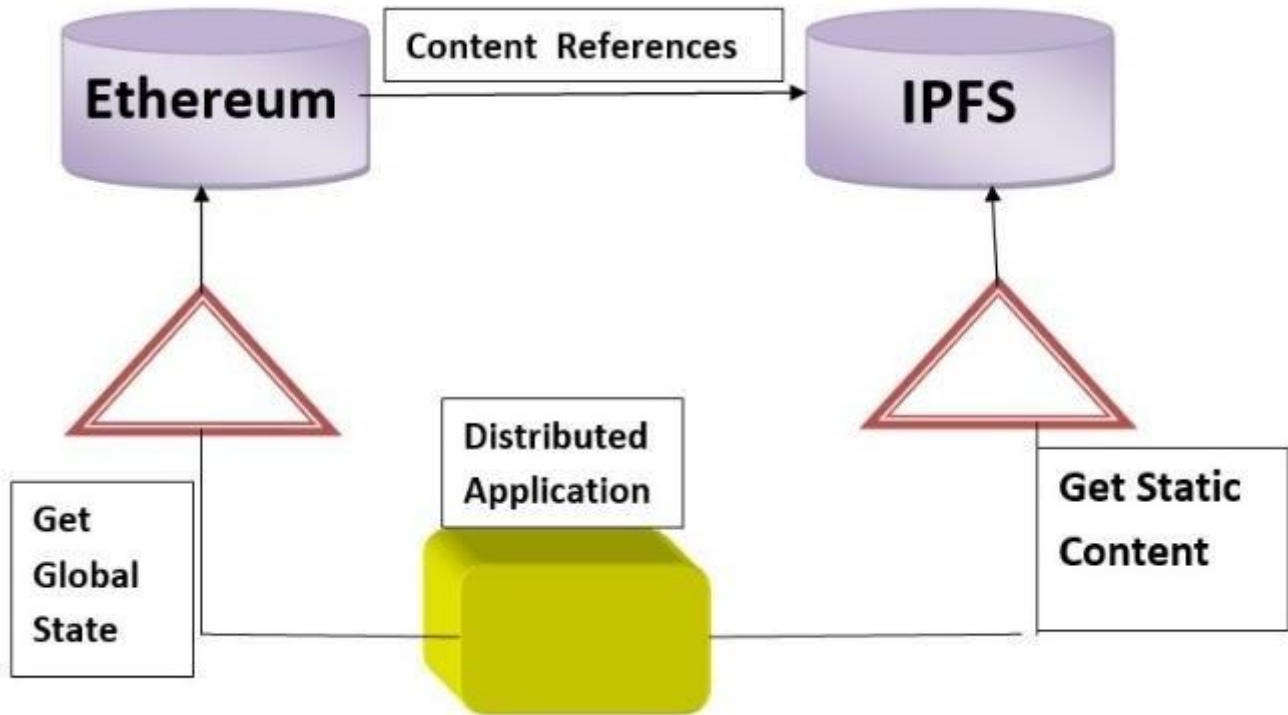
Fig.2 decentralized distributed platform

Ethereum is a decentralized widely used and open source public blockchain platform for developing and deploying decentralized application. Ethereum provide wide range of services and solutions with its readily available development tools. All the nodes on the Ethereum blockchain operates in real time. This ensures that each and every transaction that happen is verified by all the nodes or no nodes at all. Ethereum blockchain maintains a ledger that is completely online hence, it cannot be tampered. If anyone tampered node would get rejected.[5]

Now we are going to study one by one elements which are most important for building a decentralized application on Ethereum block chain.

A. Smart Contract

Ethereum establishes a peer to peer network that securely executes and verifies application code, called smart contracts. Smart contract is a self executing program that runs on the blockchain. Smart contracts allow participants to transact with each other without a trusted central authority. Transaction records are immutable, verifiable, and securely distributed across the network, giving participants full ownership and visibility into transaction data. Transactions are sent from and received by user-created Ethereum accounts. A sender must sign transactions and spend Ether, In order for it to get compiled and deployed on the blockchain, each node on the network then executes the contract in exchange for some ether. The Ethereum's native currency required to execute a contract is called gas amount and varies from contract to contract. A "smart contract" is simply a program that runs on the Ethereum blockchain. It's a collection of code (its functions) and data (its state) that resides at a specific address on the Ethereum blockchain. Smart contracts are a type of Ethereum account. This

means they have a balance and can be the target of transactions. However they're not controlled by a user, instead they are deployed to the network and run as programmed. User accounts can then interact with a smart contract by submitting transactions that execute a function defined on the smart contract. Smart contracts can define rules, like a regular contract, and automatically enforce them via the code. Smart contracts cannot be deleted by default, and interactions with them are irreversible. Anyone can write a smart contract and deploy it to the network. You just need to learn how to code in a smart contract language, and have enough ETH to deploy your contract. Deploying a smart contract is technically a transaction, so you need to pay Gas in the same way you need to pay gas for a simple ETH transfer. However, gas costs for contract deployment are far higher. Ethereum has developer-friendly language for writing smart contracts:

- Solidity

Solidity is a high-level programming language used to write smart contracts on the Ethereum blockchain. It is a high-level programming language used to write smart contracts on the Ethereum blockchain. It is a JavaScript-like contract language with syntax inspired by C++, Python, and JavaScript. Solidity allows developers to write complex smart contracts that can perform complex operation.
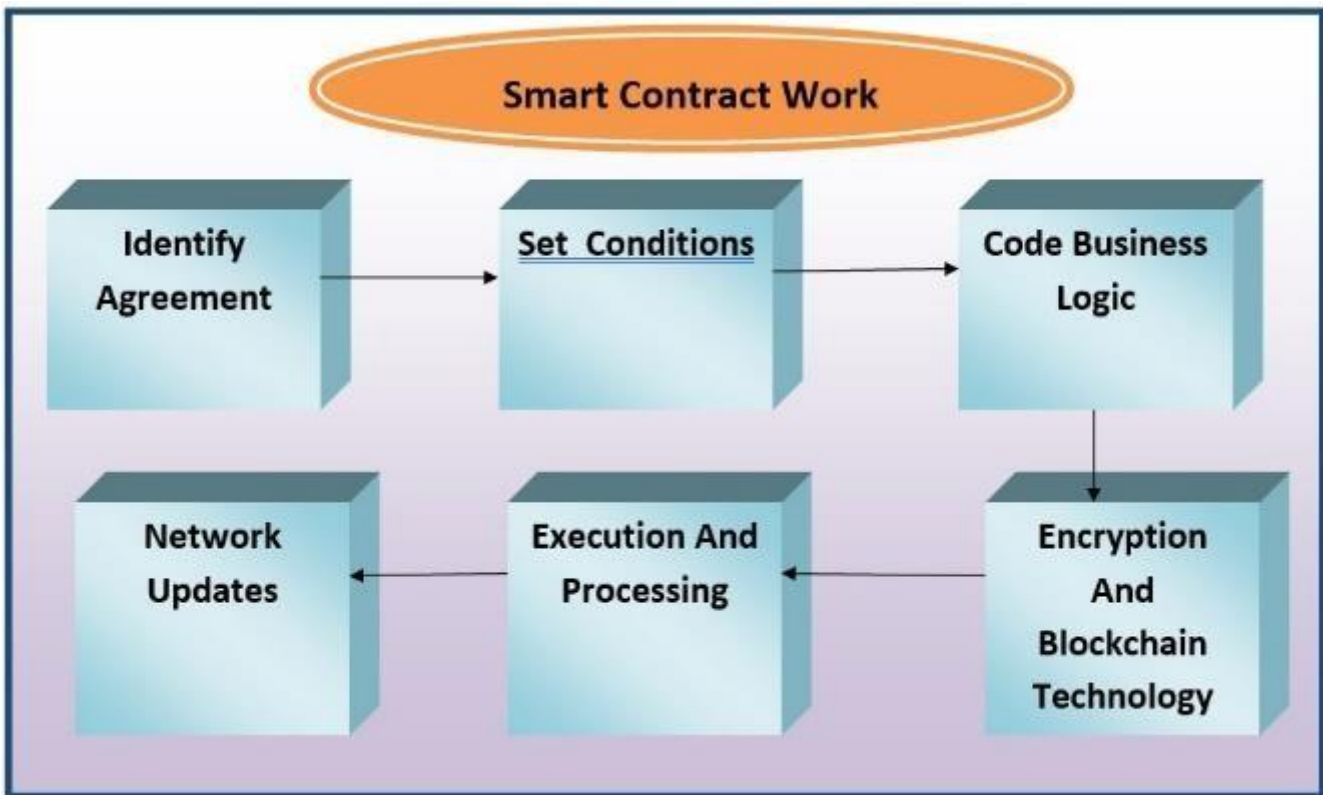
Fig.3 smart contract Work Some of the key features of Solidity include:

Contract Oriented Programming: Solidity is designed for writing smart contracts with complex logic and rules.

1] Security: Solidity provides built-in security controls that prevent common programming errors and vulnerabilities.

2] Modularity: Solidity allows developers to write reusable modules of code that can be used across multiple contracts.

3] Integration with other tools: Solidity can be used with other tools such as Remix, Truffle and Ganache to develop, test and deploy smart contracts.

Compatible with Ethereum: Solidity is designed to work specifically with the Ethereum blockchain, allowing interoperability with other Ethereum-based decentralized applications. Overall, Solidity is an important tool for building decentralized applications and smart contracts on the Ethereum blockchain. Its syntax and features allow developers to create complex and secure smart contracts that can automate complex business processes and transactions.

B. Consensus mechanisms In Ethereum

- ### Proof-of-work:

Ethereum network began by using a consensus mechanism Proof-of-work(PoW). Nakamoto consensus, which utilizes proof-of-work, is the mechanism that once allowed the decentralized Ethereum network to come to consensus (i.e. all nodes agree) on things like account balances and the order of transactions. This prevented users from "double spending" their coins and ensured that the Ethereum chain was tremendously difficult to attack or manipulate. These security properties now come from proof-of-stake instead using the consensus mechanism known as gasper. Proof-of-work is the underlying algorithm that sets the difficulty and rules for the work miners do on proof-of-work blockchains. Mining is the "work" itself. It's the act of adding valid blocks to the chain. This is important because the chain's length helps the network follow the correct fork of the blockchain. The more "work" done, the longer the chain, and the higher the block number, the more certain the network can be of the current state of things.

- ### Working of Proof of work:

The proof-of-work protocol, Ethash, required miners to go through an intense race of trial and error to find the nonce for a block. Only blocks with a valid nonce could be added to the chain. When racing to create a block, a miner repeatedly put a dataset, that could only be obtained by downloading and running the full chain (as a miner does), through a mathematical function. The dataset was used to generate a mixHash below a target that is dictated by the block difficulty. The best way to do this is through trial and error. The difficulty determined the target for the hash. The lower the target, the smaller the set of valid hashes. Once generated, this was incredibly easy for other miners and clients to verify. Even if one transaction were to change, the hash would be completely different, signaling fraud. Hashing makes fraud easy to spot. But proof-of-work as a process was also a big deterrent to attacking the chain.[6]

C. MetaMask

MetaMask is a popular software wallet that allows users to manage their Ethereum-based cryptocurrencies and interact with decentralized applications (dApps) on the Ethereum blockchain. MetaMask is a browser extension that can be installed on Chrome, Firefox, Opera and Brave browsers. It serves as a bridge between the user's web browser and the Ethereum network. With MetaMask, users can securely store their private keys, manage their digital assets, and sign transactions right from their browser. MetaMask also provides developers with an easy-to- use API that allows them to integrate their dApps with the wallet. This makes it easy for users to interact with decentralized applications without having to create a new account or manage a separate set of credentials for each dApp. Overall, MetaMask is a powerful tool that simplifies the user experience of interacting with the Ethereum blockchain and enables the creation of decentralized applications that are accessible to a wider audience.[7]

D. Hardhat

Hardhat is a development environment for Ethereum software. Before installing hardhat In our system must install node.js. Hardhat consists of different components for editing, compiling, debugging and deploying your smart contracts and dApps, all of which work together to create a complete development environment. Hardhat Runner is the main component you interact with when using Hardhat. It's a flexible and extensible task runner that helps you manage and automate the recurring tasks inherent to developing smart contracts and dApps. Hardhat Runner is designed around the concepts of tasks and plugins. Every time you're running Hardhat from the command-line, you're running a task. For example, npx hardhat compile runs the built-in compile task. Tasks can call other tasks, allowing complex workflows to be defined. Users and plugins can override existing tasks, making those workflows customizable and extendable.[8]

- Command to install hardhat

```
npm 7+    npm 6    yarn

npm install --save-dev hardhat
```

- Command to create sample project "npx hardhat".

```
$ npx hardhat
888       888                      888 888                 888
888       888                      888 888                 888
888       888                      888 888                 888
888888888 8888b.  888d888 .d8888b 888888b.    8888b.  888888
888   888    "88b 888P"  d88" 888 888 "88b   "88b 888
888   888 .d888888 888    888  888 888 888 .d888888 888
888   888 888  888 888    Y88b 888 888 888 888  888 Y88b.
888   888 "Y888888 888     "Y88888 888  888 "Y888888  "Y888

👤 Welcome to Hardhat v2.9.9 👤

? What do you want to do? _
> Create a JavaScript project
  Create a TypeScript project
  Create an empty hardhat.config.js
  Quit
```

- Command to compile smart contract

```
npx hardhat compile
```

To deploy the smart contract make sure you started blockchain after that you should use deploy script command to deploy the smart contract on block chain.

E. Web-3

Web3 is the vision of a new, better internet. At its core, Web3 uses blockchains, cryptocurrencies, and NFTs to give power back to the users in the form of ownership.

- **Web3 is decentralized:** instead of large swathes of the internet controlled and owned by centralized entities, ownership gets distributed amongst its builders and users.
- **Web3 is permission less:** everyone has equal access to participate in Web3, and no one gets excluded.

- **Web3 has native payments:** it uses cryptocurrency for spending and sending money online instead of relying on the outdated infrastructure of banks and payment processors.
- **Web3 is trustless:** it operates using incentives and economic mechanisms instead of relying on trusted third-parties.[9]
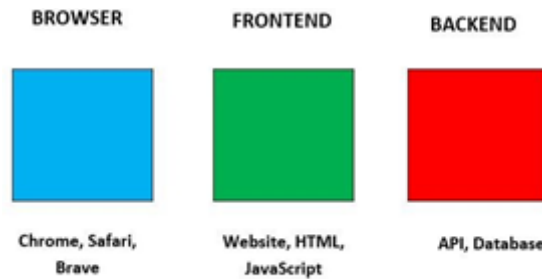
Fig.3 Web 2 model with backend API, Database
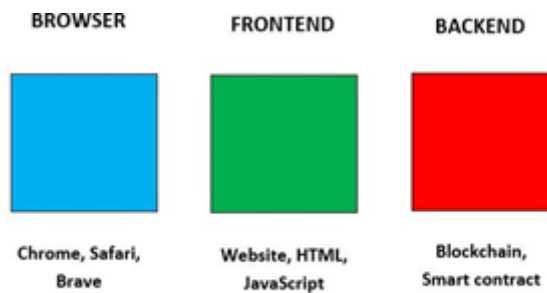
Fig.4 Web 3 Model with backend Blockchain, Smart Contract.

F. Ether.js and React.js

Ether.js and React.js are most popular javascript- based tooling kits that allow us to interact with different blockchains and it has all the wrappers that help to make the APIs call and do all sorts of things with Ethereum and polygon and avalanche and any EVM-compatible chain. Ether.js is a javascript library that enables you to work with Ethereum-based virtual machines. React.js is frontend development library which allow us to build reusable components. Ether.js consists of some important modules that can be used to interact with blockchain nodes easily, and get the transaction data as required. take an overview of all the Ether.js modules.

- **Ethers.Provider:** In this module it lets you initialize a connection with the Ethereum blockchain, and it provides you the features to issue queries and send signed transactions. Managing the state of the blockchain is also possible through this module.
- **Ethers.Contract:** In this module, you can deploy and interact with smart contracts, during the deployment part of smart contracts and to make it successful is the part of Ethers.Contract module. It also offers some unique packs of functions that let the developer "listen" to smart contract events and after listening to the contracts you can also get information about them.
- **Ethers.Utils:** This module lets you process the user data inputs and format them according to your requirements. Ether. utils make it easy to build decentralized applications.

- **Ethers.Wallet:** As the name suggests it provides a way to connect to any co-existing Ethereum address to a proper wallet. It also has important features like it lets you create new wallets and also make sign transactions.

IV. APPLICATIONS

Blockchain has wide range of applications in different sectors like Education, FinTech Economy, Agriculture, Health and Insurance, Real Estate all this sector and to Identify Crisis. Some of the application as the follows:

1. Blockchain In Education Sector.
2. Blockchain In Healthcare
3. Transfer Contracts and Wills
4. Management of the Supply Chain
5. Protection of Copyright and royalties
6. Voting.
7. Cryptocurrency
8. Internet of Things
9. Asset Administration
10. Blockchain application for anti-money laundering
11. Blockchain for Advertising

Application of **Blockchain In Education Sector** is the topic for study we consider in this paper. Blockchain can be used in Education sector as to solve following issues:

- STREAMLINING FEE PAYMENTS

Student tuition payments are a time consuming and cumbersome process. It involves several parties, including students, parents, banks, foundations or government agencies for scholarships, lenders, and various university departments. However, this procedure can be streamlined with blockchain, resulting in lower administrative expenditures.

- STUDENT INFORMATION SYSTEM:

Decentralized and well maintained data transaction with new aspect of blockchain reduces the centralized administration and untransparent system to decentralized and transparent system. Blockchain involves series of task and transaction performed in decentralized from with high security, trust and reliability of transaction that creates meaningful information. Student Information System creates information at different points. Information get stored on blockchain student can access their data in personal. Total system become transparent because no one can change the information easily as like in centralized system. Student can easily update their information and administration can easily generate reports form system.

V. CONCLUSION AND FUTURE SCOPE

In this way we studied about what is blockchain, Ethereum blockchain and its important component to build a decentralized application. There are also another some important component which we should study in depth about each topic we discuss above to gain practical knowledge about how to build an decentralized application. In the Future we can build Decentralized Student Information System as application of blockchain Technology. Which will solve the problem of students and institution by giving the functionality to store the data of student in decentralized manner. By this application student can put their information related personal and academic data on this system. The changes made by student will register as transaction on blockchain which will make system more transparent and immutable. Information related fees and payment we can make the functionality that if student paid any fees that will get recorded at that time and this record will be proof of fees paid so that any issue related to fees will be reduced. This system will not required any central authority to manage system because data will stored on blockchain in decentralized and distributed manner.

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College Complaint Management System

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ABSTRACT

A college complaint management system is a web application designed to handle and resolve students and staffs complaints efficiently. In the context of an educational institution, the complaint management system can be used to handle complaints from both students and staff. The system can be accessed through various communication channels, including SMS, calling, and email. When a complaint is submitted, it is categorized based on its nature and severity. The categories can vary depending on the institution, but some common categories include academic issues, administrative issues, and technical issues. The objective of the complaints management system is to make complaints easier to coordinate, monitor, track and resolve, and to provide company with an effective tool to identify and target problem areas, monitor complaints handling performance and make improvements in college. The system also enables communication between the complainant and the staff member handling the complaint, allowing for updates on the progress of the complaint resolution. Complaints management web application is used to record resolve and respond to customer complaints, requests as well as facilitate any other feedback.

Keywords: Student, Staff, Online, Complaint, Management, Respond, Tracking, Communication, Procedure, Policy, Improvement, Resolution, Feedback.

I. INTRODUCTION

A college complaint management system is a critical tool for managing complaints from students and staff in a college or university setting. The system provides a platform for submitting and resolving complaints, which can help ensure that complaints are handled fairly, efficiently, and effectively.

A. Background of the Study:
In many colleges and universities, complaints are often handled manually, which can be time-consuming and lead to delays in resolving issues. With the increasing number of complaints from students and staff, a more efficient and effective system is needed to manage these complaints.

B. Statement of the Problem:
The main problem is that the current complaint management process in many colleges and universities is often inefficient and ineffective. This can lead to delays in resolving complaints and result in dissatisfaction among stakeholders.

C.   Significance of the Study:

The significance of this study is that it will provide a better understanding of the current complaint management process in colleges and universities, identify areas for improvement, and propose a more efficient and effective complaint management system. This can help improve the overall student and staff experience and ensure that complaints are handled fairly and effectively.

D.   Objectives of the Study:

The objectives of this study are to:

1. Identify the current complaint management process in colleges and universities.

2. Analyze the strengths and weaknesses of the current complaint management process.

3. Propose a more efficient and effective complaint management system for colleges and universities.

4. Evaluate the proposed system's effectiveness in managing complaints.

E. Scope and Limitation:

This study will focus on the complaint management process in colleges and universities. The proposed complaint management system will be designed for use in this setting. The study will also be limited to a review of existing literature, interviews with stakeholders, and a prototype of the proposed system. The study will not include the implementation of the proposed system or a comprehensive evaluation of its effectiveness in managing complaints.

II.   REVIEW OF RELATED LITERATURE:

A.   College Complaint Management Systems:

College complaint management systems are designed to manage complaints from studentsand staff in a college or university setting. These systems typically include a user-friendly interface for submitting complaints, automated notifications to relevant parties. College complaint management systems are essential for maintaining a positive learning and working environment and ensuring that complaints are handled fairly, efficiently, and effectively.

B.   Importance of Complaint Management:

Effective complaint management is critical for maintaining a positive learning and working environment in colleges and universities. A good complaint management system can help identify and address issues early, prevent them from escalating, and ensure that complaints are handled fairly and efficiently. Complaint management can also help improve communication and trust between stakeholders and improve the overall student and staff experience.

C.   Challenges of Complaint Management:

Managing complaints in colleges and universities can be challenging due to various factors, including a large number of stakeholders, diverse cultures and backgrounds, and complex organizational structures. In addition, some complaints may involve sensitive issues, such as discrimination or harassment, which require special handling. Therefore, a complaint management system must be designed to handle these challenges effectively.

D.   Studies on Complaint Management System:

Several studies have been conducted on complaint management systems in colleges and universities. These studies have highlighted the importance of complaint management systems in maintaining a positive learning and working environment, improving communication between stakeholders, and preventing conflicts from

escalating. Some studies have also identified challenges in complaint management, such as cultural differences and inadequate resources, and proposed solutions to address these challenges. Furthermore, some studies have evaluated the effectiveness of complaint management systems and identified areas for improvement, such as increasing transparency and accountability.

Overall, the literature highlights the importance of complaint management systems in colleges and universities and the challenges associated with managing complaints effectively. The studies provide valuable insights into the design, implementation, and evaluation of complaint management systems, which can inform the development of more effective systems in the future.

III. METHODOLOGY

A. Research Design:

The research design for this study is a descriptive research design. This design will allow for the description of the current complaint management process in colleges and universities, as well as the proposal of a more efficient and effective complaint management system. A descriptive research design is appropriate for this study as it allows for the gathering of qualitative and quantitative data through interviews, surveys, and a review of existing literature.

B. Data Gathering Techniques:

The data gathering techniques for this study will include:

1. Interviews: Interviews will be conducted with stakeholders, including students, faculty, staff, and administrators, to gather data on the current complaint management process, identify strengths and weaknesses, and gather feedback on the proposed system.

2. Surveys: Surveys will be distributed to a sample of students, faculty, and staff to gather quantitative data on their experiences with the current complaint management process and their opinions on the proposed system.

3. Review of Existing Literature: A review of existing literature on complaint management in colleges and universities will be conducted to gather data on best practices, challenges, and potential solutions.

C. Data Analysis Techniques:

The data analysis techniques for this study will include:

1. Qualitative Data Analysis: Qualitative data collected from interviews and open-ended survey questions will be analysed using thematic analysis. Thematic analysis involves identifying patterns and themes in the data and categorizing them into key themes.

2. Quantitative Data Analysis: Quantitative data collected from surveys will be analyzed using statistical analysis, such as descriptive statistics and inferential statistics. Descriptive statistics will be used to summarize the data, while inferential statistics will be used to test hypotheses and determine the significance of the findings.

3. Integration of Data: The qualitative and quantitative data will be integrated to provide a comprehensive analysis of the current complaint management process, the proposed system, and the effectiveness of the proposed system. The integrated data will also be used to identify areas for improvement and make recommendations for future research.

IV. RESULTS AND DISCUSSIONS

A. Overview of the College Complaint Management System:

The current complaint management system in colleges and universities was found to be a paper-based system that is time-consuming and inefficient. Complaints are often not addressed in a timely manner, and there is a lack of transparency in the process. In addition, there is a lack of communication between stakeholders, which often leads to misunderstandings and conflicts.

B. Efficiency of the System in Addressing Complaints:

The proposed complaint management system, which is an online system, was found to be more efficient than the current system in addressing complaints. The online system allows for faster processing of complaints and greater transparency in the process. The system also allows for better communication between stakeholders, which can prevent misunderstandings and conflicts. The proposed system was found to be effective in addressing various types of complaints, including academic, administrative, and personal complaints.

C. User Satisfaction with the System:

Users, including studentsand staff, were found to be highly satisfied with the proposed complaint management system. They appreciated the convenience and efficiency of the online system and the greater transparency and communication it provided. Users also felt that the proposed system was fair and impartial in addressing complaints and that it addressed their concerns in a timely and effective manner.

D. Recommendations for Improvement:

To further improve the proposed complaint management system, it is recommended that:

1. The system should be regularly updated and maintained to ensure its efficiency and effectiveness.
2. Training and support should be provided to stakeholders to ensure that they are familiar with the system and know how to use it effectively.
3. The system should be regularly evaluated to identify areas for improvement and to ensure that it is meeting the needs of stakeholders.
4. The system should be integrated with other relevant systems, such as student information systems and HR systems, to ensure that complaints are addressed in a holistic and coordinated manner.
5. The system should be designed to be accessible and inclusive, taking into account the diverse needs of stakeholders, including those with disabilities and those who speak languages other than English.

Overall, the proposed complaint management system was found to be a significant improvement over the current system, providing greater efficiency, transparency, and user satisfaction. The recommendations for improvement can further enhance the system's effectiveness and ensure that it continues to meet the needs of stakeholders in the future.

V. CONCLUSION

This study aimed to explore the current complaint management process in colleges and universities and propose a more efficient and effective complaint management system. The study found that the current paper-based system is time-consuming and inefficient, with a lack of transparency and communication between stakeholders. In contrast, the proposed online system was found to be more efficient and effective in addressing complaints, with greater transparency and communication.The study concludes that an online complaint

management system is more efficient and effective than the current paper-based system. The proposed system provides greater transparency and communication and is fair and impartial in addressing complaints. The study also concludes that regular evaluation and maintenance, training and support, and integration with other relevant systems are essential for the system's success.

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Connected Smart Home Over Matter Protocol

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ABSTRACT

Project Connected Home over IP, known as Matter, a unifying standard for the smart home, will begin formal device certification in late 2022. The standard will prioritize connectivity using short-range wireless communication protocols such as Wi-Fi, Thread, and Ethernet. The standard will also include emerging technologies such as Block chain for device certification and security. In this paper, we rely on the Matter protocol to solve the long-standing heterogeneity problem in smart homes. This work presents a hardware Testbed built using development kits, as there is currently very few devices supporting Matter protocol. In addition, it presents a network architecture that automates smart homes to cloud services. The work is a simple and cheap way of developing testbed for automating smart home that uses matter protocol. The architecture lays the foundation for exploring security and privacy issues, data collection analysis, and data provenance in a smart home ecosystem built in matter protocol.

Keyword: Data privacy, Protocols Smart Home, Security, Blockchain, Computer architecture, Network architecture.

I. INTRODUCTION

Most the daily life applications that we normally see are already smart but they are unable to communicate with each other and enabling them to communicate with each other and share useful information with each other will create a wide range of innovative applications These emerging applications with some autonomous capabilities would certainly improve the quality of our lives, by using the concept of information exchanges is possible due to IOTIn this chapter we explain the integration of classic smart home, IOT and cloud computing. Starting by analyzing the basics of smart home, IOT, cloud computing and event processing systems. We discuss their complementarity and synergy, detailing what is currently driving to their integration. We also discuss what is already available in terms of platforms, and projects implementing the smart home, cloud and IOT paradigm. From the connectivity perspective, the added IOT appliances and the cloud, are connected to the internet and in this context also to the home local area network. These connections complement the overall setup to a complete unified and interconnected composition with extended processing power, powerful 3rd party tools, comprehensive applications and an extensive storage space and applications.

In the rest of this chapter we elaborate on each of the four components. In Section 1, we describe the classic smart home, in Section 2, we introduce the internet of things [IOT], in Section 3, we outline cloud computing and in Section 4, we present the event processing module. In Section 5, we describe the composition of an advanced smart home, incorporating these four components. In Section 6, we provide some practical

information and relevant selection considerations, for building a practical advanced smart home implementation. In Section 7, we describe our experiment introducing three examples presenting the essence of our integrated proposal. Finally, we identify open issues and future directions in the future of advanced smart home components.

II. LITERATURE REVIEW

1. **Bluetooth based home automation system using cell phones:** In Bluetooth based home automation system the home appliances are connected to the Arduino BT board at input output ports using relay. The program of Arduino BT board is based on high level interactive C language of microcontrollers; the connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between Arduino BT board and phone for wireless communication. In this system the python script is used and it can install on any of the Symbian OS environment, it is portable. One circuit is designed and implemented for receiving the feedback from the phone, which indicate the status of the device.

2. **Zig bee based home automation system using cell phones:** To monitor and control the home appliances the system is designed and implemented using Zig bee. The device performance is record and store by network coordinators. For this the Wi-Fi network is used, which uses the four switch port standard wireless ADSL modern router. The network SSID and security Wi-Fi parameter are preconfigured. The message for security purpose first process by the virtual home algorithm and when it is declared safe it is re-encrypted and forward to the real network device of the home. Over Zig bee network, Zig bee controller sent messages to the end. The safety and security of all messages that are received by the virtual home algorithm. To reduce the expense of the system and the intrusiveness of respective installation of the system Zig bee communication is helpful.

3. **GSM based home automation system using cell phones:** Because of the mobile phone and GSM technology, the GSM based home automation is lure to research. The SMS based home automation, GPRS based home automation and dual tone multi frequency (DTMF) based home automation, these options we considered mainly for communication in GSM. In figure shows the logical diagram the work of A. Alheraish, it shows how the home sensors and devices interact with the home network and communicates through GSM and SIM (subscriber identity module). The system use transducer which convert machine function into electrical signals which goes into microcontroller. The sensors of system convert the physical qualities like sound, temperature and humidity into some other quantity like voltage. The microcontroller analysis all signal and convert them into command to understand by GSM module. Select appropriate communication method among SMS, GPRS and DTFC based on the command which received GSM module.
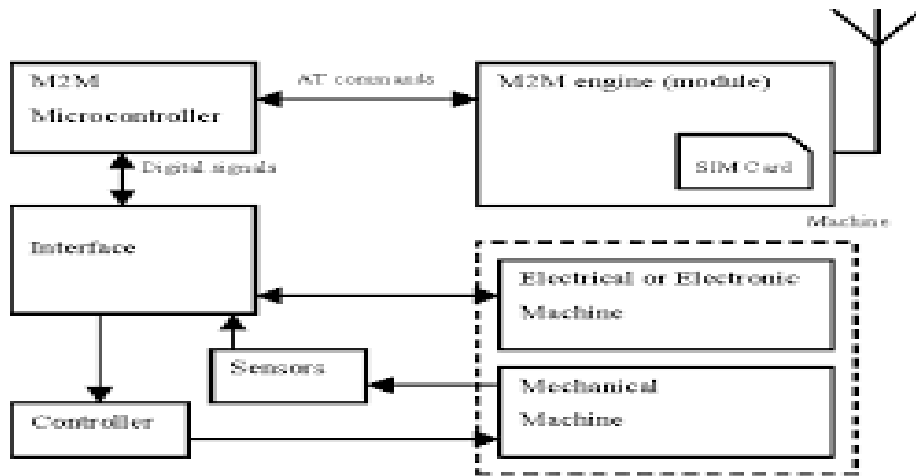
Figure. Mobile-based home automation from the work of A. Alheraish

4. **Wi-Fi based home automation system using cell phones:** Wi-Fi based home automation system mainly consist three modules, the server, the hardware interface module, and the software package. The figure shows the system model layout. Wi-Fi technology is used by server, and hardware Interface module to communicate with each other. The same technology uses to login to the server web based application. The server is connected to the internet, so remote users can access server web based application through the internet using compatible web browser. Software of the latest home automation system is split to server application software, and Microcontroller (Arduino) firmware. The Arduino software, built using C language, using IDE comes with the microcontroller itself. Arduino software is culpable for gathering events from connected sensors, then applies action to actuators and preprogramed in the server. Another job is to report theutand record the history in the server DB. The server application software package for the proposed home automation system, is a web based application built using asp.net. The server application software can be accessed from internal network or from internet if the server has real IP on the internet using any internet navigator supports asp.net technology. Server application software is culpable of, maintain the whole home automation system, setup, configuration. Server use database to keep log of home automation system components, we choose to use XML files to save system log.

Figure: The proposed home automation system layout.

5. **Home automation using RF module:** The important goal of Home Automation System is to build a home automation system using a RF controlled remote. Now technology is accelerating so homes are also getting smarter. Modern homes are deliberately relocating from current l switches to centralized control system, containing RF controlled switches. Today traditional wall switches situated in various parts of the home makes it laborious t for the end user to go near them to control and operate. Even further it turns

into more problematic for the old persons or physically handicapped people to do so. Home Automation using remote implements an easier solution with RF technology. In order to accomplish this, a RF remote is combined to the microcontroller on transmitter side that sends ON/OFF signals to the receiver where devices are connected. By operating the stated remote switch on the transmitter, the loads can be turned ON/OFF globally using wireless technology. 6. Home automation using Android ADK: The devices of home are associate to the ADK and the Connection is established between the Android device and ADK. The devices of house are link to the input/output.

III. ADVANTAGES

- Matter offers unified standard which allows different types of devices from various manufacturers to work together seamlessly within same smart home eco-system. This interoperability makes it easy for the users to add, control and manage devices from different manufacturers.
- Matter offers standardized and well defined communication framework for developers and manufacturers. Moreover, proprietary protocol development is not required. Hence it reduces development costs, reduces time to market and streamlines device development. Matter protocol uses end to end encryption and secure authentication to ensure secure communication between devices. This protects sensitive data and prevents unauthorized access.
- It works in co-existence with other smart home protocols such as Zigbee, Z-wave etc. without requiring complete overhaul of existing systems. This allows smooth transition to Matter based networks while protecting existing investments
- Matter offers cloud connectivity which allows cloud based device management, remote device access and integration with other cloud services.

IV. APPLICATION

- Lighting. Today, home lighting can automatically adjust to personal needs.
- Bathrooms. IoT technologies in the bathroom can make your home routine more   entertaining and convenient.
- Gardens.
- Kitchen.
- Security Systems.
- Safety Sensors.
- Temperature Control.
- Doors.

V. CONCLUSION

This paper proposes a low cost, secure, ubiquitously accessible, auto-configurable, remotely controlled solution. The approach discussed in the paper is novel and has achieved the target to control home appliances remotely using the WiFi technology to connects system parts, satisfying user needs and requirements.

WiFi technology capable solution has proved to be controlled remotely, provide home security and is cost-effective as compared to the previously existing systems.

Hence we can conclude that the required goals and objectives of home automation system have been achieved. The system design and architecture were discussed, and prototype presents the basic level of home appliance control and remote monitoring has been implemented.

Finally, the proposed system is better from the scalability and flexibility point of view than the commercially available home automation systems.

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DevOps Based Home Renting Web Application

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ABSTRACT

Science and Technology has changed this world into a small, secure and easy to manage every activity of the individual and organization. Everything is more secure, easy to use and easily accessible in this modern world. Thus, the use of house rental system is needed to manage, search and book the housing system easily. In order to give easy access to find the houses as per the users need, the web application has been developed in this documentation. And it includes all the detail information about the project respectively. Built on the powerful combination of HTML, CSS, JS, AWS, Docker, and DockerHub, our platform streamlines the renting process from start to finish. Say goodbye to paper forms and endless phone calls, and hello to an efficient, secure, and user-friendly renting experience

Keywords: House Renting Website, Web Application, Security, Shifting, Movers, Rent

I. INTRODUCTION

We are living in the modern age of technology when we really want is just stuff that works for us. Technology becoming more powerful and already involved in every sector, still, the housing sector remains watchful to face the challenges of change by employing a new strategy that facilitates easy management of rental houses, paying guests, hostels, and flats. This proposed project "The Rental Zone" deals with online house/PG/hostel/flat rent for all the tenants. Nowadays this is so tough for tenants to find suitable accommodation for living if they search it physically. In our modern society, the house rental management has become a very useful factor. This "The Rental Zone" can provide the facilities from any place to find a suitable living area according to their choice. The main foundation of the system is based on the owners and the renters and main purpose was to make an easy way to find the desired house with the desired location for the tenants. Everyone can search for their desired option from anywhere through location, type, and city. Users can log in as an owner or a tenant. He/she can contact the administrator or the buyer to rent his house to him. House owners and landlords will have to be registered users then they can easily post a property with photos, price range, other details, and a short description but it will be added and shown on the website after verifying by admin only or it may be rejected. And this will be informed to the owner or businessman through email whether his post is approved or rejected. Unregistered or general access users of this website can view the rent details and can contact a landlord. In this case, it will save valuable time as well as reduce distress and save unwanted money waste. This system is best applicable for the above reasons making house renting an easy process. Students or employees after coming to a new city who are facing issues like 'Where to stay in a big city?', this website will help them

to easily find boys or girls PG at an affordable price and get the owner's contact number. They don't have to deal with flat brokers to finally reach an agreement that suits the interests of all parties. As a result, our motive was to simplify these people's lives easier and hassle-free by simply clicking sitting their place, especially those single people or bachelors who face many problems while getting rent as most of the owner doesn't want to rent them. Users can also take packing and shifting service which facility will help to reach their furniture and valuable things safely in destinations.

II. LITERATURE REVIEWS

I have reviewed so many research papers and visited various websites regarding the house rental management system. There are several existing systems for house renting web applications and I tend to induce knowledge regarding existing systems and learn their weakness hence developing a new system to cater to the challenges the local and world domains face when dealing with house rental issues. The existing house rental website has a few drawbacks are there which make it less interactive. I have corrected and improved them and added some extra features and facilities which make it easy and more interactive. Some of the reviewed research papers are listed here: Gommans, Henry Peter, et al. (2014) researched how rental houses are currently being managed and realized during this modern age of technology all work was done manually with plenty of paperwork involved which may be a long-time process, risky, expensive, and really difficult task. Taking into consideration those facts, they decided and developed a property rental management system that may solve all the problems experienced with this present manual system. Although their system was developed in such a way that it provides a maximum user-friendly interface, but the system isn't scalable.

III. METHODOLOGY

DevOps is a software development methodology that emphasizes communication, collaboration, and integration between software development and IT operations teams. It combines development (Dev) and operations (Ops) to unite people, process, and technology in application planning, development, delivery, and operations. DevOps enables coordination and collaboration between formerly siloed roles like development, IT operations, quality engineering, and security. The goal of DevOps is to improve work throughout the software development lifecycle by promoting better communication and collaboration between teams in an organization. DevOps practices enable software development and operations teams to accelerate delivery through automation, collaboration, fast feedback, and continuous improvement. DevOps is a methodology meant to improve work throughout the software development lifecycle, and it can coexist with Agile software development, IT service management frameworks, project management directives, and other strategies. The DevOps process can be visualized as an infinite loop, comprising these steps: plan, code, build, test, release, deploy, operate, and monitor

IV. SYSTEM DESIGN

System Design is the process of designing the architecture, components, interfaces, and data for a system to meet the end-user requirements. The main user of this system is general people, that's why I design more

dynamic and user-friendly website that will be more useful for them. This system style is the answer to the creation of a brand-new system which could be seen as the application of systems theory to product development. This section consists of many systems and focuses on the careful implementation of the possible system. For styling this system I have use two phases of development logical and physical style. Throughout the logical style, section I analyzed and describes inputs (sources), outputs (destinations), databases (data sores), and procedures (data flows) tired a format that meets the user's needs. I conjointly specify the user desires and at a level that nearly determines the information the knowledge the information flow into and out of the system and therefore the data resources. Here the logical style is completed through information flow diagrams and info style. In physical style I produces the operating system by shaping the planning specifications, that tell the programmers specifically what the candidate system should do. The programmers write the desired programs that accept input from the user, perform the required process on accepted information through the choice and manufacture the specified report on a tricky copy or show it on the screen.

Flowchart:

V. TECHNOLOGIES USED

There is a total of three major parts of the project plan, which are frontend and backend parts and DevOps. In this scientific research project HTML, CSS are used for the frontend design of the system. PHP and MySQL are used for creating and designing the database and Backend part.and then using AWS lauch EC2 and by using docker create a dockerfile and access it from anywhere.

HTML: HTML stands for Hypertext Markup Language which allows the user to make and structure sections, paragraphs, headings, titles, line breaks, add media, links, blockquotes, etc. for websites and applications.

CSS: Stands for Cascading Style Sheets which is a simple design language intended to simplify the method of constructing this website presentable. It's designed to enable the separation of presentation and content, including layout, colours, spacing, padding, fonts, and so on.

Database: A database is a collection of inter-link data stored with minimum redundancy to serve many users fast and efficiently and it's an organized collection of structured data, or information, typically stored electronically in a computer system so that data can be easily accessed, managed, modified, updated, controlled, and arranged. The general objective is to make details access easy, fast, and flexible for the user.

DevOps: DevOps is the combination of cultural philosophies, practices, and tools that increases an organization's ability to deliver applications and services at high velocity: evolving and improving products at a faster pace than organizations using traditional software development and infrastructure management processes.

AWS: AWS stands for Amazon Web Services, which is a cloud computing platform provided by Amazon1. It offers over 200 fully featured services from data centers globally. AWS provides on-demand operations like compute power, database storage, content delivery and It is widely adopted by millions of customers, including startups, enterprises, and government agencies, to lower costs, become more agile, and innovate faster. AWS offers a wide range of different business purpose global cloud-based products, including storage, databases, analytics, networking, mobile, development tools, and enterprise applications, with a pay-as-you-go pricing model

Docker: Docker is an open-source software platform that enables the creation, deployment, and management of virtualized application containers on a common operating system (OS). Docker container technology was introduced in 2013, and it has become a de facto standard platform to quickly compose, create, deploy, scale, and run container-based applications. A Docker container image is a lightweight, standalone, executable package of software that includes everything needed to run an application, such as code, runtime, system tools, libraries, and settings. The Docker Engine is the underlying technology that handles the tasks and workflows involved in building container-based applications. Docker Hub is a software-as-a-service tool that enables users to publish and share container-based applications through a common library. Containers provide a means of enclosing an application, including its filesystem, into a self-contained unit that can run anywhere

VI. IMPLEMENTATION

For renting a house, implementation, and testing of the proposed system, a web application interface has been developed using HTML, CSS, JavaScript, PHP, and that allows us to make web pages interactive and responsive. Whenever someone wants to rent a house, he needs to search it manually by visiting door to door which kills his time and money also. What to do if someone wants to do this easily and hassle-free by simply clicking sitting their place? This "The Rental Zone" website will increase customer retention and simplify house and staff management. This is an online tool through which tenants can book available houses/PG/hostel/flats online prior to their date of using the property instead of walking around and asking for a vacant house. Visions and plans become reality in the project implementation phase. To carry out activities planned within the form with the aim of achieving project goals and delivering results and outputs is to execute a project. Its success is contingent on a variety of internal and external factors. A very well-coordinated project team and accurate monitoring of project progress and associated costs are two of the most important ones. The lead partner and project manager are responsible for the overall management, and the lead partner often uses or engages a United Nations organization. Since the project is ongoing, the project management team must have an economical management strategy and be adaptable to changing needs and circumstances. results and outputs. Quality suggests meeting expectations delineate within the application and people united inside the partnership. Software Components will be made up of different processing phases. In the database, the information is organized logically so that it can be retrieved easily, and it would be used to save data from the hardware layer. The server can use a job to clean and process the unprocessed data before analyzing it. The

processed data will be saved in a separate database and used for user registration and login and house renting. The processed data will then be submitted to the DB for analysis, and it will reflect in the front-end. For data monitoring, enhancing, implementing, and validating the controller will be responsible and he will pass the model to the database after validation. The data that has been processed and analyzed can now be visualized. The server will show the processed data via a GET Request. The server will encrypt the information sent over this channel. End devices will receive encrypted data

and will be required to decrypt it to ensure data security. Data that has been decrypted and received on end devices can then be visualized. Frontend design must be simple and easy so that every user can access it hassle-free or without any trouble. In this modern age of technology, we are having many devices like smartphones, laptops, notebooks, and tablets from where everyone is using the internet that's why we intended to make our house rental website responsive so that the user has not faced any difficulties browsing from anywhere anytime. I took help from HTML, CSS, JavaScript,PHP, and technologies to make this website's frontend part means user interface. .then we need to create a AWS ec2 instance and install docker on this and create a image for our application by writing the Dockerfile and expose it . and access form anywhere ..To implement the front-end design some factors were followed such as users must enter the password for safety so that they can update their profile. Every landlord must be a registered user to add their post and user can log in using their registered account

VII.   RESULT

In the present paper for house rent, implementation, and testing of the proposed system, a prototype website interface has been developed and designed using various coding languages. After performing the testing phase, I found lots of bugs or errors in the web application and fixed all the bugs. I have applied many different technical aspects and dedicated 100% to every step from gathering information to getting desired output. The application performs well, and the errors in posting the reports and notes have been corrected. This website simplifies work for the tenants and rental managers so that all their work can be efficient and effective. Now I have made responsive web applications, later I will make a mobile application also. This will make my system more user-friendly and will help users to use the website more efficiently. I intend to implement artificial intelligence, add more features, and keep upgrading gradually and progressively. We are currently focusing on making the website more secure and implementing a more attractive and interactive UI, since we don't have many users, we are working on search engine optimization.

VIII.   CONCLUSION

The main purpose of this house rental website is to make an easy way to find a house/PG/hotel/flat for tenants as they suffer most while getting rent. I gave effort into this website to establish a platform where owners and tenants can easily interact and believe that this rental zone website is a blessing for them and makes their life easier. This online house rental zone is very easy to use, and the best suitable for the owners as well as tenants. Because it saves tenants valuable time as well as reduce distress and save unwanted money waste. For the owner, there is no need to explain the room details on the speaker and for the renter, there is no need to go door to door. The online house rental website or system is the best way to search for a house, apartment, office, PG, or hostel, and that online system makes renting process easy and effective. General people are the main user of this website, that's why I try to make a more dynamic and user-friendly website that will be more useful for them. Through this website, tenants can book available houses/PG/hostel/flats online prior to their date of using the property instead of walking around and asking for a vacant house. Finally, the goal of the project is to make an online rental system for all tenants and landlords to create a better relationship and easy interaction between them which can be achieved through this project

IX. FUTURE SCOPE OF THE STUDY

Nowadays house renting has become a very useful factor but finding the desired house in a suitable living area is not an easy task. Current manual system is money wasting and time killing process also. Householders and tenants must face many difficulties and go through lots of processes to make an affordable agreement. The

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rental zone will help users to find and rent houses easily. Our motive is to simplify these people's lives easier and hassle-free by simply clicking sitting their place. Through this website, a renter can easily find a rentable house, PG, hostel, or flat. Having the search functionality based on location will be able to help users find houses easily where they want to live. This system will save tenants valuable time as well as reduce distress and save unwanted money waste. This online house rental zone is very easy to use, and it will increase customer retention

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Diet Monitoring System Using Artificial Intelligence

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ABSTRACT

As the world becomes healthier and more inform, technology related solutions such as artificial intelligence (AI) are increasing to provide various solutions to health problems. The system stores and processes this information and then calculates nutrial BMI values to meet the customer's needs. The system again uses the RETE algorithm to make the system intelligent, which we call artificial intelligence-based maintenance. The RETE algorithm can be defined as a standard matching algorithm for implementation rule-based method. It is used to determine which rules should be followed according to the data collection that is correct

Keywords - RETE Algorithm, BMI calculator, Artificial Intelligence, Nutrient

I. INTRODUCTION

Today, people experience many health problems every day and cannot manage their health due to their hard work. Therefore, they need a healthy diet after consulting a nutritionist. That's why we're creating a website to help   take care of their health and well-being without spending too much time consulting a nutritionist. We create websites to help provide them with accurate nutritional information. The system was trained on a large database of various foods and their nutritional values. When system has a user's physical measurements, it should know the user's diet. The user should inform about the breakfast, dinner, and lunch times. It recommends the user to prepare food according to the   body weight index. Thus, the need to go to a nutritionist can be eliminated [1].

II. EXSITING SYSTEM

The previous nutrition system was mainly developed using cold processing and data mining, the use of database type, data processing, data access permanent, and attention to the health of is not affected. Existing system takes in account the users height weight and gives a diet chart without conducting their daily routine such as breakfast, lunch, snacks, dinner and health conditions types of food they can eat into account which is a very serious problem [2].

III. PROBLEM STATEMENT & OBJECTIVE

Everyone needs to eat healthy food and keep our body healthy. This is very important for health. Today, people eat unhealthy food and get some serious diseases because of their careless behavior. These diseases can be cured, but health can deteriorate. So, everyone should eat right for their own benefit. People should also

follow the diet. This system fulfills above requirement. This system presents clients with the need for meal planning from a variety of perspectives.

Objective:

- Dietitians can use this technique to determine how they feel about patients.
- The system will be effective for teaching and can be used in medical faculties so that students can learn.
- This system can be used in gyms, especially for calorie counting and meal plans for clients.
- People can use this software privately at home [3].

IV. PROPOSED SYSTEM

The system will provide the user with a user interface where the user has to register and login accordingly. Users must enter information such as their measurements (height, weight, and age), goals, and treatments on. All these suggestions will be used by the inference engine, which will use a pattern matching algorithm to match ideas with valid information in the knowledge base. There are many matching algorithms, such as Decision tree algorithm, genetic algorithm but RETE algorithm is the best algorithm for professional system application. Our application will enter and calculate BMI (Body Mass Index) and compare this BMI with the data stored in the information. The information stored in the knowledge base is provided by real and qualified food professionals, so the correct information is. Our app is designed to make users feel like they are dealing with human experts. After completing the data mapping, the application will provide the appropriate food according to the specific user [4].

V. TECHNICAL SPECIFICATIONS

Software Requirements: - operating system: Windows 10, Sql Server, Visual studio 2019 (asp.NET)

Hardware Requirements: - Processor - i5, Hard Disk - 500 GB, Memory - 8GB RAM

VI. DATA FLOW DIAGRAM
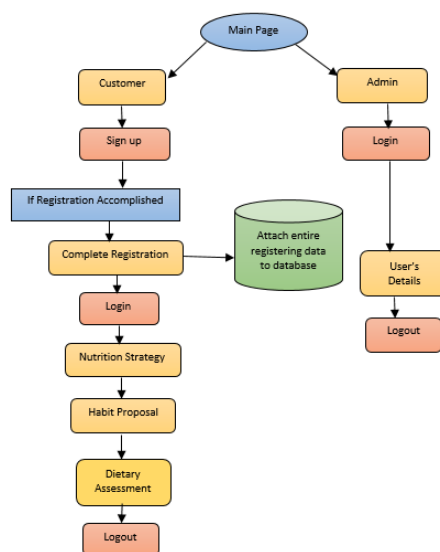
Fig 6.1: Data Flow Diagram

VII.   METHODOLOGY

The framework consists of the following two main elements and supporting elements:

- Admin

1) Login: The administrator may login to his own profile.
2) Include a dataset information
3) Establish a diet plans to integrate and coordinate: If the client requests one, the administrator may design one for them.
4) Customer details: Administrator may see user details.
5) Logout: The administrator may exit his session.

- Customer

1) Create an account: The user may enter his/her information such as name, address, email id, password along with the option of which type of meal do you prefer like veg or non-veg, etc.
2) Log in to the system: By entering a legitimate username and password, the user has access to his/her own profile.
3) Dietary Program: The system generates a user's diet program with information on macro and micronutrients under each category, which is something the user may see.
4) Dietary Record: The client may keep track of the meals that was consumed throughout the day or see a timeline of prior tracking while also viewing the number of calories ingested when consuming the meal.
5) Logout: The user may exit his/her login [5].

VIII.   IMPLEMENTATION

The system works similarly to a nutritionist. Individuals who want a nutritionist to know their diet, should provide information about their body characteristics, Height, weight etc. The client's BMI will be calculated and a Meal Plan will be created based on the results. Conversely, the framework also generates food patterns based on user-supplied Information. Model returns all customer information to provide customers with a customized diet. Thus, the customer can get the meal plans they want by clicking once instead of consulting the doctor number and save a lot of time. This model will provide more accurate results as it uses customer supplied data and compares it with parameters that the application trusts. Our application will use input and compare with data stored in the information to calculate BMI (Body Mass Index). The information stored in the knowledge base is provided by real and qualified food professionals, so the information is correct. Our app is designed to make users feel like they are interacting with human experts. After completing the data mapping, the application will provide the appropriate food according to the specific user.

The formula for BMI is: -

BMI= (Weight in Kilograms) / (Height in Meters * Height in Meters))
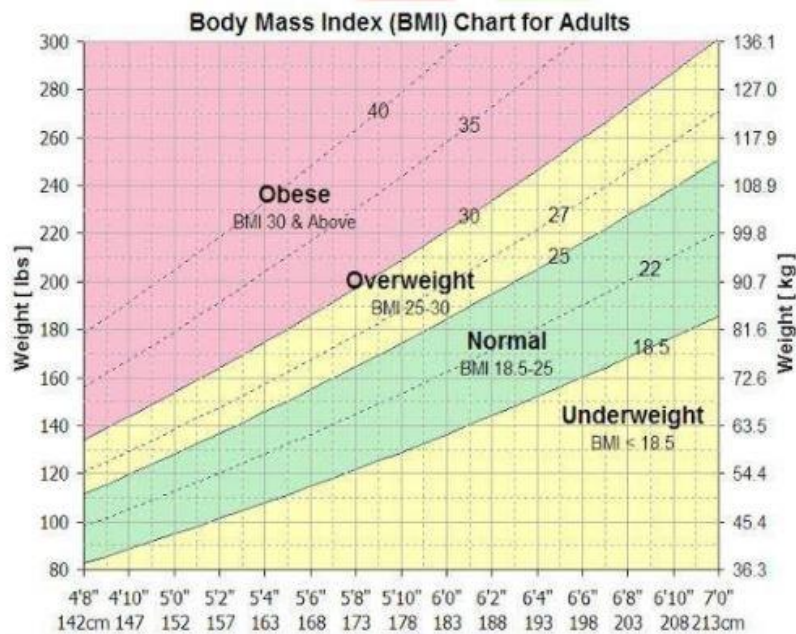
Fig 8.1: Body Mass Index Chart

Body Mass Index (BMI) is calculated using the height of a person and the weight of a person. BMI is given as the weight of a person (in kgs) divided by the height of a person (in meters) squared. Figure 1 shows the Body Mass Index of adults and their categorization as Obese (BMI>30), Overweight (BMI 25-30), Normal (BMI 18.5-25) & Underweight (BMI<18.5) based on their body mass index [6].

- **RETE Algorithm**

RETE algorithm is a pattern matching algorithm which is designed by Dr. Charles L. Forgy of Carnegie Mellon University. RETE is the Latin word which means net. It is an excellent algorithm for comparing reality to pattern in code. Understanding the RETE algorithm will make it easier to understand why it is useful to write code one-way.

The RETE network is a direct acyclic graph that consists of nodes representing patterns in the conditions of the rules. The nodes behave like filters; they test the incoming token and send only those that have passed the test. The RETE network consists of two parts: alpha network and beta network. Alpha network consists of nodes known as alpha nodes. Each alpha node consists of one input that defines intra-elements. Beta nodes are components of Beta network where two inputs are taken from each node so as to define inter-element conditions.

A token is created from the assertion of each fact. Initially the tokens enter the root node, for each token type, the network then split a branch. A copy of the token is received by each kind node and it then performs a SELECT operation to select similar tokens. Alpha nodes receive a copy of token node from the kind node. On receiving the token, the alpha nodes perform a PROJECT operation and from that token components are extracted that match with pattern variables. The conditions are basically evaluated by the alpha nodes. The possible cross product for a rule is then determined by the Beta node. Then, finally rules containing action will be executed.

The RETE network begins with a root node called as the RETE Node. A major drawback of RETE is that it is limited to only one root node and the entire process is based on only one parameter. We will be making use of three parameters and these parameters will play a crucial role in determining the diet. Age, Body Mass Index and Body fat of the user will be taken into consideration. Upon calculation of these, assigned rules will be fired

and a diet will be selected from our knowledge base. This diet will then be modified taking into consideration the preferences and medical conditions of the user. The user will also be provided with the option of searching for alternatives [8].

A potential problem with experts is the comparison that needs to be made between rules and facts in the literature. In some cases, there are hundreds or thousands of rules and it is impractical to make a comparison for each rule. The Rete algorithm is a good solution to this problem and is used by many professional tools, including OPS5 and Eclipse. It is a rete-directional, acyclic, root diagram. Each root-to-leaf path in the tree represents the left side of the rule. Each node stores a summary of the facts that match the code at that point in the path. As the truth changes, the new truth spreads from the root of the leaf to the leaf of Rete and the information stored in the node's changes accordingly. This means adding a new case or changing information about an old case or deleting an old case. In this way, the system should only test each new fact against the rules and only the rules pertaining to the new phenomenon, instead of checking each new fact against each rule [9].

The basic inference cycle of a production system is Match, Select & Execute as show in below fig.
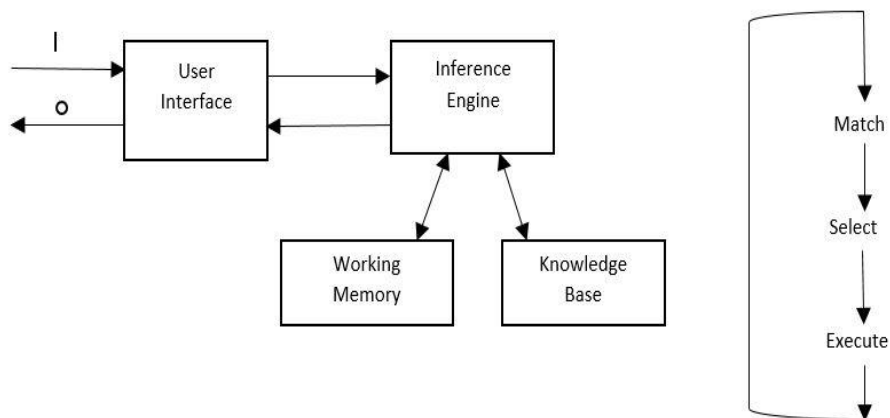
Fig 8.2: Production system components & Basic cycle

These operations are performed as follows:

- Match:
- During the match portion of the cycle, the conditions in the LHS of the rules in the knowledge base are matched against the contents of working memory to determine which rules have their LHS conditions satisfied with consistent bindings to working memory terms.
- Rules which are found to be applicable are put in a conflict set
- Select:
- From the conflict set, one of the rules is selected to execute. The selection strategy may depend on recency of usage, specificity of the rule or other criteria
- Execute:
- The rule selected from the conflict set is executed by carrying the action or conclusion part of the rule, the RHS of the rule. This may involve an I/O operation, adding, removing or changing clauses in working memory or simply causing a halt.
- The above cycle is repeated until no rules are put in the conflict set or until a stopping condition is reached.

Example: IF weight <71 or weight>66 and Height>5.4 or Height<5.8 we will get a particular Diet [10].
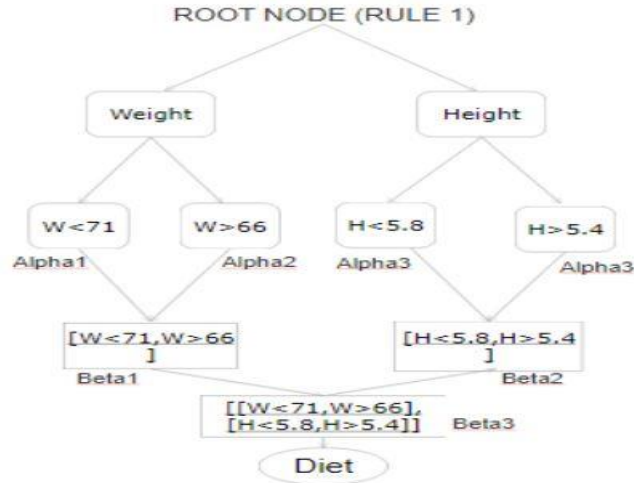
Fig 8.3: RETE algorithm Example

IX. RESULT

On Microsoft SQL Server Management Studio 2019, different queries and databases are created & coding is done in visual studio code 2019. We need to connect to server first for three different situations, and different queries are written for calculation like BMI, Diet, etc.
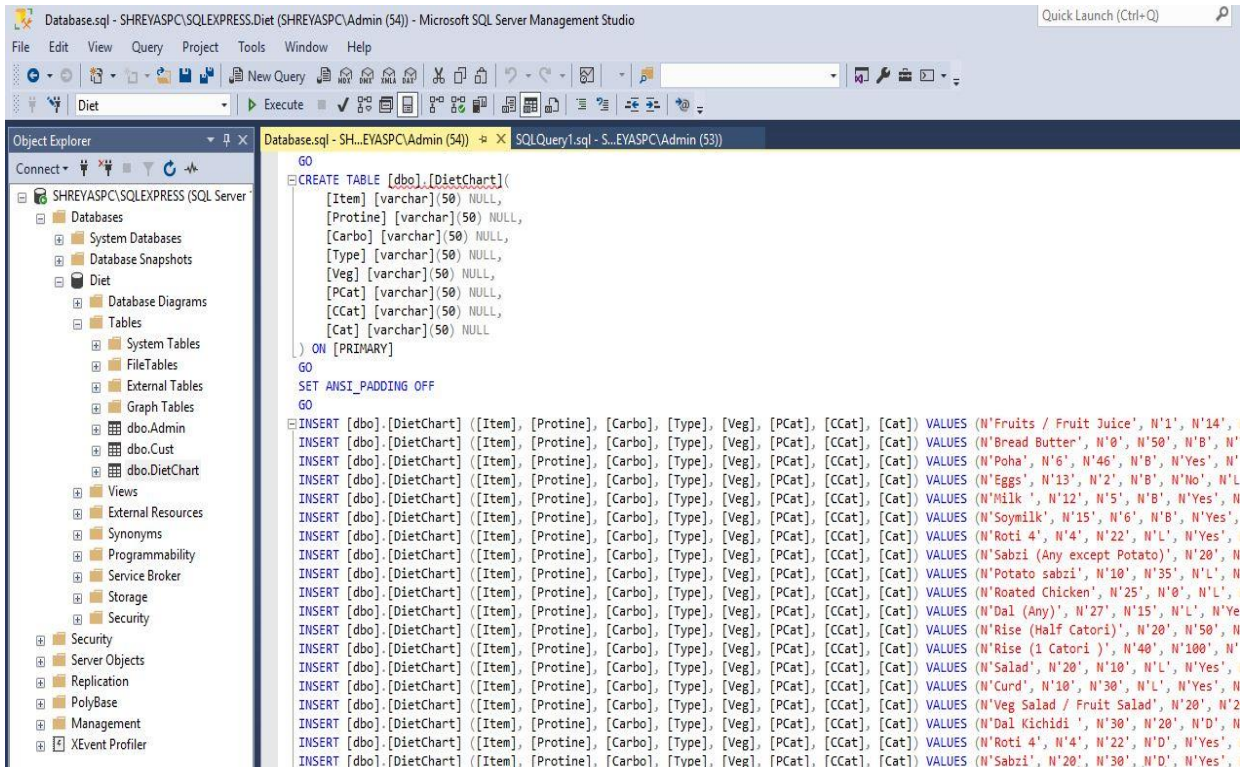
Fig 9.1: Database for Diet Plan

In this way database is created for three situations like Underweight, Normal, & Overweight and Visual Studio code is produced. With the help of the SQL language, we are able to provide the user with the necessary data as per their instructions. ASP.NET language in Visual Studio is utilized for coding.

Fig 9.2: User Registration process

The user must first complete the registration process, then remember the ID provided by the system. Provide all necessary information, including your preferences and personal paper information. Veg or Non-Veg and then continue. User then login to system by using Id and Password.

Fig 9.3: BMI Calculator

User have to provide their height, weight, before clicking on the calculate button. BMI will be calculated by the system using the user's input.
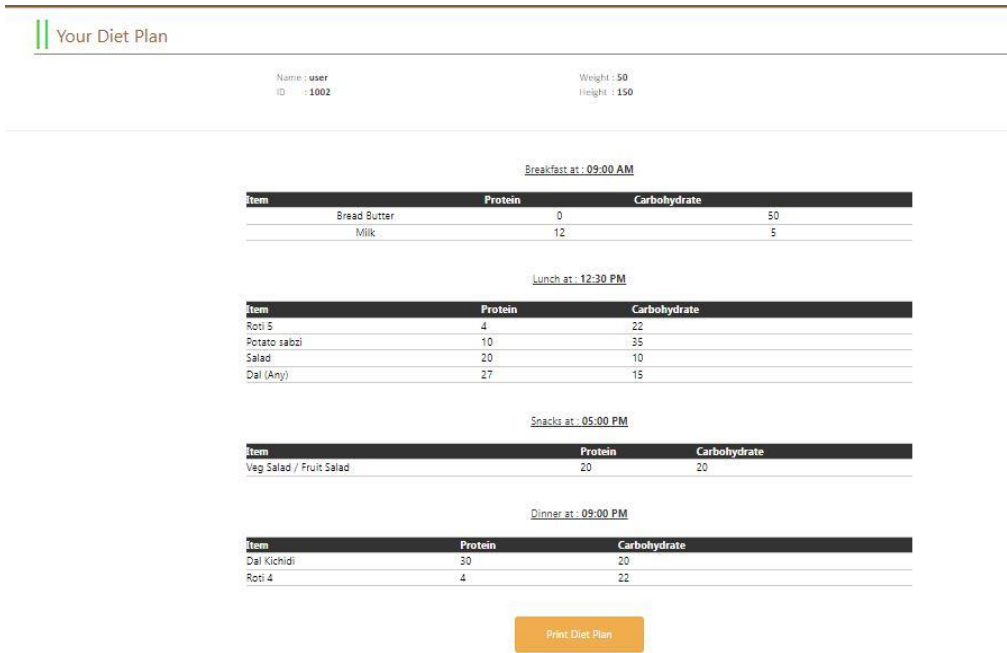
Fig 9.4: User's Diet Plan

System will provide Diet plan according to the input and timings of meal provided by the user and provides the "Print Diet Plan" option if user want to print their diet plan.
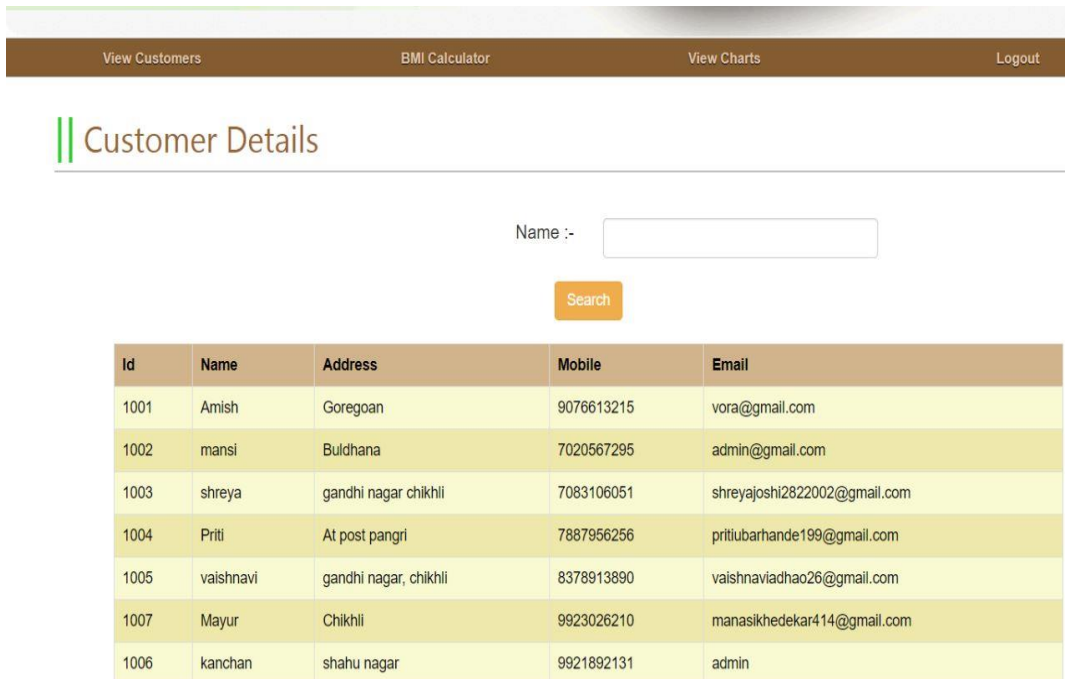
Fig 9.5: User's Details

Administrators can view all customer information after login and can also search specific customers by name. Users do not have access to this page, only Admin can have access.

X. FUTURE SCOPE

- A future aspect of this application will be the improved GUI for this application. The right path can be achieved through knowledge and proper nutrition and culture. Less use of databases and algorithms, more use of artificial intelligence to make work better. This is a web-based application and can also be developed as an Android and IOS application [11].
- The opportunities in the AI Dietitian are available in both public and private sectors such as hospitals, community health centers, nursing homes, NGOs, health clubs, fitness centers, sports centers, hotels, pharmaceutical firms, and so on.
- User uses the device to monitor consumption.
- Calculates food intake and gives suggestions to improve the health of users.
- The system will be customized that will be changed the diet plan as per the customer requirement.
- It will be providing the suggestion or option for video calling to the customer [12].

XI. CONCLUSION

The system is the perfect tool for educating customers on health-related issues with the help of proven experiences created in collaboration with nutrition experts. The plan to complete their mission while searching for healthy food, most people go to nutritionists. People don't need to go to an expert because our ideas will be sent to. Consumers screens will help people create their diet and will save them money and time because our project will be given for free, they provide without charge unlike other options. now has access. The customers using the included RETE Count, each of our customers will receive a personalized meal based on their needs and preferences. This article describes a simulated nutritionist who uses an AI machine to recognize a person's lifestyle-appropriate physical goals, taking into account all the important aspects of food products, starting with. meeting. Make an appointment with a real registered doctor. Here are a few of the main benefits of: A personalized plan can be created for any activity and age, and there are many different recipes to choose from, sharing and adding recommendations in the right proportions that respect your nutritional concerns. depends on the body.

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Digital Signature

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ABSTRACT

People have traditionally used signatures as a means of informing others that a signature has been read by a understood the document. A digital signature in a document is bound to that document in such a way that changing the signed document or moving the signature to another document will invalidate the signature. This security eliminates the need for paper copies of documents and can speed up related processes documents that require a signature. Digital signatures are messages that identify and authenticate a a specific person as the source of the electronic message and indicate the consent of those persons to the electronic message information contained in an electronic

message. Emerging applications such as e-commerce and Secure communication over open networks has clearly demonstrated the fundamental role of public key cryptosystems as unique security solutions. On the other hand, these solutions clearly reveal the fact that protecting private keys is a security bottleneck in these sensitive applications. This problem is further worsened in cases where a single and unaltered private key must be kept very secret for a long time (such as CA keys and electronic cash keys). They help users achieve basic building blocks of security such as identification, authentication, and integrity.

I. INTRODUCTION

The Digital Signature Standard, created by NIST, specifies DSA as the algorithm for digital signatures and SHA-1 for hashing. However, DSA is only for signatures and is not an encryption algorithm Schneier describes encryption mechanisms (ElGamel encryption and RSA encryption) based on DSA. DSA is a public key algorithm; the secret key works with the message hash generated by SHA-1; on verify the signature, recalculate the hash of the message, use the public key to decrypt the signature and then compare the results. The key size is variable from 512 to 1024 bits, which is adequate for current computing capabilities if you use more than 768 bits. Signature creation is about as fast as RSA, but is 10 to 40 times (Schneier) slower for verification. However, these numbers partly depend on assumptions made by the benchmark. Since validation is done more often than creation, this is the case an issue worth noting. The only known cracks (fakes) can be easily bypassed by avoiding a specific module (primary factor p - 1, where p is the public key), which lead to weak signatures. Schneier states that DSS is less vulnerable to attacks than RSA; the difference is that RSA depends on a secret prime while DSA depends on a public prime - the verifier can check that the prime is not fake to allow forgery. The DSA algorithm can be implemented by creating a "subthreshold channel". it can expose key data and lead to forgeable signatures, so one is warned not to use unexamined code. A digital signature is a checksum that

depends on the time period during which it was created. It depends on all the bits of the transmitted message as well as the secret key, but it can be checked without knowing the secret key.

II. LITERATURE REVIEW

Digital signatures allow people to sign digital documents by providing handwritten signature features. It must meet the five persuasive attributes of handwritten signatures listed in (Schneier, 1996). He stated that handwritten signatures are authentic, inexcusable, cannot be reused, immutable and cannot be rejected. In the case of a handwritten signature, the signature is also the signature document are physical things, making it difficult for the signer to claim that the signature is not theirs own. In order to provide a secure electronic signature scheme, these attributes must be met. Electronic signature technologies include PINs, user identifications and passwords, digital signatures, digitized signatures, and hardware and biometric tokens. That's why it's important to make a distinction between electronic and digital signature. Digital signatures are a subset of electronic signature technologies that use keys and cryptographic algorithms to sign documents. Digital signatures can be generated using different techniques; however, the only digital signature standard approved by the National Institute of Standards and Technology (NIST) uses public key cryptography in combination with one-way hash function. This infrastructure, commonly referred to as public key infrastructure (PKI), requires each user to have a public-private key pair, where the public key is available to the entire world while the private key is known only to the user. Figure 1 illustrates the use of PKI to generate a digital signal signatures. The following is an example of a digital signature scenario. Bob (sender) wants to send Alice (the recipient) text message with a digital signature. First, Bobreates a text message to be signed and generates a hashed message using a message digest function

III. DIGITAL SIGNATUREST

The idea of digital signatures is the same as your handwritten signature. You use it to validate the fact that you promised something that you can't take back later. A digital signature does not involve signing something with pen and paper and sending it over the Internet. But like a paper signature, it attaches the signer's identity to the transaction. Having a digital certificate is like using a 6 driver's license to verify your identity. For example, you might have gotten your driver's license from Maryland, but your Maryland driver's license allows you to drive in Nevada and Florida. Similarly, your digital certificate proves your online identity to anyone who accepts it. A digital signature can also be used to verify that information has not been altered after signing. A digital signature is an electronic signature that can be used in all imaginable types of electronic transmission. A digital signature is significantly different from other electronic signatures in terms of process and results. These differences make the digital signature more usable for legal purposes.Digitalsignatures are based on mathematical algorithms. These require the signer to have two keys (one private and one public) for signing and verification. A verifiable trusted entity called a certification authority creates and distributes signatures.

IV. SECURITY SERVICES

Message verification: A secure digital signature scheme, like a secure conventional signature, can provide message authentication. the electronic equivalent of a message signature authenticator, the signature or message authentication code (MAC) is sent with the message, the MAC is generated using some algorithm that depends on both the message and some key (public or private) known only to the sender and recipient the message can be of any length, the MAC can be of any length, but more often it has some fixed size that requires some hash function to be used to condense the message to the desired size if this is not achieved the authentication scheme must consider message replay issues and the MAC requires the message sequence number, time stamp or negotiated random values . ex. Authentication using Private-key Ciphers if the message is encrypted using a session key known only to the sender and receiver, then the message can also be authenticated because only the sender or recipient could have caused any interference to it will corrupt the message (assuming it contains enough redundancy to detect the change), but no provide non-repudiation because it is impossible to prove who created the message.

Message integrity: Message integrity is preserved even if we sign the entire message because we cannot retrieve it the same signature if the message changes. Integrity is something else entirely. Integrity guarantees it if you send an encrypted message, there is no way that encrypted message can be tampered with s after you've encrypted it without the recipient knowing. EX. MAC. A MAC is essentially a hash-code: a short string appended to a message that summarizes the message in some way, so that if any part of the message has been changed

V. APPLICATION OF DIGITAL SIGNATURES

A digital signature is a process that guarantees that the content of a message has not been altered transit. When you, the server, digitally sign a document, you add a oneway hash (encryption) of the document message contents how we'll know that the message has been corrupted. using your public-private key pair. Your client can still read it, but the process creates a "signature" that only the server's public key can decrypt. Client using public server key, then it can verify both the sender and the integrity of the message content. Whether it is

- e-mail
- online order
- or a photo with a watermark on eBay

If the transmission arrives but the digital signature does not match the public key in the digital certificate, then the client knows that the message has not been altered

VI. BENEFITS OF DIGITAL SIGNATURES

These are common reasons for using a digital signature on communications: Authentication Although messages may often contain information about the entity sending the message, this information may not be accurate. Digital signatures can be used to verify the source of messages. When the ownership of the secret key of a digital signature is tied to a specific user, a valid signature shows that message was sent by this user. A high level of confidence in the authenticity of the sender is especially important obvious in a financial context. For

example, suppose a bank branch sends instructions to head office requesting to change the account balance. If headquarters is not convinced that such a message is actually sent from an authorized source, acting on such a request could be grave error. Integrity In many scenarios, the sender and receiver of a message may need to be sure that the message was not modified during transmission. Although encryption hides the content of the message, it may be possible to change an encrypted message without understanding it. (Some encryption algorithms, known as nemaleable, prevent this, but others do not.) However, if the message is digitally signed, any change in the message will invalidate the signature. Moreover, there is no effective way edit the message and its signature to create a new message with a valid signature because it is Most cryptographic hash functions are still considered computationally infeasible

VII.   CONCLUSION

Digital signatures are in some ways a complementary technology to public key encryption data origin verification and non-repudiation of digital messages. Digital signatures have different properties and offer different guarantees for handwritten signatures. Security of digital signatures it critically relies on the security of the keys used to generate and authenticate them. digital signature technology widely used in modern life and technology. digital signature algorithm is used for various purposes such as internet protocols, business contracts, software certification, mobile phones, and internet sites etc. Digital signatures using a public key cryptographic system have each the potential to achieve the same level of legal recognition as handwritten signatures. However, the main one the obstacle is currently the non-repudiation functional element. This element, unlike the other three the elements of handwritten signatures discussed cannot be achieved by technology alone. Assistance is required from the law to help him achieve the functional element of non-repudiation. Once non-rejection has been achieved, then and only then can e-commerce be expected to be successfully launched up. A CA can then be verified by higher CAs, creating a certificate chain. Thus, the credibility of a CA may depend on its reputation in traditional business transactions, or may be a participant of a higher certification authority and use certificate from a higher certification authority to assure participants and relying parties that this is not the case fake certificate authority. A CA on top of a CA the hierarchy is known as the root certification authority and issues root certificates. Root Certification the authority verifies itself for the purposes of determining the validity of certificates.

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Efficiency and Accuracy Improvement in Billing Management

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ABSTRACT

This paper deals with the today's fast-paced business environment, organizations are constantly looking for ways to improve efficiency and accuracy in their billing management practices. One solution that has gained increasing popularity in recent years is the use of billing management systems. This study explores the benefits of billing management systems and their impact on organizational performance.

Keywords— Efficiency, Accuracy, Revenue cycle management, Billing and invoicing, Electronic billing.

I. INTRODUCTION

Billing management systems are crucial tools for ensuring that organizations receive payment for goods and services provided to customers. They involve the management of billing data, invoicing, and payment collection, which can be a complex and time-consuming process. In recent years, blank billing management systems have become increasingly popular, as they offer numerous benefits in terms of efficiency and accuracy.

This research paper seeks to explore the advantages of billing management systems over traditional manual systems. Specifically, we will examine the extent to which systems improve the accuracy and efficiency of billing management practices. We will also investigate the impact of these systems on overall business performance and customer satisfaction.

The paper begins with a literature review of previous research on billing management systems and their benefits. We will then describe the research methodology and data collection methods used in our study. Next, we will present the results of our analysis, which includes a comparison of the accuracy and efficiency of and manual billing management systems. We will conclude by discussing the implications of our findings for billing management practices and future research in this area.

By exploring the benefits of billing management systems, this research paper aims to contribute to a better understanding of how organizations can improve their billing processes and ultimately enhance their overall performance[1].

II. OBJECTIVE

In today's fast-paced business world, efficient and accurate billing management is essential for the success of any organization. By improving the efficiency and accuracy of billing management processes, we can:

Save time: By streamlining the billing process, we can reduce the time it takes to generate invoices, process payments, and reconcile accounts.

Reduce errors: With improved accuracy, we can reduce the number of errors in billing, such as incorrect pricing, overbilling, and under billing, which can lead to customer dissatisfaction and financial losses.

Enhance customer satisfaction: By improving billing accuracy and reducing errors, we can provide customers with timely and accurate invoices, resulting in higher customer satisfaction and loyalty.

Increase revenue: With efficient billing management, we can ensure that invoices are generated and paid on time, reducing the risk of delayed or missed payments, and improving cash flow.

To achieve these goals, we will implement various measures, including automating billing processes, improving data management, and increasing staff training and development. We will also leverage technology and software to improve billing accuracy and reduce errors, such as implementing software to automatically match invoices with purchase orders, flagging potential errors, and generating detailed reports.

By improving efficiency and accuracy in billing management, we can ensure that our organization remains competitive and successful in today's business environment[4].

III. PROBLEM DEFINITION

Efficiency and accuracy in billing management refer to the ability of an organization to process billing transactions in a timely and accurate manner. It involves managing the entire billing process, from invoicing to payment collection, and ensuring that all financial information is recorded accurately and securely. Efficiency in billing management ensures that the process of generating and sending invoices, tracking payments, and managing customer accounts is completed quickly and smoothly. This reduces the risk of errors, delays, and customer complaints, which can negatively impact the organization's reputation and revenue.

IV. FUNCTIONAL REQUIREMENT

A utilitarian necessity characterizes an element of a framework and its parts. This subsection presents the recognized utilitarian necessities for BS which are recorded underneath.

- Billing - The orders made can be charged too. The staffs too as the administrator can make bills of the orders made by the clients without any problem.
- History - History of the billing can be seen without any problem.

4.1 Non-practical necessities:

Coming up next are the non-practical necessities of BS:

- Consistency-This framework gives consistency UI plan to the client. The plans of the screen are normalize and reliable that cause the client to feel good to utilize it.
- Accommodation - The framework gives comfort to the client to perform different exercises like making request, menu making due, staff the executives, and so on
- Ease of use - The BS programming is prepared to utilize framework. The clients will feel simple to utilize the framework absent a lot of specialized aptitude.

- Security - This framework gives the secret phrase security access control to keep away from unapproved client to login to the framework. The framework additionally authenticates the staff level to admittance to a portion of the administrator part.
- Dependability - The billing framework gives successful strategy to keep up with the back-finish of the framework.
- Versatility - It has the ability to deal with a developing measure of work and its capability to be amplified in to oblige that development.

4.2 Feasibility Study:

The attainability review is completed to test whether the proposed framework merits being carried out. Plausibility review is a trial of framework proposed with respect to its work capacity, its effect on the association to address client issues and compelling utilization of assets. It is generally completed by few individuals who know about the data framework strategies, get the piece of the business organization that will be involved or impacted by the undertaking and are gifted in the framework examination and configuration process[2].

All tasks are possible in the event that they have limitless assets and boundless time. However, the improvement of programming is tormented by the shortage of assets and troublesome de-attire rates. It is fundamental and reasonable to assess the practicality of a task at the earliest conceivable time. The key thought engaged with the plausibility study are:

I. Specialized plausibility
II. Financial practicality
III. Functional plausibility
IV. Plan attainability

Technical attainability Specialized attainability lopes on the current PC framework (equipment, programming) and how much it can uphold the proposed framework.

The innovations utilized in this undertaking are:

Programming:

Front End
- Language utilized : Java Back End
- SQL

Working System:
- Windows XP and higher. Our framework requires window working framework which is effectively accessible.

Equipment:
- Intel based processor run PC framework, which have console and mouse as info gadgets.
- This has been chosen for the situation of accessibility and up-degree.

Economic achievability

This possibility study is to decide the advantages and reserve funds that are expected from a framework and contrast it and its expenses. On the off chance that an advantage offsets costs, the choice is made to plan and

execute the framework[3]. In any case further adjustments are made in the proposed framework. A portion of the expenses to be considered are:

- Labor supply cost
- Equipment and programming cost

Operational achievability

Individuals are innately impervious to change and programming or applications have been known to work with change. In this venture, a specialized group is expected to arrange the product. Specialized foundation on Java, information base is significant. For clients/clients, a short course or demo can be given so they will be comfortable with the product. They don't need a lot of specialized mastery to utilize BS programming.

V. GENERAL ARCHITECTURE

The general architecture of the application is shown in the figure below.
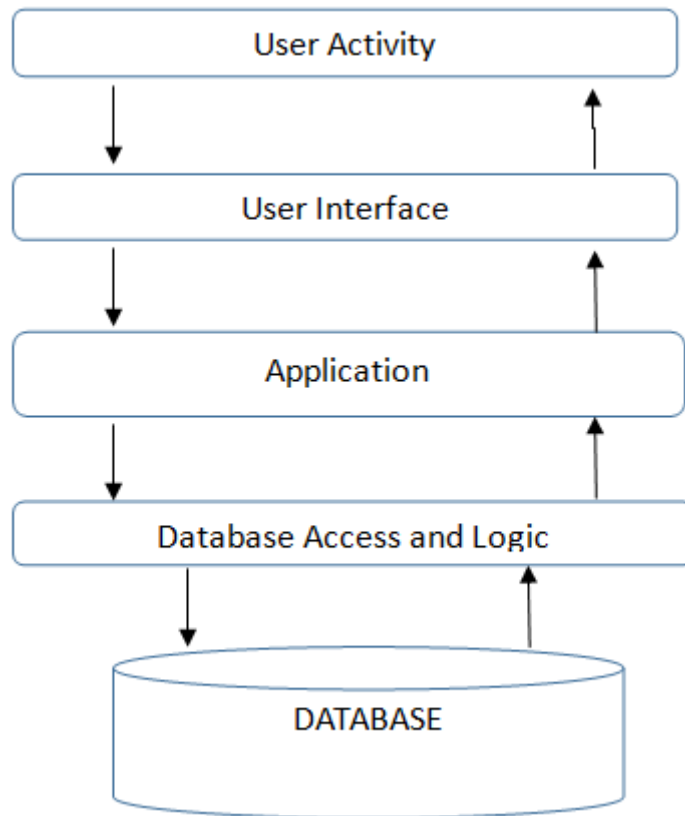
Figure:-General Architecture

1) User Case Diagram

A use case diagram is a graphical representation of the interaction among the elements of a system. A use case is a methodology used in a system analysis to identify, clarify and organize system requirements.
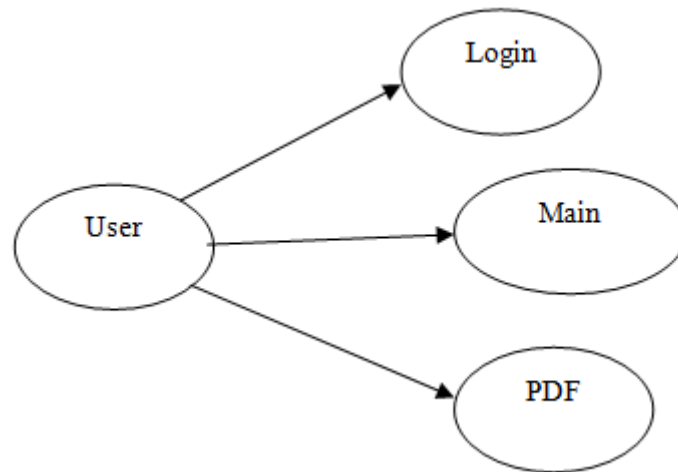
Figure:-User Case Diagram

2) Client Login

This arrangement chart makes sense of the different advances that are required for the client to sign in the application. First client enters his/her username and secret key, for the absolute first login they should enter client name and secret key allocated by the administrator. Once the login subtleties are placed and tapped on login button, the solicitation proceeds to approve client which checks in the information base. Assuming the entered subtleties are found in the information base, the client can see dashboard any other way the application will show a blunder message.

3) Billing

This succession outline show bit by bit course of how billing is done once the client is finished with the supper, he/she request the bill and staff first snap on the billing page and enters all the thing's the client had then the application shows the aggregate sum and the client click on print bill operation which prints the bill and every one of the things requested by the client are put away in the data set.

VI. CODING TOOLS

There are different instruments accessible for the advancement of an undertaking. Our Billing System programming has been created utilizing the front end java and back end SQLite.

Following apparatuses are utilized for the BS project.
- JAVA Programming Language Java is universally useful programming language that is class-based, object-arranged explicitly intended to have not many intricacy as could really be expected.
- Net beans IDE Net beans is the apparatus we have used to execute the code and plan the UI for the Restaurant Billing System.
- Together is a charting and vector illustrations application that has been utilized to plan framework models like, Use- Case Diagram, Sequence Diagrams, etc.

VII. CONCLUSION

The findings of this study suggest that billing management systems can significantly improve efficiency and accuracy, leading to improved organizational performance. The benefits of these systems are not limited to any particular industry or organization size and can be an effective tool for improving cash flow management and compliance with regulatory requirements.

VIII. FUTURE SCOPE

1. This project will help the store keeper in fast billing.
2. This project enable store keeper to maintain a   great database of all customers visited and   purchase product from store.
3. Project will enable to see report regarding product and category.
4. Easy to maintain in future prospect.

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Event Management Application

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ABSTRACT

This study is aimed at developing a system to manage events. The demand for event planning and operation firms has increased as events like marriages, birthday fests, and many others have evolved into musts of life. Events and guests are growing rapidly. The event operation system is an online event booking application designed to perform the functions of an event manager. In the operation, new users can sign up with their credentials, the system helps with the operation of user, events, and their surroundings. This was designed as a web operation. The design provides the utmost of the basic functionality needs for an event (e.g., marriage, birthdays, parties, and other events). Additionally, the system allows the user to book the date and set the budget. The design offers the maturity of the essential features demanded by a certain event type, such as, (marriage, Birthday, Parties, and other events), and also the system lets the user choose the event's date and budget. A receipt number is issued for the booking and all the data is stored in a database. As soon as the administrator receives the data, they are able to engage with the client as necessary.

Keywords—Event Management, event, booking, android studio

I. INTRODUCTION

This study aims to develop an online event management system to meet the increasing demand for event planning and operation firms due to the growing number of events such as weddings, birthday parties, corporate events, and other social gatherings. The system provides an easy-to-use platform for users to manage their events and surroundings efficiently. The system is designed as a web application, making it accessible to users worldwide. The design of the system offers the essential functionality required for any event type, such as booking dates and setting budgets. Additionally, the system provides specific features demanded by particular event types, such as catering, venue. This study aims to develop an online event management system to meet the increasing demand for event planning and operation firms due to the growing number of events such as weddings, birthday parties, corporate events, and other social gatherings. The system provides an easy-to-use platform for users to manage their events and surroundings efficiently. The system is designed as a web application, making it accessible to users worldwide[1][2]. The design of the system offers the essential functionality required for any event type, such as booking dates and setting budgets. Additionally, the system provides specific features demanded by particular event types, such as catering, venue decoration, photography

services, online registration, ticketing, and payment processing. The system issues a receipt number for the booking, and all the data is stored in a database. The administrator can engage with the client as necessary once they receive the data. Overall, this online event booking application is designed to provide users with an efficient and convenient platform to plan and manage their events. The report will provide an overview of the design, its features, and its benefits to clients and event managers[3].

II. LITERUTURE REVIEW

Event management applications have become increasingly popular as the demand for efficient event planning and execution has grown. These applications are designed to streamline the entire event planning process, from start to finish. The purpose of this literature survey is to explore the features, benefits, and drawbacks of event management applications[1].

A. Features of Event Management Applications:

Event management applications offer a wide range of features, including online registration, ticketing, and payment processing. They also offer event scheduling, budgeting, and site selection. These applications provide a platform for communication and coordination between event planners and attendees. Additionally, they allow event planners to track attendance and manage event logistics in real-time[2].

B. Benefits of Event Management Applications:

Event management applications offer several benefits to event planners and attendees. First, they save time and money by reducing the need for physical meetings and paperwork. Second, they provide a platform for communication and coordination between event planners and attendees. Third, they provide a secure and reliable platform for booking and payment transactions. Fourth, they offer real-time tracking of attendance and event logistics, allowing event planners to make adjustments as needed[2].

C. Drawbacks of Event Management Applications:

Event management applications are not without their drawbacks. One common issue is the potential for technical glitches, which can lead to errors in registration and payment processing. Additionally, some users may be hesitant to use online platforms for sensitive information such as personal and financial data. Finally, some event planners may find that the customization options for event management applications are limited[2].

III. PROBLEM STATEMENT

The problem statement of the event management application is the need for efficient event planning and execution in today's fast-paced world. With the growing demand for events like weddings, birthday parties, and corporate events, the need for a streamlined and easy-to-use event management application has become increasingly important. The traditional methods of event planning, which rely on manual processes and physical paperwork, are time-consuming, prone to errors, and do not allow for real-time tracking and adjustment of event logistics. The problem statement, therefore, is to design an online event booking application that provides a platform for communication and coordination between event planners and

attendees, saves time and money by reducing the need for physical meetings and paperwork, provides a secure and reliable platform for booking and payment transactions, and offers real-time tracking of attendance and event logistics. The application should provide the essential functionality needed for event management, including booking venues, vendors, and other services, as well as allowing users to book the date and set the budget. The solution to this problem is an online event booking application that provides a simple and efficient way to plan, manage, and execute events[3][4].

IV. TECHNOLOGIES USED

The Unfold Events app will be developed using the following technologies:
- Front-end: XML, Android Studio, Java
- Back-end: SQLite

Overview of technologies used:

A. Front End
a) **XML:** XML (Extensible Markup Language) is a markup language that is used to design user interfaces in Android apps. It is a language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. In Android app development, XML is used to create the user interface (UI) of an app. The user interface consists of a collection of layouts, views, and widgets that are arranged to form the overall look and feel of the app[5].

b) **Java:** Java is a programming language that is used in Android app development to implement the business logic layer of the app. It is a class-based, object-oriented language that is designed to be portable and platform-independent. In the Unfold Events app, Java is used to implement the functionality of the app, such as event booking, payment processing, and event management[6].

B. Back-End:
a) **SQLite:** SQLite is a popular open-source relational database management system that is widely used in mobile app development, including in the development of the Unfold Events app. It is a lightweight and efficient database system that is designed to be embedded within an application, which makes it an ideal choice for mobile app development. SQLite provides a number of key features that make it a powerful tool for managing data within an app. *These include:*
- Relational Database Management: SQLite is a relational database management system, which means that it organizes data into tables that are linked by common fields[7].

b) **Android Studio :** Android Studio is an integrated developmentenvironment (IDE) created specifically for developing applications for the Android operating system. It is the official IDE for Android app development, and it is developed and maintained by Google. Android Studio provides a comprehensive set of tools for building Android apps, including a code editor, visual layout editor, project management tools, debugging tools, and a variety of other features to help developers create high-quality, performant apps for Android devices. Overall, Android Studio is a powerful and feature-rich tool that helps developers create high-quality Android apps quickly and efficiently[8].

V. E-R DIAGRAM
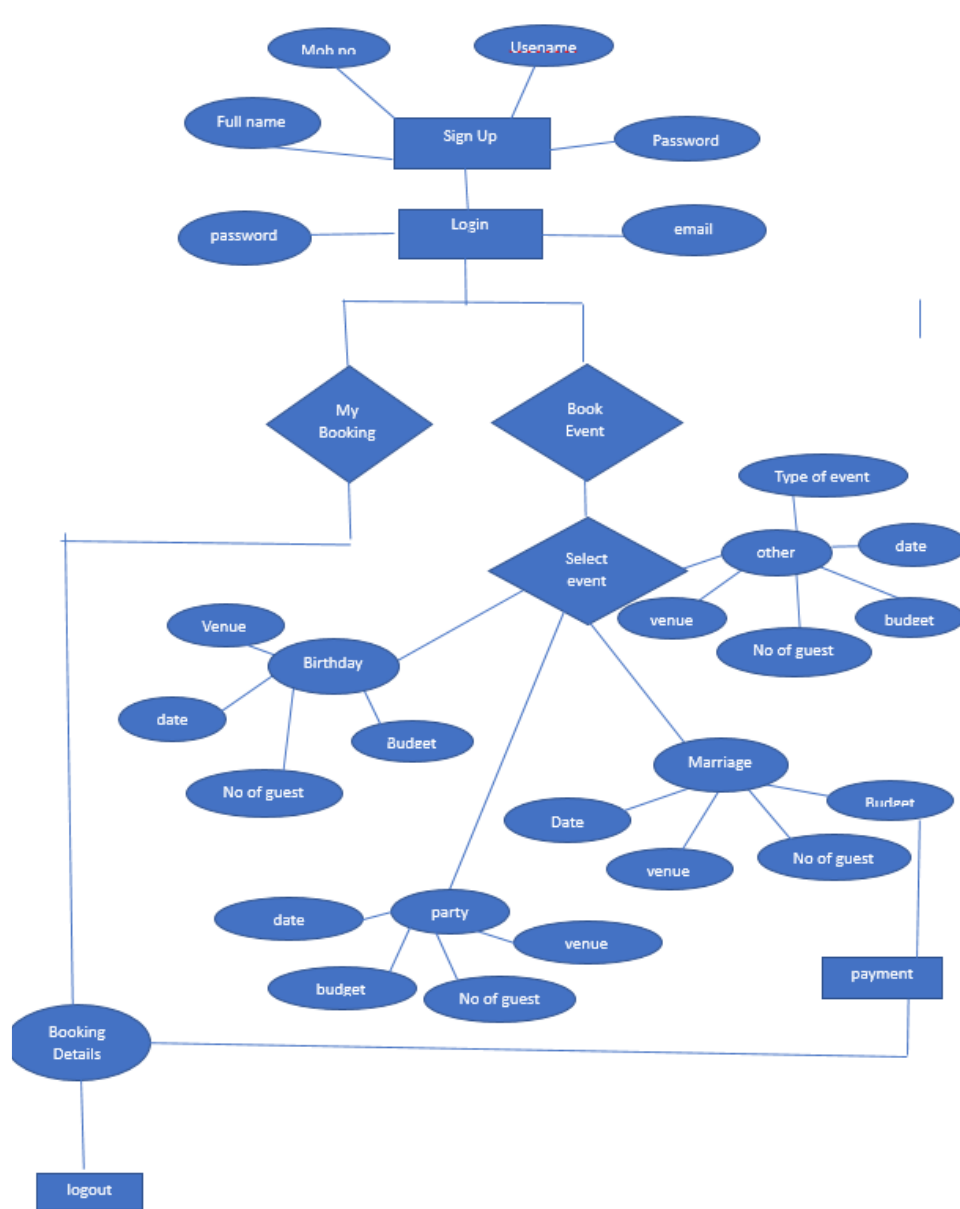
Fig. 1. E-R Diagram

An Entity-Relationship (ER) diagram is a visual representation of the entities, relationships, and attributes involved in a system. In the case of an event management application, the entities could include attendees, events, venues, organizers, and sponsors.

An ER diagram for the event management application could be as follows:

A. Entities:

- User: stores user details such as name, phone number, email address, and password
- Event: stores event details such as event type, number of guests, budget, food, venue, and date
- Payment: stores payment details such as account information and transaction ID
- Coordinator: stores coordinator details such as name, phone number, and email address

B. **Relationships:**

- User-Event: a one-to-many relationship where a user can book multiple events, but each event can only have one user associated with it
- Event-Payment: a one-to-one relationship where each event can only have one payment associated with it
- User-Coordinator: a one-to-many relationship where a user can be assigned to multiple coordinators, but each coordinator can only have one user associated with it

C. **Attributes:**

- User ID: a unique identifier for each user
- Event ID: a unique identifier for each event
- Payment ID: a unique identifier for each payment
- Coordinator ID: a unique identifier for each coordinator

D. **Constraints:**

- The Event entity must have a User ID attribute associated with it, indicating the user who booked the event
- The Payment entity must have an Event ID attribute associated with it, indicating the event for which the payment was made
- The User entity may have a Coordinator ID attribute associated with it, indicating the coordinator assigned to the user

OVERALL, this ER diagram represents the relationships between the key entities and attributes involved in the event management application. It provides a clear picture of the data model and can help to guide the development of the application.

VI. RESULT AND OUTCOME

The working of Event Management Application consists of the following steps:

1) **Registration:** First, the user needs to create an account on the app by providing their basic information such as name, email address, and phone number. Once the account is created, they can log in into the app.

2) **Event Selection:** After logging in, the user can search for events based on their preferences such as location, type of event, and budget. They can browse through the list of available events and select the one they want to plan.

3) **Event Details:** Once the user selects an event, they need to provide the details such as the date of the event, number of guests, preferred food type, and venue. They also need to specify their budget for the event.

4) **Event Coordinator:** The app connects the user with an event manager who will plan the event according to their preferences and budget. The event manager will suggest different options for the user to choose from such as venue, catering, decorations, etc.

5) **Budget:** The event manager will keep the budget in mind while planning the event and will suggest options that fit within the user's budget. They will also provide regular updates to the user regarding the expenses incurred during the event planning process.

6) **Payment:** Once the event planning is complete, the user can make the payment through the app. They can choose to pay online or through other payment options available on the app.

7) **Execution:** On the day of the event, the event manager will oversee the execution of the event and ensure that everything goes smoothly. They will coordinate with the vendors and ensure that the user's requirements are met.

8) **Cancellation:** In case the user needs to cancel the event, they can do so through the app. The event manager will provide information regarding the cancellation charges and refund policy.

9) **Improved event planning and execution:** By providing users with tools to manage guest lists, budget, and logistics, the application can help ensure that events run smoothly and meet the needs of all stakeholders.

Overall, the Event Management Application provides a hassle-free and convenient way for users to plan and execute events. By connecting them with experienced event managers, the app ensures that the user's requirements are met, and the event is executed smoothly[4].

VII.   FUTURE SCOPE

A. **Integration with social media:** Consider integrating your application with social media platforms like Facebook, Instagram, and Twitter. This will allow users to easily share information about their upcoming events with their social networks, which could increase visibility and potentially attract more users.

B. **AIand Machine Learning:** Consider incorporating artificial intelligence (AI) and machine learning (ML) into your application. This could help you to personalize recommendations for users based on their preferences and past events, improve your booking process by optimizing scheduling and venue selection, and improve your customer service by providing automated support and responses.

C. **Virtual and Hybrid Events:** With the COVID-19 pandemic, virtual and hybrid events have become increasingly popular. Consider incorporating features that allow users to plan and book virtual or hybrid events, such as live streaming capabilities and virtual venue options.

D. **Marketing and Analytics:** Consider incorporating marketing and analytics features into your application to help users promote their events and track their success. This could include features like email marketing, social media advertising, and event tracking and analysis.

E. **Customer Relationship Management:** Consider incorporating customer relationship management (CRM) features into your application to help users manage their interactions with attendees and vendors. This could include features like attendee tracking, vendor management, and invoicing and payment processing.

VIII.   CONCLUSION

Event Management Application is a fantastic app that has been specifically designed to make event planning quick, simple, and stress-free. Through the platform, you can effortlessly book your desired event and relax, knowing that an expert event manager has taken care of everything else. With features such as personalized service, time-saving, and hassle-free planning, Unfold Events is undoubtedly an essential tool for anyone who wants to effortlessly host a successful event. So, try Unfold Events today and experience the difference.

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Implementation and Result on a system based on SQL Injection Prevention

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ABSTRACT

In the modern world, the development of system data leakage detection via SQL injection protection is really helpful. Present vulnerabilities in online systems. SQL injection is the most common web system vulnerability. By using these systems and a secret key, we can stop data leakage. We can also identify the leak of our data files, which include vital documents, if there was a data leak. These systems are implemented using HTML, Java Script, PHP, and regular expressions, a theory of formal languages. The system tools that have been built allow users to defend their own data from SQL-based attacks.

Keywords—SQL Injection, Vulnerabilities, data leakage, Detection, watermark.

I. INTRODUCTION

An injection attack known as SQL Injection (SQLi) enables the execution of malicious SQL commands. These commands manage the web application's database server. Attackers can use SQL Injection flaws to get around application security controls. They can access the complete contents of a SQL database by getting beyond a website's or web application's authentication and authorization. They can also add, alter, and delete records from the database using SQL Injection [1].

Data allocation choices suggested by the Data Leak Detection Project improve the possibility of finding leaks. To increase our chances of finding a leak and the culprit, we occasionally add "realistic but fake" data entries.

Sensitive data must occasionally be provided in the course of business to apparently reliable third parties. If your data processing may be used by another company, the data must be delivered to many other businesses. The likelihood of data leaking from the agent exists at all moments [2].

Watermarking, whereby an individual code is encoded in each propagated copy, handles leakage detection. The creator can be found if this copy is discovered in the possession of a third party. But once again, this calls for modifying the code. In some instances, watermarks can be removed if the data is received by a malicious party. Watermarking has historically been used to detect leaks; for example, a special code is put into each distributed copy. The attacker can be located if this copy is later found in the hand of a person who is not authorised. In certain situations, watermarks can be very useful, yet they once again require a certain modification of the original material. In addition, if the data is hacked, watermarks could vanish [3].

The recipient is a bad person. In this article, we explore covert methods for identifying the loss of a collection of items or documents. In particular, we investigate the following case: Agents get a package of items from a distributor, but later find some of the same items in an unapproved area. (For instance, information can be acquired through a legal discovery procedure or from websites.) The distributor can now determine whether it

is more likely that one or more agents were responsible for the data breach than that it was independently gathered using other methods. Using a comparisonwith the cookies stolen from the cookie jar, when we catch Freddie with a single cookie, he can argue that a friend gave him the cookie. But if we catch Freddie with five cookies, it will be much harder for him to claim his hands weren't in the cookie jar.

If the distributor sees "sufficient evidence" that the agent has leaked data, they can stop doing business with them or take legal action. In this paper, we develop a model for evaluating the "guilt" of agents. We also present object distribution strategies that improve the likelihood that a leak will be found. Last but not least, think about include "dummy" items in the distributed collection. Although they don't correspond to actual entities, these items seem lifelike to agents. Mock objects function somewhat like a watermark for the entire set without altering the individual components. The distributor can be more certain that the agent was at fault if it turns out that the agent received one or more phoney items that ended up leaking[4].

This module's major goal is to give consumers comprehensive information about the data and content they can access on the website. The website's security is ensured using the form authentication mechanism to stop data leaking [5].

II. METHODS

Watermarking is a technique that can be used to embed a unique digital mark or signature within a file, document, or data set. This watermark can be used to identify the origin or ownership of the data, as well as to detect unauthorized data access or transfer [6]. Some of the methods used in data leakage detection systems with watermarking include.

Visible watermarking: Visible watermarking involves embedding a visible watermark within a file or data set. This watermark can be used to deter data leakage by indicating that the data is protected and owned by a specific entity. It can also be used to detect unauthorized data access or transfer by identifying the source of the leaked data [7].

III. ALGORITHM

MD5 is a hashing algorithm commonly used to verify data integrity. Creates a 128-bit hash value that is unique to the hashed data. A hash value is often used to verify that data has not been altered or corrupted during transmission or storage.

To detect a data breach, organizations typically use data loss prevention (DLP) tools that monitor network traffic and identify sensitive data being transferred outside the organization. These tools can use various techniques such as content analysis, file fingerprinting, and machine learning algorithms to detect and prevent data breaches.

MD5 can be used as part of the file fingerprinting process where it is used to generate a unique hash value for each file in the organization. The hash values can then be compared to the values of files found outside the organization to determine if sensitive data has been leaked. However, MD5 is not a reliable data leak detection method because it is vulnerable to collision attacks where different data can produce the same hash value [8].

IV. APPLICATION

A. Admin Module

The Admin module allows the system administrator to set up the back-end of the system and perform basic system configuration. Part of the administrator settings is user management, which allows users to set a definable level of access/role, access to one or more branches. Admin can also set overall system security settings.

In these system administrators, log in using your email and password, which is stored in the backend. Admin can also edit password in backend.

Fig 3.1 :- login Page

When admin is login admin dashboard page is open which contain profile, send file , key request, file send y me, file send by another user registration request and leaker. By user registration request admin user seen request from user that admin can activate, block or remove user account.

Fig 3.2:- Admin dashboard page

Leaker option shows the leakage of data. Here for Downloading the send file secret key is required which is ask using key request. If there is data get download without asking secret key that means data is get leaked so leaker shows the all information about leaker. AES algorithm is used here for encryption of secret key.

B. User Module

The user module allows users to register, log in and log out. Users benefit from being able to log in because it links the content they create to their account and allows them to set different permissions for their roles.

In user module Registration page contain user name, email ID, password and conformation of password. User fill all this information and then sign up.

Fig 3.3:- Regisration page

After registration, user can login using an ID and password. login page created with PHP and MySQL database. Here also add forget password page. After login There ope a user dashoboard page here user can edit detail, send files, ask for kay request and have data auout files transaction.

Fig 3.4:- User Dashboard page

C. Database module

To create and delete a database, you must have administrator rights. The MySQL query function is used by PHP to build a MySQL database. Two parameters are required for this function, which returns TRUE upon success or FALSE upon failure.

Selecting database:

Once you have established a connection to the database server, you must select a specific database to which all your tables are associated.

This is required because multiple databases can be hosted on one server and you can work with one database at a time.

PHP provides the MySQL_select_db function to select a database. Returns TRUE on success or FALSE on failure.

Creating Tables:

You must follow the same steps as when building the database to create tables in the new database. To build the tables, first create a SQL query, then use the MySQL_query() method to run the query.

In case you need to create many tables, then it is better to first create a text file and put all the SQL statements in this text file, then load this file into the $sql variable and run those statements.

Fig 3.5:- Database page

V. RESULT

When someone downloads the file without asking secret key system shows them as leaker and show all report to admin. User can block or remove the leaker user.

Fig 4.1:- Leakage Information page

VI. SCOPE OF PROJECT

Data Leakage Detection: The main scope of this module is provide complete information about the data/content that is accessed by the users within the website. Forms Authentication technique is used to provide security to the website in order to prevent the leakage of the data.

VII. COCLUSION

In our data leakage detection project, we presented that whenever someone shares files with others, there will be a secret key, and if someone wants to download or access the file, they need the secret key, which will be requested by the sender who is sharing the file, after secret key sharing user can download this file if someone downloads this file without asking for secret key using guess method it will be flagged as leak

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A Framework design of Fingerprint Based Voting System using Arduino and Machine Learning

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ABSTRACT

The guiding ideas of democracy are free elections. Through elections, humans reaffirm their voice, their beliefs, and pick anybody whose thoughts guide them most. Voters will decide on their representatives by elections. The want to maintain free, equal, and secret elections is emphasised here. It entails the supervision of elections by means of free, accountable, unbiased and self-sustaining electoral bodies. The use of science in balloting will make it easier, extra effective, and much less inclined to breaches of security. Technology will enhance and pace up the security of all votes and make the counting and computerized verification a good deal greater effective. The secrecy of a ballot have to be maintained. No proof of which candidate receives specific vote casting shall be supplied with the aid of the balloting system. The authors applied the Authenticated Voting Machine in the College elections in this paper to ease the procedure and enhance transparency. The notion is nevertheless in its infancy and requires extra lookup to hold it steady and theoretically strong. To make certain protection, the mannequin makes use of radiofrequency and fingerprint recognition.[1]

Keywords: supervision, counting, proof, casting, protection.[1].

I. INTRODUCTION

Biometrics is the science and technology of measuring and analyzing biological data. Biometrics refers to technologies that measure and analyze human body characteristics, such as DNA, fingerprints, eye retinas and irises, voice patterns, facial patterns and hand measurements, for authentication purposes. The field of biometrics was formed and has since expanded on too many types of physical identification. Among the several human fingerprints remain a very common identifier and the biometric method of choice among law enforcement. These concepts of human identification have lead to the development of fingerprint scanners that serve to quickly identify individuals and assign access privileges. The basic point of these devices is also to examine the fingerprint data of an individual and compare it to a database of other fingerprints. In this project fingerprint used for the purpose of voter identification or authentication. As the thumb impression of every individual is unique, it helps in minimizing the error. A database is created containing the fingerprint images of all the voters as required. Illegal votes and repetition of votes is checked for in this system with accurate coding. Hence with the application of this fingerprint based EVM system elections could be made fair and free from rigging. Further that the elections would are no longer tedious and expensive jobs. [3]

II. LITERATURE REVIEW

2.1 Electronic Voting in India.

The Election Commission of India developed the country's EVMs in partnership with two government-owned companies, the Electronics Corporation of India (ECIL) and Bharat Electronics Limited (BEL). Though these companies are owned by the Indian government, they are not under the administrative control of the Election Commission. They are profit-seeking vendors that are attempting to market EVMs globally. The first Indian EVMs were developed in the early 1980s by ECIL. They were used in certain parts of the country, but were never adopted nationwide. They introduced the style of system used to this day, including the separate control and ballot units and the layout of both components. These first-generation EVMs were based on Hitachi 6305 microcontrollers and used firmware stored in external UV erasable PROMs along with 64kb EEPROMs for storing votes. Second-generation models were introduced in 2000 by both ECIL and BEL. These machines moved the firmware into the CPU and upgraded other components. They were gradually deployed in greater numbers and used nationwide beginning in 2004. In 2006, the manufacturers adopted a third-generation design incorporating additional changes suggested by the Election Commission. According to Election Commission statistics, there were 1,378,352 EVMs in use in July 2009. Of these, 448,000 were third-generation machines manufactured from 2006 to 2009, with 253,400 from BEL and 194,600 from ECIL. The remaining 930,352 were the second-generation models manufactured from 2000 to 2005, with 440,146 from BEL and 490,206 from ECIL. The first-generation machines are deemed too risky to use in national elections because their 15-year service life has expired [5], though they are apparently still used in certain state and local contests. In the 2009 parliamentary election, there were 417,156,494 votes cast, for an average of 302 votes per machine. [3][4]

2.2 Evaluation of Voting Equipment.

In the recent years, voting equipment which were widely adopted may be divided into five types.

1) **Paper-based voting:** The voter gets a blank ballot and use a pen or a marker to indicate he want to vote for which candidate. Hand counted ballots is a time and labor consuming process, but it is easy to manufacture paper ballots and the ballots can be retained for verifying, this type is still the most common way to vote.

2) **Lever voting machine:** Lever machine is peculiar equipment, and each lever is assigned for a corresponding candidate. The voter pulls the lever to poll for his favorite candidate. This kind of voting machine can count up the ballots automatically. Because its interface is not user-friendly enough, giving some training to voters is necessary.

3) **Direct recording electronic voting machine:** This type, which is abbreviated to DRE, integrates with keyboard, touch screen, or buttons for the voter press to poll. Some of them lay in voting records and counting the votes is very quickly. But the other DRE without keep voting records are doubted about its accuracy.

4) **Punch card:** The voter uses metallic hole-punch to punch a hole on the blank ballot. It can count votes automatically, but if the voter's perforation is incomplete, the result is probably determined wrongfully.

5) **Optical voting machine:** After each voter fills a circle correspond to their favorite candidate on the blank ballot, this machine selects the darkest mark on each ballot for the vote then computes the total result. This kind of machine counts up ballots rapidly. However, if the voter fills over the circle, it will lead to the error result of optical scan. [3][2]

III. PROPOSED METHODOLOGY

The system aims at developing a fingerprint based advanced Electronic Voting Machine (EVM) which helps in free and fair way of conducting elections which are basis for democratic country like India. This project consists of following units a Voting system, fingerprint module and Arduino controller Unit. The voter first puts his finger on the fingerprint module which checks for the authentication of the user. If the voter is the authenticated one, he will now poll his vote in the voting system by simply pressing button against his favorite leader through a button. The control unit consists of a Arduino controller, push button for different operations of EVM. The votes casted for particular candidate in that particular section of constituency is shown through an LCD display. To perform this intelligent task, Arduino controller is loaded with an intelligent program written in embedded "C" language. The system consists of following hardware:

3.1 Arduino Controller

Arduino controller is Brain of this project, it has the features like 32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.8 kB to 40 kB of on-chip static RAM and 32 kB to 512kB of on-chip flash memory. 128-bit wide interface/accelerator enables high-speed 60 MHz operation. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems. MAX-232 The MAX-232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX-232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals. The drivers provide RS-232 voltage level outputs (approx. ± 7.5 V) from a single + 5 V supply via on-chip charge pumps and external capacitors. Crystal oscillator an electronic oscillator is an electronic circuit that produces a repetitive Electronic signal, often a sine wave or a square wave. ARM controller internally having 4 MHz clock frequency. We are giving the 60 MHz clock frequency as an external source for increasing the system performance.[2]

Fig.1. Block diagram of proposed system

3.2 Fingerprint module

The device is the most popular among all the identification devices because of its ease in acquisition, and also the number of sources that are available for its data collection. It has found its vast use in law enforcement and immigration purposes. The module used here is R305. The basics of this identification process come from "Galton points" – a certain characteristics defined by Sir Francis Galton, through which the fingerprints can be identified. In this module the scanned image are compared with an earlier existing finger print of yours to get the correct identity. The comparison is carried out by the processor and the comparison is made between the valleys and ridges though your whole fingerprint is recorded, the computer takes only parts of the print to compare with other records. [2][4]

3.3 Power source module

The major blocks of power supply are given below Transformer, Rectifier, Filter, 7805 voltage regulators. These will provide a regulated power supply to the unit which is first converted into 12V AC. 12V AC is then converted into DC by using rectifier circuit. Finally, the 7805-voltage regulator provides constant 5V DC supply which will be given to circuit.

3.3.1 Keypad

Push buttons are used in keypad. A push-button or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. [5]

3.3.2 Reset

This button is used to reset the whole system so that it can be configured for next elect

IV. HARDWARE IMPLEMENTATION
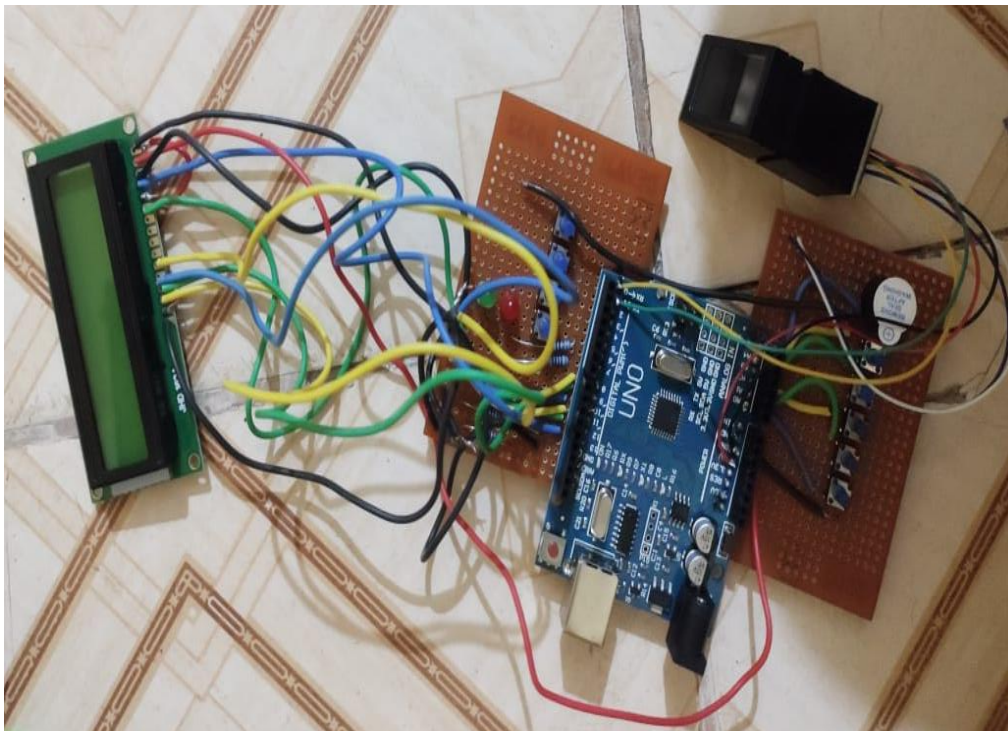
Fig. 2. Demonstration of voting system

V. ADVANTAGES

- It is economical
- Less manpower required
- Time conscious, less time required for voting & counting
- Avoids invalid voting as it prevents unregistered voters from voting.
- Ease of transportation due to its compact size.
- Convenient on the part of voter.
- This system allows only authenticated voting than the existing equipment as the person is identified based on his Fingerprint which is unique to each individual.
- Low power consumption [2]

VI. APPLICATIONS

This project can be used as a voting machine to prevent rigging, during the elections in the polling booths.

- Fast track voting which could be used in small scale elections, like resident welfare association, "panchayat" level election and other society level elections, where results can be instantaneous.
- It could also be used to conduct opinion polls during annual shareholders meeting.
- It could also be used to conduct general assembly elections where number of candidates are less than or equal to eight in the current situation, on a small-scale basis. [4]

VII. CONCLUSION

The project "Fingerprint Based Voting Machine" was mainly intended to develop a fingerprint based advanced Electronic Voting Machine (EVM) which helps in free and fair way of conducting elections which are basis for democratic country like India.[4]

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Home Automation System Using Arduino

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ABSTRACT

Home automation is an emerging technology that has revolutionized the way people live their lives. The use of technology to automate tasks in the home has become more popular in recent years, as people seek to simplify their lives and save time. In this research paper, we propose an Arduino-based home automation system that is designed to improve the quality of life for people by reducing the time and effort required to perform daily tasks.

Keywords: Home Automation, Arduino, Sensors, Energy-efficient, User-friendly.

I. INTRODUCTION

to Home automation is the process of automating various tasks within the home environment to improve the quality of life for people living there. The use of automation technology has increased significantly in recent years due to its various benefits, including energy efficiency, convenience, and increased security. Arduino is a popular microcontroller platform used in home automation due to its low cost, ease of use, and ability to interface with various sensors and electronic components. This research paper explores the feasibility of implementing a home automation system using Arduino and its various components.

II. LITERATURE REVIEW

It was from 1880s wireless communication was started. Nikola Tesla gave the idea of using remote control for vessel and vehicles in 1898. Further with the study of electrical appliances the idea of home automation. A. R. Al-Ali and M. Al- Rousan were the first to develop home automation system using java programming. It mainly used Wi-Fi as a medium for communication between software and hardware component.

The use of home automation has been increasing in popularity over the years, with various studies highlighting the benefits of automation technology in the home environment. Researchers have explored the use of various microcontrollers, including Arduino, in home automation systems. Arduino microcontrollers have been found to be suitable for use in home automation due to their low cost, ease of use, and ability to interface with various sensors and electronic components. Some of the sensors commonly used in home automation include infrared sensors, light dependent resistor sensors, and light sensors. The use of these sensors helps to automate tasks such as switching on and off lighting, among others.

III. COMPONENTS REQUIRED

1. Arduino UNO
2. IR Sensor
3. LDR sensor
4. Relays for connecting home appliances
5. Mobile phone to operate home appliances Arduino UNO

1. Arduino uno:

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.
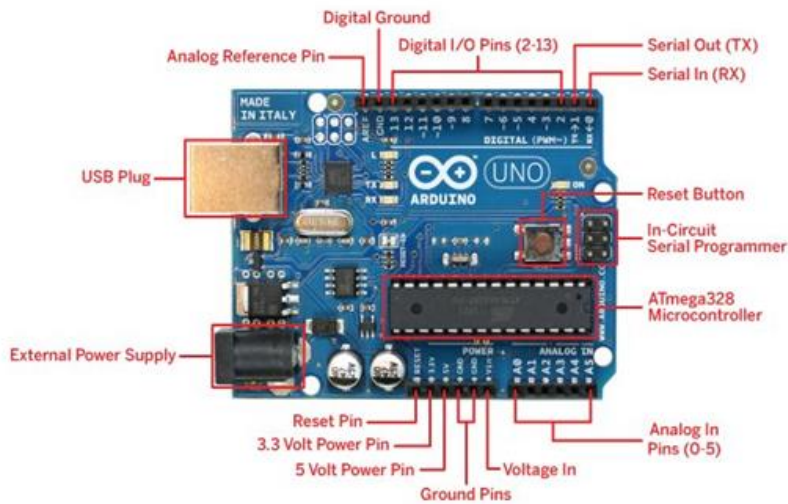
Fig. 1 Arduino Uno

2. Infrared sensor:

Fig.2 IR Sensor

An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion. Definition and relationship to theelectromagnetic spectrum. Infrared radiation extends from the nominal red edge of the visible spectrum at 700 nanometres (nm) to 1 mm.

This range of wavelengths corresponds to a frequency range of approximately 430 THz down to 300 GHz nanometres (nm) to 1 mm. This range of wavelengths corresponds to a frequency range of approximately 430 THz down to 300 GHz.

3. LDR sensor

LDRs are tiny light-sensing devices also known as photoresistors. An LDR is a resistor whose resistance changes as the amount of light falling on it changes. The resistance of the LDR decreases with an increase in light intensity. This property allows us to use them for making light sensing circuits.

LDR sensor modules are used where there is a need to sense the presence and absence of light is necessary. These resistors are used as light sensors and the applications of LDR mainly include alarm clocks, street lights, light intensity meters, and burglar alarm circuits.

Fig. 3 LDR Sensor

4. Relays for connecting home appliances:

A relay is an electrically operated switch that can be turned on or off, letting the current go through or not, and can be controlled with low voltages, like the 5V provided by the Arduino pins. Controlling a relay module with the Arduino is as simple as controlling any other output.

Fig. 4 Relay Board

IV. PROBLEM STATEMENT

In the present-day home automation is becoming essential for the purpose of improving our life condition. Convenience and ease of using home appliances is what home automation is offering. Home automation offers a futuristic way of life in which an individual gets to control his entire house using a smart home, from turning on a TV to locking/unlocking doors; it also offers an efficient use of energy. But to get or acquire such system installed will cost a lot of money and that is the major reason of why home automation has not received much demand and attention, adding to that also the complexity of installing it and configuring it. Thus, it is essential to make it cost effective and easy to configure, if this is granted to people then will be willing to acquire it in their homes, offices and schools. In other words, a system modification for the home automation is required in order to lower the price of applying it to houses.

V. PROPOSED WORK

Home automation describes a system of networked, controllable device that work together to make your home more comfortable, customized, efficient and secure.

In this device we are using Arduino which is most commonly used device for automation. Arduino is a hardware which is used to connect computer and the project model so that we can control it by using Arduino code accordingly. Arduino is a microcontroller it is just like human brain it processes information and then it performs some Logical and mathematical operation on that information. The proposed work involves the design and implementation of the Arduino-based home automation system. The system will be designed to automate tasks such as lighting, temperature control, and other such automated task. The system will use sensors to monitor the environment and actuators to control the appliances. The system will be tested to ensure that it meets the design specifications and is easy to use and maintain.

VI. IMPLEMENTATION

Home automation using Arduino involves the integration of various electronic devices and appliances into a central system, which is then controlled using a microcontroller Some of the most common applications of home automation using Arduino include Lighting control:Arduino can be used to control the lighting system in a home, enabling user to switch lights on and off using any electronic device.

Automatic doors: Arduino can be used to open and close doors without anyone having to physically make a movement.

VII. ADVANTAGES

1. The proposed system has several advantages, including energy efficiency, convenience, and increased security.
2. The use of sensors and automation technology helps to reduce energy consumption within the home environment, leading to cost savings.
3. The system also provides convenience by automating tasks such as lighting and temperature control.

4. Additionally, the system increases security by providing real-time alerts in case of any security breaches within the home environment.

VIII.   CONCLUSION

The implementation of a home automation system using Arduino and its various components is a feasible and cost-effective solution for automating various tasks within the home environment. The proposed system is energy-efficient, user-friendly, and provides increased security to the homeenvironment. The proposed system can be extended in several ways to provide even more functionality and convenience to homeowners.

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Home Automation System using IoT

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ABSTRACT

The theme of this home automation project using IOT is to create a smarter, more efficient, and more secure home .Time is a very valuable thing. Everybody wants to save time. In this Project We are using Different types of Sensors and Arduino Board I.R. Sensor, LDR sensor, Parking Motor etc. This project will focus on using IOT technology to automate various aspects of the home, such as lighting, Auto Open Close Parking Gate, security, and many more. The goal is to create a home that is more comfortable, efficient, and secure, while also reducing energy costs.

Keywords— Arduino , I.R. sensor, Auto Parking System etc.

I. INTRODUCTION

This study aims to develop an smart home automation system Home automation is constructing automation for a domestic, mentioned as a sensible home or smart house. In the IoT home automation ecosystem, you can control your devices like light, fan, TV, etc. A domestic automation system can monitor and/or manage home attributes adore lighting, climate, enjoyment systems, and appliances. It is very helpful to control your home devices. It's going to in addition incorporates domestic security such as access management and alarm systems. Once it coupled with the internet, domestic gadgets are a very important constituent of the Internet of Things. A domestic automation system usually connects controlled devices to a central hub or gateway. The program for control of the system makes use of both wall-mounted terminals, tablet or desktop computers, a smartphone application, or an online interface that may even be approachable off-site through the Internet. Smart Home automation refers to the use of technology to control and automate various functions in a home, such as lighting, heating, air conditioning, and security. In the context of IoT(Internet of Things) and M2M (Machine-to-Machine) communications, home automation systems can be controlled and monitored remotely through a network connection.

One of the key benefits of IoT-enabled home automation is the ability to control and monitor a wide range of devices and systems from a single, centralized location, such as a smartphone or tablet. This can include everything from lighting and temperature control to security cameras and alarm systems. Another advantage of IoT-enabled home automation is the ability to remotely monitor and control devices, even when away from home. This can be useful for controlling energy consumption and ensuring the safety and security of the home.

II. LITERATURE REVIEW

Home Automation System have become increasingly popular as the demand for efficient smart home Facilities. The purpose of this literature survey is to explore the features, benefits, and drawbacks of home automation system[1].

A. Features of Home Automation System :

Home automation allows you to control entertainment, lighting, electrical appliances, etc. remotely, to help you add efficiency to your schedule. Your system will shut off lights at night, so you don't have to worry about wasting energy. You can automate your system and program it to follow your preferred routines. [2].

B. Benefits of Home Automation System:

Many people invest in home automation technology for peace of mind. If you can't remember whether you closed the garage after you left, you can verify remotely with an app. Or, you can set up geofence automations so that the garage door closes, all exterior doors lock, and lights turn on or off once your phone, security system key fob, or vehicle tracker is a certain distance away. Here's another great example: if you're worried about frozen pipes this winter, temperature and water leak sensors can notify you when that's a risk. Until then, you get to rest easy.Plus, smart baby monitors and remote caregiving hubs like Alexa Together let you check on your loved ones—from a sleeping newborn to an aging parent. Even fur-babies benefit from home automation thanks to pet cameras—some of which dispense treats as part of a home automation routine. [2].

C. Drawbacks of Home Automation System:

One of the main drawbacks of home automation is the cost. Smart devices and systems can be expensive, and the cost can add up quickly if you want to fully automate your home. Reliance on Technology: Home automation also means that you are relying on technology to control various aspects of your home.[2].

III. PROBLEM STATEMENT

The problem statement of the home automation system is the need for efficient home facilities and Security in today's fast-paced world. One of the biggest disadvantages of building automation systems is that many systems go without regular service. This eventually leads to larger problems and increased costs. Most issues develop over time, and a qualified service technician can help prevent them through regular maintenance. The IoT based model should provide the essential functionality needed for home automation, including smart parking, smart door bell, and other services, as well as allowing users to moniterate the system over the world . The solution to this problem is an embedded based home automation system to moniter the all appliances which are present in the smart home [3][4].

IV. TECHNOLOGIES USED

The Home Automation System Model will be developed using the following technologies:
- Embedded C
- Arduino Software

Overview of technologies used:

A. Embedded C

Embedded C is generally used to develop microcontroller-based applications. C is a high-level programming language. Embedded C is just the extension variant of the C language. This programming language is hardware independent [5].

B. Arduino Software

Arduino IDE is the software is used to create a home automation system by using arduino Nano. The Arduino Nano is a microcontroller-based device with 16 digital pins that can be used for various purposes. It can be used for almost every task, from minor to massive industrial-scale projects. It can also be used for prototyping and developing new applications.

V. E-R DIAGRAM
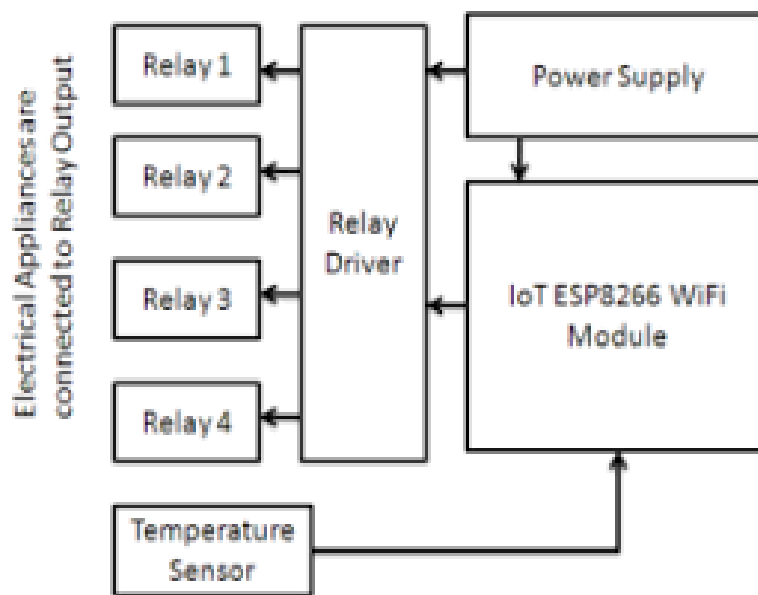
Fig. 1. **E-R Diagram**

VI. RESULT AND OUTCOME

The working of Home Automation System consists of the following steps:

1) **Smart Parking :** First, the user needs to enter in the home with their vehicle then he can used smart parking.
2) **Smart Door Bell :** After put hand infront of door bell sensor the door will be ranged.
3) **Smart Door (Open & Close):** Once the door opened then the user enter in the room and door illbe closed automatically.
4) **Staircase:** When then User entering in the room , if he goes to the upstairs then by stepping every stair there will be lights are on.
5) **LED Panel :** The LED Panel are used to watch the TV in your smart room.
6) **Garden Lights :** Once the sunsets the lights in the garden are blinked with the help of IR Sensors.

VII.   FUTURE SCOPE

A. Home Automation is creating new automation technologies for houses that will make them smart using internet-based technologies. These homes/houses that use home automation technologies are smart Homes.

B. This field of home automation is fastly emerging in technology making homes safer and better places to live. These features help users to virtually monitor and control home attributes like lights, entertainment systems, security, climate control, etc.

C. Smart devices are so common and popular devices that are becoming integral parts of our lives.

D. Devices like smart Homes (Google *home, Amazon Echo, Apple home pod*) and smart assistants make it easy to control smart devices installed at homes connected via IoT.

E. The System will provide the better performance home appliances.

VIII.   CONCLUSION

The home automation using Internet of Things has been experimentally proven to work satisfactorily by connecting simple appliances to it and the appliances were successfully controlled remotely through internet.

Main purpose of home automation system is to provide ease to people to control different home appliances with the help of the android application present in their mobile phones and to save electricity, time and money.

The Arduino is connected to the Bluetooth module, all the appliances can be controlled using the Arduino but it needs to be within a small distance for it to connect to the Bluetooth. Disadvantage: Since Bluetooth module is used, the range at which the home appliances can be controlled is reduced.

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Home Renting Web Based Application

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ABSTRACT

Day by day world population is growing rapidly and a huge amount of people shifting to large cities and new places for work, education or job purpose, or a better life. That's why the housing demand is increasing and house renting becoming an elemental part of our society. As a result, I realized the importance of an online house renting website and come up with a decision to implement a such web application. In this paper rental website development is discussed. Through this website, tenants can rent properties and landlords can upload their property details for rent. This website will help users to give or take rent houses without dealing with flat brokers to finally reach an agreement that suits the interests of all parties. The packaging and shifting services facility will help users to shift valuable things safely to destinations. To implement, and testing of the proposed system, this application interface has been developed using HTML, CSS, JavaScript, and MySQL database server that allows for making web pages interactive and responsive. This system was developed in such a manner so that it can provide a maximum user-friendly interface, and users can use it more efficiently.
Keywords: House Renting Website, Web Application, Security, Shifting, Movers, Rent.

I. INTRODUCTION

We are living in the modern age of technology when we really want is just stuff that works for us. Technology becoming more powerful and already involved in every sector, still, the housing sector remains watchful to face the challenges of change by employing a new strategy that facilitates easy management of rental houses, paying guests, hostels, and flats. This proposed project "The Rental Zone" deals with online house/PG/hostel/flat rent for all the tenants. Nowadays this is so tough for tenants to find suitable accommodation for living if they search it physically. In our modern society, the house rental management has become a very useful factor. This "The Rental Zone" can provide the facilities from any place to find a suitable living area according to their choice. The main foundation of the system is based on the owners and the renters and main purpose was to make an easy way to find the desired house with the desired location for the tenants. Everyone can search for their desired option from anywhere through location, type, and city. Users can log in as an owner or a tenant. He/she can contact the administrator or the buyer to rent his house to him. House owners and landlords will have to be registered users then they can easily post a property with photos, price range, other details, and a short description but it will be added and shown on the website after verifying by admin only or it may be rejected. And this will be informed to the owner or businessman through email whether his post is approved or rejected. Unregistered or general access users of this website can view the rent details and can contact a landlord. In this case, it will save valuable time as well as reduce distress and save unwanted money waste. This

system is best applicable for the above reasons making house renting an easy process. Students or employees after coming to a new city who are facing issues like 'Where to stay in a big city?', this website will help them to easily find boys or girls PG at an affordable price and get the owner's contact number. They don't have to deal with flat brokers to finally reach an agreement that suits the interests of all parties. As a result, our motive was to simplify these people's lives easier and hassle-free by simply clicking sitting their place, especially those single people or bachelors who face many problems while getting rent as most of the owner doesn't want to rent them. Users can also take packing and shifting service which facility will help to reach their furniture and valuable things safely in destinations.

II. LITERATURE REVIEWS

I have reviewed so many research papers and visited various websites regarding the house rental management system. There are several existing systems for house renting web applications and I tend to induce knowledge regarding existing systems and learn their weakness hence developing a new system to cater to the challenges the local and world domains face when dealing with house rental issues. The existing house rental website has a few drawbacks are there which make it less interactive. I have corrected and improved them and added some extra features and facilities which make it easy and more interactive. Some of the reviewed research papers are listed here: Gommans, Henry Peter, et al. (2014) researched how rental houses are currently being managed and realized during this modern age of technology all work was done manually with plenty of paperwork involved which may be a long-time process, risky, expensive, and really difficult task. Taking into consideration those facts, they decided and developed a property rental management system that may solve all the problems experienced with this present manual system. Although their system was developed in such a way that it provides a maximum user-friendly interface, but the system isn't scalable.

III. METHODOLOGY

The methodology is a contextual framework for research that describes methods, approaches, and designs in detail highlighting those used throughout the study that guides the choices researchers or other users make. The term methodology shows how data will be collected and the proposed system will be developed. The research methodology adopted in the present research work consists of multiple stages. The primary one entails a literature review and, as a result, a critical evaluation of applicable work. Then I prepared a plan for the process of creating a renting website as a whole and establishing the structure that will direct the event system.This means each phase must be completed before beginning the next phase and there is no overlapping in the phases. The phases are the requirement and feasibility study, analysis phase, design phase, coding and implementation phase, testing phase, and finally the maintenance phase. Analyzing, validating, and managing systems is known as software requirements analysis which is categorized into Functional Requirements and Non-Functional Requirements. In this process, I have tried to fulfill the potential expectations of the users of this proposed system. Later I did design the system, coding, implementation, and testing. The purpose of testing is to execute a program with the intent of finding errors and when an error is found, it must be determined whether the error is a design error or not, then make it errors free. After successfully completing the project is ready for the maintenance phase.

IV. SYSTEM DESIGN

System Design is the process of designing the architecture, components, interfaces, and data for a system to meet the end-user requirements. The main user of this system is general people, that's why I design more dynamic and user-friendly website that will be more useful for them. This system style is the answer to the creation of a brand-new system which could be seen as the application of systems theory to product development. This section consists of many systems and focuses on the careful implementation of the possible system. For styling this system I have use two phases of development logical and physical style. Throughout the logical style, section I analyzed and describes inputs (sources), outputs (destinations), databases (data sores), and procedures (data flows) tired a format that meets the user's needs. I conjointly specify the user desires and at a level that nearly determines the information the knowledge the information flow into and out of the system and therefore the data resources. Here the logical style is completed through information flow diagrams and info style. In physical style I produces the operating system by shaping the planning specifications, that tell the programmers specifically what the candidate system should do. The programmers write the desired programs that accept input from the user, perform the required process on accepted information through the choice and manufacture the specified report on a tricky copy or show it on the screen.

Flowchart:

V. TECHNOLOGIES USED

There is a total of two major parts of the project plan, which are frontend and backend parts. In this scientific research project HTML, CSS, JavaScript used for the frontend design of the system. MySQL are used for creating and designing the database and Backend part. For writing all the codes Sublime text editor is used.
HTML: HTML stands for Hypertext Markup Language which allows the user to make and structure sections, paragraphs, headings, titles, line breaks, add media, links, blockquotes, etc. for websites and applications.

CSS: Stands for Cascading Style Sheets which is a simple design language intended to simplify the method of constructing this website presentable. It's designed to enable the separation of presentation and content, including layout, colours, spacing, padding, fonts, and so on.

JavaScript: JavaScript is a scripting or dynamic computer programming language that allows to implementation of complex features on web pages and client-side scripts to interact with the user and make dynamic web pages.

Database:A database is a collection of inter-link data stored with minimum redundancy to serve many users fast and efficiently and it's an organized collection of structured data, or information, typically stored electronically in a computer system so that data can be easily accessed, managed, modified, updated, controlled, and arranged. The general objective is to make details access easy, fast, and flexible for the user.

DevOps : DevOps is the combination of cultural philosophies, practices, and tools that increases an organization's ability to deliver applications and services at high velocity: evolving and improving products at a faster pace than organizations using traditional software development and infrastructure management processes.

VI. IMPLEMENTATION

For renting a house, implementation, and testing of the proposed system, a web application interface has been developed using HTML, CSS, JavaScript that allows us to make web pages interactive and responsive. Whenever someone wants to rent a house, he needs to search it manually by visiting door to door which kills his time and money also. What to do if someone wants to do this easily and hassle-free by simply clicking sitting their place? This "The Rental Zone" website will increase customer retention and simplify house and staff management. This is an online tool through which tenants can book available houses/PG/hostel/flats online prior to their date of using the property instead of walking around and asking for a vacant house. Visions and plans become reality in the project implementation phase. To carry out activities planned within the form with the aim of achieving project goals and delivering results and outputs is to execute a project. Its success is contingent on a variety of internal and external factors. A very well-coordinated project team and accurate monitoring of project progress and associated costs are two of the most important ones. The lead partner and project manager are responsible for the overall management, and the lead partner often uses or engages a United Nations organization. Since the project is ongoing, the project management team must have an economical management strategy and be adaptable to changing needs and circumstances. results and outputs. Quality suggests meeting expectations delineate within the application and people united inside the partnership. Software Components will be made up of different processing phases. In the database, the information is organized logically so that it can be retrieved easily, and it would be used to save data from the hardware layer. The server can use a job to clean and process the unprocessed data before analyzing it. The processed data will be saved in a separate database and used for user registration and login and house renting. The processed data will then be submitted to the DB for analysis, and it will reflect in the front-end. For data monitoring, enhancing, implementing, and validating the controller will be responsible and he will pass the model to the database after validation. The data that has been processed and analyzed can now be visualized. The server will show the processed data via a GET Request. The server will encrypt the information sent over this channel. End devices will receive encrypted data and will be required to decrypt it to ensure data security. Data that has been decrypted and received on end devices can then be visualized. Frontend design must be

simple and easy so that every user can access it hassle-free or without any trouble. In this modern age of technology, we are having many devices like smartphones, laptops, notebooks, and tablets from where everyone is using the internet that's why we intended to make our house rental website responsive so that the user has not faced any difficulties browsing from anywhere anytime. I took help from HTML, CSS, JavaScript,AWS,DevOps and technologies to make this website's frontend part means user interface. To implement the front-end design some factors were followed such as users must enter the password for safety so that they can update their profile. Every landlord must be a registered user to add their post and user can log in using their registered account

VII. RESULT

In the present paper for house rent, implementation, and testing of the proposed system, a prototype website interface has been developed and designed using various coding languages. After performing the testing phase, I found lots of bugs or errors in the web application and fixed all the bugs. I have applied many different technical aspects and dedicated 100% to every step from gathering information to getting desired output. The application performs well, and the errors in posting the reports and notes have been corrected. This website simplifies work for the tenants and rental managers so that all their work can be efficient and effective. Now I have made responsive web applications, later I will make a mobile application also. This will make my system more user-friendly and will help users to use the website more efficiently. I intend to implement artificial intelligence, add more features, and keep upgrading gradually and progressively. We are currently focusing on making the website more secure and implementing a more attractive and interactive UI, since we don't have many users, we are working on search engine optimization.

VIII. CONCLUSION

The main purpose of this house rental website is to make an easy way to find a house/PG/hotel/flat for tenants as they suffer most while getting rent. I gave effort into this website to establish a platform where owners and tenants can easily interact and believe that this rental zone website is a blessing for them and makes their life easier. This online house rental zone is very easy to use, and the best suitable for the owners as well as tenants. Because it saves tenants valuable time as well as reduce distress and save unwanted money waste. For the owner, there is no need to explain the room details on the speaker and for the renter, there is no need to go door to door. The online house rental website or system is the best way to search for a house, apartment, office, PG, or hostel, and that online system makes renting process easy and effective. General people are the main user of this website, that's why I try to make a more dynamic and user-friendly website that will be more useful for them. Through this website, tenants can book available houses/PG/hostel/flats online prior to their date of using the property instead of walking around and asking for a vacant house. Finally, the goal of the project is to make an online rental system for all tenants and landlords to create a better relationship and easy interaction between them which can be achieved through this project

IX. FUTURE SCOPE OF THE STUDY

Nowadays house renting has become a very useful factor but finding the desired house in a suitable living area is not an easy task. Current manual system is money wasting and time killing process also. Householders and tenants must face many difficulties and go through lots of processes to make an affordable agreement. The rental zone will help users to find and rent houses easily. Our motive is to simplify these people's lives easier and hassle-free by simply clicking sitting their place. Through this website, a renter can easily find a rentable house, PG, hostel, or flat. Having the search functionality based on location will be able to help users find houses easily where they want to live. This system will save tenants valuable time as well as reduce distress and save unwanted money waste. This online house rental zone is very easy to use, and it will increase customer retention

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House Price Prediction Using ML

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ABSTRACT

The real estate market stands out as one of the bestwatcherfor a value and consistency. Using machine learning technique to increase and predict costs with high efficiency is one of the key areas the purpose of this article is to estimate the market value of real estate. the system will help you find the starting price of property based different areas. By analyzing past business modules and price ranges and future progress future price can be predicted. This text means estimating house prices in the estimate the market value of real estate. This test means estimating houses prices in the city of Bengaluru using a multiple linear regression algorithm. It will help clients make a will without resorting to a broker. The authors developed a very linear regression model to predict house prices and tested the model using data from Bengaluru real estate prices. From the data analysis and experiments in this article, it can be concluded that various types of horizontal lines for real estate prices in some areas can be well predicted and analyzed, and the algorithm can also be improved by many machine learning methods.

Keywords: real estate, machine learning, multiple linear regression, Analysis, business modules

I. INTRODUCTION

to It has been one of the most important economic studies of our time due to its significant impact on business and economy, such as economics, construction, investment and public welfare. In general, buying and investing in a land project involves times as many transactions between different parties. Three, is an important decision for both families and businesses. How to construct a real model to accurately estimate the value of real estate has been a difficult topic, and has potential for further research. It is generally accepted by scholars () that it is impossible to accurately predict the specific price () of a particular product (), because there are many factors that affect the final price of factors exerting influence on the eventual cost. According to economic principles, the market price is properties is achieved when the supply and demand curves are interwoven with each other, which is subject to factors, both subjectively and objectively. In practice, this is doubtful that the market price of the property will be equal to the market price value because the real estate market was too unpredictable and volatile to be considered an ideal market. interior architectural features (such as session location, number of rooms, etc.) and other spatial attributes (such as demographic characteristics, income, population), level starting algorithm (such as linear regression) 0.113 prediction error. congestion etc.). uses machine learning algorithms; where machine learns from the data and uses to predict the new data. As we know, strategic models that accurately predict future results are finance, business, banking, medicine, electricity business, biological ground, sports and others. A method for calculating property is based on elements. In cities like Bangalore, a

potential buyer of will consider many factors such as 's location, size, proximity to parks, schools, hospitals, electricity at stations, and most importantly, the price of the stations. The main purpose of this article is to apply machine learning techniques and incorporate them into machine learning models. Machine learning algorithms generate mathematical models using data models, also known as decision-making data, without being specifically programmed to make decisions. This is where machine learning comes in, training the ML model with hundreds or thousands of data. A solution can be found to accurately estimate the cost and send it to anyone who needs it. Regression is a machine learning tool that supports you to make predictions by learning from available measurable data and measuring the relationship between a target parameter and multiple variables. no. According to these details, the price of a house is the number of rooms, living space, area, etc. subject to certain restrictions. If we ask Forge to calculate how to use this index, we will calculate the value of houses in an area. The target attribute of the model is the attribute value, and the individual attributes are: No. BHK, No. Bathrooms, Sq. foot, Location, of the property.

II. LITERATURE SURVEY

In this article, we explore various machine learning algorithms to improve the training of Machine Learning models. There are many factors that affect real estate prices. In this questionnaire, these items were divided into three main categories: plausibility, concept, and original. Our property is limited to those who describe the house, such as the size of the house, rooms, kitchen and parking, open nursery courtyard, land size and model and age of the building, and the idea is architectural idea. was prepared. from distribution to attracting buyers, such as the potential of the middle house, sustainable and green products and quality. The location of the home has a great influence on its value. This is because the region has chosen land value models. In addition, the district chooses businesses such as schools, fields, crisis locations and welfare places, and family entertainment venues such as strip malls, gourmet tours or more important pathways to open up the magnificent scenery.

Use machine learning to increase the accuracy of real estate price predictions. Real estate data analyzed urban buildings from Fairfax County and compared the classification accuracy of various algorithms. He later developed a better model for further consideration as a measure of home price to assist real estate agents. A few years ago, real estate companies tried to manually estimate real estate values. The company has a special committee of that is responsible for estimating the value of the real estate. They determined the value by analyzing previous records. But this estimate is wrong 25 percent of the time. Therefore, both buyers and sellers lose. Hence there are many systems developed for house price prediction.

III. METHODOLOGY

We build UI (User Interface) to get user feedback. Among them, we use some important tools such as HTML, CSS, Java Script. We also use Nguni's local server. Finally check the API with the Postman application. We are using Anaconda software which we use to write our machine learning algorithm while working on the backend. NumPy for machine learning, Pandas, Matplotlib, Seaborn, etc. We also used some advanced python libraries such as Using these libraries we load the data, clean the data, analyze the data, remove outliers and find the data.

Fig 1: Attributes in the data set

We use the linear regression algorithm to perform this task. Because in this study, we want to estimate the house price and house prices are continuous data. Therefore, we use the regression algorithm for continuous data. We got the highest score in linear regression when choosing the optimal algorithm for grid search cv for That's why we use the Linear Regression algorithm. In the linear regression algorithm, we use the concepts of coefficients and trends. Because linear means harmonious. line equation comes with two elements, slope and intersection.

Fig 2: Drop unused features

Fig 4: Drop null values

1. Data collection and analysis:

My process can be broken down into several stages. The first phase is phase data collection, I online data collection phase. This will be used to train the machine learning model. The data collected in this category are raw and redundant data. According to file. The value column in database is a variable and some columns are individual attributes (also known as attributes).

This file has many properties, including:

- Area type
- Availability
- Location
- Size
- Society
- Total square foot
- Bath
- Balcony
- Price

2. Data Cleaning:

Losing data in real life is always a problem. Fields such as machine learning and data mining face serious problems in estimating the accuracy of the model because a missing value of results in poor data. I check for missing values in any of the green data rows to clear the data. But the blank line was not found in my file. So, I enter the next level which is   files first.

3. Data Processing:

I converted my raw data into a form designed to fit the machine learning model. Since I have to use the multiple regression model and needs to learn from my data, all the independent variables of should store the data in numbers, not in written form. After manually filling in the data from input   there may be some errors in input, null values or null values, human errors or unrealistic values, which we call outliers. So,to overcome the inconsistency of we need to process and organize the data of the aggregated results. may give model   a true estimate of   close to the true value. In Pre-Data Processing and Cleaning, we remove the important ones, check the entire database and also remove the redundant data (independent characters) for precision.

4. Data visualization:

Date visualization   data view is a data analysis area related to the visual representation of data. Theorganizes informationclearlyand is a good way to think about communication through information.we are using data view where we can get the visual content of the data. With pictures, maps and charts, human brains can easily process and understand   information given. The Matplotlib and Seaborn we are using are python libraries for displaying data. There are modules built in, which can create different graphics. Matplotlib is for embedding graphs in the application, while Seaborn is   primarily for mathematical graphs.

5. Distribution of data:

The choice of size of each data set will be somewhat speculative based on the overall sample size of and a full discussion of is not clear in this process. Overall, more training data leads to better model Performance and potential performance, and more testing data leads to better evaluation of models.

6. Training model regression model:

The 80% of the databases were used to generate the sample, and 20% of the database samples were used to test from the picture above we can see that the value depends on many factors and these factors are different events / properties. The standard function uses to calculate the coefficient and calculate the "c" part. After calculating these, the model will calculate for a custom entry. Line generates code where you enter a specific number (X) and outputs the target variable (Y) we want to find.

7. Test evaluate the performance of our model:

Represents Full Error.

- Square Error Represents Root Error Square Represents.

- Unlike error total error and square, scikit-learn frame does not contain the root of 4 error Fortunately, is also rarely used. Since the root mean square error is, it is simply the square root of the square root error of After choosing my best model, I evaluate the validity of, by calculating the square root error (RMSE) and by comparing the straight to the predicted values.

IV. RESULTS

V. CONCLUSION

The article is named "House Price Prediction Using Machine Learning" to estimate house price based on various features of the given data. We estimated the variance of the independent variable using linear regression, so we wanted to understand it from the beginning when adding the data. Ultimately, the impact of this research is to assist other researchers and in building accurate models that can easily and accurately predict the price of the house. Further studies of real samples are needed to confirm that they apply our findings. It helps people buy homes on a budget and lose less money. In the future, we will add more features to predict all possibilities of housing prices. Additional parking, schools, regional structures, etc. There are many partially completed projects such as So we can continue our work to higher sensitivity.

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Implementation on Text to Speech Synthesizer

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ABSTRACT

Speech is one amongst the oldest and most natural means that of data exchange between human. Over the years, tries are created to develop vocally interactive computers to understand voice/speech synthesis. Text-To-Speech Synthesis may be a Technology that gives a way of changing written communication from a descriptive type to a speech communication that's simply comprehensible by the top user Basically in English Language. The methodology used was Object orientating Analysis and Development Methodology whereas knowledgeable System was incorporated for the interior operations of the program. This style is going to be double-geared towards providing a unidirectional communication interface whereby the pc communicates with the user by reading out matter document for the aim of fast reading.

The Internet is a bone to mankind. The main field revolutionized by the internet is communication. A Text-to-Speech Synthesizer is used to convert text into speech (voice) by analyzing and processing. Speech synthesis can be described as artificial production of human speech. A computer system used for this purpose is called a speech synthesizer, and can be implemented in software or hardware. A text to speech system converts normal language text into speech. Synthesized speech can be created by concatenating pieces of recorded speech. This system can be composed of two parts front-end and a back-end.[4]

Keywords—Designed and implementation, Text to speech synthesizer.

I. INTRODUCTION

The speech synthesizer takes input as a sequence of words (strings) and converts it into speech that resembles as close as speaker reading that text. A Text To Speech generally contains two modules: Text Analysis Linguisticc Analysis and Digital Signal Processing. The Linguistic Analysis module takes set of strings words as an input and gives a normalized phonetic sentence. These phonetic sentences are the input for DSP module which is responsible for generating the corresponding possible natural speech. Speech Synthesizer can be used for various purposes like: i) can be used by visually impaired ii) can be used by vocally impaired iii) in language pedagogy iv) talking books and talking toys etc. Current area of research is speech prosody for all languages, which is essential in both speech synthesis and speech recognition. Synthesized speech should contain prosodic cues for clear perception of words and the construction of meaning of the utterance for listeners. This paper covers types of synthesis, details of concatenative synthesis, unit selection in concatenation synthesis and some problems associated with concatenation synthesis.[10]

II. LITERATURE SURVEY

Test-to-Speech synthesizer is developing rapidly from past few years to gain the current shape. The most suitable methods for Text To Speech synthesizer are Formant, Articulator and concatenative synthesis. Even in India some research organizations are also working on Text-to-Speech in regional languages like Marathi, Hindi, Telugu, Punjabi, Kannada, so on. A vast scope of improvement can be achieved in Text to Speech synthesis to obtain a good amount of natural and emotion aspect.[11] A speech synthesis system is by definition a system, which produces synthetic speech. It is implicitly clear, that this involves some sort of input. What is not clear is the type of this input. If the input is plain text, which does not contain additional phonetic and/or phonological information the system may be called a text-to-speech Synthesizer system. A schematic of the text-to-speech process is shown in the figure 1 below. As shown, the synthesis starts from text input. Nowadays this may be plain text or marked -up text e.g., HTML or something similar like JSML (Java Synthesis Mark-up Language) Synthesized speech can be created by concatenating pieces of recorded speech that are stored in a database. Systems differ in the size of the stored speech units; a system that stores phones or diphones provides the largest output range, but may lack clarity. For specific usage domains, the storage of entire words or sentences allows for high- quality output. Alternatively, a synthesizer can incorporate a model of the vocal tract and other human voice characteristics to create a completely "synthetic" voice output..[5]

Input text → Text and linguistic analysis → Prosody and speech generation → Synthesized speech
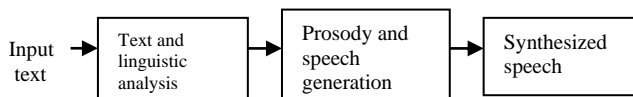
Fig.1 Schematic Text to speech synthesizer

A. Identification of the Need

Language technologies can provide solutions in the form natural interfaces so that digital content can reach to the masses and facilitate the exchange of information across different people speaking different languages. There are already many speech synthesizers existing for English.

B. Significance of the Text-to-speech Sythesizer

The significance of the ttss is The application will build a platform to aid people with disabilities especially on reading and also help get information easily without any stress. The project could also help children learn how to pronounce words and how to read.

III. SYSTEM DEVELOPMENT

Speech synthesis can be described as artificial production of human speech. A computer system used for this purpose is called a speech synthesizer, and can be implemented in software or hardware. A text-to-speech synthesizer system converts normal language text into speech. Synthesized speech can be created by concatenating pieces of recorded speech that are stored in a database. Systems differ in the size of the stored speech units; a system that stores phones or diaphones provides the largest output range, but may lack clarity. For specific usage domains, the storage of entire words or sentences

allows for high-quality output. Alternatively, a synthesizer can incorporate a model of the vocal tract and other human voice characteristics to create a completely "synthetic" voice output. The quality of a speech synthesizer is judged by its similarity to the human voice and by its ability to be understood. An intelligible text-to-speech program allows people with visual impairments or reading disabilities to listen to written works on a home computer.[4]

IV. CHOICE OF METHODOLOGY FOR THE NEW SYSTEM:

Two methodologies were chosen for the new system: The first methodology is Object Oriented Analysis and Development Methodology (OOADM). OOADM was selected because the system has to be represented to the user in a manner that is user-friendly and understandable by the user. Also, since the project is to emulate human behavior, Expert system had to be used for mapping of Knowledge into a Knowledge base with a reasoning procedure. Expert system was used in the internal operations of the program, following the algorithm of Rule Based computation. The technique is derived from general principles described by researchers in knowledge engineering techniques.[5]

V. THERE ARE MAJOR SUB-TYPES OF CONCATENATIVE SYNTHESIS

Domain- specific Synthesis: Domain-specific synthesis concatenates pre-recorded words and phrases to create complete utterances. It is used in applications where the variety of texts the system will output is limited to a particular domain, like transit schedule announcements or weather reports.The technology is very simple to implement, and has been in commercial use for a long time, in devices like talking clocks and calculators. The level of naturalness of these systems can be very high because the variety of sentence types is limited, and they closely match the prosody and intonation of the original recordings. Because these systems are limited by the words and phrases in their databases, they are not general-purpose and can only synthesize the combinations of words and phrases with which they have been pre-programmed. The blending of words within naturally spoken language however can still cause problems unless many variations are taken into account.[1]

Unit Selection Synthesis: Unit selection synthesis uses large databases of recorded speech. During database creation, each recorded utterance is segmented into some or all of the following: individual phones, diphones, half-phones, syllables, morphemes, words, phrases, and sentences. Typically, the division into segments is done using a specially modified speech recognizer set to a "forced alignment" mode with some manual correction afterward, using visual representations such as the waveform and spectrogram. Unit selection provides the greatest naturalness, because it applies only a small a90-mount of digital signals processing (DSP) to the recorded speech. DSP often makes recorded speech sound less natural, although some systems use a small amount of signal processing at the point of concatenation to smooth the waveform.The output from the best unit-selection systems is often indistinguishable from real human voices, especially in contexts for which the Text to speech synthesizer system has been tuned.[1]

Diphone Synthesis: Diphone synthesis uses a minimal speech database containing all the diphones (sound-to-sound transitions) occurring in a language. The number of diphones depends on the phonotactics of the language: for example, Spanish has about 800 diphones, and German about 2500. In diphone synthesis, only one example of each diphone is contained in the speech database. The quality of the resulting speech is generally worse than that of unit-selection systems, but more natural-sounding than the output of formant synthesizers. Diphone synthesis suffers from the sonic glitches of concatenative synthesis and the robotic-sounding nature of formant synthesis, and has few of the advantages of either approach other than small size[1].[3]

A. The structure of the text-to-speech synthesizer can be broken down into major modules

Natural Language Processing (NLP) module: It produces a phonetic transcription of the text read, together with prosody.[1]

Digital Signal Processing (DSP) module : It transforms the symbolic information it receives from NLP into audible and intelligible speech. The major operations of theNLP module.[1]

Prosody Generation: after the pronunciation has been determined, the prosody is generated. The degree of naturalness of a TTS system is dependent on prosodic factors like intonation modelling (phrasing and accentuation), amplitude modelling and duration modelling (including the duration of sound and the duration of pauses, which determines the length of the syllable and the tempos of the speech)[4]

The output of the NLP module is passed to the DSP module. This is where the actual synthesis of the speech signal happens. In concatenative synthesis the selection and linking of speech segments take place. For individual sounds the best option (where several appropriate options are available) are selected from a database and concatenated.[6]

VI. PERFORMANCE ANALYSIS

The Text to Speech Synthesizer system converts an arbitrary ASCII text to speech. The first step involves extracting the phonetic components of the message, and we obtain a string of symbols representing sound-units (phonemes or allophones), boundaries between words, phrases and sentences along with a set of prosody markers (indicating the speed, the intonation etc.). The second step consists of finding the match between the sequence of symbols and appropriate items stored in the phonetic inventory and binding them together to form the acoustic signal for the voice output device.[7]

VII. CONCLUSION

For Text to speech conversion the concatenation speech synthesis is the simplest method where phonemes are concatenated which are called units. The unit plays important role. However, concatenative synthesizers are usually limited to one speaker and one voice and usually require more memory capacity than other methods. The most important aspects in concatenative synthesis is to find correct unit length. With longer units high naturalness, less concatenation points and good control of co articulation are achieved, but the amount of required units and memory is increased. This method also has a problem of pitch differences of units and also spectral discontinuities.[10]

VIII. FUTURE SCOPE

The existing systems encounters issues while performing scan on documents with complex backgrounds and the output is expected to have less accuracy. The proposed system ensures to read text present in the image for assisting blind people. Pre- processing part ensures efficient background separation with an improved algorithm. The future work will be concentrated on developing an efficient product that can convert the text in the image tospeech with high accuracy.[11]

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Implementation and Result on Entity Relationship Model of Crime Management System

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ABSTRACT

Building this type of website is a need of this modern era, as it is going to be very helpful for police to register the FIR report of criminals and getting the required data (criminal record of that person) about that criminal whenever and wherever in the India, only if they have added the information about that criminal previously in their servers, With the help of this website, we tried to break the boundaries or the hurdles that a police personnel have to face on the daily basis such as finding the information about a particular criminal from the criminal records is hectic but with the help of this website it is become easier and helpful for police personnel.

Keywords — Technology, public safety, data accessibility, data management, FIR Writing, ease of use.

I. INTRODUCTION

Due to the global rise in crime events, crime management systems have grown in important in modern times. With the use of these systems, criminal activity may be tracked, monitored, and managed effectively, improving public safety and lowering crime rates.

Entity Relationship Model of Crime Management System, is a database system in which the police will keep the records of criminal who have done a crime and being arrested or who have been arrested, escaped the prison. This will help the police department to make accessing the criminal record easier and to manage it if they want to delete information of some existing criminal or to add information about new criminal.

The purpose of designing this system is to replace the existing manual system of FIR (First Investigation Report) managing the information of the criminal.

II. PURPOSED ALGORITHM

2.1 Modules

2.1.1 Administrators Module :-

Viewing the complaints, viewing reminders, Generating the reports.

The work of an administrator typically involves managing and maintaining computer systems, networks, and software applications within an organization. Some specific responsibilities of an administrator may include:

1) Installing and configuring software and hardware on computers and servers

2) Managing user accounts and access permissions to systems and applications
3) Monitoring system performance and identifying and resolving issues
4) Backing up data and ensuring system security
5) Managing network infrastructure and connectivity
6) Developing and implementing policies and procedures for system usage and security
7) Conducting training sessions for employees on system usage and best practices
8) Managing budgets and resources for system maintenance and upgrades.

Overall, an administrator's role is to ensure that the organization's computer systems and applications are running smoothly, securely, and efficiently. This may involve working with other IT professionals such as network engineers, system analysts, and developers to troubleshoot issues and implement solutions.

Fig: - Administrator Module

Administrator will gate a separate ID and Password for the login, the figure below shows the image of a page responsible for administrator login.

2.2 Operator Module :-

In a crime report system management, operators can be used to perform various operations on data related to crime reports. Here are some examples of how operators might be used in such a system:

1) Comparison operators: These operators could be used to compare different crime reports and identify patterns or similarities in the data. For example, a greater than sign (>), less than sign (<), or equals sign (=) could be used to compare the number of reported crimes in different neighborhoods, cities, or states.

2) Logical operators: These operators could be used to combine multiple criteria when searching for specific crime reports. For example, an AND operator (&&) could be used to find reports of crimes that occurred on a specific date AND in a specific location. An OR operator (||) could be used to find reports of crimes that occurred in either of two locations.

3) Assignment operators: These operators could be used to update or modify data related to crime reports. For example, a plus equals sign (+=) could be used to add new data to an existing crime report, such as the name of a suspect or a description of the crime scene.

4) Bitwise operators: These operators could be used to perform operations on binary data related to crime reports, such as fingerprint or DNA evidence. For example, a bitwise AND operator (&) could be used to compare two sets of DNA data and identify matches or similarities.

5) Ternary operator: This operator could be used to write conditional statements that determine how data related to crime reports should be handled. For example, a ternary operator could be used to determine whether a specific crime report should be marked as high priority or low priority based on the severity of the crime and other factors.

Fig: - Operator module

2.3 Database module :-

In a SQL crime report management system, MySQL can be used as the database management system to store and manage the data related to crime reports. Here are some steps to establish a connection between the SQL crime report management system and MySQL database:

1) Install MySQL on the server: The first step is to install MySQL on the server where the crime report management system is running. This can be done by downloading and installing the MySQL server software from the official website.

2) Create a MySQL database: Once MySQL is installed, create a new database in MySQL to store the crime report data. This can be done using the MySQL command line or a graphical user interface tool such as phpMyAdmin.

3) Configure the SQL crime report management system: The SQL crime report management system needs to be configured to connect to the MySQL database. This typically involves specifying the hostname, port number, database name, username, and password for the MySQL server.

4) Test the connection: Once the SQL crime report management system is configured to connect to the MySQL database, test the connection to ensure that the system can communicate with the database. This can be done by attempting to retrieve data from the database using SQL queries.

5) Start using the database: Once the connection is established and tested, start using the MySQL database to store and manage the crime report data in the SQL crime report management system. This can include creating new records, updating existing records, searching for records based on various criteria, and generating reports on crime statistics.

Overall, establishing a connection between the SQL crime report management system and MySQL database is an important step in building a robust and efficient crime report management system.

In database module you will gate two pages first page is a login page and the second page will be the page that shows all the criminal information.

Fig: - login page of the database module

And the second page will be the page that shows all the criminal information

Fig: - criminal database page

III. SYSTEM DESIGN

3.1 Administrator Module
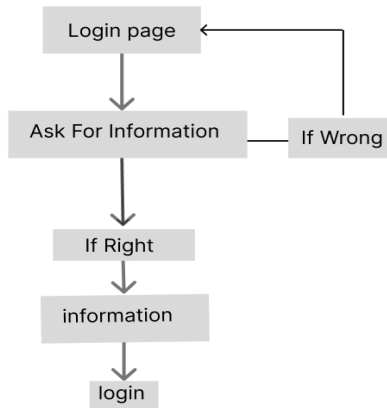
Fig:- 3.1 Administrator Login Module

3.2 Operator Module
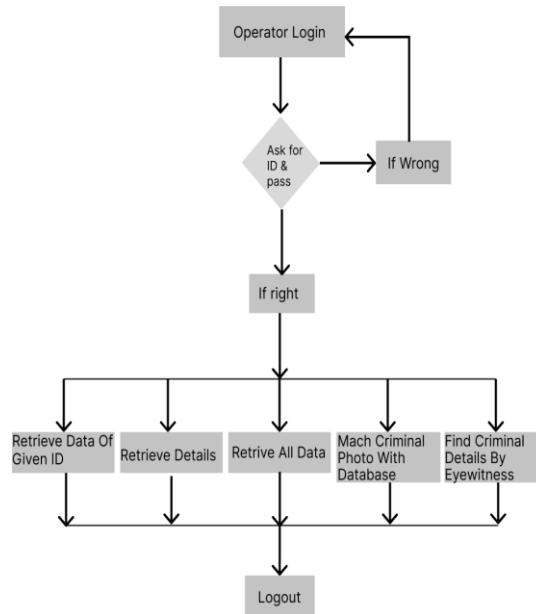
Fig:- 3.2 Operator Module

3.3 System Flow Diagram
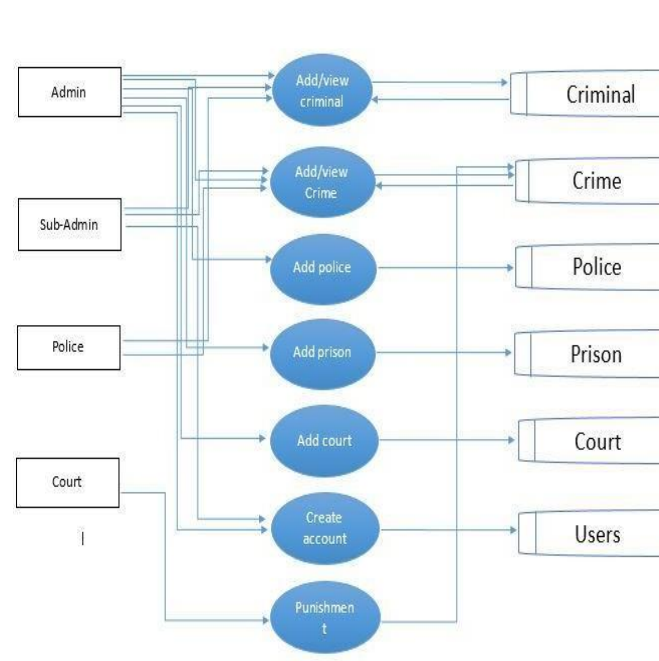
Fig:-3.3 System Flow Diagram

IV. FUTURE SCOPE

- ➢ Police access in all over India.
- ➢ Finding criminals record by scanning his\her fingerprint.
- ➢ Can add news section in website so police can add news about the criminals if they want to.
- ➢ Integration with emerging technology like AI, Machine Learning.

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Implementation and Result on a system based on SQL Injection Prevention

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ABSTRACT

In the modern world, the development of system data leakage detection via SQL injection protection is really helpful. Present vulnerabilities in online systems. SQL injection is the most common web system vulnerability. By using these systems and a secret key, we can stop data leakage. We can also identify the leak of our data files, which include vital documents, if there was a data leak. These systems are implemented using HTML, Java Script, PHP, and regular expressions, a theory of formal languages. The system tools that have been built allow users to defend their own data from SQL-based attacks.

Keywords—SQL Injection, Vulnerabilities, data leakage , Detection, watermark.

I. INTRODUCTION

An injection attack known as SQL Injection (SQLi) enables the execution of malicious SQL commands. These commands manage the web application's database server. Attackers can use SQL Injection flaws to get around application security controls. They can access the complete contents of a SQL database by getting beyond a website's or web application's authentication and authorization. They can also add, alter, and delete records from the database using SQL Injection [1].

Data allocation choices suggested by the Data Leak Detection Project improve the possibility of finding leaks. To increase our chances of finding a leak and the culprit, we occasionally add "realistic but fake" data entries.

Sensitive data must occasionally be provided in the course of business to apparently reliable third parties. If your data processing may be used by another company, the data must be delivered to many other businesses. The likelihood of data leaking from the agent exists at all moments [2].

Watermarking, whereby an individual code is encoded in each propagated copy, handles leakage detection. The creator can be found if this copy is discovered in the possession of a third party. But once again, this calls for modifying the code. In some instances, watermarks can be removed if the data is received by a malicious party. Watermarking has historically been used to detect leaks;   for example, a special code is put into each distributed copy. The attacker can be located if this copy is later found in the hand of a person who is not authorised. In certain situations, watermarks can be very useful, yet they once again require a certain modification of the original material. In addition, if the data is hacked, watermarks could vanish [3].

The recipient is a bad person. In this article, we explore covert methods for identifying the loss of a collection of items or documents. In particular, we investigate the following case: Agents get a package of items from a distributor, but later find some of the same items in an unapproved area. (For instance, information can be acquired through a legal discovery procedure or from websites.) The distributor can now determine whether it is more likely that one or more agents were responsible for the data breach than that it was independently gathered using other methods. Using a comparisonwith the cookies stolen from the cookie jar, when we catch Freddie with a single cookie, he can argue that a friend gave him the cookie. But if we catch Freddie with five cookies, it will be much harder for him to claim his hands weren't in the cookie jar.

If the distributor sees "sufficient evidence" that the agent has leaked data, they can stop doing business with them or take legal action. In this paper, we develop a model for evaluating the "guilt" of agents. We also present object distribution strategies that improve the likelihood that a leak will be found. Last but not least, think about include "dummy" items in the distributed collection. Although they don't correspond to actual entities, these items seem lifelike to agents. Mock objects function somewhat like a watermark for the entire set without altering the individual components. The distributor can be more certain that the agent was at fault if it turns out that the agent received one or more phoney items that ended up leaking[4].

This module's major goal is to give consumers comprehensive information about the data and content they can access on the website. The website's security is ensured using the form authentication mechanism to stop data leaking [5].

II. METHODS

Watermarking is a technique that can be used to embed a unique digital mark or signature within a file, document, or data set. This watermark can be used to identify the origin or ownership of the data, as well as to detect unauthorized data access or transfer [6]. Some of the methods used in data leakage detection systems with watermarking include.

Visible watermarking: Visible watermarking involves embedding a visible watermark within a file or data set. This watermark can be used to deter data leakage by indicating that the data is protected and owned by a specific entity. It can also be used to detect unauthorized data access or transfer by identifying the source of the leaked data [7].

III. ALGORITHM

MD5 is a hashing algorithm commonly used to verify data integrity. Creates a 128-bit hash value that is unique to the hashed data. A hash value is often used to verify that data has not been altered or corrupted during transmission or storage.

To detect a data breach, organizations typically use data loss prevention (DLP) tools that monitor network traffic and identify sensitive data being transferred outside the organization. These tools can use various techniques such as content analysis, file fingerprinting, and machine learning algorithms to detect and prevent data breaches.

MD5 can be used as part of the file fingerprinting process where it is used to generate a unique hash value for each file in the organization. The hash values can then be compared to the values of files found outside the

organization to determine if sensitive data has been leaked. However, MD5 is not a reliable data leak detection method because it is vulnerable to collision attacks where different data can produce the same hash value [8].

IV. APPLICATION

A. Admin Module

The Admin module allows the system administrator to set up the back-end of the system and perform basic system configuration. Part of the administrator settings is user management, which allows users to set a definable level of access/role, access to one or more branches. Admin can also set overall system security settings.

In these system administrators, log in using your email and password, which is stored in the backend. Admin can also edit password in backend.

Fig 3.1 :- login Page

When admin is login admin dashboard page is open which contain profile, send file , key request, file send y me, file send by another user registration request and leaker. By user registration request admin user seen request from user that admin can activate, block or remove user account.

Fig 3.2:- Admin dashboard page

Leaker option shows the leakage of data. Here for Downloading the send file secret key is required which is ask using key request. If there is data get download without asking secret key that means   data is get leaked so leaker shows the all information about leaker. AES algorithm is used here for encryption of secret key.

B. User Module

The user module allows users to register, log in and log out. Users benefit from being able to log in because it links the content they create to their account and allows them to set different permissions for their roles.

In user module Registration page contain user name, email ID, password and conformation of password. User fill all this information and then sign up.

Fig 3.3:- Regisration page

After registration, user can login using an ID and password. login page created with PHP and MySQL database. Here also add forget password page. After login There ope a user dashoboard page here user can edit detail, send files, ask for kay request and have data auout files transaction.

Fig 3.4:- User Dashboard page

C. Database module

To create and delete a database, you must have administrator rights. The MySQL query function is used by PHP to build a MySQL database. Two parameters are required for this function, which returns TRUE upon success or FALSE upon failure.

Selecting database:

Once you have established a connection to the database server, you must select a specific database to which all your tables are associated.

This is required because multiple databases can be hosted on one server and you can work with one database at a time.

PHP provides the MySQL_select_db function to select a database. Returns TRUE on success or FALSE on failure.

Creating Tables:

You must follow the same steps as when building the database to create tables in the new database. To build the tables, first create a SQL query, then use the MySQL_query() method to run the query.

In case you need to create many tables, then it is better to first create a text file and put all the SQL statements in this text file, then load this file into the $sql variable and run those statements.

Fig 3.5:- Database page

V. RESULT

When someone downloads the file without asking secret key system shows them as leaker and show all report to admin. User can block or remove the leaker user.

Fig 4.1:- Leakage Information page

VI. SCOPE OF PROJECT

Data Leakage Detection: The main scope of this module is provide complete information about the data/content that is accessed by the users within the website. Forms Authentication technique is used to provide security to the website in order to prevent the leakage of the data.

VII. COCLUSION

In our data leakage detection project, we presented that whenever someone shares files with others, there will be a secret key, and if someone wants to download or access the file, they need the secret key, which will be requested by the sender who is sharing the file, after secret key sharing user can download this file if someone downloads this file without asking for secret key using guess method it will be flagged as leak

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College Enquiry Chat-Bot System

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ABSTRACT

Nowadays, many people are using smartphone with many new applications i.e. technology is growing day by day. Today Artificial Intelligence is playing a major role in a variety of fields ranging from industries in product manufacturing, to customer care in public relations. As there are many online Artificial Intelligence (AI) systems or chat bots which are in existence that help people solve their problems. So, we are going to implement a virtual assistant based on AI that can solve any college related query. This will work as a College Oriented Intelligence machine. This virtual machine will respond the queries of students on college related issues. A chat bot has information stored in its database to identify the sentences and making a decision itself as response to answer a given question. The college enquiry chat bot will be built using algorithm that analyses queries and understand user's message.

Keywords— Artificial Intelligence, Database, Intelligence Machine

I. INTRODUCTION

A chatbot is a software application used to conduct an online chat conversation via text or text-to-speech, in lieu of providing direct contact with a live human agent. Designed to convincingly simulate the way a human would behave as a conversational partner [14]. Bots can be created by using language like Artificial Intelligence Mark-up Language(AIML), a language based on XML that allow developer's write rules for the bot to follow. Another drawback is writing rules for different scenarios is very time consuming and it is impossible to write rules for every possible scenario. So these bots can handle simple queries but fail to manage complex queries is stated in paper [7]. In paper [2] the chat-bot system is been proposed and designed using chat fuel platform and integrated in Facebook page. The chatbot has been designed to provide students feel like talking to the staff from college and their queries are addressed through the conversational text. Responses can be provided to the user in text format, pictures and with many more features provided by the chat fuel. The setup AI feature makes the bot smart and answers the queries of user [2].

The purpose of developing this project is based on an intellectual chat-bot system which will deal with the academic activities like admission enquiry, fees structure, scholarship details, time-table of every department, details of the documents required to attach etc. With this chat-bot system it will be easy for the student to directly clear their queries in lesser time.

II. LITERATURE SURVEY

A literature survey is a comprehensive summary of previous research on a topic. The literature review surveys scholarly articles, books, and other sources relevant to a particular area of research. It should give a theoretical base for the research and help you (the author) determine the nature of your research. [14]

Prof. Ram Manoj Sharma [2] proposed a college enquiry chatbot system which has been built by using Artificial Intelligence algorithms. The bot analyses user's query and understands user messages. The system has modules like Online chatbot, Online Noticeboards etc[2].

P.Nikhila, G.Jyothi, K.Mounika, Mr. C Kishor Kumar Reddy and Dr. B V Ramana Murthy [3], they have designed using AIML (Artificial Intelligence Mark-up Language) to make response to queries. AIML is employed to make or customize alicebot that could be a chat-bot application supported ALICE free code [3].

Harsh Pawar , Pranav Prabhu, Ajay Yadav, Vincent Mendonca , Joyce Lemos [6], a chatbot is designed by them using knowledge in database. The proposed system has Online Enquiry and Online Chatbot System. The development is done using various programming languages by creating a user friendly graphical interface to send and receive response. The main purpose is it uses SQL (Structured Query Language) for pattern matching which is been stored in program [6].

Nitesh Thakur, Akshay Hiwrale, Sourabh Selote, Abhijeet Shinde and Prof. Namrata Mahakalkar [10], proposed an artificial chatbot using NLP (Natural Language Processing) which can be done in two ways the first via written text and the second is via verbal or voice communication. Written communication is much easier than the verbal communication. This paper introduces an interest in some emerging capabilities for evolving speed understanding and processing in virtual human dialogue system [10].

III. PROPOSED METHODOLOGY

The proposed methodology makes use of both qualitative and quantitative perspectives, and includes a broad array of approaches such as literature reviews, expert opinions, focus groups, and content validation [14].

The proposed system will have the following modules:

A] Online Enquiry:

Students can enquire about facilities and query related to exams, academics, fee structure, etc.

Students can also ask questions related to placement activities.

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B] Online Chatbot:

The result can be showed in the form of images and card format or in text format. The query will be answered on the basis of questions asked and the language model built and also the response media created.

Users that want to enquire about the college at the time of admission or any competition held in the college can query to the chat-bot.

Given below is the system architecture of this chat-bot:
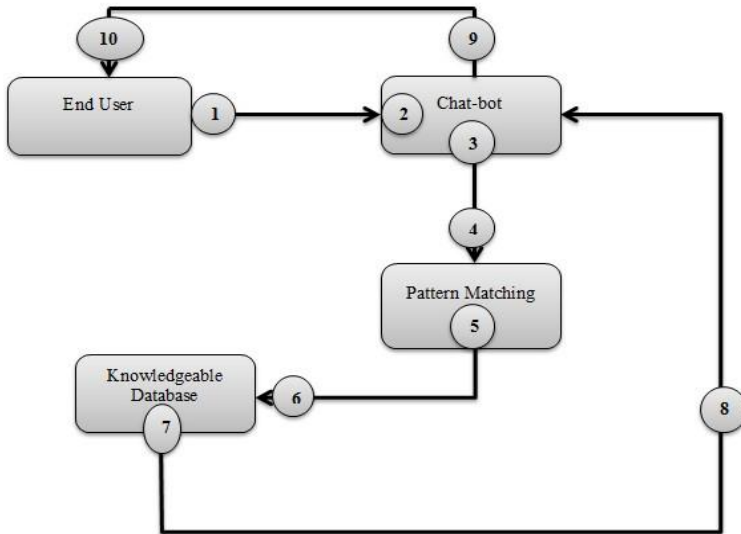
The basic algorithm that will be implemented for working of this proposed system is as follows:

Step 1: Start.

Step 2: Get the input query from the user.

Step 3: The query is pre-processed. E.g. suppose there is this query "what are the project domains for CSE fourth year major projects." So, we are going to remove these stop words like "are", "the" using pre-processing technique.

Step 4: Fetch the remaining keywords from the query.

Step 5: Match the fetched keywords with the keywords in Knowledge base, and provide an appropriate response.

Step 6: Further the Database module is used to call proper services using entity information to find proper data.

Step 7: The keywords will be matched with the help of keyword matching algorithm.

Step 8: It returns the query response to the bot.

Step 9: Chat-bot packages the data into proper response for display by the client.

Step 10: Exit

IV. CONCLUSION

The goal of the system is to help the students to stay updated with their college activities. Artificial Intelligent is the fastest growing technology everywhere in the world, with the help of Artificial Intelligent and Knowledgeable database. We can make the transformation in the pattern matching and virtual

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assistance. This system is developing chat bot based on android system so with the combination of Artificial Intelligent Knowledgeable database and virtual assistance. We can develop such chat bot which will make a

conversion between human and machine and will satisfy the question raised by user. The main motive of the project is to reduce the work load on the college's office staff and reduce the response time to a user's query.

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Online Complaints Management System

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ABSTRACT

Online Complaint Management System provides an online way of solving the problems faced by the public by saving time and eradicate corruption. The objective of the complaints management system is to make complaints easier to coordinate, monitor, track and resolve, and to provide company with an effective tool to identify and target problem areas, monitor complaint-handling performance and make business improvements. Online Complaint Management is a management technique for assessing, and responding to customer complaints. Complaints management software is used to record resolve and respond to customer complaints, requests as well as facilitate any other feedback. A online complaint management system is a web application designed to handle and resolve students and staffs complaints efficiently. The categories can vary depending on the institution, but some common categories include academic issues, administrative issues.Complaints management web application is used to record resolve and respond to customer complaints, requests as well as facilitate any other feedback.

KEYWORDS: Student, Staff, Online, Complaint,Management,Respond,Tracking Communication, Procedure, Policy, Improvement, Respond, costumer.

I. INTRODUCTION

A online college complaint management system is a critical tool for managing complaints from students and staff in a college or university setting. The system provides a platform for submitting and resolving complaints.A complaint system a set of procdures use in organization to address complaints and resolve disputes. A number of Artifical Intelligence technologies are helpful in complaint resolution process,understanding the attitudes of involved parties and reasoning about them,in particular, based on Belief-desire-intention model.

II. EXISTING SYSTEM

In the existing system the people must go to the office for any kind of help.The users can post their problems but cannot get the details of the problems and some other services. This system does not have much popularity and is not user friendly.

III. OBJECTIVES

The objective of complaints management is:

1. To make complaints easier to coordinate, monitor,track and resolve.
2. To provide company with an effective tool to identify and target problem areas, monitor and handling perfomances.
3. To make business improvements. complainthandling performances.
4. Prompt and specific retrieval of data.
5. Controlling redundancy in storing the same data multiples times.
6. Enhancement in the completion of work within the constraints of times.
7. Stability and operability by people of average.

IV. PURPOSE

Online Complaint Management System provides an onlineway of solving the problems faced by the public by savingtime and eradicate corruption , and The ability ofproviding many of the reports on the system , and add toFacilitate the process of submitting a complaints.

V. METHODOLOGY

A. Research Design:
The research design for this study is a descriptive research design. This design will allow for the description of the current complaint management process in colleges and universities, as well as the proposal of a more efficient and effective complaint management system. A descriptive research design is appropriate for this study as it allows for the gathering of qualitative and quantitative data through interviews, surveys, and a review of existing literature.

B. Data Gathering Techniques:
The data gathering techniques for this study will include:
1. Interviews: Interviews will be conducted with stakeholders, including students, faculty, staff, and administrators, to gather data on the current complaint management process, identify strengths and weaknesses, and gather feedback on the proposed system.
2. Surveys: Surveys will be distributed to a sample of students, faculty, and staff to gather quantitative data on their experiences with the current complaint management process and their opinions on the proposed system.
3. Review of Existing Literature: A review of existing literature on complaint management in colleges and universities will be conducted to gather data on best practices, challenges, and potential solutions.

C. Data Analysis Techniques:
The data analysis techniques for this study will include:
1. Qualitative Data Analysis: Qualitative data collected from interviews and open-ended survey questions will be analysed using thematic analysis. Thematic analysis involves identifying patterns and themes in the data and categorizing them into key themes.

2. Quantitative Data Analysis: Quantitative data collected from surveys will be analyzed using statistical analysis, such as descriptive statistics and inferential statistics. Descriptive statistics will be used to summarize the data, while inferential statistics will be used to test hypotheses and determine the significance of the findings.

3. Integration of Data: The qualitative and quantitative data will be integrated to provide a comprehensive analysis of the current complaint management process, the proposed system, and the effectiveness of the proposed system. The integrated data will also be used to identify areas for improvement and make recommendations for future research.

VI. RESULTS AND DISSCUSSION

A. Overview of the Online Complaint Management System:

The current complaint management system in colleges and universities was found to be a paper-based system that is time-consuming and inefficient. Complaints are often not addressed in a timely manner, and there is a lack of transparency in the process. In addition, there is a lack of communication between stakeholders, which often leads to misunderstandings and conflicts.

B. Efficiency of the System in Addressing Complaints:

The proposed complaint management system, which is an online system, was found to be more efficient than the current system in addressing complaints. The online system allows for faster processing of complaints and greater transparency in the process. The system also allows for better communication between stakeholders, which can prevent misunderstandings and conflicts. The proposed system was found to be effective in addressing various types of complaints, including academic, administrative, and personal complaints.

C. User Satisfaction with the System:

Users, including studentsand staff, were found to be highly satisfied with the proposed complaint management system. They appreciated the convenience and efficiency of the online system and the greater transparency and communication it provided. Users also felt that the proposed system was fair and impartial in addressing complaints and that it addressed their concerns in a timely and effective manners.

VII. CONCLUSION

Application software has been computed successfully and also tested successfully by taking TEST CASES. The system has been designed keeping in view the present and future requirements in mind and made very flexible. It can be utilized by the user to perform the desired operations.In contrast, the proposed online system was found to be more efficient and effective in addressing complaints, with greater transparency and communication.

The study found that the proposed complaint management system is more efficient and effective than the current paper-based system. Users were highly satisfied with the proposed system, and it was found to be effective in addressing various types of complaints. The study also identified several recommendations for improving the proposed system.

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Online Diet Recommendation System Using AI

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ABSTRACT

The online artificial dietitian is an application with artificial intelligence about human diets. It acts as a diet consultant similar to a real dietitian. This work proposes an intelligent agent, called the personal dietitian agent, based on the user's characteristics and specification. The agent can create a meal plan according to a person's lifestyle and particular health needs. The experts recommend eating a wide variety of foods, including vegetables, whole grains, fruits, non-fat or low-fat dairy products, beans, etc. However, each person has a unique dietary pattern and have different health issues so a dietitian creates a meal plan depending on each case. This system acts in a similar way as that of a dietitian. A person in order to know its diet plan needs to give some information to the dietitian such as its body type, weight, height and the number of hours worked. The system asks all this data from the user and processes it to provide the diet plan to the user.

Keywords - Artificial dietitian, Body type, Weight, Height, Data processing

I. INTRODUCTION

A healthy diet can help to control body weight. Whether it is to lose weight or simply improve your diet. Nutrition is a simple step that help you to achieve your goals. Calories measures the energy of food. It burns calories while walking, thinking, or breathing. In general, a person's calorie needs will depend on their gender, age, and physical activity. On average, a person will need 2,000 calories per day to maintain their weight. Also, men need more calories than women. In addition, people who participate in more physical activity need more calories than people who do not participate in physical activity. Therefore, the practice of consulting a nutritionist is increasing. We know that not everyone can find or afford a nutritionist. That is why we want artificial intelligence-based nutrition. This allows users to get a diet plan suitable for their body type without going to the doctor at any time. We ask the user's age, gender, height, weight, allergies and personal preferences, and use various types of machine learning to make recommendations from the user and choose the right model to show users their tailored meal plans. As people around the world lead healthy lifestyles, their nutrition plays an important role. A healthy diet is essential for health and well-being. A healthy lifestyle can be achieved by maintaining a healthy diet and getting all the essential nutrients your body needs. Body Mass Index (BMI) is calculated based on a person's height and weight. Therefore, the practice of consulting a nutritionist is increasing. Process user-provided information using a variety of machine learning methods and select the most accurate models to show customers their specialty food

II. LITERATURE SURVEY

In the previous system, food charts were often created using proprietary methods and data mining, which accelerated the use of data, and was done on data that resulted in constant input of data, and did not focus on existing health systems. Offering a diet plan without having to reach the user's height and weight and daily health is a big deal to be able to consider the type of food. The AI domain has the advantage of creating optimal nutrition plans not found in this system and has the same disadvantage [1]

- IT does not include the user's health (such as high blood pressure or heart disease).
- Most systems do not use artificial intelligence as a time signature.

This paper [2] presents a study of algorithms for automatic meal preparation for children. It is a food recommendation initiated by food management for Indian food database using ID3. For the Indian Cuisine Database, a recommendation for children is based on characteristics such as food preferences, food availability, medical information, disease information, personal information, and the child's employment level. This advice helps choose food from the data so that deficiencies don't show up quickly and provide with a good meal plan for the child.

Artificial Nutritionist Online is a web-based chatbot that provides artificial intelligence about human nutrition. The biggest advantage of using a standalone app is that it reduces the time, people have to deal with a dietitian and it also reduces the cost of hiring a dietitian for some specific purposes. Based on the BMI (Body Mass Index) calculation concept, Nutri-Freak will display the correct food plan to the user. Users should follow their diet appointments. Users sometimes have to attend long meetings. This makes it very difficult for users to convince diet plans. Therefore, this system helps people to overcome above problems [3].

This work [4] is proposed for the application of the data mining technology for a personalized nutrition in the recommendations for cancer patients. The system focuses on calculating the daily nutritional intake of the patient, based on the nutritional value corresponding to the patient's condition. Accordingly, the system recommends daily meal plans for each patient, including meal options to try for breakfast, lunch, and dinner.

Case-based reasoning (CBR) is a data mining problem solving method. Instead of relying on general knowledge at the root of the problem, CBR uses case information about specific problems they have faced before, causing association between organization or description and outcome [5].

This work [6] provides us an advice on nutrition. It uses such as evidence filtering and algorithm training for high blood pressure patients by age, weight, height, client's diet, contraindications, smoking and drinking and blood pressure.

This paper at [7] explored utilizing a specific instance methodology to construct an intelligent system for dietary guidance. By this method, medical recording system is built with the help of artificial intelligence The idea is contained in the law, but clinical features and acts of law also require independent discipline.

In this work of [8] discusses the analysis of consumer products. In this case, the customer can choose to modify the menu as desired, then the meal planner sets the parameters and the performs the paretio optimal solution. Therefore, due to the inclusion of meal planning, the user is expected to take meal plans more.

The aim was to use the website so that the user can get a good user interface and system would be easy to use. Because some system requires fees and others are free to use without any fees required, we need to make our work free for everyone. We started collecting information on the present system's operation, as well as how a real dietician determines a meal pattern based on a person's demographics data relating to their healthcare

submitted.   In fact, the internet had given a great help in finding formulas for calculating actual caloric requirements. A person's BMI and BMR values have a significant impact on their eating habbits.

In proposed worked [9] Poor eating habits are at the root of disease and health problems. That is why our system gives a wise recommendations like a nutritionist recommending client's custom nutrition plans. The system takes into account user factors such as age, height, weight, gender and allergies to make recommendations based on machine learning algorithms.

The work [10] approach diet recommendation services. In the first method, medical specialist gives the diet by considering all the general constraint. Also in the second method, it prescribes the diet through a nutritionist and compares it with a reference table of nutrition. It also calculates the calorie intake and prescribes a diet plan accordingly.

III. PROPOSED SYSTEM
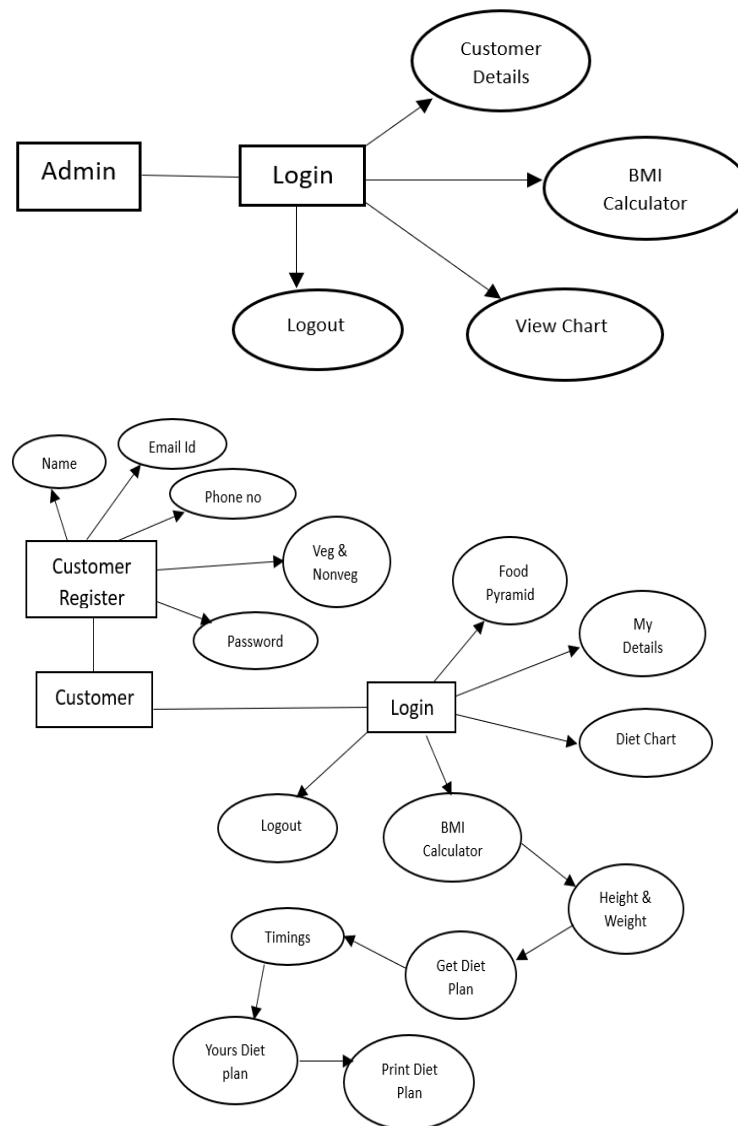
Fig 3.1 : ER Diagram For Admin And Customer Module

The proposed system is fully computerized and eliminates all the disadvantages of existing systems. This system mainly consists of two main modules a) Admin Module & b) User Module.

a) Admin Module :-   In Admin module admin can login to system using his/her Id & Password. He/She can view the user's details.

b) User Module :- In User Module user can login to system by using his/her Id & Password. If the user does not have their account so they have to create their account by entering their personal information such as name, address, email id, veg or non-veg, password etc. After the user enters the BMI statistical model, he or she must enter personal information such as height, weight. By height and weight, the BMI is acquired and on that basis the system will provide proper diet plan according to users timings.
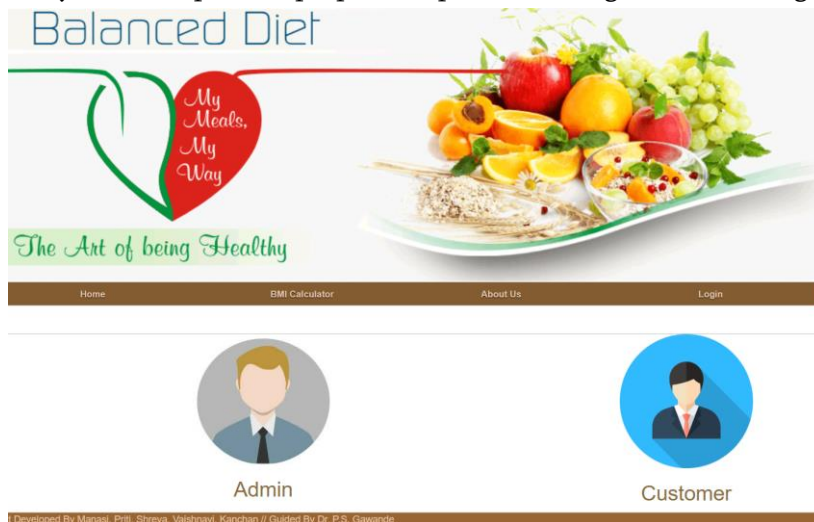
Fig 3.2 : Admin and Customer Module
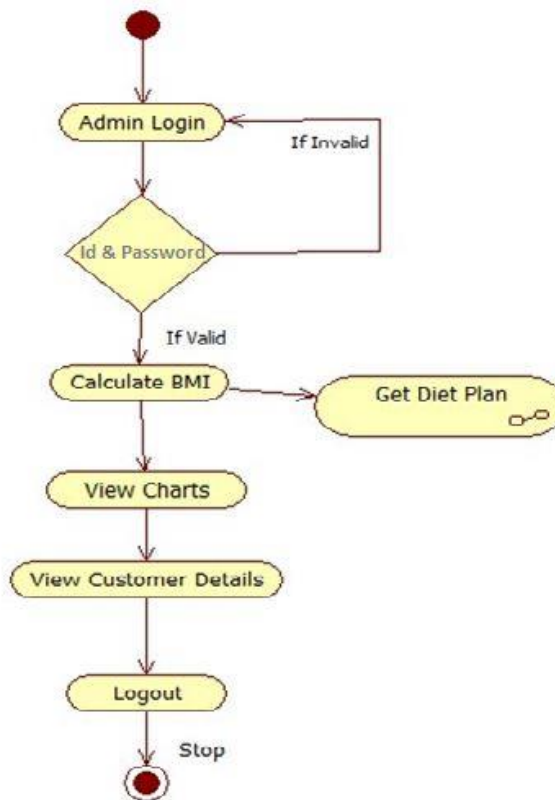
Fig 3.3 : Data Flow Diagram for Admin Login
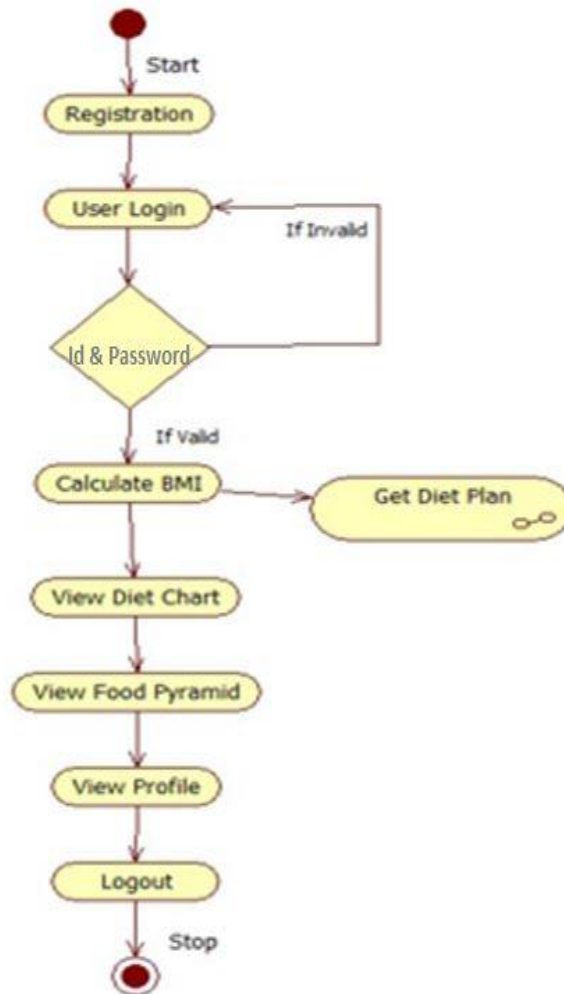
Fig 3.4 : Data Flow Diagram For User Login

IV. ADVANTAGES

- Users get a free meal plan.
- Users will have access to foods recommended by many experts, not by a single nutritionist.
- User saves time and money on physical Dietitian visits.
- We will also provide tips and advice on various exercises to keep users fit.
- By answering only a few questions, the system gives detailed information about the nutritional status of the body and whether additional nutrition is needed and planned.
- Saves money, is useful and efficient because it is written with meal charts [11].

V. DISVANTAGES

- If you are not sure about the information entered in fields such as age, height, weight, working hours, the system will return inappropriate results to the user.
- This system does not consider any disease while providing the diet plan to user.

VI. FUTURE SCOPE

- The user can use the device to keep track of what eats.
- Calculates food intake and gives suggestions to improve the health of users.
- Using the system, dietitians can determine what they recommend patients.
- The system can be effectively used for teaching in medical school and students can be used to learn from it.
- This system can also be used in gyms, specifically, to calculate customers' calorie and food intake.
- People can also use this software at home, specially for.
- Can also be used in restaurants to help people with diabetes or heart disease eat healthy.

VII.   CONCLUSION

The designed system will be useful for common people to maintain their health by taking proper diet suggested by AI dietitian application. The predicted result shows whether the person is fit or unfit. On that basis, the application provides user a proper diet plan to maintain proper health. This software reduces the time span and cost for expert advices for diet. This site is exceptionally valuable to wellbeing cares and dietician. This product diminishes the time compass and cost for master advices for eating routine.

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Online Food Ordering Website

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ABSTRACT

The purpose of Online Food Ordering System is to automate the existing manual system by the help of computerized equipment's and full-fledged computer software, fulfilling their requirements, so that their valuable data / information can be stored for a longer period with easy accessing and manipulation of the same. The required software and hardware are easily available and easy to work with. The Online Food Ordering System's main purpose is to maintain track of information such as Item Category, Food, Delivery Address, Order, and Shopping Cart. It keep strack of information about the Item Category, the Customer, theShoppingCart,andtheItemCategory.Onlytheadministratorgetsaccesstotheprojectbecauseitistotallybuiltatthea dministrativelevel.Theproject'spurposeistodevelopsoftwarethatwillcutdownonthetimespentmanuallymanageIte mCategory,Food,Customer,andDeliveryAddress.ItsavestheDeliveryAddress,Order,andShoppingCartinformation.

I. INTRODUCTION

Onlinefoodorderingistheprocessoforderingfoodfromawebsite.Theproductcaneitherbefoodthathasbeenspeciallyp reparedfordirectconsumption(suchasvegetablesstraightfromafarmorgarden,frozenmeats,etc.)orfoodthe hasnotbeen(suchasdirectfromacertifiedhomekitchen,restaurant).Theefforttocreateanonlinefoodorderingsystema imstoreplacethemanualmethodoftakingorderswithadigitalone.Theabilitytorapidlyandcorrectlycreateordersumm aryreportswhenevernecessaryisakeyfactorinthedevelopmentofthisproject.Thepotentialofanonlinefoodorderings ystemisenormous.AnyrestaurantorfastfoodchaincanusethisPHPprojecttokeeptrackofcustomerorders.Thisproject issimple,quick,andprecise.Thereislessdiskspace needed. MYSQL Server is used as the backbonebytheonlinefoodorderingsystem,eliminatingtheriskofdatalossandensuringdatasecurity.

Rationale: Thereareseveralgoodreasonstocreateanonlinefoodorderingapplication.Thereisalotofdemand,whichisw hysomanyrestaurantsareutilizingonlineordering.

Objectives: Themanagementoftheinformationregardingitemcategory,food,deliveryaddress,order,andshoppingcar tisthesystem'sprimarygoal.Itoverseesthemanagementofallcustomer,shoppingcart,anditemcategoryinformation.

NeedsofOnlineFoodOrder: Helpingcustomersinplacingmealorderswhenevertheywant.Customerswillbeabletoord ertheirpreferredfoodsatanytime,butaswe'vealreadymentioned,thisisonlyalimitedoption.Asaresult,restaurantsnee dtohaveaspecificsysteminplacethatwillallowthemtoservealargenumberofcustomerswhilestreamliningoperations. Oneofthebestplatformsisordering,whichoffersalloftheseservices.

Functionalities:

* Providessearchoptionsbasedonavarietyofcriteria.likeFoodItem,Customer,Order,andOrderConfirmation.

- Onlinefoodorderingsystemsalsomanagepaymentinformationfororderdetails,orderconfirmationdetails,andfooditemsonline.·ItkeepstrackofallthedataregardingCategories,Payments,Orders,etc.
- Managethecategory'sdetails.
- Displaysthefooditem'sinformationanddescriptionforthecustomer.EasytomanagetheFoodItem,Categorymoreeffectively.
- Itfocusesonkeepingtrackoforder'sdataandtransactions.
- Managethefooditem'sinformation.
- Improvementsinediting,adding,andupdatingrecordsleadtoproperresourcemanagementoffooditemdata.
- Managetheorder'sinformationbycombiningallConfirmOrderdata.

Features:
- Basedonproductsandcomponents.
- Easilycreatingandalteringissues.
- IssueListcanbequeriedinanydetail.
- Reporting&Chartinginamorethoroughmanner.
- Useraccountsareusedtomanageaccessanduploadsecurity.
- Straightforwardstatus&resolutions.
- Prioritiesandseveritylevelsatvariouslevelsaswellastargetsandmilestonesfortheprogrammerstofollow.
- Attachments&AdditionalCommentsformoreinformation.
- Asoliddatabasebackend.
- Variouslevelsofreportsareprovidedwithmanyfilteringoptions.
- Ithasmorestoragespace.
- Accuracyinthework.
- Informationretrievalissimpleandquick.nicelycraftedreports.
- Reducetheworkloadofthepersonusingthecurrentmanualsystem.
- Individualaccesstoanyinformation.
- Workprogressesquickly.Simpleinformationupdates.

II. LITERATUREREVIEW

BackgroundoftheStudies.Theresearchpapersweconsideredwhiledoingouranalysisarelistedbelow.Inawirelessmealorderingsystemwasdesignedandimplementedtogetherwithconsumerfeedbackforarestaurant.ItmakesitsimpleforrestaurantoperatorstochangemenupresentationsandsetupthesysteminaWi-Fisetting. The configurable wireless meal orderingsystemhaslinkedasmartphonewithrealtimecustomerfeedbackimplementationtoenablereal-timecontactbetweenpatronsofrestaurantsandbusinessowners.Thegoalwasinvestigatingthevariablesthataffectinternetusers'perceptionsofonlinefoodorderingamonguniversitystudentsinTurkey.

III. IMPLEMENTATION

Agoodrestaurantreservationwillalsoincludeaneasy-to-use table management systemestablish.Thisallowsrestaurantstoseetheirrestauranthourbyhourandtakereservationsdifferentways

Toolsandtechnique

I. Php

II. XAMPP

III. MySQLvog

IV. HTML

V. CSS

I.Php

HypertextPreprocessor(orsimplyPHP)isaaserver-
sidescriptinglanguageusedforgeneralprogrammingpurposesaswellasWebdevelopment.ThePHPGroupnowproduc
esthePHPreferenceimplementation,whichwasfirstdevelopedbyRasmusLerdorfin1994.PersonalHomePagewasthe
firstmeaningofPHP,howeverithassinceevolvedintoPHP:HypertextPreprocessor.PHPcodecanbeusedalone,inconj
unctionwithdifferentwebtemplatesystems.andwebframeworks,oritcanbeincorporatedintoHTMLcode.

II.XAMP

PisastackoffreeandopensourcePHPandPerlinterpreters,theMariaDBdatabase,andtheApacheHTTPServerarethepr
imarycomponentsofApacheFriends'freeandopensourcecross-platformwebserversolutionstack.Cross-
Platform(X),Apache(A),MariaDB(M),PHP(P),andPerlmakeuptheacronymXAMPP(P).Itisastraightforward,light
weightinstallationofApachethatmakessettingupalocalwebserverfortestinganddeploymentverysimplefordevelope
rs.Anextractablefilecontainstheserverprogram(Apache),database(MariaDB),andscriptinglanguage(PHP)required
tosetupawebserver.Cross-platformmeansthatXAMPPfunctionsequallywellonLinux,Mac,andWindows
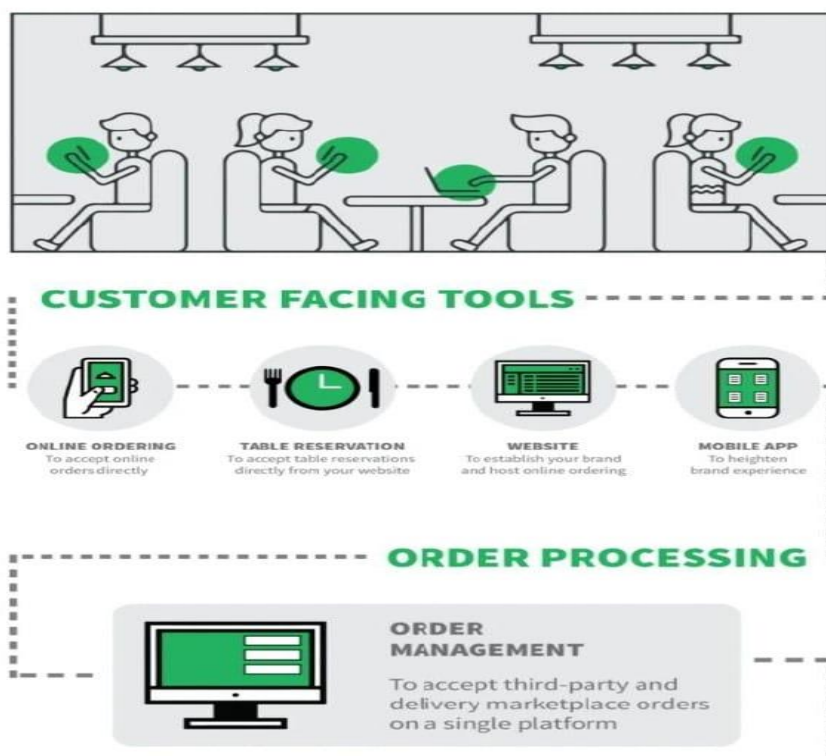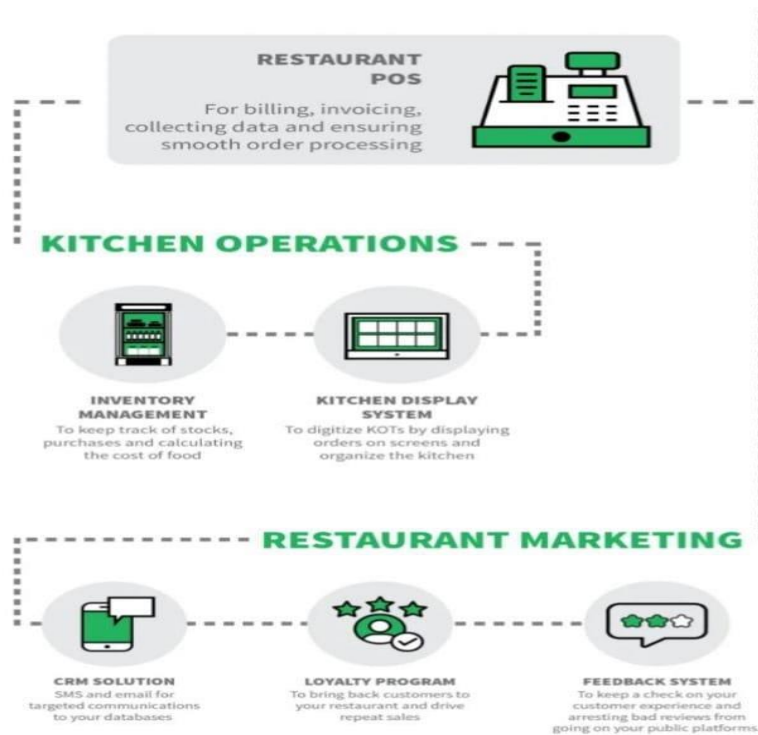
III.MySQL

yogaMySQLWorkbenchisacomprehensivevisualtoolfordatabaseadministrators,databasearchitectsanddevelopers. Datamodeling,SQLcreationandextensiveadministrativetoolsforserver,userconfigurationmanagement,backupand othertasksarehandledbyMySQLWorkbench.TherearereversionsfromMySQLWorkbenchforWindows,Linux,andM acOSX.

IV.HTML

HypertextMarkupLanguage(HTML)isastandardmarkuplanguagefordevelopmentwebapplicationsandpages.Itison eofthethreebasictechnologiesthattheworldreliesonWebtogetherwithJavaScriptandCascadingStyleSheets(CSS).H TMLdocumentsaredownloadedfromawebserverorlocalstoragebywebbrowsers,whichthentransformthemintoam ultimediawebsites.HTMLoriginallycontainedguidelinesfordocumentdesignandexplainssemanticswebsitestructur e.HTMLcomponentsarethebasisofHTMLpages.

VII.CSS

CascadingStyleSheets(CSS)isalanguageforcreatingstylesheetsthatdescribehowadocumentcreatedinamarkuplangu agesuchasHTMLwilllooklike.WorldWideWebtheunderlyingtechnologies,alongwithHTMLandJavaScript,includ eCSS.Layout,colorandfontcanbeseparatedfromcontentandpresentationusingCSS.Bydescribingtherelevant.

IV. ADMIN WORKFLOW PROCESS

Theusergoestothehomepageofthedomain.Ifhe/hasanaccount,hecansigninattherestaurantotherwise,theymustregi steranaccountaftersuccessfulregistrationyoucanloginonthehomepage.
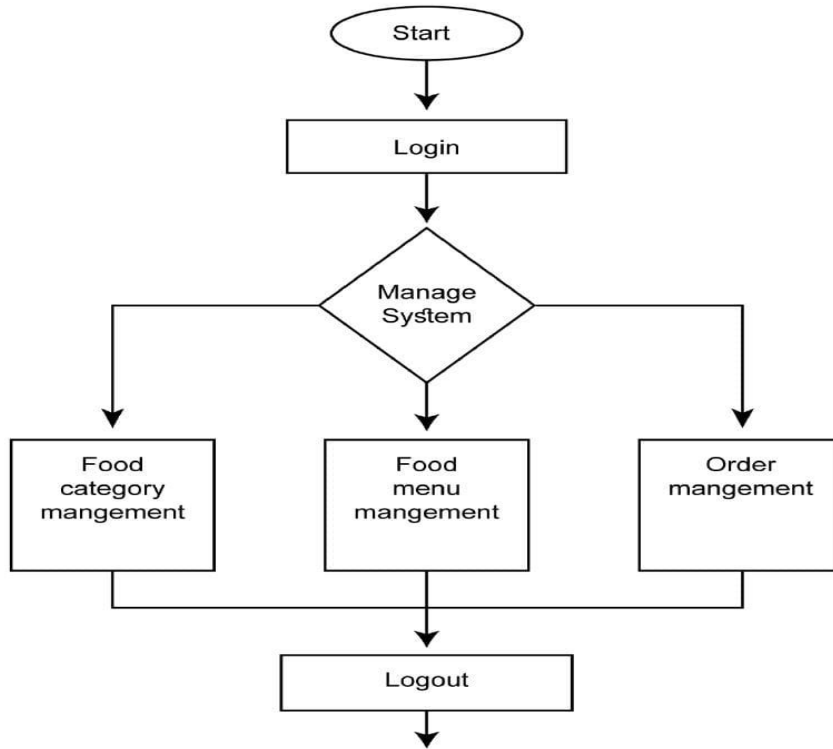
Fig.AdminworkflowProcess

V. CUSTOMER WORKFLOW PROCESS

Initially,usersdonotneedtologin/registeranaccounttovisitfoodcategoriesormenu.Aftercheckingthecategoriesand menuitems,whethertheuserfindshisdesiredmenuandwhetherwanttoorderaspecificitem,theycangototheorderpage.Whenplacinganyorderthecustomermustprovidehis/hertherequiredinformation.
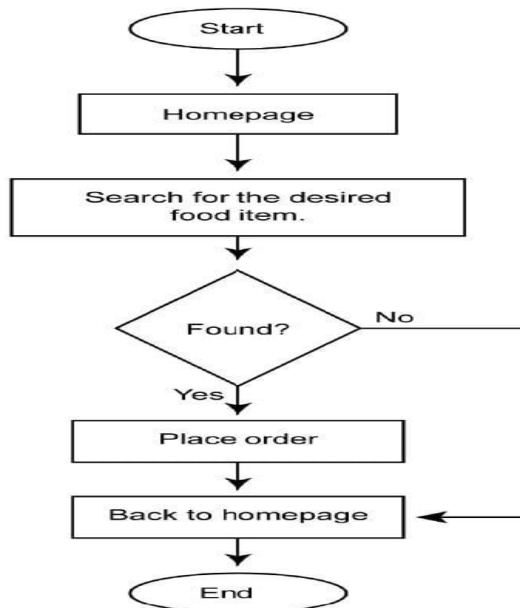
Fig.CustomerWorkflowProcess

VI. RESULTOFANALYSISANDDISCUSSION

SystemimplementationplanAsoftwaredesignpatterncalledModelViewController,orMVCasitisformallyknown,isused tocreateonlineapplications.Themodelviewcontrollerhasthreecomponentspattern:

- Model–thelowestlevelofthemodel,inchargeofdatamaintenance.
- View–isinchargeofdisplayingallorpartofthedatatotheuser.
- Controller–
  Acomputerprogramthatcontrolstheinteractionofthemodelandtheview.MVCispopularbecauseitprovidesseparationof servicesbyseparationofapplicationlogicanduserinterfacelayers
- ProjectplanningHereisanillustrationofasoftwareprojectplan:1)Howtheprojectwillbecarriedoutwithintheframework company?Whatarethetime,financialandpersonnelconstraints?Whatdoesitmeantohavedoesitinvolve amarketstrategy?2)Meetingswithcustomers:Weeklyorasneededmeetingswithcustomersincludeaprogressreport presentation.
- Understandingofspecificationsandrequirements.
- Useofanalysis,designandimplementationmethods.
- Useoftestprocedures.
- Documentation.
- Budgetallocationoroverrunsundercontrol.
- Understandingprojectmilestonesanddeliverables
- Projectestimates.
- Costandtime.

VII.   FACEPROBLEMSDURINGPROJECTDEVELOPMENT

Whilebuildingthe"OnlineFoodOrder"webapplication,thedevelopercameacrossseveralproblems.Hereareafewissues inanutshell:

I.RequirementsGatheringPhase: Itisacrucialstep.Theprojectwillfailifrequirementsarewrong.Atthetime,thedeveloper wasdisappointedwhenthedevelopercollectedinformationanddata,whatinformationanddatawillbeusefulorappropriatefor thisproject.

II.Duringthedesignphase: Atthispoint,thedeveloperwastryingtodecidewhichflowchartwouldbebestforthisproject whencreatingit.

III.Developmentphase: Itisaveryimportantpartoftheenterprise.Often,thedevelopermisplacedthesemicolon(;)atthe endofthestatement.

VIII.   APPLICATION

Restaurants,takeawaysandbusinessesthatsellfoodbenefitfromonlinefoodorderingsoftwaredesignedspecificallyforthem. Customerslovetheeaseoforderingfoodonline,thereforeitexpandsrapidly.Expandyoursaleschannelsbydownloadingour onlinefoodorderingapp.Throughthisgroceryorderingwebsite,customerscanplaceordersfromtheircomputers,tablets,and mobilephones.

IX. FINALOUTPUT
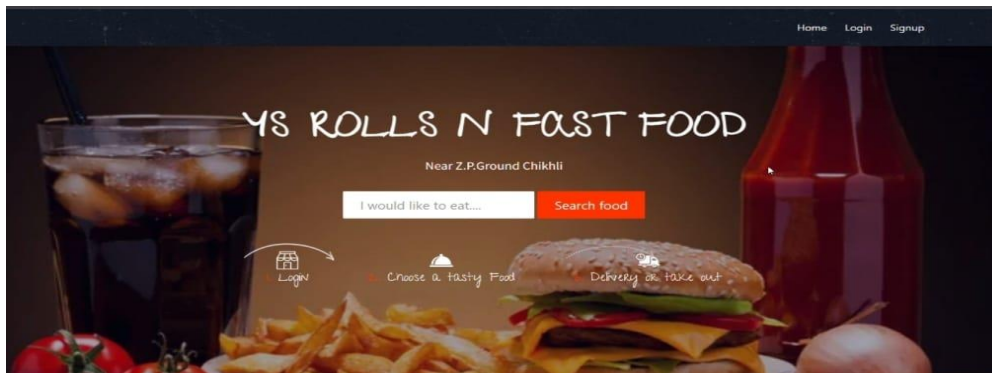
Food Menu
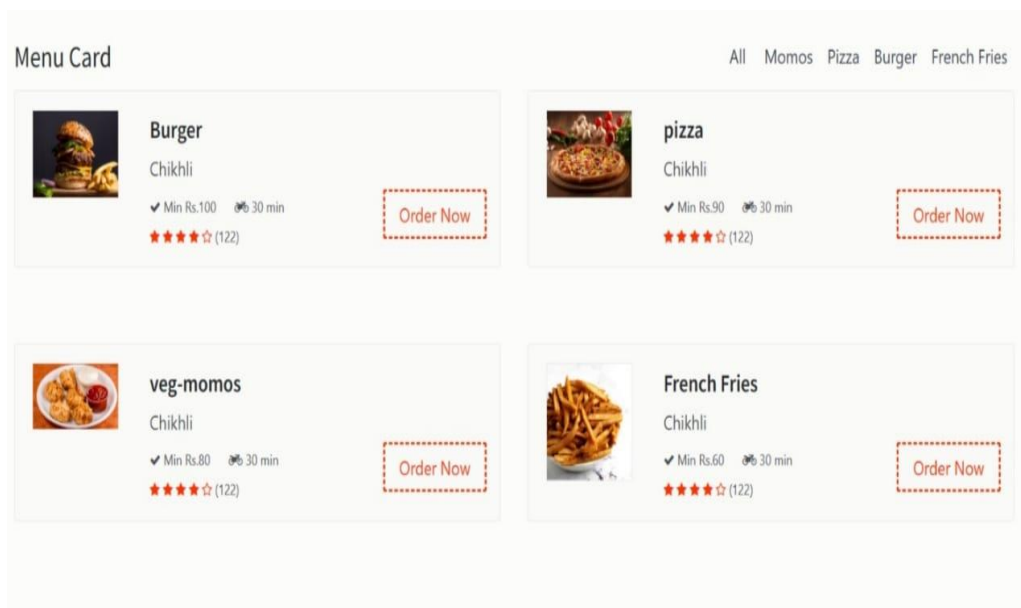
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Online Shopping Web Application

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ABSTRACT

The Online Shopping is a web based application intended foronline retailers. The main objective of this application is to make it inter active and its ease of use. It would make searching, viewing ands election of a product easier. Itcontainsasophisticatedsearchengineforuser'stosearchforproductsspecific to their needs. The search engine provides an easy andconvenient way to search for products where a user can Searchfor a product interactively and the search engine would refine theproducts available based on the user's input. The user can thenview the complete specification of each product. They can alsoview the product reviews and also write their own reviews. Theapplication also provides a drag and drop feature so that a usercan add a product to the shopping cart by dragging the item in to the shopping cart. The main emphasis lies in providing a user friendly search engine for effectivelyshowingthe desiredresultsandits draganddropbehavior.

Keywords—template, Scribbr, IEEE, format.

I.   INTRODUCTION

1.1 Goal Shopping has long been considered a recreationalactivity by many. Shopping online is no exception. The goalof this application is to develop a web based interface foronline retailers. The system would be easy to use and hencemake the shopping experience pleasant for the users. Thegoal of this application is ᐧ To develop an easy to use webbased interface where users can search for products, view acompletedescriptionoftheproductsandordertheproducts.

- A search engine that provides an easy and convenient wayto search for products specific to their needs. The searchengine would list a set of products based on the search termandtheusercanfurtherfilterthelistbasedonvariousparameters.ᐧAnAJAXenabledwebsitewiththelatestAJAX controls giving attractive and interactive look to theweb pages and prevents the annoying post backs. ᐧ Drag andDropfeaturewhichwouldallowtheuserstoaddaproductto or remove a product from the shopping cart by draggingthe product in to the shopping cart or out of the shoppingcart. ᐧ A user can view the complete specification of theproductalongwithvariousimagesandalsoviewthecustomer reviews of the product. They can also write theirown reviews.ThisIsa Level2Heading

II. ONLINECUSTOMER

Consumer preference refers to, "how customers select goodsand services in relation to factors like taste, preference andindividual choicesFactors such as the consumers incomeand price of goods do not influence thecustomers preferredproductorservices".Consumerpreferenceforaproductcan make or break a company. If consumers generally like aproduct, it may say around for years and sell millions ofcopies. However if consumer do not like a product, it coulddisappearveryquickly Online customer must have access to the internet and a validmethodofpaymentinordertocompleteatransaction.Generally, higher levels of education and personal incomecorrespond to more favorable perception of shopping online.Increasedexposuretotechnologyalsoincreasestheprobabilityofdevelopingfavorableattitudetowardsnewshoppingchannels

A. PROJECTOBJECTIVE:

The objective of the project is to make an application inandroid platform to purchase items in an existing shop. Inorder to build such anapplication complete web supportneedtobeprovided.Acompleteandefficientwebapplicationwhichcanprovidetheonlineshoppingexperience is the basic objective of the project. The webapplication can be implemented in the form of an androidapplicationwithwebview.Thisisafigurecaption.Itappearsdirectlyunderneaththe figure.

III. PROJECT OVERVIEW

ThecentralconceptoftheapplicationistoallowthecustomertoshopvirtuallyusingtheInternetandallowcustomers to buy the items and articles of their desire fromthe store. The information pertaining to the products arestoreson anRDBMSat theserver side (store).

TheServerprocessthecustomersandtheitemsareshipped to the address submitted by them. The applicationwas designed into two modules first is for the customerswho wish to buy the articles. Second is for the storekeeperswho maintains and updates the information pertainingtothe articles and those of the customers. The end user of thisproductis adepartmentalstorewheretheapplicationishostedonthewebandtheadministratormaintainsthedatabase.Theapplica tionwhichisdeployedatthecustomerdatabase,thedetailsoftheitemsarebroughtforwardfromthedatabaseforthecusto mer viewbased on the selection through the menu and the database of all theproducts are updated at the end of each transaction. Dataentryintotheapplicationcanbedonethroughvariousscreensdesignedforvariouslevelsofusers.Oncetheauthoriz ed personnel feed the relevant data into the system,severalreportscouldbegeneratedasperthesecurity.The end user of this product is a departmental store where theapplicationishostedonthewebandtheadministratormaintains the database The application was designed intotwo modules first is for the customers who wish to buy thearticles. Second is for the storekeepers who maintains andupdates the information pertaining to the articles and thoseofthe customers.

IV. PROJECT SCOPE

This system can be implemented to any shop in the localityortomultinationalbrandedshopshavingretailoutletchains.Thesystemrecommends afacilitytoaccepttheorders 24*7 and a home delivery system which can makecustomers happy.If shops are providinganonline portalwheretheircustomerscanenjoyeasyshoppingfromanywhere, the shops won't be losing any more customers tothe trending online shops such as flipcart or ebay. Since theapplicationisavailableintheSmartphoneitiseasilyaccessibleandalwaysavailable.

V. STUDY OF THE SYSTEM

A. MODULES:

The system after careful analysis has been identified to bepresented withthe followingmodulesandroles. Themodulesinvolved are:

a) **ADMIN**
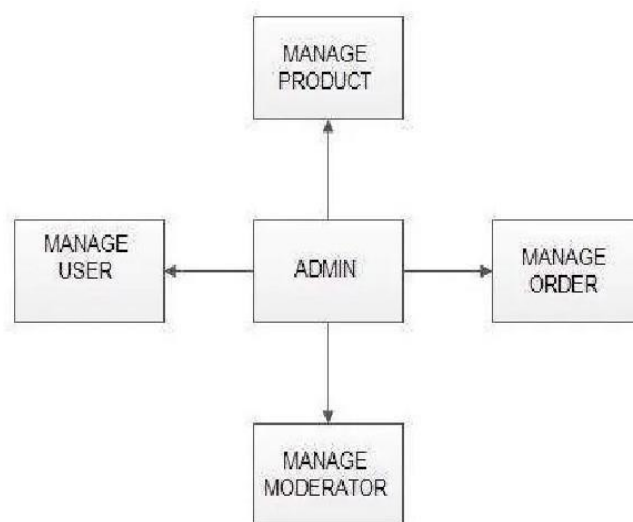
Fig.1.AdmineModule

The administrator is the super user of this application. Onlyadmin have access into this admin page. Admin may be theowneroftheshop.Theadministratorhasalltheinformation aboutalltheusersandaboutallproducts. Thismoduleisdivided intodifferentsub-modules.

1. ManageModerators
2. ManageProducts
3. ManageUsers
4. ManageOrders

b) **CUSTOMER:**

Acustomerisanindividualorbusinessthatpurchasesanothercompany'sgoodsorservices.Customersareimportantbec ausetheydriverevenues;withoutthem,businessescannotcontinuetoexist.
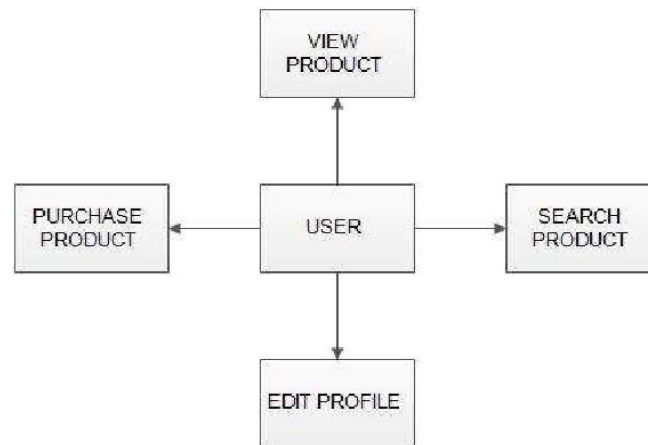
Fig.2CustomerModule

1) Registration:

A new user will have to register in the system by providingessential details in order to view the products in the system.Theadminmustaccepta newuserby unblockinghim.

2) Login:

Ausermustloginwithhisusernameandpasswordtothesystem afterregistration.

3) ViewProduct:

User can view the list of products based on their names aftersuccessfullogin.Adetaileddescriptionofaparticularproduct with product name, products details, product image,pricecanbeviewedbyusers.

4) SearchProduct:

Userscan search foraparticularproductin thelistby name.

5) AddTo Card:

Theusercanaddthedesiredproductintohiscartbyclicking add to cart option on the product .He can view hiscartbyclickingonthecartbutton.Allproductsaddedbycart can be viewed in the cart. User canremove an itemfrom thecartbyclickingremove.

6) SubmitCard:

After confirming the items in thecart the user can submitthecartbyprovidinga delivery address.

7) EditProfile:

Thecustomer canviewand edittheprofile

8) System Tool:

The various system tools that have been used in developingboth the front end and the back end of the project are beingdiscussed inthischapter.

VI. FRONTEND

JSP,HTML,CSS,JAVASCRIPT,ANDROIDareutilized
to implementthefrontend.

A. JAVASERVERPAGES(JSP)

Different pages in the applications are designed using jsp. AJava Server Pages component is a type of Java servlet that isdesigned to fulfil the role of a user interface for a Java webapplication.Webdevelopers writeJSPs as textfiles thatcombineHTMLorXHTMLcode,XMLelements,andembedded JSP actions and commands. Using JSP, one cancollectinputfromusersthrough webpage.

CSS(CascadingStyleSheets)

CSSisastylesheetlanguageusedfordescribing thelook formattingofadocumentwritten

B. JAVASCRIPT

JS is a dynamic computer programming language. It is mostcommonlyusedaspartofwebbrowsers,whoseimplementationsallow client-side

scriptstointeractwiththeuser,controlthebrowser,communicate.

asynchronously,andalterthedocumentcontentthatisdisplayed. Java Script is used to create pop up windowsdisplaying different alerts in the system like "User registeredsuccessfully". "Product addedtocart"

VII. BACKEND

ThebackendisimplementedusingSarvletJDBCandMySQLwhichisused todesignthedatabase.

A) SERVLETS

Servlets act as an interface, or as a www technology, or as aweb component, or a class, or as an API. With servlets, wecan collect user information through web pages/ forms, or adatabase,and any otherdatasourcesandcreateweb pages.

B) JDBC(JAVADATABASECONNECTIVITY)

JDBC makes it possible to do establish a connection with adata source, send queries and update statements, and processtheresults.Simply,JDBCmakesitpossibletodothefollowingthingswithinaJavaapplication:Establishaconnect ionwithadatasource.Sendqueriesandupdatestatementstothe data source.

C) MySQL:

MySQL is the world's second most widely used open-sourcerelationaldatabasemanagementsystem(RDBMS).TheSQLphrase standsforStructuredQueryLanguage.

An application software called Navicat was used to designthetablesinMySQL.

VIII. RESULTS

Online shopping will never completely replace high streetshops, as there will always be a small demand for going intostores. However, if we are talking about which will becomethe most popular form of shopping over the coming years, itis hardtoseehowshops cancompetewiththeironlinecounterparts.17-Oct-2018
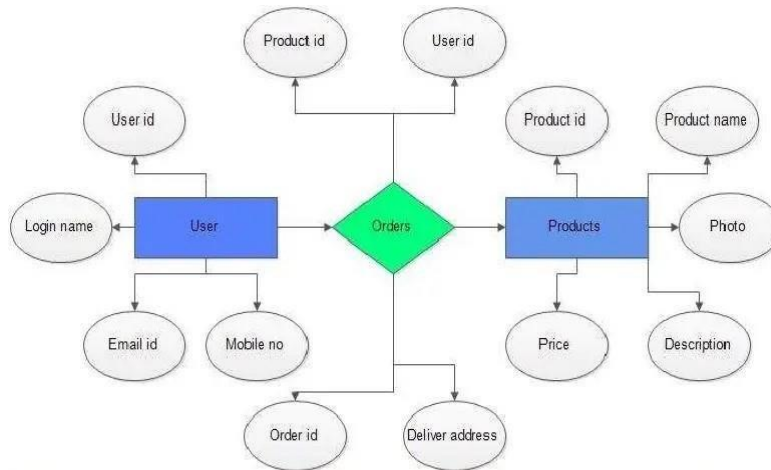
1. LOGIN
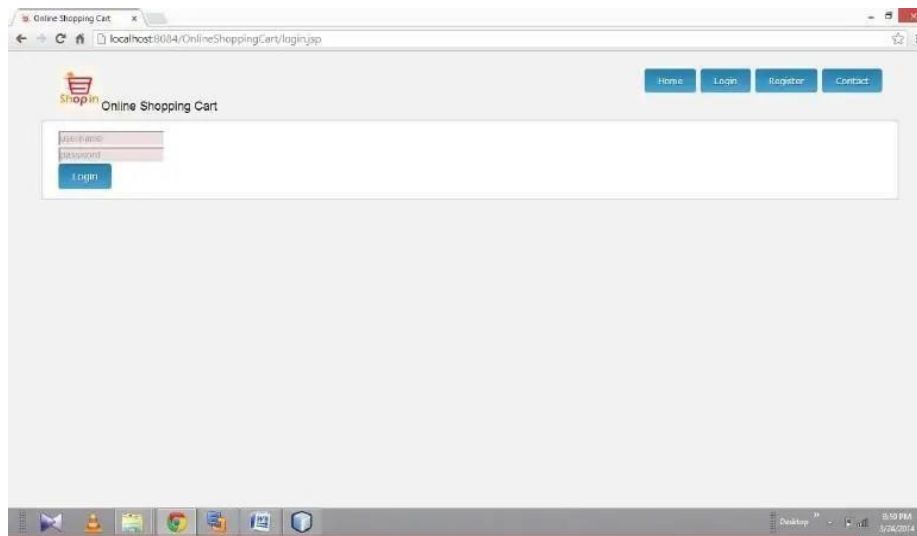
Fig.3Login

2. REGISTRATION
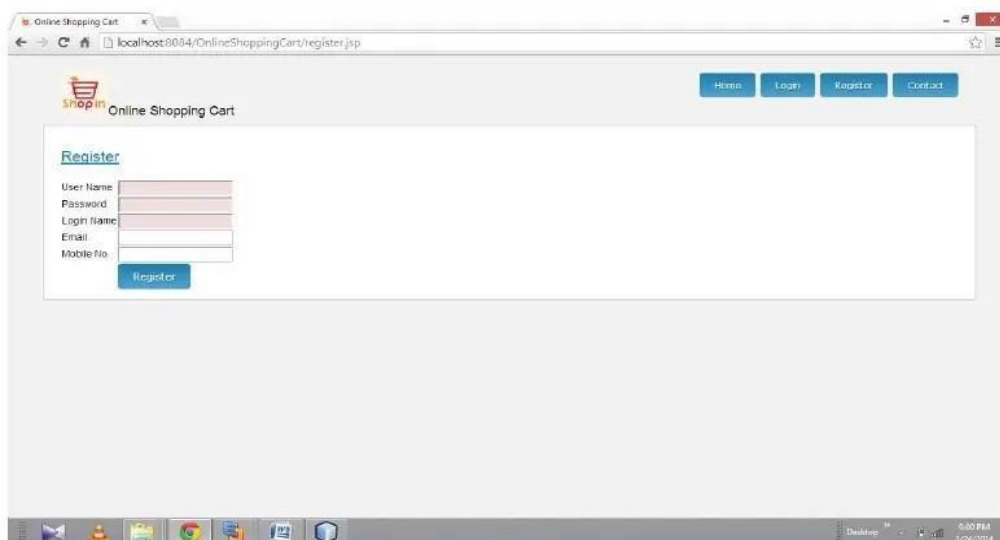
Fig.4Registration

3.   HOME
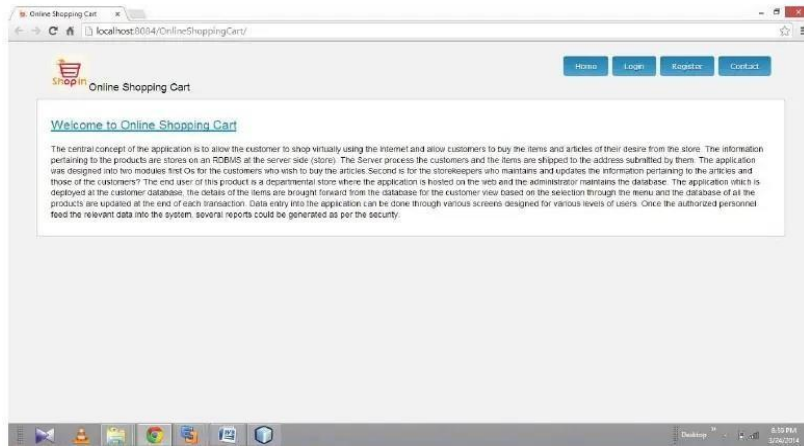
Fig.5 Home

4.   ADMINEPRODUCT

Fig.6 Admine Product

5.   ADMINEODER
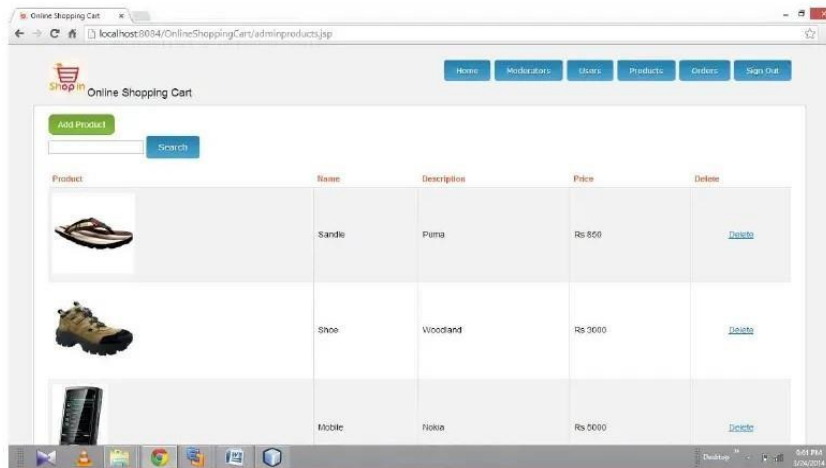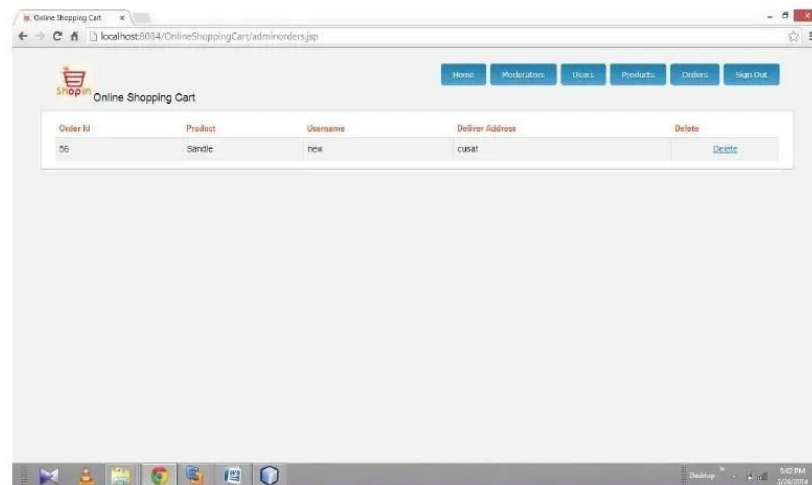
Fig.7AdmineOder

6. CUSTOMERTO HOME
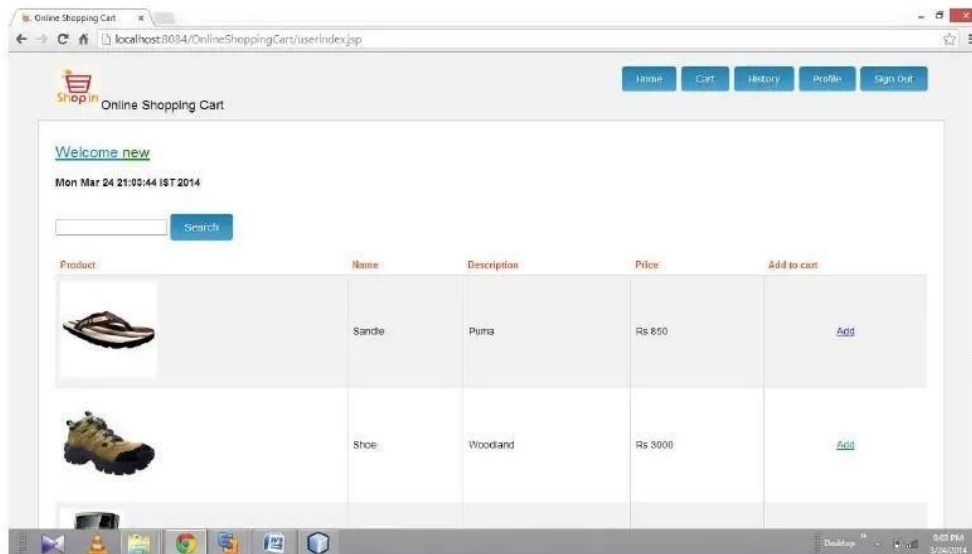
Fig.8Customertohome

7. CUSTOMERORDERSUCCESSFULY
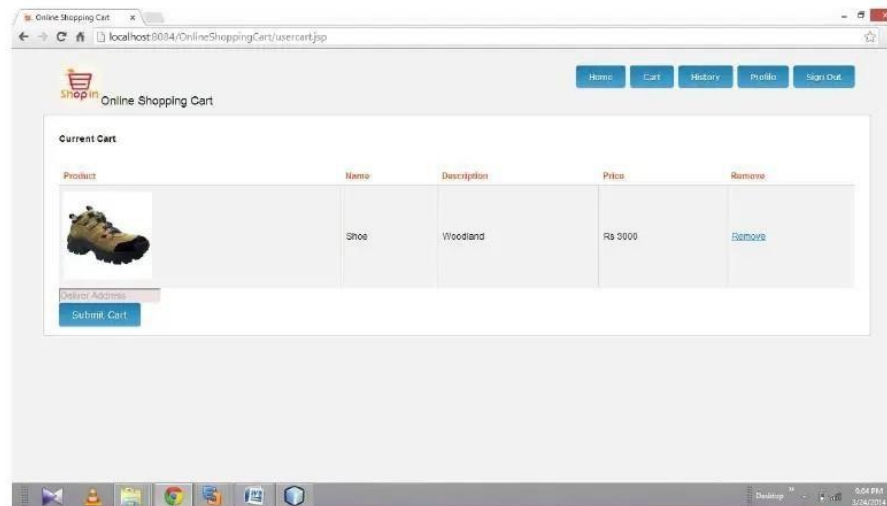
Fig.9Customerordersuccessfuly

IX. CONCLUSION

The project entitled Online shopping system was completedsuccessfully.

The system has been developed with much care and free oferrorsandatthesametimeitisefficientandlesstimeconsuming. The purposeofthis projectwastodevelopaweb application and an android application for purchasingitemsfroma shop.

This project helped us in gaining valuable information andpractical knowledge on several topics like designing webpagesusinghtml&css,usageofresponsivetemplates,designingofandroidapplications,andmanagementof database using mysql. The entire system is secured. Also

theprojecthelpedusunderstandingaboutthedevelopmentphases of a project and software development life cycle. Welearned howtotestdifferentfeaturesof aproject.

Thisprojecthasgivenusgreatsatisfactioninhavingdesigned an application which can be implemented to anynearbyshopsorbrandedshopssellingvariouskindsofproductsbysimple modifications.

There is a scope for further development in our project to agreat extend. A number of featurescan be added to thissystem in future like providing moderator more control overproductssothateachmoderatorcanmaintaintheirownproducts.Anotherfeaturewewishedtoimplementwaspro viding classes for customers so that different offers canbe given to each class. System may keep track of history ofpurchases of each customer and provide suggestions basedontheirhistory.Thesefeaturescouldhaveimplementedunlessthe time didnotlimitedus.

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Review on SQL Injection Prevention with Trust factor and Security

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ABSTRACT

SQL injection is a type of cyber-attack that has been around for over 20 years, but it is still a major threat to web-based applications. Despite technological advancements, hackers can still find vulnerabilities in web applications that allow them to perform SQL injection attacks. These attacks can give hackers access to sensitive information stored in electronic records in databases. However, there are ways to prevent SQL injection attacks. This paper looks at various techniques proposed in existing research to prevent SQL injection, and proposes the use of blockchain technology to prevent SQL injection attacks on database management systems via IP. Overall, SQL injection is a significant threat to web-based applications and it is important to take steps to prevent it.

Keywords— SQL injection attacks, Input validation, Prepared statements, least privilege, Encryption, Security, Data loss, Cyber security, Database security, Vulnerabilities, Risk management, Access control, Authentication, Authorization.

I. INTRODUCTION

SQL is a language used to interact with databases and manipulate stored data. SQL injection is a technique used by hackers to execute malicious SQL queries on a database server via a web-based application, and it is a common way for attackers to access sensitive information. MySQL is an example of a database system that has been vulnerable to SQL injection attacks. There are several vulnerabilities that can lead to data leakage in MySQL, including privilege escalation and root privilege escalation bugs. Login systems are particularly vulnerable to SQL injection attacks, but there are ways to prevent them. One approach is to use SQL injection sanitizers, which can detect intervention in web-based applications. Another approach is to provide firewalls for the SQL server. Several journal papers have been reviewed on the topic of SQL injection, which provide information on how to fight against and prevent these types of attacks. The National Security Agency (NSA) has identified SQL injection as the most common technique used by hackers, and even a major database organization like MYSQL has been hacked using this method. Attackers can exploit vulnerabilities in the database, such as privilege escalation bugs, to gain access to sensitive information and potentially compromise the entire server. The login system is a common target, with hackers using brute force or SQL injection to gain unauthorized access. SQL injection involves inserting code into login fields to bypass security measures, and if successful, the attacker can access the system without authorization. Preventing SQL injection attacks is crucial for maintaining the security and integrity of databases. SQL injection is a type of cyber-attack where an attacker injects malicious SQL code into a web application's input fields, tricking the application into executing

unintended actions. SQL injection attacks can lead to serious consequences, including data theft, data corruption, and unauthorized access to sensitive information.

Preventing SQL injection attacks is crucial for ensuring the security and integrity of web applications. There are several methods and best practices that developers can implement to prevent SQL injection attacks, such as input validation, parameterized queries, and stored procedures.

In this review, we will explore the various techniques and strategies used to prevent SQL injection attacks in detail. We will discuss the importance of understanding SQL injection vulnerabilities and how they can be exploited by attackers. We will also examine common prevention techniques and provide real-world examples of successful implementation. By the end of this review, readers will have a comprehensive understanding of SQL injection prevention methods and how to implement them effectively to protect their web applications from potential attacks.

According to National Security Agency (NSA), SQL injection is the most typically ways used by hackers, even the famous database organization MYSQL was hacked by these techniques on electronic records[1]. There is some vulnerability that will cause data leakage in MySQL because of the attackers accessing to the database and exposure the information or alter it. One of the vulnerabilities of it is privilege escalation or called it race condition bug. This bug allows the local system users access to the database and upgrade their privileges like change their id to 1 which can be an admin and alter or execute the information as their like. This will give an opportunity to an attacker access to the entire database server. The attacker might get fully compromise the target server. Besides that, there is another vulnerability which is root privilege escalation bug. This bug works with the previous vulnerability. Since the previous bug the attackers gain the privilege to access to the server and get upgrade user to administrator, the attacker can change a certain system file to a random file. Due to the present bug, it will cause the tied to an unsafe file. That's why, the attack can change the file easily because the bug is open a backdoor for the attacker to alter the file. Normally, the most common attack that will happen and threat the database system is the login system. For the login page, most of the attack will try using brute force with mean that guessing the password by trying every possibility like dictionary attack is consider as a type of brute force. Another attack is very common and use widely for attackers which is SQL injection. SQL injection is putting '1' OR '1' = '1' into username and password. If the system does not have any SQL injection prevention, if the attacker enters this code inside, the attacker can access to the system will authorization [1]-[4].

What is SQL Injection?

SQL injection is a type of security vulnerability that allows attackers to inject malicious code into SQL statements, which are used to communicate with a database. This can lead to unauthorized access to sensitive data, modification of data, or even deletion of entire databases. SQL injection attacks occur when an application does not properly validate user input before incorporating it into a SQL statement. Attackers can exploit this vulnerability by inputting malicious SQL code into an input field on a website or application, such as a login form, search field, or comment box. Once the attacker's SQL code is executed, they can access sensitive information, such as passwords, credit card numbers, or other personally identifiable information. They can also modify or delete data in the database, which can have serious consequences for businesses and organizations. To prevent SQL injection attacks, developers must ensure that all user input is properly validated and sanitized before being used in a SQL statement. This can be done through the use of prepared statements,

input validation, and input filtering. Additionally, regular security testing and code reviews can help identify and prevent vulnerabilities before they can be exploited by attackers.[3]

A database is a collection of organized data and information, structured into rows, columns, and tables, with an indexing system to facilitate easy access and retrieval of related data. The database is constantly updated, expanded, and purged to accommodate new data. Databases process workloads, run applications, and facilitate data inquiries. Unfortunately, as the usage of databases increases, so does the frequency of attacks against them. Data breaches pose a significant threat to organizations, causing more than just the loss of sensitive information. Therefore, organizations must prioritize database security to protect their data from malicious attacks. Database attacks are on the rise, driven by the increasing accessibility of stored data and information.

databases are a way to organize and store data, which can be easily accessed and updated. As the use of databases has increased, so have the number of attacks against them, with hackers trying to steal sensitive information for illegal gain. Lack of awareness regarding database security can lead to loss of data integrity, confidentiality, and availability. To reduce these threats, various techniques have been proposed, such as improving existing security systems and using anomaly detection to detect insider attacks. Different types of attackers and attacks have also been identified, including intruders, insiders, and administrators, and direct or indirect, passive or active attacks. Finally, it's important to consider the security of databases in mobile devices.

What is SQL injection Prevention?

SQL injection prevention involves taking steps to prevent attackers from exploiting vulnerabilities in a web application's SQL code. The following are some common methods for preventing SQL injection: Input validation: Developers should validate all user input and ensure that it meets expected criteria. For example, an email input field should only accept valid email addresses. This can be achieved using regular expressions or other validation methods. Parameterized statements: [4] Developers should use parameterized statements instead of dynamically constructing SQL statements. Parameterized statements use placeholders for user input, which are then replaced with sanitized data. This makes it impossible for attackers to inject SQL code into the statement. Sanitization: Developers should sanitize user input by removing any special characters or other potentially malicious code. This can be achieved through the use of input filters or other sanitization methods. Least privilege: Database users should be granted the least amount of privilege necessary to perform their tasks. This reduces the potential damage that can be done if an attacker gains access to a user's account. Regular updates and testing: Developers should regularly update their software and test their applications for vulnerabilities, including SQL injection. This can help prevent attackers from exploiting newly discovered vulnerabilities. By implementing these SQL injection prevention measures, developers can help protect their applications and the sensitive data stored within them from SQL injection attacks.[5]

Importance of SQL Injection Prevention

- SQL injection is a type of web application vulnerability that allows attackers to manipulate a database by injecting malicious SQL statements through user input. These attacks can result in unauthorized access to sensitive data, data loss, data corruption, and other damages that can have serious consequences for individuals and organizations. Therefore, preventing SQL injection is crucial to ensure the security and integrity of web applications and the data they store.

- Preventing SQL injection attacks requires careful attention to the security of the application's code and database configuration. This can involve implementing input validation and sanitization to prevent malicious inputs, using parameterized queries or prepared statements to avoid dynamic SQL, and restricting database user permissions to limit access to sensitive data. By taking these steps, businesses and organizations can reduce their risk of SQL injection attacks and protect their data from unauthorized access and manipulation.

- The importance of SQL injection prevention is further highlighted by the fact that these attacks are a common and persistent threat. According to a report by the Open Web Application Security Project (OWASP), SQL injection is still one of the most critical web application security risks. Furthermore, the impact of SQL injection attacks can be severe, leading to financial losses, damage to brand reputation, and legal and regulatory compliance issues.

- In summary, SQL injection prevention is critical for the security and integrity of web applications and the data they store. By implementing effective prevention techniques, businesses and organizations can protect themselves from the damaging effects of SQL injection attacks and maintain the trust of their customers and stakeholders.[6]

Types of SQL injection attacks: -

- Union-based SQL injection: This type of attack involves exploiting a vulnerability that allows an attacker to append additional SQL statements to the original query using the "union" keyword. By doing so, the attacker can retrieve additional data that is not intended to be exposed.

- Error-based SQL injection: This type of attack involves injecting malicious SQL statements that generate an error response from the database. The error message often contains sensitive information that the attacker can use to further exploit the vulnerability.

- Boolean-based SQL injection: This type of attack involves exploiting a vulnerability that allows an attacker to use Boolean conditions to infer information about the database. For example, an attacker might use a series of Boolean conditions to determine the number of columns in a table or the contents of a specific column.

- Time-based SQL injection: This type of attack involves exploiting a vulnerability that allows an attacker to delay the database response by using time-based SQL statements. By doing so, the attacker can infer information about the database structure or content.

- Out-of-band SQL injection: This type of attack involves exploiting a vulnerability that allows an attacker to retrieve data from the database using an alternative communication channel. For example, an attacker might use a DNS lookup to retrieve data from the database.

Fig. SQL Injection Prevention

II. THE MATERIAL AND METHOD

Literature suggests that lack of awareness about database security is a major reason behind the increasing number of database attacks. Therefore, literature proposes different techniques to improve the database security system such as improving the existing security system, using anomaly detection to detect insider attacks, and categorizing the attackers and types of attacks. Moreover, literature also discusses the importance of database security in mobile devices and proposes ways to overcome security threats in mobile database systems. A thorough literature review is necessary for providing a theoretical and analytical base for any research in the area of database security.

TABLE I METHODS COMPARISON BASED ON EACH AUTHORS

Reference Number	Author	Method	Drawback
[1]	V. Verma and R. K. Singh	Minimize the privileges, Implementation of consistent coding standards	It does not have node to node verified signature
[2]	Singh, G., Singh, R., & Thakur, D.	Processing input, , Managing Permissions, Tools to detect SQL injection queries	It does not have node to node verified signature
[3]	M. Ali, R. Mahmood, and A. Anwar	SQL injection commands datasets extraction, preprocessing, machine learning model analysis for SQL injection prediction and detection, testing and training,	It does not have node to node verified signature
[4]	Suman, S. S., & Kumar, S	Entirely dependent on user-defined approach (DUD) Threshold value	It does not have node to node verified signature
[5]	Zar Chi Su Su Hlaing , Myo Khaing	Filtering sending and receiving mechanism	It does not have node to node verified signature
[6]	A.A. Nedhal and A. Dana,	Web application firewall	It does not have node to node verified signature

Based on [8] attackers can be classified into three categories: intruders, insiders, and administrators. Intruders are anonymous individuals who illegally access computer systems to obtain valuable data and information stored in databases. Insiders are trusted users who abuse their privileges to obtain unauthorized access to data and information. Administrators are authorized individuals who have complete control over a computer system but use their privileges in an illegal manner to obtain system information. In addition, the literature also discusses different types of attacks, including direct attacks, indirect attacks, passive attacks, and active attacks. Many web-based applications, such as those used by organizations, universities, and schools, have login forms that users can input data into. However, these forms can be exploited through SQL injection, which can lead to

significant data breaches. there are different types of attacks that can be launched against a database, including direct attacks, indirect attacks, passive attacks, and active attacks. Attackers can be categorized as intruders, insiders, or administrators, and they may attempt to gain access to sensitive information and data stored in the database through various means, such as SQL injection or electronic attacks. It is crucial for organizations to implement robust security measures to protect their databases and prevent these types of attacks from occurring.

III. ADVANTAGES

- Enhanced data security: SQL injection prevention helps to ensure that sensitive data is protected from unauthorized access and manipulation. By preventing SQL injection attacks, organizations can protect their databases from being compromised and prevent data breaches.
- Improved system performance: SQL injection prevention can also help to improve system performance by reducing the risk of malicious queries that can cause system crashes or slowdowns. This can help to improve the overall efficiency and effectiveness of the system.
- Reduced costs: Preventing SQL injection attacks can help to reduce costs associated with data breaches, such as legal fees, fines, and reputational damage. By proactively protecting sensitive data, organizations can avoid the costs and consequences of a data breach.
- Increased compliance: SQL injection prevention is essential for compliance with regulations such as the Payment Card Industry Data Security Standard (PCI DSS) and the General Data Protection Regulation (GDPR). By implementing effective SQL injection prevention measures, organizations can ensure that they are compliant with relevant regulations and standards.
- Greater customer trust: Effective SQL injection prevention measures can help to build greater customer trust by demonstrating a commitment to data security and privacy. This can help to enhance the organization's reputation and increase customer loyalty.

IV. FUTURE SCOPE

Improved detection: Advanced techniques such as machine learning and artificial intelligence can be used to analyze user input and identify potential SQL injection attacks. These systems can also learn from past attacks and use this knowledge to improve their detection capabilities.

Real-time prevention: Instead of simply detecting SQL injection attacks after the fact, future prevention systems may be able to stop them in real-time. This could be achieved through the use of active monitoring and automated responses.

Integration with other security measures: SQL injection prevention systems can work alongside other security measures such as firewalls and intrusion detection systems to provide a layered defense against attacks.

Better education: Educating developers and IT professionals on SQL injection prevention and the importance of secure coding practices can go a long way in preventing these types of attacks. Therefore, future systems may focus on providing better training and resources to help prevent SQL injection attacks.

Integration with cloud-based services: With the increasing popularity of cloud-based services, SQL injection prevention systems will need to be adapted to work seamlessly with these services. This will ensure that security is not compromised when moving applications to the cloud.

Overall, the future scope of SQL injection prevention systems will focus on improving detection and prevention, integrating with other security measures, providing better education, and adapting to the changing technology landscape.[8]

V. RESULTS

In this study, it is emphasized that SQL injection is a serious threat to the security of web-based applications, as hackers can exploit vulnerabilities in the application to steal data from the database. To prevent SQL injection attacks, developers should prioritize the security of web-based applications and consider implementing blockchain technology. It is important to regularly test the security of web-based applications to ensure they are not vulnerable to SQL injection attacks. The study also highlights various types of database security threats, including insider attacks, internal attacks, and external attacks. However, there are solutions available to address these threats, such as access control, inference policy, user authentication, and data encryption.

VI. CONCLUSION

The main aim of this research is to investigate SQL injection, which is a technique used by hackers to gain unauthorized access to a database of a web-based application. The research also aims to identify and explore different types of database threats, including excessive privilege abuse, legitimate privileges abuse, privileges elevation, and platform vulnerabilities, and to provide solutions to overcome these problems. The use of Blockchain technology, specifically Nodes Verification with IP, is proposed as a solution to prevent SQL injection attacks. Furthermore, future work will investigate the use of Blockchain and Augmented Reality to prevent SQL injection and improve the potential for detecting injection attempts.

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Prepration and Characterization of Activated Carbon Derived From Limonia Acidissima and Its Application in Adsorption

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ABSTRACT

2,4-D (2,4- dichlorophenoxyacetic acid) is a list a pesticide active ingredient classified as a herbicide. Over the last 50 years, 2,4-D is mostly used as herbicides on large scale due to its low cost. This results in pollution of surface and ground water. In present study, the removal of 2,4-D from aqueous solution was carried using activated carbon derived from shell of fruit of Limonia Acidissima plant. The charcoal was firstly prepared from shell of Limonia Acidissima fruit using pyrolysis at 450-550°C temperature. The activation of charcoal was performed by chemical activation method using acetic acid. The activated carbon thus prepared was characterized using FTIR, BET surface area, CHNS, XRF and proximate analysis. The potential of this activated carbon was tested for removal of 2,4-D from aqueous solution in batch adsorption. The effects of adsorbent dosages, initial concentration, contact time, pH and temperature were studied. The equilibrium data were analyzed using Langmuir, Freundlich and Temkin isotherm. The maximum adsorption capacity by Langmuir isotherm was found to be 15.38 mg/g at 25°C. The kinetics of adsorption was studied using pseudo first order, second order and Elovich models. The pseudeo second order model is found the best to explain the adsorption kinetics. The second order kinetic constant was calculated to be 5.051 g/(mg min).

Keywords: 2,4-D, adsorption, isotherm, kinetics

I. INTRODUCTION

The US Environmental Protection Agency (EPA) defines the term "pesticide" as any substance or a mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. The Food and Agriculture Organization of the United Nations (FAO) defines this term as any substance or a mixture of substances intended for preventing, destroying, or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances, which may be administered to animals for the control of insects, arachnids, or other pests in or on their bodies. Thus, the term "pesticide" refers not only to insecticides, but also to herbicides, fungicides, and various other substances used to control pests. The use of pesticides is alleviating food shortages in developing countries, allowing them to produce crops multiple times a year and export nontraditional agricultural products to developed nations.

Pesticides are also defined as chemical compounds commonly used in agriculture to protect crops and grains from any pernicious insects, weeds, fungi, rodents, nematodes and microorganisms like bacteria and viruses. Once the pesticides are sprayed on the crops, some of the quantity gets incorporated into the soil and enters into the ecosystem. Hence, the presence of pesticides in the environment represents a serious risk to the human health and environment since these substances are very toxic, carcinogenic and mutagenic.

Pesticides can be classified based upon their biological mechanism function or application method such as: Algicides, Antimicrobials, Attractants, Biopesticides Biocides, Disinfectants, Fungicides, Herbicides, Insecticides and Nematicides repellents.

The worldwide consumption of pesticides is 56% herbicides, 25% fungicides and bactericides and 19% insecticides. In India, insecticides are used at huge amount i.e, 51%, 33% fungicides and 16% bactericides.

1.1 Limonia Acidissima (Adsorbent)

Limonia acidissima is the only species within the monotypic genus Limonia. Common names for the species in English include wood-apple and elephant-apple. It is sometimes also called monkey fruit. Limonia acidissima is a large tree growing to 9 meters (30 ft) tall, with rough, spiny bark. The leaves are pinnate, with 5-7 leaflets, each leaflet 25–35 mm long and 10–20 mm broad, with a citrus-scent when crushed. The flowers are white and have five petals. The fruit is a berry 5–9 cm diameter, and may be sweet or sour. It has a very hard rind which can be difficult to crack open, it appears greenish-brown in colour from outside and contains sticky brown pulp and small white seeds. The fruit looks similar in appearance to the Bael fruit (Aegle marmelos). It contains considerable amount of protein, carbohydrate, iron, fat, calcium, Vit-B & C etc. 100 g of ripe fruit pulp contains up to 49 KCal.

Different parts of Limonia Acidissima L. are responsible for different medicinal as well as cosmetics properties. Fruit of Limonia Acidissima L. is used as a substitute for bael in diarrhea and dysentery. Fruit is much used in India as a liver and cardiac tonic and when unripe, as a means of halting diarrhea and dysentery and for effective treatment for high cough, sore throat and disease of the gums. Leaves and stem bark of wood apple have been studied for anti-tumor and antimicrobial activity and pulp has anti-inflammatory, antipyretic activity. The fruit contains flavonoids which gives anti-oxidant property, saponins which are responsible for foaming and anti-fungal property. Glycosides, tannins, some coumarins and tyramine derivatives have also been isolated from the fruits of Limonia. The fruit shells of Limonia Acidissima contain anti-fungal compounds, namely, psoralene, xanthotoxin, 2, 6-dimethoxybenzoquinone and osthenol. The shell of the fruit can be also used for skin exfoliation purpose.

Limonia Acidissima . is globally reported from India, SriLanka, Pakistan, Java and Malesia. In India, it is found to occur in the dry regions. It is reported from the states of Punjab, Delhi, Rajasthan, Madhya Pradesh, West Bengal, Arunachal Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu and Andhra Pradesh This species is globally distributed in Indo-Malesia. Within India, it is cultivated for its fruits throughout the plains of India, especially in the drier zones

Shell of Limonia Acidissima contains Psoralene, xanthotoxin, 2, 6-dimethoxybenzoquinone, osthenol (anti-fungal) Amino acid, total amino acid, etc

1.2 2,4-D (Adsorbate)

2,4-D belongs to a group of chemicals known as phenoxy compounds, which are potentially toxic to humans.2,4 Dichlorophenoxyacetic acid (2,4-D) can be dissipated within 20 days in various land use types. Because of extensive use of herbicides such as 2,4-D various concentration of these herbicide are being reported in both surface and ground water worldwide. In general, when pesticides are sprayed in agricultural field, part of it enters into the soil and soil ecosystem. It can degrade or can remain in its original form for long periods percolation of pesticide into ground water through soil depends on its mobility and persistence as well as the hydrothermal condition of the soil.

The first modern herbicide i.e. 2,4-D was first discovered and synthesized by W.G.Templeman at Imperial Chemical Industries in 1940. When 2,4-D has led to continue dosage today, and it remains the most commonly used herbicides in the world. 2,4-D is an organic compound with the chemical formula C8H6Cl2O3. It is a pesticide, classified as herbicides, a plant growth regulator and fungicide. It is a selective post appearance herbicide for the control of broadleaf. Among several pesticides or herbicides registered under EPA and Agricultural Planning and Information Bank India, 2,4-D is one of the globally used herbicides to control broadleaf weeds in agricultural and forestry. It is a selective herbicide applied in the form of acid, sodium salt, amine and ethyl ester and its application is recommended in the farming of crepes, vegetables, rice, wheat, maize, sugarcane, sorghum, potato, citrus and grapes.

1.3 Adsorption

Adsorption is a process in which a single or a group of ions/compounds is accumulated on the surface of solid. Adsorption mainly involves adsorbent and adsorbate. Adsorbent is generally a solid material (mostly in powder form) on which adsorption takes place and the substance that gets adsorbed is called adsorbate. The adsorption process is classified into two types: physical adsorption (van der Waal's adsorption) and chemical adsorption (chemisorption).

Physical adsorption occurs due to the van der Waal's force of interaction, and heat of this type of adsorption is generally in the range of 20–40 kJ/mol. Physical adsorption is rapid and reversible, and can be of two types, namely, monolayer adsorption and multilayer adsorption. In chemisorption, chemical interaction occurs between the adsorbent surface and adsorbate molecules. The heat of chemisorption usually varies from 40 to 400 kJ/mol. It is an irreversible process because a strong force of interaction exists between the adsorbent and adsorbate molecules and is relatively slow process.

The surface active material is referred to as the adsorbent and the molecules which are accumulated on the adsorbent called adsorbate molecules. The strength by which adsorbate molecules are attached with the adsorbents determines the nature of adsorption. Normally, release of energy in the range of 8 to 25 KJ/mole due to adsorption is termed as physisorption whereas a much larger energy comparable to chemical bonding energy leads to chemisorption. There are always some exception to these values. The prescribed value of energy differentiating physisorption and chemisorption are based on general experience.

When an adsorbed molecule receives energy equal to or greater than the energy of adsorption, it will leave the surface. This phenomenon is the reverse of adsorption and is called as desorption. When the number of molecules striking the surface and staying there is equal to the number of molecules that are leaving the surface the system is said to be in equilibrium. All the atoms or molecules adsorbed on the surface do not have identical

environment since distribution of free energy on the surface is not always smooth because of the differences in the energy of the molecular orbitals of the adsorbent and also due to other internal interactions.

Adsorption is well known equilibrium separation process and an effective method for water decontamination application. Adsorption has been found to be superior to other techniques for water re-use in terms of initial cost, flexibility, and simplicity of design, ease of operation, and insensitivity to toxic pollutants. Adsorption also does not result in the formation of harmful substances.

1.4 Need of pesticide removal

Globally, there is a large-scale use of pesticides to achieve the desired level of crop production, which is largely due to increased food demands. Once the pesticides are sprayed on the crops, some of the quantity is incorporated into the soil and enters into the ecosystem where it moves from one system to another or degrades or remains in the same system in its original form or in its metabolites form. The pesticides possess sufficient mobility and persistence under the specific conditions of the soil and atmosphere, which allow them to leach into the ground and surface waters. In the past few years, some studies have reported that the amount of pesticides in groundwater resources has grown significantly, and thus, this has become an intensive and burning issue requiring urgent attention. The overuse and misuse of pesticides has contributed to the adverse environmental and health consequences. Inappropriate application of pesticides affects the whole ecosystem, as these chemicals enter into the food chain, and eventually pollute the soil, air, ground and surface waters. Some of the pesticides have been reported to be persistent, toxic, mutagenic, carcinogenic, and tumorogenic, and therefore, their removal from ground water resources is of great environmental concern.

1.5 Methods for pesticide removal

Because a wide range of pesticides is used in agricultural and non-agricultural practices, it is extremely difficult for producing a single method for the removal of pesticides that applies universally. Several methods have been postulated for pesticide removal, which are given as follows:

➢ Aerobic degradation
➢ Combined photo-Fenton and biological oxidation
➢ Photocatalytic degradation
➢ Advanced oxidation process
➢ Nanofiltration membranes
➢ Ozonation
➢ Coagulation
➢ Solid-phase extraction
➢ Fluid extraction

Some of these methods have one or more disadvantages such as concentrated sludge production, being expensive, short half-life, high energy requirement, and formation of by-products. Adsorption is an efficient process for water decontamination application. It is found to be better than the aforementioned methods in terms of initial cost, flexibility and simplicity of design, and ease of operation. Further, adsorption is insensitive to noxious pollutants and does not result in the formation of harmful substances.

1.6 Adsorbents for pesticide removal

Adsorption is a surface phenomenon and its efficacy depends on the number of active sites available on adsorbent, porosity, and specific surface area of adsorbent as well as various types of interactions. The adsorbents for removal of pesticides can be divided as follows:

➢ carbonaceous adsorbents
➢ agricultural wastes
➢ polymeric materials
➢ industrial wastes
➢ bioadsorbents
➢ inorganic adsorbents
➢ nanomaterials

II. THEORETICAL CONSIDERATIONS

2.1 Adsorption isotherm models

In an attempt to explore novel adsorbents for use in an ideal adsorption system, it is essential to establish the most appropriate adsorption equilibrium correlation, which is crucial for reliable prediction of adsorption parameters and quantitative comparison of adsorbent behavior for different adsorbent systems. Considering this perspective, equilibrium relationships, generally known as adsorption isotherms, describe how pollutants interact with the adsorbent materials, and how they are decisive for adsorption mechanism pathways, capacities of adsorbents, and effective design of the adsorption systems.

Before 1914 only a few theoretical interpretations of adsorption isotherms were in use. However, since then, many isotherm models were proposed by different investigators. Some of those in frequent use are as follows:

➢ Langmuir adsorption isotherm
➢ Freundlich adsorption isotherm
➢ Temkin adsorption isotherm

2.1.1 Langmuir adsorption isotherm

The Langmuir adsorption isotherm is derived by considering following assumptions:

➢ Fixed number of adsorption sites
➢ Homogeneous surface of adsorbent
➢ One adsorbate molecule occupies only one active site
➢ No interaction between the adsorbate species
➢ Formation of monolayer of adsorbate on adsorbent surface

Langmuir isotherm model in linear [equation (2.1)] and nonlinear [equation (2.2)] forms is given below

$$\frac{C_e}{q_e} = \frac{1}{K_L q_{max}} + \frac{C_e}{q_{max}} \qquad (2.1)$$

$$\frac{C_e}{q_e} = \frac{1}{K_L q_{max}} + \frac{C_e}{q_{max}} \qquad (2.2)$$

where KL (L/mg) is the equilibrium adsorption constant, which is related to the affinity of binding sites and qmax (mg/g) is the maximum amount of adsorbate adsorbed per gram of adsorbent at equilibrium when all

binding sites are occupied; qe (mg/g) and Ce (mg/L) are equilibrium capacity and equilibrium concentration, respectively.

Langmuir isotherm has following drawbacks

- The formation of monolayer is possible only under low concentration of adsorbate. Thus Langmuir isotherm is valid under low concentration only.
- Langmuir isotherm assumes homogeneous surface of adsorbent. But in real, solid surfaces are heterogeneous.
- The weak force of attraction exists even between molecules of same type.

2.1.2   Freundlich adsorption isotherm

Freundlich adsorption isotherm was first proposed by van Bemmelen in 1888 as an empirical equation. Later, Freundlich made some useful modifications as a result of which, it acquired great importance. The Freundlich isotherm model is based on the assumption that the adsorption process takes place on heterogeneous surfaces and adsorption sites are distributed exponentially with respect to the heat of adsorption. Linear and nonlinear forms of Freundlich isotherm are given as follows:

$$\log q_e = \log K_F + \frac{1}{n} \log C_e \tag{2.3}$$

$$q_e = K_F \, C_e^{1/n} \tag{2.4}$$

where qe (mg/g) is the equilibrium adsorption capacity, Ce (mg/L) is the equilibrium concentration of the adsorbate in solution, KF[(mg/g)/(mg/L)1/n] and n are Freundlich constant and adsorption intensity factor, respectively.

Freundlich isotherm has following drawbacks

- Freundlich equation is purely empirical and has no theoretical basis.
- The equation is valid only upto a certain concentration and invalid at higher concentration.
- The constants K and n are not temperature independent, they vary with temperature.

2.1.3   Temkin adsorption isotherm

Temkin adsorption isotherm assumes that the heat of adsorption (function of temperature) of all molecules in the layer decreases linearly rather than logarithmically with coverage. This model is generally used to explore the energy-distribution pattern. Its derivation is characterized by a uniform distribution of binding energies up to some maximum binding energy. The expressions of Temkin isotherm are as follows:

$$q_e = B \ln A_T + B \ln C_e \tag{2.5}$$

$$q_e = B \ln(A_T C_e) \tag{2.6}$$

where AT (L/g) is Temkin isotherm equilibrium binding constant (B=RT/bT), T is absolute temperature in Kelvin, and R (8.314 J/mol·K) is the universal gas constant. The constant bT (J/mol) is related to the heat of adsorption; Ce (mg/L) and qe (mg/g) are equilibrium concentration and capacity, respectively.

Temkin isotherm has following drawbacks

- Temkin isotherm is not appropriate for complex adsorption systems.
- Temkin isotherm is not applicable to extremely low and large value of concentrations.

2.2 Adsorption kinetic models

The study of kinetics in adsorption is significant as it provides valuable insight into the reaction pathways and into the mechanism of the reaction. Further, it is important to predict the equilibrium time at which the adsorbate is removed from aqueous solution to design an appropriate adsorption treatment plant. Any adsorption process is normally controlled by the following diffusive transport processes for the adsorbate:

➢ From bulk solution to the film surrounding the adsorbent

➢ From the film to the adsorbent surface

➢ From the surface to the internal sites followed by binding of the metal ions onto the active sites.

However, in kinetic modeling, all these three steps are grouped together and it is assumed that the difference between the average solid-phase concentration and equilibrium concentration is the driving force for adsorption. Further, it is established from the experimental observations that at optimal agitation speed, the external boundaries hardly have any effect. Therefore, application of the kinetic model depends only on the initial and final concentrations of the solution at different time intervals. It is incorrect to apply simple kinetic models such as first- and second-order rate equations to an adsorption process with solid surface, which is rarely homogenous. In addition, the effects of transport and chemical reaction are often experimentally inseparable.

Several kinetic models have been proposed to unveil the mechanism of a solute adsorption from aqueous solution onto an adsorbent. The following kinetic models are applied in this work:

➢ Pseudo-first-order kinetic model/Lagergren kinetic model

➢ Pseudo-second-order kinetic model

➢ Elovich kinetic model

2.2.1 Pseudo-first-order kinetic model

The pseudo-first-order (PFO) or Lagergen kinetic rate equation is one of the most widely used adsorption rate equations and is derived based on solid adsorption capacity for adsorption of a solute from a liquid solution. According to this kinetic model, the overall adsorption rate is directly proportional to the driving force, that is, the difference between the initial and equilibrium concentrations of the adsorbate. The differential form of the PFO kinetic equation is expressed as follows:

$$\frac{dq_t}{dt} = k_1 (q_e - q_t) \tag{2.7}$$

where qe and qt (mg/g) are the amounts of adsorbate adsorbed at equilibrium and at time t, respectively, k1 (min-1) is the pseudo-first-order rate constant, and t (min) is the contact time between the adsorbent and adsorbate. The integration of equation (2.7) using the boundary conditions (at t = 0, qt= 0; at t = t, qt = qt) resulted in the next; linear form (equation 2.8) and nonlinear form (equation 2.9), which is known as the "first-order Lagergren's rate equation"

$$\ln(q_e - q_t) = \ln q_e - k_1 t \tag{2.8}$$

$$q_t = q_e \left(1 - e^{-k_1 t}\right) \tag{2.9}$$

2.2.2 Pseudo second order kinetic model

The pseudo-second-order (PSO) kinetic model in differential form is expressed as

$$\frac{dq_t}{dt} = k_2 \, (q_e - q_t)^2 \qquad\qquad (2.10)$$

where k2 [g/(mg·min)] is the rate constant of the pseudo-second-order adsorption and the other symbols are the same as those detailed under equation (2.7). After applying the boundary conditions, the integrated form of equation (2.10) becomes

$$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{t}{q_e} = \frac{1}{h} + \frac{t}{q_e} \qquad\qquad (2.11)$$

$$q_t = \frac{k_2 q_e^2 t}{1 + k_2 q_e t} \qquad\qquad (2.12)$$

where is known as "initial adsorption rate".

2.2.3 Elovich kinetic model

The Elovich (EL) kinetic model has been originally used for describing reactions involving chemisorption of gases on a solid surface. Nowadays, it is also used in solid–liquid adsorption systems. The Elovich kinetic equation is generally expressed as follows:

$$\frac{dq_t}{dt} = \alpha \exp(-\beta_L \, q_t) \qquad\qquad (2.13)$$

where α [mg/(g·min)] is the initial adsorption rate constant, βL (g/mg) is another constant related to the extent of surface coverage. Applying boundary conditions after integration of equation (2.13), the following equation is obtained.

$$q_t = \frac{1}{\beta_L} \ln(1 + \alpha \beta_L t) \qquad\qquad (2.14)$$

In further simplification of Elovich kinetic model, it is assumed that the product is much greater than a unit (i.e., αβLt>>1). Therefore, the Elovich equation in linear and nonlinear form is finally obtained as follows:

$$q_t = \frac{1}{\beta_L} \ln(\alpha \beta_L) + \frac{1}{\beta_L} \ln(t) \qquad\qquad (2.15)$$

$$q_t = \frac{1}{\beta_L} \ln(\alpha \beta_L t) \qquad\qquad (2.16)$$

By applying the isotherm and kinetic models in linear form, the model parameters can be determined from the slope and intercept of the straight line.

2.3 Rate-controlling mechanism

The transport of adsorbate from the solution phase to the surface of the adsorbent particles involves a few steps. The transport pathway of adsorbate can be divided into three stages, namely, (a) mass transfer (boundary layer/film diffusion), (b) adsorption on to sites, and (c) intraparticle diffusion. The overall adsorption process may be controlled either by one or more steps mentioned. In a rapidly stirred batch adsorption, the diffusive mass transfer can be related by an apparent diffusion coefficient. In general, a process is diffusion controlled if its rate is dependent on the rate at which components diffuse toward one another. The possibility of adsorption controlled by intraparticle diffusion is explored by intraparticle diffusion model [144] (IPD), which is given as follows:

$$q_t = k_d t^{\frac{1}{2}} + C \tag{2.17}$$

where kd [(mg/g)/min1/2] is the intraparticle diffusion rate constant and C (mg/g) is a constant that gives an idea about the thickness of the boundary layer (i.e., larger the value of C, the greater is the boundary layer effect). The plot qt versus t1/2 is known as "Weber–Morris plot" and if the plot satisfies the linear relationship with the experimental data, then the adsorption process is controlled by intraparticle diffusion only. If multilinear plots are observed, then two or more steps influence the adsorption process.

The rate-limiting step in adsorption is determined by assuming the adsorbent particle to be a sphere of radius "a" and the diffusion follows Fick's law. The relationship between adsorbate uptake and time is given by following expressions.

$$F = 1 - \frac{6}{\pi^2} \sum_{n=1}^{\infty} \frac{1}{n^2} \exp\left[-n^2 Bt\right] \tag{2.18}$$

$$F = \frac{q_t}{q_e} \tag{2.19}$$

where F is the fractional attainment of equilibrium at time t and n is n is an integer. Bt is a time constant. Reichenberg (1953) transformed equation (2.18) to obtain the approximations given in equations (3.20) (For F > 0.85) and (2.21) (For F < 0.85).

$$Bt = -0.4977 - \ln(1-F) \tag{2.20}$$

$$Bt = \left(\sqrt{\pi} - \sqrt{\pi - \left(\frac{\pi^2 F}{3}\right)}\right)^2 \tag{2.21}$$

The effective diffusion coefficient can be calculated from the slope of Bt versus t plot using

$$B = \text{Slope} = \frac{\pi^2 D_{eff}}{a^2} \tag{2.22}$$

where Deff (cm2/s) is the effective diffusion coefficient. If a Bt versus time plot is linear and passes through the origin, then the adsorption rate is governed by diffusion in the particle; otherwise, the film diffusion (i.e., boundary layer) governs the adsorption rate.

When the transport of the solute molecules from the liquid phase to the solid phase boundary plays the most significant role in adsorption, the liquid film diffusion model is generally applied using the equation described by Boyd et al.

$$\log(1-F) = -\frac{k_{fd}}{2.303} t \tag{2.23}$$

where F is the fractional attainment of equilibrium (F = qt/qe) and kfd (min-1) is the film diffusion rate constant. A linear plot of log(1–F) versus t with zero interceptsuggests that the kinetics of the adsorption process are controlled by diffusion through the liquid film.

2.4 Thermodynamic equations

Thermodynamic properties such as equilibrium constant, temperature and enthalpy, entropy, and (Gibbs) free energy are essential for designing any adsorption system. These properties are important to check viability, spontaneity, and nature of adsorption process, and are determined using thermodynamic relations. The changes in enthalpy (ΔH, kJ/mol), entropy [ΔS, kJ/(mol·K)], and Gibbs free energy (ΔG, kJ/mol) were investigated by

applying equations (3.24) and (3.25) to experimental findings obtained at different temperatures and initial concentrations.

$$\ln K_p = -\frac{\Delta H}{RT} + \frac{\Delta S}{R} \qquad (2.24)$$

$$\Delta G = -RT \ln K_p \qquad (2.25)$$

where Kp is the ratio of equilibrium concentration of adsorbate in the solid and liquid phases and T is temperature in K. ΔH and ΔS were derived from the slope and intercept of linear plot (i.e.,van't Hoff plot) of lnKp versus 1/T, respectively.

III. MATERIALS AND METHOD (BATCH ADSORPTION)

3.1 Materials

3.1.1 Adsorbent Preparation of activated carbon

In this study, the activated carbon is prepared from shell of Limonia Acidissima fruit. The fruit of Limonia Acidissima (kavit) is collected from nearby market. The fruit is commonly names as wood-apple and elephant-apple. The fruit has a very hard shell which can be difficult to break, and contains sticky brown pulp and small white seeds. The fruit shells are wastes that are mainly disposed of after extraction of their inner contents. The fruit shells after extraction of the inner contents were washed to remove soil and other substances and then sun dried for 6-7 days to eliminate moisture. Fruit shells were broken into smaller pieces. It was then packed in an air tight in a cylindrical container with top completely sealed to prevent the entry of air during the process of charring. The sealed container was heated in muffle furnace at 450-550˚C for 2 hrs. The sealed container was withdrawn from the furnace and place to cool. The charcoal removed from the container and then washed twice with distilled water. The charcoal was dried in an oven at 110˚C for 5 hrs. The charcoal removed from furnace kept in desiccators for cooling. The charcoal was then crushed in mortar by means of pestle applying moderate pressure in order to have smaller particle size.

The activation of charcoal was carried out by chemical activation method using acetic acid as the activating agent. The crushed/grinded charcoal soaked in acetic acid (40%) solution and the impregnation ratio was in the range of 3.5 to 12.25. The impregnation ratio was determined as the ratio of the weight of activating agent to the weight of the raw material. The sample having weight 3 g sample was kept in 50 ml acetic acid. The soaking time of charcoal in acetic acid was between 12 to 48 hrs at room temperature. After soaking, the sample was decanted and washed with distilled water to get rid of excess acetic acid. The sample was dried in a hot air oven at 70-80˚C for about two hours. The dried activated charcoal sample was carbonized in muffle furnace. The temperature of the furnace was gradually increased to the final preselected temperature ranging from 300-450˚C in an inert atmosphere. After attaining maximum final temperature, it was hold for 15 minutes. The activated charcoal sample thus formed was named as activated carbon (AC). The percentage yield of activated carbon was calculated using the following formula:

$$\% \text{ yield} = \frac{w_1}{w_2} \times 100$$

Where w1 is the dry weight (g) of final activated carbon = 5.770 g, w2 is the dry weight (g) of precursor = 6.012 g.
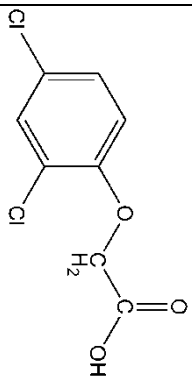
Percentage yield of activated carbon = 94.28%

The surface area, pore diameter, and pore volume of activated carbon were determined by the Brunaer–Emmett–Teller (BET) method using ASAP 2010 (Micromeritics; Norcross,GA, USA). The elemental chemical contents of AC were determined by XRF analysis using PAN alytical PW 2403 (Netherlands). CHNS analysis was carried out on an elemental analyzer (Elementar, vario MACRO cube, Hanau, Germany). The presence of functional groups on the surface of AC was investigated by FTIR analysis performed on IR-Affinity-1 (Shimadzu, Tokyo,Japan). The morphology of AC was examined using a scanning electron micrograph (SEM; JSM 7600F). The proximate analysis was performed according to ASTM method.

3.1.2 Adsorbates

The carbamate pesticides, namely 2,4-D (2,4 Dichlorophenoxyacetic acid), was purchased from Sigma Aldrich (Bengaluru, India). The structure and properties of herbicides are presented in Table 3.1.

Table 3.1 Pesticides structure and properties

	2,4 Dichlorophenoxyacetic acid
Structure	
Molecular Formula	C8H6Cl2O3
Molecular Weight (g/mol)	221.04
Purity (%)	99.99%
Solubility (mg/L)	890
pKa	2.87
λmax (nm)	283

3.2 Experimental method: Batch adsorption

During the batch adsorption of 2,4-D, a stock solution of pesticide was prepared by dissolving an appropriate quantity of pesticide in deionized water. According to the experimental design presented in Table 4.2, the stock solution was diluted to different concentrations. A weighed amount of adsorbent (AC) was added to a certain volume (mL) of herbicide solution taken in glass vials of 50-mL capacity. The vials were agitated in a temperature-controlled water bath shaker for variable time at different temperatures. The effect of pH was studied by varying the pH using 0.1MHCl and 0.1MNaOH. pH was measured using a pH meter (Model- Hanna pH-213). The prepared samples were withdrawn, filtered using Whatman filter paper, and then centrifuged. The equilibrium concentration of filtrate i.e. 2,4-D was measured on a double-beam UV/Vis spectrophotometer (UV 1900i;Shimadzu, Japan) at λmax276 nm. Each experiment was performed in duplicate, and the results were recorded as average of the values. The percent removal, adsorption capacity qt (mg/g) at any time t, and adsorption capacity, qe(mg/g) at equilibrium were calculated using the following equations:

$$\% \text{ removal} = \frac{(C_0 - C_e)}{C_0} \times 100 \qquad (3.1)$$

$$q_t = \frac{(C_0 - C_t) \times V}{m} \qquad (3.2)$$

$$q_e = \frac{(C_0 - C_e) \times V}{m} \qquad (3.3)$$

WhereC0 (mg/L) and Ce (mg/L) are the initial and equilibrium concentrations of adsorbate, respectively, V (L) is volume of the solution, and m (g) is adsorbent mass. Batch adsorption of 2,4-D was performed by varying adsorbent dosages, initial concentration, contact time, pH, particle size of adsorbents, and temperature according to the values listed in Table 3.2.

Table 3.2 Batch adsorption experiment design

Expt. No.	Variable	Constant
1	m = 250–1250 mg per 25 mL	C0, t, pH, T
2	C0 =50–500 mg/L	m, t, pH, T
3	t =30–60 min.	m, C0, pH, T
4	pH =2–11	m, C0, t, T
5	T =298–318 K	m, C0, t, pH

IV. RESULTS AND DISCUSSION

This chapter includes detail discussion on characterization of adsorbents and batch adsorption.

4.1 Physiochemical characterization of activated carbon

The physiochemical characterizations of a solid, powdered material are important in its utilization as adsorbent. The characteristics that are generally considered for adsorbent selection are determined by proximate analysis, chemical analysis (i.e., XRF analysis) and BET surface area. Table 5.1 presents the in depth physiochemical characteristics of AC.

Table 4.1 : Physiochemical characteristics of AC.

Characteristics		Unit in %
Proximate Analysis	Moisture %	6.82
	Ash %	3.30
	Volatile Matter %	5.30
	Fixed Carbon %	84.58
Chemical Analysis	SiO2 %	9.043
	MgO %	0.00
	K2O %	12.537
	Fe2O3 %	4.193
	CaO %	52.566
	P2O5 %	5.782
	SO3	5.881

	Cl	7.291	
	ZnO	0.519	
	SnO2	0.949	
	TeO2	1.178	
CHN Analysis	C %	89.32	
	H %	00.15	
	N%	00.78	
	S %	00.62	
	O %	12.08	
Surface Area (m2/g)	326.09 m2/gm		

4.2 Scanning Electron Micrograph

The scanning electron micrograph reveals the particle size and porosity and suggest the nature of AC. The magnification image indicates the presence of a wide range of different particles in AC. Higher magnification clearly shows pores and some pores appear internally connected.
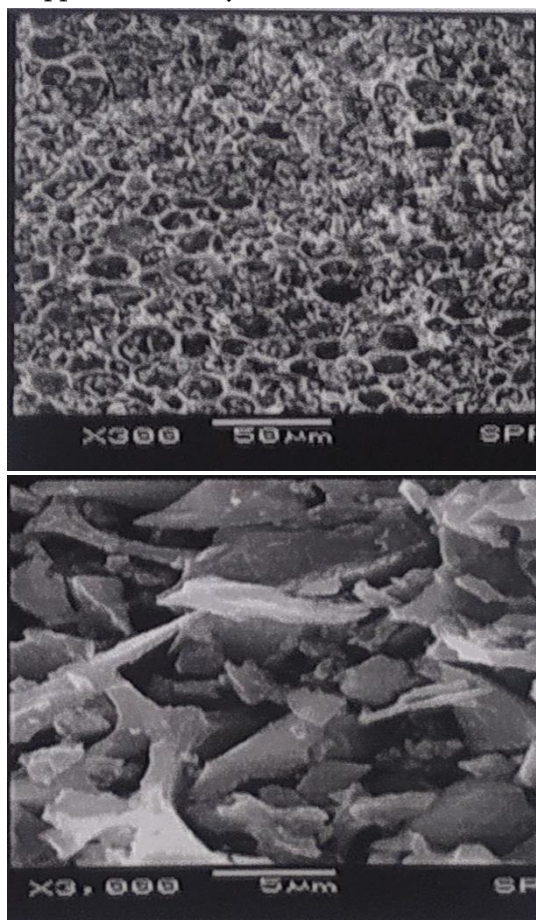
Fig. 4.1 Scanning Electron Micrograph of AC

The effect of various parameters such as adsorbent dosage, initial concentration, contact time, temperature and pH are studied on the removal of 2,4-D from aqueous solution.

4.3 Effect of adsorbent dosage on 2,4-D removal

The effect of adsorbent dosage on removal of 2,4-D was studied by varying the adsorbent dosage 250,500,750,1000 and 1250 mg per 25 mL of adsorbate solution. The concentration of adsorbate i.e., was kept at 100 mg/L at constant pH (6.5) and temperature 25oC. The experiments were performed for 5 hrs of contact time. Results obtain are plotted in the following Figure. It is observed that, the percentage removal of 2,4-D is increased with increase in adsorbent dosage. The 2,4-D removal about 97% is obtain for 1250 mg adsorbent dosage. The increment in removal of 2,4-D with increase in dosage is due to increase in quantity of adsorbent which increased surface area of adsorbent. The higher adsorbent dosage of activated carbon provides the greater number of adsorption sites. Therefore the removal is higher for higher dosage. For 500 mg adsorbent dosage, the removal is found to be around 96 %. Thus there is not significant increase in removal of 2,4-D for additional dosage after 500 mg. Therefore the optimum dosage of 500 mg per 25 mL of pesticide solution is selected for further studies.
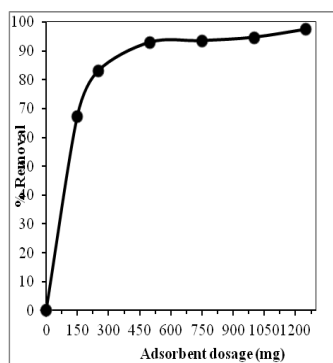
Fig 4.2 Effect of adsorbent dosage on removal of 2,4-D

4.4 Effect of initial concentration on removal of 2,4-D

The adsorption of 2,4-D onto the activated carbon was studied for different concentrations such a 50,100,200,300,400 and 500 mg/L of 2,4-D solution. The dosage of activated carbon is selected as 500 mg per 25 ml of solution at fixed pH (6.5). The experiment is carried out for 5 hrs of contact time at 25 oC. Figure shows the effect of initial concentration of 2,4-D was raised. It could be described to fixed concentration of adsorbent dosage; this results in reduction of 2,4-D removal. For 50 mg/L concentration of 2,4-D, nearly complete removal of 2,4-D is achieved whereas for 500 mg/L concentration of 2,4-D, the removal is reduced to 60%. The percentage removal is decreased with increase in concentration of adsorbate. This is due to the higher mass transfer gradient for the greater initial concentration for pesticide.
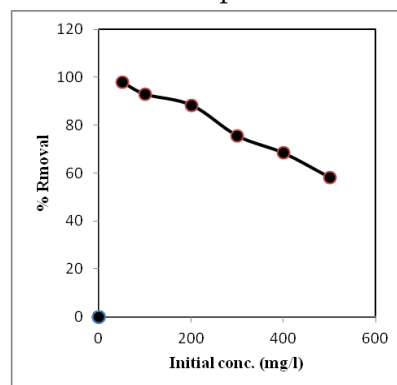
Fig 4.3 Effect of initial concentration on removal of 2,4-D

4.5 Effect of contact time on removal of 2,4-D

The dependence of adsorption on contact time time was studied using fixed amount 500 mg of adsorbent (activated carbon) for initial concentration of 100 mg/L and 25 ml volume of solution. The experiments were performed for different time intervals at 25oC for 6.5 pH of pesticide solution. The results are given in Figure. It was observed that adsorption increases with increase in contact time. Initially within first 2 hrs exponential increase in removal of 2,4-D was observed. After 2 hrs of contact time, the increment in removal of 2,4-D is not significant. The removal of 2,4-D at 6 hrs contact time is to be nearly 90%. The equilibrium time of adsorption is selected as 3 hrs because the removal after 3 hrs of contact time is nearly constant. In initial phase of adsorption, the removal of 2,4-D is rapid due to fast interaction between 2,4-D and surface of activated carbon. The number of adsorption site initially available for adsorption are large, therefore initial adsorption is fast. As the adsorption of 2,4-D on activated carbon increases with time, the number of sites available decreases with time. There develops repulsion between solid phase and liquid phase 2,4-D molecules, therefore the rate of adsorption decreases in internal phase of adsorption. At 3 hrs of contact time, the rate of adsorption and desorption becomes same and equilibrium establishes.
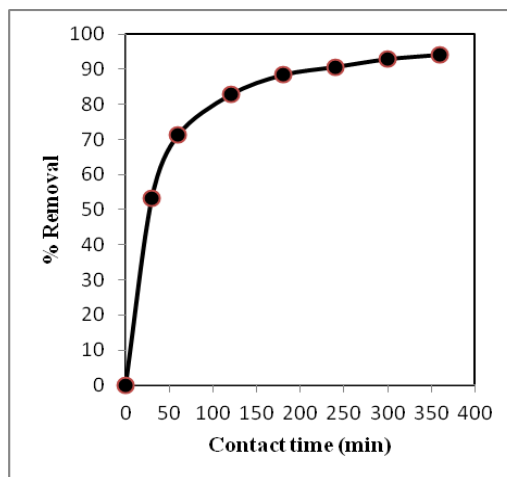
Fig 4.4 Effect of contact time for removal of 2,4-D

4.6 Effect of pH on the removal of 2,4-D

One of the most important factors in adsorption studies is the effect of the acidity of the medium. It is because both adsorbed molecules and adsorbent particles may have functional groups which are affected by the concentration of hydrogen ions H+ in the solution and which are involved in the molecular adsorption process at the active sites of adsorbent. To observe pH effects, we had studied first the stability of 2,4-D at different pH and the result of this study shows that 2,4–D was stable. Therefore the effect of pH on removal is studied for the pH range between 2 to 12. The experiment was performed for initial concentration of 100 mg/L, adsorbent dosage of 500 mg, contact time 5 hrs and temperature 25oC. Results given in figure indicates that the percentage removal of 2,4-D is decreased with increase in pH of the pesticide solution. At pH 2, the removal is found to be 95% and at pH 12 the removal is found to be nearly 78%. At lower pH, the adsorbent surface develops positive charges since the point of zero charge of activated carbon is around 8. Therefore there is attraction between positive surface of activated carbon and neutral 2,4-D molecules. Hence removal of 2,4-D is greater at lower pH. At higher pH, the activated carbon surface develops negative charges. So at higher pH, there is repulsion between negatively charged surface and neutral 2,4-D molecules.
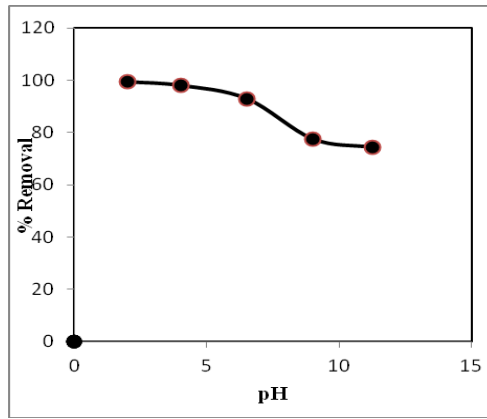
Fig 4.6 Effect of solution pH on removal of 2,4-D

4.7 Effect of temperature on removal of 2,4-D

Adsorption experiments were carried out for different initial concentration at three different temperatures (25oC, 35 oC and 45 oC) using a activated carbon dosage of 500 mg per 25 ml. Removal of 2,4-D by activated carbon was found to increase with increase in temperature. With increasing the temperature of the solution, the increment in removal may be due to increase in surface area. At higher temperature, the blocked pores of activated carbon might be opened resulting in increase in surface area. This indicates the endothermic adsorption of 2,4-D on activated carbon. This implies that the adsorption of 2,4-D on activated carbon may be physisorption as well as chemisorption because the exothermic adsorption is usually physisorption. Figure represents the effect of temperature on the removal of 2,4-D from aqueous solution.

Table 4.2 Effect of Temperature on removal of 2,4-D

Initial Conc. In mg/L	% of Adsorption		
	Temp 25oC	Temp 35oC	Temp 45 oC
50	97.93	98.15	99.318
100	92.92	96.76	98.44
200	88.37	85.78	90.48
300	75.55	78.36	81.99
400	68.40	71.10	77.44
500	58.23	61.84	67.36
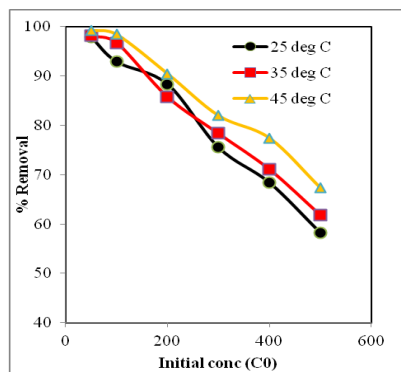
Fig.4.7 Effect of Temperature on removal of 2,4-D

4.8 Adsorption Isotherm

The commonly used adsorption isotherm such as Langmuir, Freundlich and Temkin isotherm models are applied in this study. The linear equations of adsorption isotherm models are given in chapter 3. The experimental result obtained in effect of temperature on removal of 2,4-D are used to apply the isotherm models. The figure shows the Langmuir isotherm and Freundlich isotherm. The parameters of Langmuir isotherm, Freundlich isotherm and Temkin isotherm are calculated from the slope and intercept equation of models. The values of isotherm parameters are given in table. The Langmuir isotherm adsorption capacity at 25oC is calculated as 15.38 mg/g, which is slightly greater at 35oC and 45oC. Thus the adsorption capacity of activated carbon is increased with increase in temperature. The adsorption intensity factor (n) given by Freundlich isotherm for three different temperatures are between 0 to 1 which indicates the favorability of adsorption of 2,4-D on activated carbon. The value of coefficient of determination (R^2) for Langmuir isotherm is higher than for Freundlich isotherm. This indicates the more suitability of Langmuir isotherm than that of Freundlich isotherm for the experimental data. The dimensionless factor RL [RL =1/(1+KLC0) for Langmuir isotherm determined for different concentration at three temperature is found to be between 0 and 1. Thus the temperature range of 25oC-45oC is considered to be favorable for adsorption of 2,4-D on activated carbon.
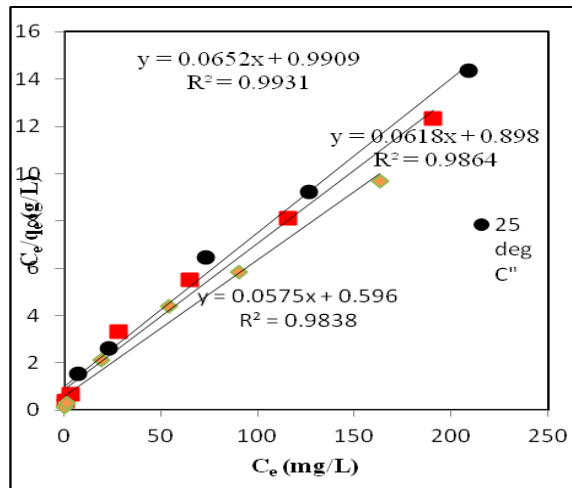
Fig.4.8 Langmuir isotherm model
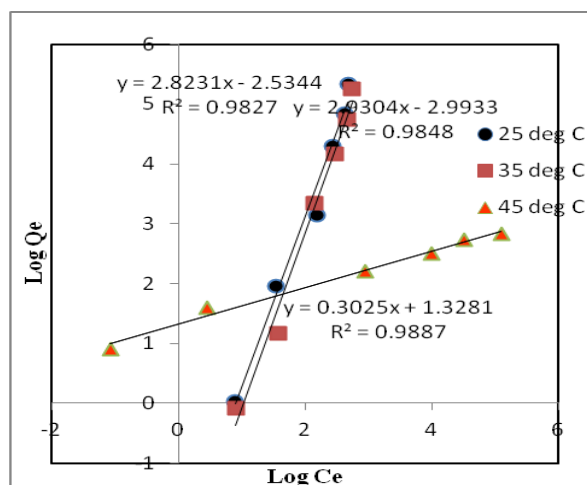
Fig.4.9 Freundlich isotherm model
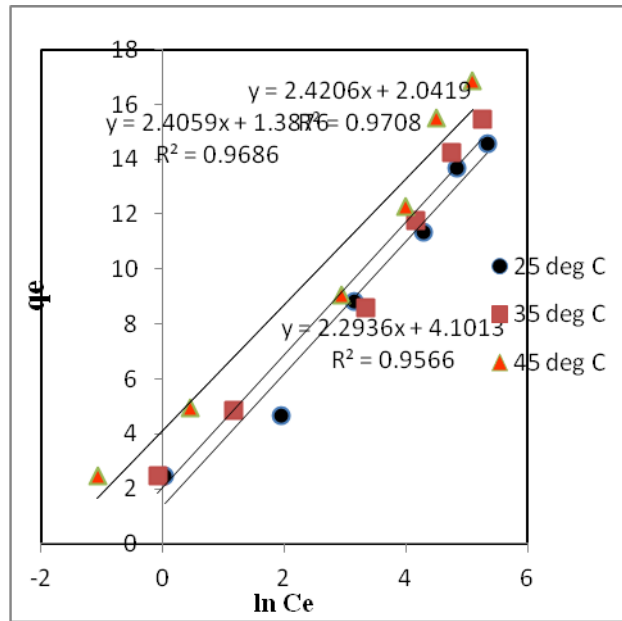
Fig. 4.10 Temkin isotherm model

Table 4.3 The parameters of Langmuir, Freundlich and Temkin adsorption isotherm

Temp.	Langmuir isotherm parameters			Freundlich isotherm parameters			Temkin isotherm parameters		
	KL (L/mg)	qmax (mg/g)	R2	KF	n	R2	AT (L/g)	B	R2
25 oC	0.06567	15.38	0.99	0.9298	0.3542	0.98	-0.5504	2.405	0.97
35 oC	0.0679	16.39	0.98	1.0963	0.3413	0.98	-0.1708	2.420	0.97
45 oC	0.0956	17.54	0.98	0.2837	0.3020	0.99	0.2524	2.293	0.95

4.9 Adsorption Kinetics

The experimental data obtained in effect of contact time on removal of 2,4-D is used to study the kinetics of adsorption and to apply the kinetics models. The linear forms of Pseudo first order, Pseudo second order and Elovich kinetic models are given in chapter 3.
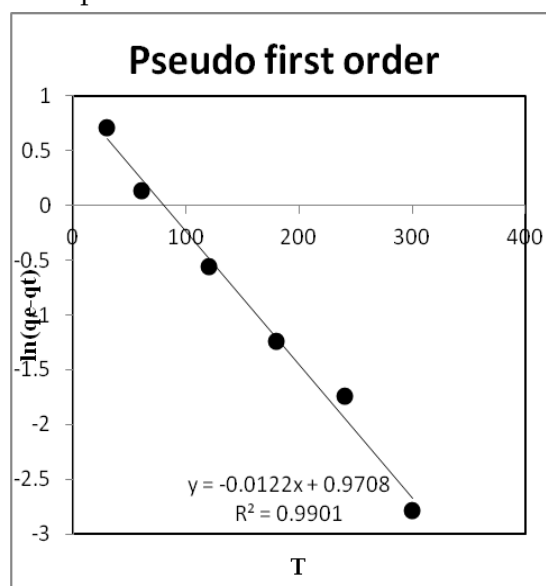
Fig 4.11 : Pseudo first order kinetic model
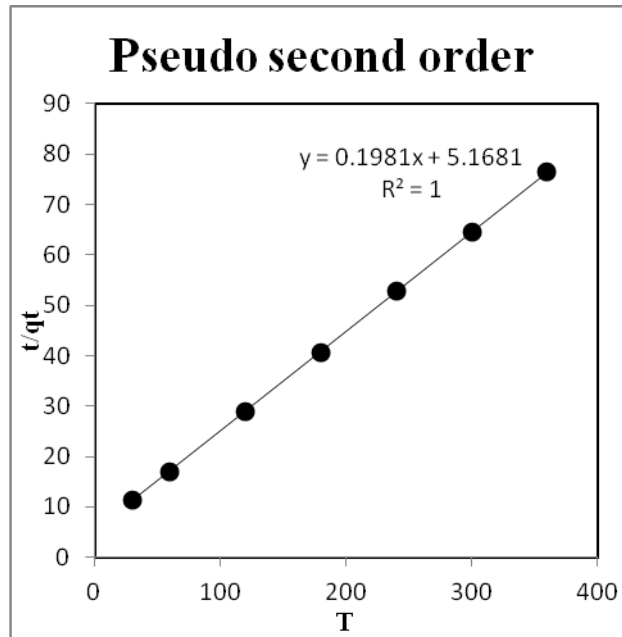
Fig 4.11 Pseudo second order kinetic model
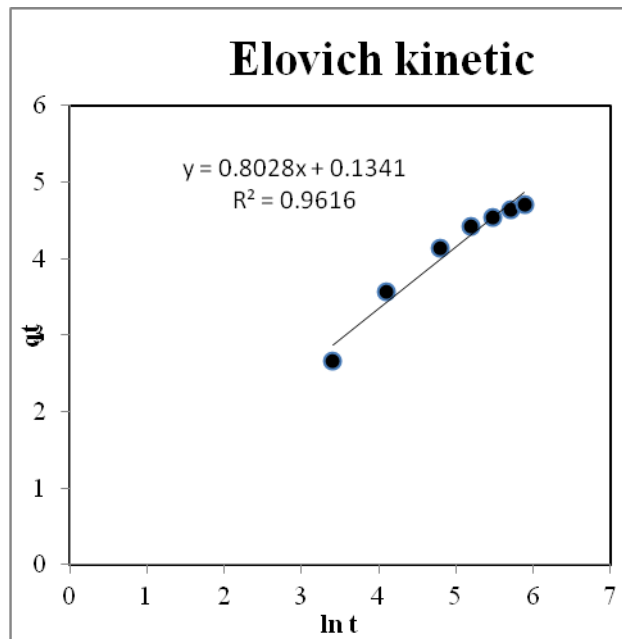
Fig 4.12 : Elovich kinetic model

The constant of kinetic models are determined from the slope and intercepts of straight line equations of plots, the values of these constants are given in table. The coefficient of determination (R2) for pseudo second order model is nearly equal to 1 and higher than that of pseudo first order and Elovich kinetic model. This informs the best fitting of pseudo second order kinetic model for adsorption of 2,4-D on present activated carbon. The equilibrium capacity (qe) predicted by pseudo second order kinetic model is 5.168 mg/g. Thus the experimental value and predicted value of equilibrium capacity are nearly same. This conforms the best fitting of pseudo second order kinetic model for adsorption of 2,4-D on activated carbon developed in this study.

Table 4.4: Constant of kinetic models

	Pseudo first order			Pseudo second order			Elovich model		
	K_1	$q_{e\ (model)}$	R^2	K_2	$q_{e\ (model)}$	R^2	α	β	R^2
2,4-D	0.012	2.6379	0.990	5.0505	5.168	1	1.8351	1.2469	0.961

4.10 Thermodynamic properties

The studies of temperature influence on pesticide adsorption available in the literature reveal that the relation between temperature and adsorption depends on the adsorbent/ adsorbate pair. In order to study the nature of adsorption, the thermodynamic parameters for the adsorption process, such as the change in Gibbs free energy (ΔG), change in enthalpy (ΔH) and change in entropy (ΔS) were calculated from the slope and intercept of plot between ln Kd versus 1/T for initial 2,4-D concentration of 100 mg/L. thermodynamic study showed the negative values of ΔG (-6381.81, -8705.23,

10958.1 J/mol) indicating the feasibility and spontaneity of the adsorption of 2,4-D on activated carbon. The value of change in enthalpy (ΔH) is 61814.59 KJ/mol and change in entropy (ΔS) is 228.88 J/K.
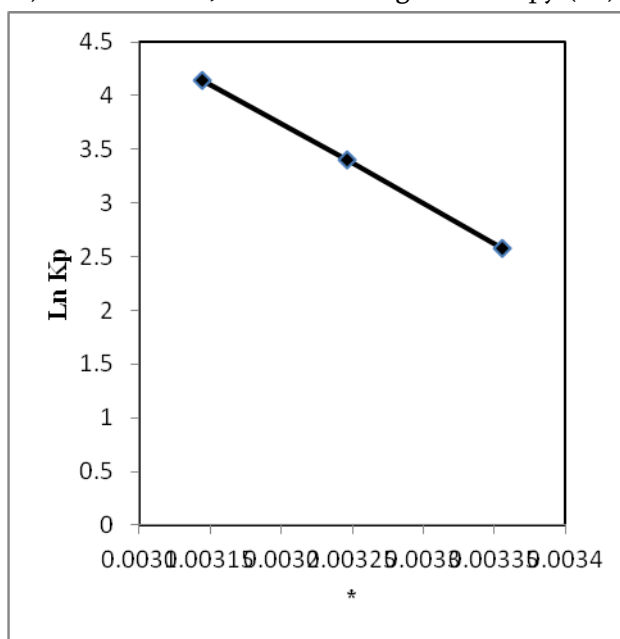
Fig. 4.13 Van't Hoff plot

V. CONCLUSION

The bigger particles of activated carbon have higher surface area, therefore the adsorption capacity of bigger particles is more than that of smaller particles. Activated carbon show endothermic adsorption for pesticide selected. Adsorption capacity of activated carbon is more for least soluble pesticide. The adsorption process for selected pesticide follows Langmuir isotherm, which indicates the favorable adsorption on the activated carbon surface. The value of bT for the Temkin isotherm model indicate physisorption as well as chemisorptions of pesticide on activated carbon. The Pseudo first order and Pseudo second order models best describes the adsorption process. Both kinetic models revels the heterogeneous surface of activated carbon and

chemisorptions of pesticide. Both intraparticle and boundary layer diffusions are rate limiting steps in the adsorption process. Results of thermodynamic study indicate the feasibility and spontaneity of adsorption.

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Real Estate Price Prediction Using ML

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ABSTRACT

The real estate market is one of the price orientedsector which is constantly changing due to high rate of civilization. Using Machine Learning techniques to predict costs with high efficiency is one of the key area.Our article estimates the market value of real estate. The system will help people to find the starting price of the property based on different areas.By analysing past business models, price ranges and future progress, future prices can be predicted. We used many variations on this approach, and our results are not the exclusive judgment of a single technique, but aweighted average of several techniques to give the most accurate results. The most successful Machine Learning algorithm proved is the random forest that has better compatibility to the data situation. The article also has several validation techniques on regression models that provide useful results for predicting home prices. The planning process will take into account the base factors used to calculate the home price and will provide a more accurate estimate.

Keyword: Machine Learning, real estate, random forest, regression.

I. INTRODUCTION

Housing is one of the essential factors to measure the success rate of a country's economy. As the economy grows, people tend to move form urban to rural areas,and as a result, the population of urban dwellers is increases, the demand for accommodation facilities will increase.Therefore house price also increase.In addition to these infrastructures development in an area can cause sudden increase in housing prices in a particular area.House Price Index (HPI)often used to calculatehouse price increases. .How're, studies show that the use of HPI is insufficient in the 21st century.House prices are affected by many variables.Like size of real estate,numbers of rooms,usable gardens,size of land and property,numbers of kitchen and bath rooms etc.{from 1-s2}Therefore Machine Learning is technologies have grown and raised its capabilities across a suited of application. Mlis a computer program andbranch of artificial intelligence that learn from experiences to predict current performance and improve future data.There are different types of learning in machine learning,supervise and unsupervised learning. The machine learning works by learning past patterns using selection algorithms and predicting future outcomes.This article focuses on the literature review of real estate price prediction based on machine learning models and based real estate price prediction based on factors affecting real estate prices, which have been used frequently in past.

II. LITERATURE REVIEW

In the 21st century, this century housing is redundant, it represents a lot today. is not only for those who want to buy real estate, there are also companies selling these properties. According to [4], houses are not only needed by people, but today also represents wealth and fame. Investing in products often looks profitable because values do not drop quickly. Changes in real estate prices affect many home investors, investors, policy makers and more. Investing in real estate seems like a good investment option. It is seen that the estimated real estate value of is an important economic indicator. The [3] shows that every organization in the real industry today is working hard to gain a competitive advantage over their other competitors. The need to simplify the process for ordinary people while providing the best possible results. [6] proposed using machine learning and artificial intelligence to create an algorithm that can predict real estate prices based on some input. The commercial application of this algorithm is that distribution websites directly use this method to estimate the value of new properties to be listed soon, and it takes about different ideas to estimate the correct and reasonable price. Home value estimation is a big topic, done with a lot of computer science methods. Use Google Colab/Jupiter IDE. Jupiter IDE is an open source web application that helps us share and create files with LiveCode, views, equations and annotations. It has tools for data cleaning, data transformation, numerical simulation, statistical models, data visualization and machine learning tools. [10] developed a system called to help people know the true value of the attribute. Users can get the price of the house they want by giving the code according to their needs. Users can also get the home plan to use the homes.A holds information about values. According to the findings of [1], the best accuracy is provided by the random forest regressor, followed by the decision tree regressor. Similar results are the produced by Ridge and Linear Regression with a slight on Lasso. In all selected groups, there is no difference between all , regardless of the strong and weak groups. It gives a good indication that the match value can be used alone to estimate sales without considering other features to reveal an overfit of model . Also, in the very weak group, the accuracy drops. For each particular option, the same outcome pattern can be seen in Root Mean Square Error (RMSE) . Like Machine Learning, Outbound, Decision Trees, Network Learning, Fuzzy Logic, ANFIS (Adaptive Neuro-Fuzzy Inference System) and Linear Performance Pricing. In machine learning models, data is divided into two parts, training and testing. 80% of the data is used for educational purposes and 20% is used for testing. Training methods involve different goals. The model was trained using various machine learning algorithms with random forest regression predicting better results. They use the NumPy and Pandas Python libraries to implement the algorithm. [1] Other forms of machine learning use various regression models for prediction. In addition, is compared with other learning models and decision tree regressors such as Lasso, LassoCV, Ridge, RidgeCV. Multivariate Linear Regression and Lasso CV performed best out of 84.

III. METHODOLOGY

A. Data Collection and Exploration

The first step is to identify machine learning-related articles in real estate price prediction,thusresearching for good literature reviewed on the topic in two licensed database, scopes and web of science.An advanced search using the query string revealed records,over 2,254 available items.The second stage is the review of statistical data;The is a selection of articles on the research topic. The third level is attribution and exclusion by the

author with various attributions and executions.First and foremost,authors will select articles from journals with empirical and theoretical data, that is, they will not include research articles,book chapters and book series by text type. Then social science indexed article is selected.Finally,the author alsofocuses on machine learning research in real estate forecasting, making the research paper applicable to all fields.Fourth is data abstraction and analysis. This level contains important information and analysed to focus on a particular study in response to question of the information in the article and the objectives of the method. Find and analyse the ML distribution for real estate price estimation from the collected data. Select an appropriate dataset on which our machine learning model will build.

B. Data Preprocessing

The first is to investigate missing data fromselecteddataset.Any observation which had missing value was removed from dataset. Drop features that are not required to build our model.

C. Feature Engineering

Remove features that are not required to build our model. Any location having less than 10 data points should be tagged as "other"location.Removeoutlier using business logics.We should remove outliers per location using mean and one standard deviation.

D. Model Selection
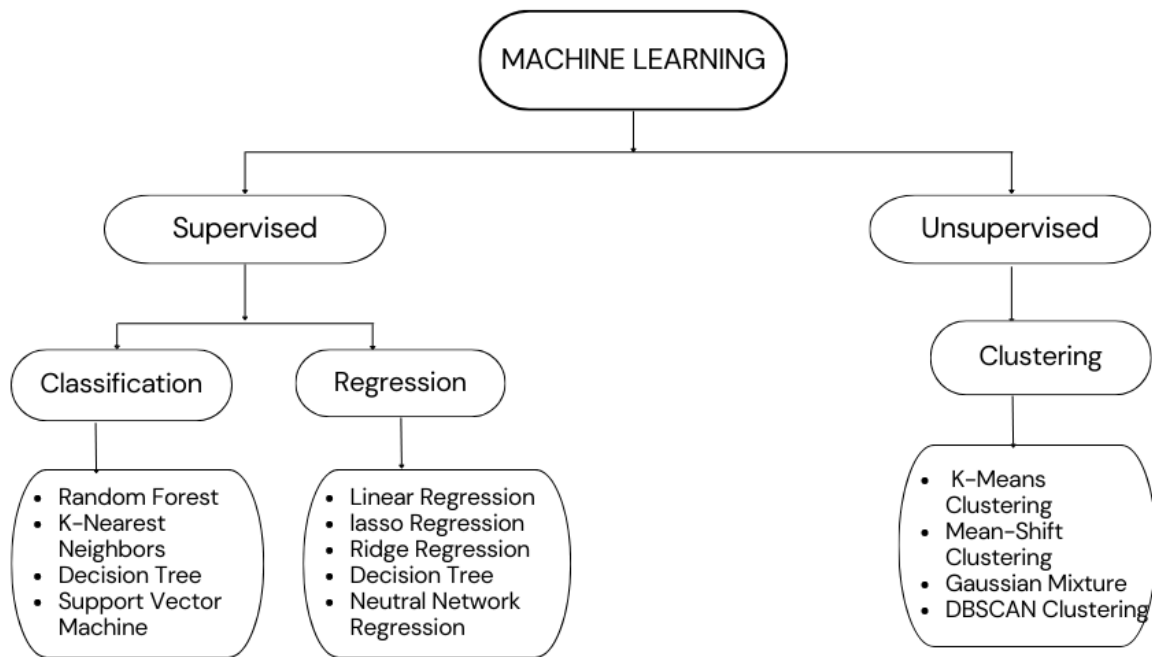
Fig no :1 Types of machine learning

Model selection is the way of selecting machine learning model from different types of machine learning models for a training dataset. There are different types of machine learning models Support vector regression (SVR),multiple linear regression, decision tree , etc.

- support vector regression.

There are two types of machine learning supervise andunsupervised. Support Vector Regression is a supervised learning algorithm used to predict random variables.SVR is inspired by Support vector machines(SVMs). SVMs is able to process non linear results and overcome small sample learning issues. Its ability to generate economic forecasts in a variety of markets, including real estate, shows that the model can overcome non-horizontal problems and few learning problems. In addition, this model is often used for building standards, as it does not rely on the ability of the model to disperse thoughts and express ideas (linear or non-linear) [22]. Support Vector Regression has huge advantages over models, because it avoids a lot of trouble while increasing agreement by reducing both risk and empirical.

- Multiple linear regression

Multiple linear regression is a regression model that uses a straight line to predict the relationship between a variable and two or more variables. We can find relationship between two or more independent variables and one dependent variable by using multiple linear regression The strength of the multiple regression models can be seen when evaluating the value of the relationship between the dependent variable in andthe independent variable in . [28] used a multiple regression model to explain the evolution of independent variables by variable. This model can be used independently and for the price of the house, the size of the house, the number of apartments, bedrooms, etc. It can be used to predict house price based on variables. Therefore, house price was determined as the target or living variable, other features were determined as a different variable, and the main variable was determined by , which determines the correlation coefficient of each feature.

- decision tree

A decision tree regressor identifies features and trains a tree-like model to predict future data to provide large outcomes. The highest and lowest value of the graph is obtained by the decision tree regressor and then splits the data by as seen by the system. The Web Search CV is a strategy for tracking changes that will generate values and learn patterns for each combination of the parameters shown in the subsection. Search System In this calculation, CV is used to determine the best value of the most important used to construct the decision tree.

E. Training the model

In this step we divide our model into two modules: a training set and test set In training, you import the prepared data into a machine learning model to see patterns and make predictions. It allows the model to learn from the data so that it can complete the task. Over time, through training, the model gets better at predicting.

F. Testing and Integrating with UI.

Apply the training model to the test data and estimate the cost of generating the . Then the training model is included in the front end using Flask in python .
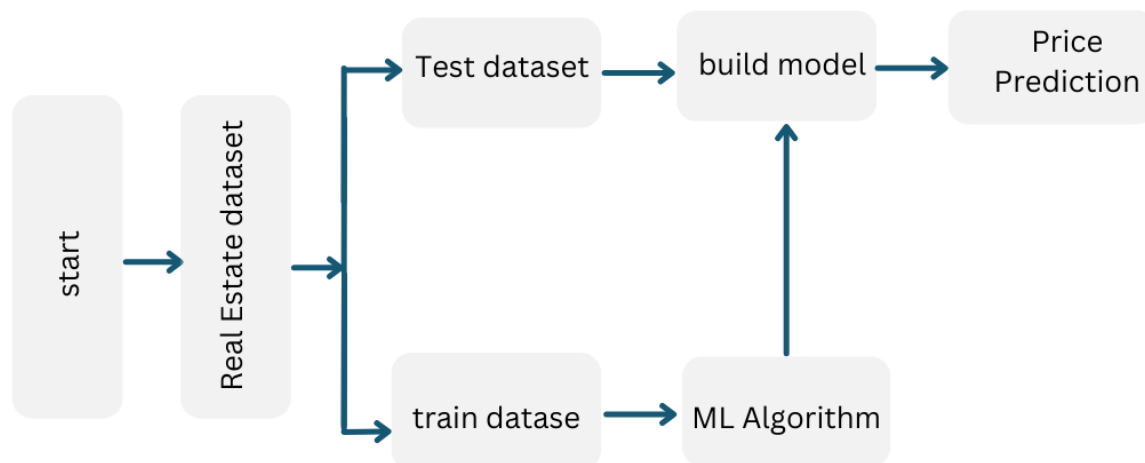
Fig no:2 Flow diagram

IV. PURPOSE WORK

The purpose of the system is to determine the value of the building by looking at the various features entered by the   user. These features are fed into the ML model and give the label How does this feature affect the bid according to . This will be done by first searching for a suitable file that fits the developer's and user's requirements. Also, after processing the file, it goes through a process called file cleanup ; where all   junk files are removed and the file raw text is converted to a .csvfile.In addition, the data will be passed through the file first, where the missing data will be corrected and if necessary, the tag will be coded. Also, this will go through a data transformation to where it will be converted to a NumPy array so that it can be sent to train the model. During the training, various machine learning algorithms will be used to train the models and their errors. ratios will be subtracted so algorithms and models will complement to produce accurate predictions. Users and companies will be able to log in and then fill out a form specifying the various characteristics of the property they want to estimate the price of . In addition, the form will be sent after the selection of all features is completed.User enters their purchase information into the template and within seconds, user can see the estimated price for the product they have entered.

V. FUTURE WORK

The main purpose of this study is to analyze the value estimation we obtained using different learning systems such as random forest, multiple regression, support vector machine, gradient boosted trees, neural networks and bagging, i.e. it is obviously Random. forest has higher accuracy in prediction than forest, and my research also provides a way to find actions involving in prediction. Therefore, this research will be useful for people, government and future studies are as follows: Every new system and software can help estimate the cost of . Price Forecast This can be improved by adding many elements to the building such as: environment, market and many other variables. Estimated information can be stored in a file and an application can be created for people so that they have a short-term idea and deposit their money safely. If there is real-time data capability,

the data can be connected to the H2O, the machine learning algorithm can be directly connected to the interface, and the application environment can be created.

VI. CONCLUSION

Buying your own home is everyone's dream. Using this model of , we want people to buy houses and real estate at reasonable prices and not be scammed by sloppy agents   just for their money. Additionally, the model will also help large companies set their prices against the and provide them with accurate forecasts, saving the a lot of intervention and saving a lot of time and money. Accurate real estate prices are inherent in the market and we want to ensure that using this model. Buying your own home is everyone's dream.Using this model of , we want people to buy houses and real estate at reasonable prices and not be scammed by sloppy agents   just for their money. Additionally, the model will also help large companies set their prices against the and provide them with accurate forecasts, saving the   a lot of intervention and saving a lot of time and money. Accurate property prices are important in the   market, and we hope to achieve that using this model. One more thing   can add is that the uses the entire user interface, so   can have many functions for the user to use in many places with the ML model. Finally, create an integrated Webapplication that can estimate cost when users need to complete a project.

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Adsorptive Removal of Chlorinated Herbicide Using Activated Carbon Synthesized From Wood Apple Shell

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ABSTRACT

Diuron (DCMU (3-(3,4-dichlorophenyl)-1,1-dimethylurea) is a list A pesticide active ingredient classified as a herbicide. Over the last 50 years, Diuron is mostly used as herbicidesdue to its low cost. Once the pesticides are sprayed on the crops, some of the quantity getsincorporated into the soil and enters into the ecosystem. As these pesticides possess sufficientmobility, it reaches into the ground and surface water thus causing water pollution. The methods like photocatalytic degradation, combined photo-Fenton and biological oxidation,advanced oxidation processes, aerobic degradation, nanofiltration membrane, ozonation andadsorption have been developed for treatment of water to get rid of the pesticides. This workfocuses on the removal of Diuron from aqueous solution using activated carbon based on fruitshell of wood apple (Limonia Acidissima / Kavit) using batch adsorption. In batch adsorption,the effects of adsorbent dosages, initial concentration, contact time, pH and temperature werestudied. The equilibrium data were analyzed using isotherm models such as Langmuir,Freundlich and Temkin adsorption isotherm.

Keywords: Diuron, limonia acidissima, Langmuir isotherm, Freundlich isotherm.

I. INTRODUCTION

The US Environmental Protection Agency (EPA) defines the term "pesticide" as any substance or a mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. The Food and Agriculture rganization of the United Nations (FAO) defines this term as any substance or a mixture of substances intended for preventing, destroying, or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances, which may be administered to animals for the control of insects, arachnids, or other pests in or on their bodies. Thus, the term "pesticide" refers not only to insecticides, but also to herbicides, fungicides, and various other substances used to control pests. The use of pesticides is alleviating food shortages in developing countries, allowing them to produce crops multiple times a year and export nontraditional agricultural products to developed nations.

Pesticides are substances that are meant control pests, including weeds. The term pesticide includes all of the following term: herbicides, insecticides, fungicides, antimicrobial and bactericide. The most common of these are herbicides which accounts for approximately 80% of all pesticide use.

Pesticides can be classified based upon their biological mechanism function or application method such as: Algicides, Antimicrobials, Attractants, Biopesticides Biocides, Disinfectants, Fungicides, Herbicides, Insecticides and Nematicides repellents.

Insecticides are substances used to kill insects. They include ovicides and larvicides used against insect eggs and larvae, respectively. Insecticides are used in agriculture, medicine, industry and by consumers. Herbicides are usually chemicals used for killing or dential or agricultural weed. Herbicide application occurs most frequently in row crop farming, where they are applied before or during planting to maximize crop productivity by minimizing other vegetation. Herbicides also commonly known as weed killers are chemical substance used to control unwanted plants although research into chemical herbicide began in the early 20th century. Herbicides are classified in several ways, including effect, selectivity, persistence, application, and action. They are also further divided into herbicides that are acceptable in organic growing methods and non organic growing method. There are most commonly used herbicides are as follows: 2,4-D, Atrazine, Clopyralid, Dicamba, Glyphosate, Imazapyr, Metoalachlor, Paraquat, Picloram and Triclopyrand. Fungicides are pesticides that kill or prevent the growth of fungi and their spores. They can be used to control fungi that damage plants, including rusts, mild sand blights. They might also be used to control mold and mildew in other setting.

The worldwide consumption of pesticides is 56% herbicides, 25% fungicides and bactericides and 19% insecticides. In India, insecticides are used at huge amount i.e, 51%, 33% fungicides and 16% bactericides.

II. LIMONIA ACIDISSIMA L (WOOD APPLE)

Limonia Acidissima also known as Wood Apple belonging to family Rutaceae. Different parts of Limonia Acidissima L. shows different properties like essesial oil obtained from the leaves of Limonia Acidissima L. shows anti-bacterial activity because of carvacrol and cyclodecandine constituents. Shell shows anti-fungal activity against gram positive and gram negative bacteria because of Psoralene. Pulp of the Limonia Acidissima L is good for skin because of its higher moisture content. The other main constituents of Limonia Acidissima L are saponins, flavonoids, amino acids, beta carotene, tannins, carbohydrates, vitamin B, triterpene. This constituents are responsible for some cosmetic properties hence Limonia Acidissima L. can be used in cosmetic products.

Limonia Acidissima L. is globally reported from India, SriLanka, Pakistan, Java and Malesia. In India, it is found to occur in the dry regions. It is reported from the states of Punjab, Delhi, Rajasthan, Madhya Pradesh, West Bengal, Arunachal Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu and Andhra Pradesh This species is globally distributed in Indo-Malesia

III. CLASSIFICATION OF PESTICIDES

Diverse criteria are used to describe the pesticides, for example, their toxicity, pest organisms that are killed and their functioning as pesticides, chemical composition and route of entrance, mode of action, how or when it works, formulations and sources of origin I. Yadav and Devi (2017); Akashe et al. (2018); Freedman (2018); Hassaan and Nemr (2020); Nayak et al. (2020); Tudi et al. (2021).

Classification of pesticides according to its toxicity:

Pesticide toxicity isprimarily determined by two factors: dose and time. Thus, the amount of this chemical (dose) is involved and how often (time) the material is exposed to lead to two different kinds of toxicity, acute and chronic.

Table 1 Pesticides classificationon the basis of its toxicity

WHO Class		LD$_{50}$ for rats (mg/kg of body weight)	
		Oral	Dermal
Class- I$_a$	Extremely Hazardous	Less than 5	Less than 5
Class-I$_b$	Highly Hazardous	5 to 50	5 to 200
Class-II	Moderately Hazardous	50 to 2000	200 to 2000
Class-III	Slightly Hazardous	Over 2000	Over 2000
Class-V	Unlikely to present acute hazard	5000 or higher	

3.1. Classification of Pesticides according to Chemical Composition: This is the most popular and useful way of pesticide classification based on chemical makeup. Pesticides such as insecticides, fungicides, herbicides, and rodenticides are also classed based on their chemical compositions, as shown below: Insecticides: Insecticides are classed chemically as Carbamates (Carbaryl), Organochlorine (Endosulfan), Organophosphorus (Monocrotophos), Pyrethroids Neonicotinoids various pesticides such as Spinosyns Benzolureas, Antibiotics (abamectin), Fungicides: Fungicides are categorised as aliphatic nitrogen fungicides amide fungicides (carpropamid), aromatic fungicides (chlorothalonil), dicarboximide fungicides (famoxadone), dinitrophenol fungicides (dinocap), and others.

Herbicides: Herbicides include anilide herbicides (lufenacet), phenoxyacetic herbicides (2, 4-D), quaternary ammonium herbicides (Paraquat), chlorotriazine herbicides (atrazine), sulfonylurea herbicides (chlorimuron), and others. Rodenticides: Rodenticides are classed as inorganic rodenticides (Zinc phosphide, Aluminium Phosphide) or organic coumarin rodenticides (bromadiolone, coumatetralyl)

3.2. Classification of pesticides based on the pest organism they kill and pesticide's functionality (Use): Pesticides are characterized in this way based on the pest organisms they kill and their functions. Different type of pesticides are mentioned below: Insecticides are chemicals that are used to kill insects and other arthropods. Fungicides are chemicals that kill fungi. Acaricides are pesticides that kill mites and ticks. Algicides are chemicals that kill or suppress algae. Herbicides are chemicals that are used to kill undesired plants. Antifeedants are chemicals that stop insects and other pests from eating. Avicides are poisonous chemicals used to kill birds. Bactericides are substances that kill or inhibit bacteria. Larvicides stop larvae from growing. Repellents are substances that repel bugs based on their taste or odour. Dessicants work by drying the tissues of plants. Virucides are antiviral agents. Ovicides inhibits the growth of insect and mite

eggs. Nematicides are chemicals that kill nematodes, which are plant parasites. Termiticides are chemicals that kill termites. Chemicals that make an insect sterile and hence prevent it from reproducing are known as chemosterillants. Plant growth regulators are substances that affect the expected rate of plant growth, lowering, or reproduction. 4. Classification of pesticides based on Mode of Entry: Pesticide modes of entry refer to the various ways pesticides come into touch with or enter the target.

1. **Systemic pesticides:** pesticides absorbed into and transported to untreated tissue by plants and animals. 2, 4-Dichlorophenoxyacetic acid (2, 4-D) and glyphosate are both examples of systemic insecticides.
2. **Contact (non-systemic) pesticides:** When target pests come into contact with them, the pesticide acts on them. Paraquat and diquat dibromide, both contact insecticides, are examples.
3. **Stomach poisons:** These toxins enter the body of the pest through the mouth and digestive system. Malathion is one example.
4. **Fumigants:** Pesticides that kill or may kill target pests by creating vapour and entering the pest's body through the trachea.
5. **Repellents:** Repellents do not kill but they are disgusting enough to keep them away. The capacity of the pesticide to locate a crop also interferes.

3.3. Classification of pesticides by mode of action: various pesticides have various mode of action. And pesticides are categorised as following according to mode of action

1. **Physical poison:** Pesticides kill an insect with a physical effect.
2. **Protoplasmic poisons:** protein precipitation is caused by pesticides.
3. **Respiratory poison:** chemical substances which are respiratory enzymes that are in-active.
4. **Nerve poison:** Chemicals block the transmission of impulses.
5. **Inhibition of chitin:** Compounds hinder synthesis of chitin in pests

3.4. Classification based on sources of origin: Pesticides are divided into two categories: bio-pesticides and chemical pesticides, depending on their source of origin. Organochlorine, organophosphate, carbamate, and pyrethroid pesticides are further classified into organochlorine, organophosphate, carbamate, and pyrethroids, as explained in the previous section. Pesticides originating from natural sources such as animal, plant, and microorganisms are known as bio-pesticides (bacteria, viruses, fungi, and nematodes). Theyare divided into three categories.

1. **Microbial pesticides:** They are a type of pesticide that is produced by microorganisms Microorganisms such as bacteria, fungi, and protozoa are the activeingredient in microbial pesticides. These pesticides kill insects by releasing poisons produced by microbiological organisms or infecting them.
2. **Plant-incorporated pesticides:** These pesticides are naturally produced by plants. In addition, genetic engineering is used to insert the gene required for pesticide production into the plant. As a result, the pesticide produced by such a plant, as well as the genetic material injected, are referred to as plant integrated protectants (PIPs).
3. **Biochemical pesticides:** These are natural compounds with nontoxic pest control processes. Insect sex pheromones (which interfere with mating) and a variety of fragrant plant extracts are examples of biochemical insecticides (work by attracting insect pests into traps).

IV. MATERIALS AND METHODS

4.1. Adsorption:

Adsorption is a process in which a single or a group of ions/compounds is accumulated on the surface of solid. Adsorption mainly involves adsorbent and adsorbate. *Adsorbent* is generally a solid material (mostly in powder form) on which adsorption takes place and the substance that gets adsorbed is called *adsorbate*. The adsorption process is classified into two types: physical adsorption (van der Waal's adsorption) and chemical adsorption (chemisorption). Physical adsorption occurs due to the van der Waal's force of interaction, and heat of this type of adsorption is generally in the range of 20–40 kJ/mol. Physical adsorption is rapid and reversible, and can be of two types, namely, monolayer adsorption and multilayer adsorption. In chemisorption, chemical interaction occurs between the adsorbent surface and adsorbate molecules. The heat of chemisorption usually varies from 40 to 400 kJ/mol. It is an irreversible process because a strong force of interaction exists between the adsorbent and adsorbate molecules and is relatively slow process.

The surface active material is referred to as the adsorbent and the molecules which are accumulated on the adsorbent called adsorbate molecules. The strength by which adsorbate molecules are attached with the adsorbents determines the nature of adsorption. Normally, release of energy in the range of 8 to 25 KJ/mole due to adsorption is termed as physisorption whereas a much larger energy comparable to chemical bonding energy leads to chemisorption. There are always some exception to these values. The prescribed value of energy differentiating physisorption and chemisorption are based on general experience.

4.2. Adsorbate:

The diuron herbicide having purity 98% was used as obtained from Sigma Aldrich, Germany (Corporate office Bangalore, India). The stock solution of diuron having concentration 40 mg/L was prepared by dissolving diuron in deionized water, and then the other required concentrations were prepared by subsequent dilution of stock solution.

V. PREPARATION OF ACTIVATED CARBON

The activation of charcoal was carried out by chemical activation method using acetic acid as the activating agent. The crushed/grinded charcoal soaked in acetic acid (40%) solution and the impregnation ratio was in the range of 3.5 to 12.25. The impregnation ratio was determined as the ratio of the weight of activating agent to the weight of the raw material. The sample having weight 3 g sample was kept in 50 ml acetic acid. The soaking time of charcoal in acetic acid was between 12 to 48 hrs at room temperature. After soaking, the sample was decanted and washed with distilled water to get rid of excess acetic acid. The sample was dried in a hot air oven at 70-80˚C for about two hours. The dried activated charcoal sample was carbonized in muffle furnace. The temperature of the furnace was gradually increased to the final preselected temperature ranging from 300-450˚C in an inert atmosphere. After attaining maximum final temperature, it was hold for 15 minutes.

5.1. Characteristics of Activated carbon:

Characteristics		Unit in %
Proximate Analysis	Moisture %	6.82
	Ash %	3.30
	Volatile Matter %	5.30
	Fixed Carbon %	84.58
Chemical Analysis	SiO_2 %	9.043
	MgO %	0.00
	K_2O %	12.537
	Fe_2O_3 %	4.193
	CaO %	52.566
	P_2O_5 %	5.782
	SO_3	5.881
	Cl	7.291
	ZnO	0.519
	SnO_2	0.949
	TeO_2	1.178
CHN Analysis	C %	89.32

	H %	00.15
	N%	00.78
	S %	00.62
	O %	12.08
Surface Area (m^2/g)	326.09 m^2/gm	

5.2. BET Surface Area of Activated Carbon:
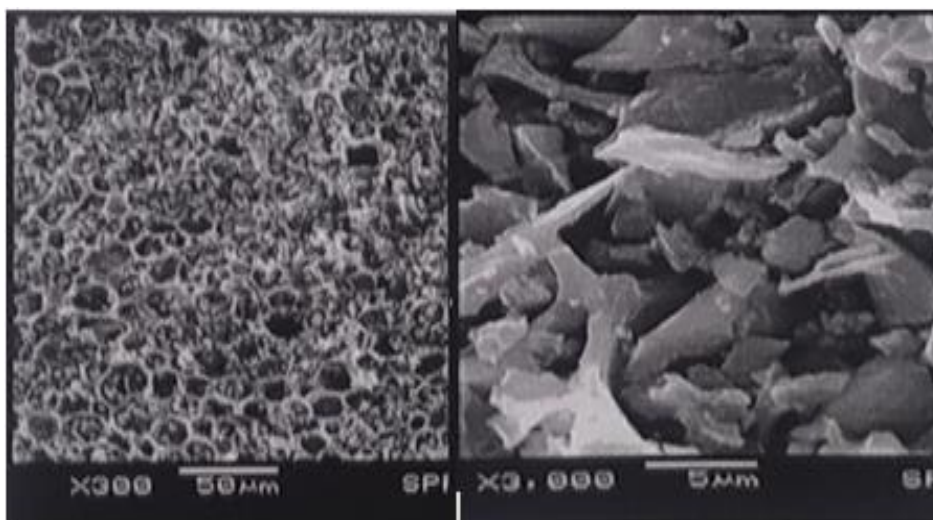
5.3. Experimental method: Batch adsorption:

During thebatch adsorption of Diuron, a stock solution of pesticide was prepared by dissolving an appropriate quantity of pesticide in deionized water. According to the experimental design presented in Table 4.2, the stock solution was diluted to different concentrations. A weighed amount of adsorbent (AC) was added to acertain volume (mL) of herbicide solution taken in glass vials of 50-mL capacity. The vials were agitated in a temperature-controlled water bath shaker for variable time at different temperatures. The effect of pH was

studied by varying the pH using 0.1MHCl and 0.1MNaOH. pH was measured using a pH meter (Model- Hanna pH-213). The prepared samples were withdrawn, filtered using Whatman filter paper, and then centrifuged. The equilibrium concentration of filtrate i.e. Diuron was measured on adouble-beam UV/Vis spectrophotometer (UV 1900i;Shimadzu, Japan) at λ_{max}248 nm.Each experiment was performed in duplicate, and the results were recorded as average of the values. The percent removal, adsorption capacity Q_t (mg/g) at any time t, and adsorption capacity Q_e(mg/g) at equilibrium were calculatedusing the following equations:

$$\% \text{ removal} = \frac{(C_0 - C_e)}{C_0} \times 100 \quad (4.1)$$

$$q_t = \frac{(C_0 - C_t) \times V}{m} \quad (4.2)$$

$$q_e = \frac{(C_0 - C_e) \times V}{m} \quad (4.3)$$

WhereC$_0$ (mg/L) and C$_e$ (mg/L) are the initial and equilibrium concentrations of adsorbate, respectively, V (L) is volume of the solution, and m (g) is adsorbent mass. Batch adsorption of 2,4-D was performed by varying adsorbent dosages, initial concentration, contact time, pH, particle size of adsorbents, and temperature according to the values listed inTable 4.2.

Batch adsorption experiment design

VI. RESULTS AND DISCUSSION

Expt. No.	Variable	Constant
1	m = 0.25–1.25 per 50 mL	C0, t, pH, T
2	C0 =50–500 mg/L	m, t, pH, T
3	t =1–72hrs.	m, C0, pH, T
4	pH =2–12	m, C0, t, T
5	T =303–333 K	m, C0, t, pH

VII.   ISOTHERM

7.1. Freundlich isotherm:
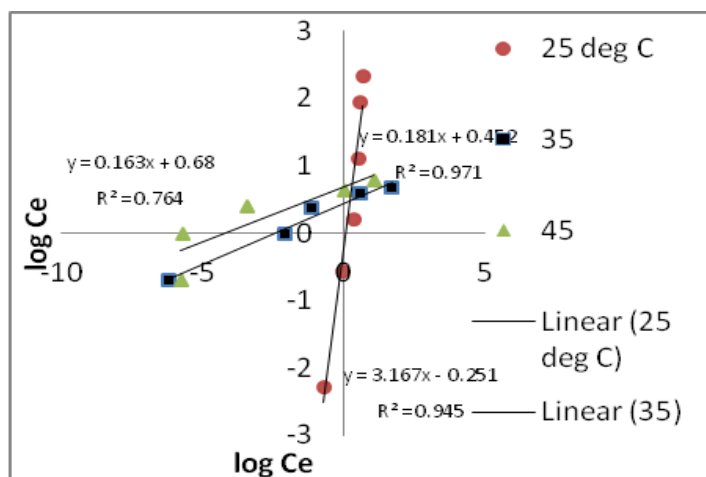
Freundlich adsorption isotherm was first proposed by van Bemmelen in 1888 [2] as an empirical equation. Later, Freundlich made some useful modifications as a result of which, it acquired great importance. The Freundlich isotherm model is based on the assumption that the adsorption process takes place on heterogeneous surfaces and adsorption sites are distributed exponentially with respect to the heat of adsorption. Linear and nonlinear forms of Freundlich isotherm are given as follows:

$$\log q_e = \log K_F + \frac{1}{n} \log C_e$$

$$q_e = K_F C_e^{1/n}$$

where qe (mg/g) is the equilibrium adsorption capacity, Ce (mg/L) is the equilibrium concentration of the adsorbate in solution, KF [(mg/g)/(mg/L)1/n] and n are Freundlich constant and adsorption intensity factor, respectively. Freundlich isotherm has following drawbacks

➤ Freundlich equation is purely empirical and has no theoretical basis.
➤ The equation is valid only upto a certain concentration and invalid at higher Concentration
➤ The constants K and n are not temperature independent, they vary with Temperature

7.2. Langmuir isotherm:
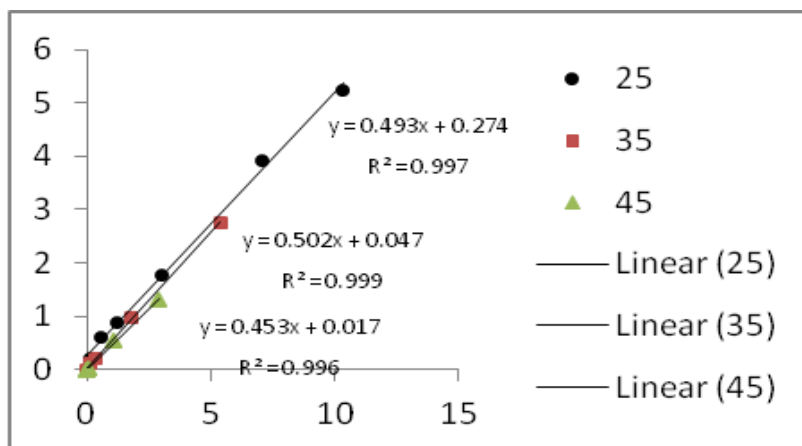
The Langmuir isotherm assumes monolayer adsorption on adsorbent surface with finite number of homogeneous active sites. The Langmuir capacity of RHA is decreased with

increase in temperature for adsorption of 2,4-D, MCPA and 2,4,5-T and it is increased with increase in temperature for adsorption of diuron. This is due to endothermic adsorption of diuron and exothermic adsorption of other three pesticides on RHA as

described in the "Effect of Temperature" section. For diuron adsorption, the increase in Langmuir constant with temperature is indicative of greater affinity for binding of diuron molecules on RHA at higher temperatures. Therefore, adsorption of diuron is stronger at higher temperatures. The Langmuir adsorption isotherm is derived by considering following

assumptions:

➤ Fixed number of adsorption sites
➤ Homogeneous surface of adsorbent
➤ One adsorbate molecule occupies only one active site
➤ No interaction between the adsorbate species
➤ Formation of monolayer of adsorbate on adsorbent surface

Langmuir isotherm model in linear and nonlinear forms is given below

$$\frac{C_e}{q_e} = \frac{1}{K_L q_{max}} + \frac{C_e}{q_{max}}$$

$$q_e = \frac{K_L q_{max} C_e}{(1 + K_L C_e)}$$

where KL (L/mg) is the equilibrium adsorption constant, which is related to the affinity of binding sites and qmax (mg/g) is the maximum amount of adsorbate adsorbed per gram of adsorbent at equilibrium when all binding sites are occupied; qe (mg/g) and Ce (mg/L) are equilibrium capacity and equilibrium concentration, respectively. Langmuir isotherm has following drawbacks

➢ The formation of monolayer is possible only under low concentration of adsorbate. Thus Langmuir isotherm is valid under low concentration only.

➢ Langmuir isotherm assumes homogeneous surface of adsorbent. But in real, solid surfaces are heterogeneous.

➢ The weak force of attraction exists even between molecules of same type.

7.3. Temkin isotherm:
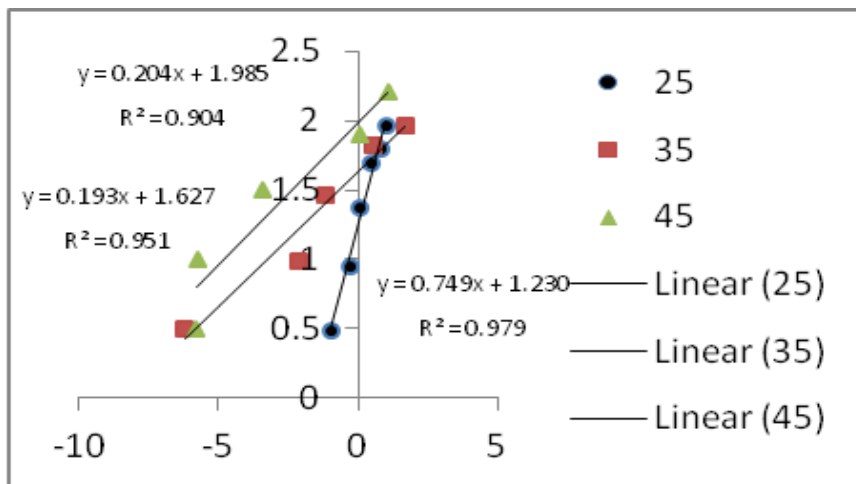
Temkin adsorption isotherm assumes that the heat of adsorption (function of temperature) of all molecules in the layer decreases linearly rather than logarithmically with coverage. This model is generally used to explore the energy-distribution pattern. Its derivation is characterized by a uniform distribution of binding energies up to some maximum binding energy. The expressions of Temkin isotherm are as follows:

$$q_e = B \ln A_T + B \ln C_e$$

$$q_e = B \ln(A_T C_e)$$

where AT (L/g) is Temkin isotherm equilibrium binding constant (B=RT/bT), T is absolute temperature in Kelvin, and R (8.314 J/mol·K) is the universal gas constant. The constant bT (J/mol) is related to the heat of adsorption; Ce (mg/L) and qe (mg/g) are equilibrium concentration and capacity, respectively. Temkin isotherm has following drawbacks

➢ Temkin isotherm is not appropriate for complex adsorption systems.

➢ Temkin isotherm is not applicable to extremely low and large value of concentrations.

VIII. KINETIC MODEL

The study of kinetics in adsorption is significant as it provides valuable insight into the reaction pathways and into the mechanism of the reaction. Further, it is

important to predict the equilibrium time at which the adsorbate is removed from aqueous solution to design an appropriate adsorption treatment plant. Any adsorption process is normally controlled by the following diffusive transport processes for the adsorbate:

➢ From bulk solution to the film surrounding the adsorbent

➢ From the film to the adsorbent surface

➢ From the surface to the internal sites followed by binding of the metal ions onto the active sites.

However, in kinetic modeling, all these three steps are grouped together and it is assumed that the difference between the average solid-phase concentration andequilibrium concentration is the driving force for adsorption. Further, it is established from the experimental observations that at optimal agitation speed, the external boundaries hardly have any effect. Therefore, application of the kinetic model depends only on the initial and final concentrations of the solution at different time intervals. It is incorrect to apply simple kinetic models such as first- and second-order rate equations to an adsorption process with solid surface, which is rarely homogenous. In addition, the effects of transport and chemical reaction are often experimentally inseparable.

Several kinetic models have been proposed to unveil the mechanism of a solute adsorption from aqueous solution onto an adsorbent. The following kinetic models [3] are applied in this work:

8.1. Pseudo-first-order kinetic model/Lagergren kinetic model:
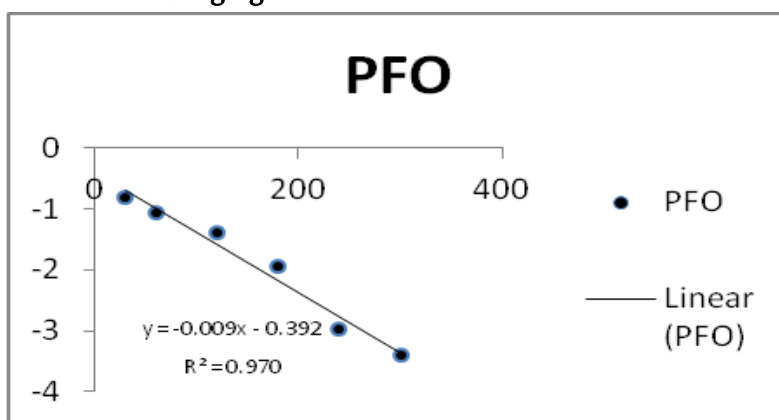
The pseudo-first-order (PFO) or Lagergen kinetic rate equation is one of the most widely used adsorption rate equations and is derived based on solid adsorption capacity for adsorption of a solute from a liquid solution. According to this kinetic model, the overall adsorption rate is directly proportional to the driving force, that is, the difference between the initial and equilibrium concentrations of the adsorbate. The differential form of the PFO kinetic equation is expressed as follows:

$$\frac{dq_t}{dt} = k_1 (q_e - q_t)$$

where qe and qt (mg/g) are the amounts of adsorbate adsorbed at equilibrium and at time t, respectively, k1 (min-1) is the pseudo-first-order rate constant, and t (min) is the contact time between the adsorbent and adsorbate. The integration of equation (3.7) using the boundary conditions (at t = 0, qt= 0; at t = t, qt = qt)

resulted in the next; linear form (equation 3.8) and nonlinear form (equation 3.9), which is known as the "first-order Lagergren's rate equation"

$$\ln(q_e - q_t) = \ln q_e - k_1 t$$

$$q_t = q_e \left(1 - e^{-k_1 t}\right)$$

8.2. Pseudo second order kinetic model:
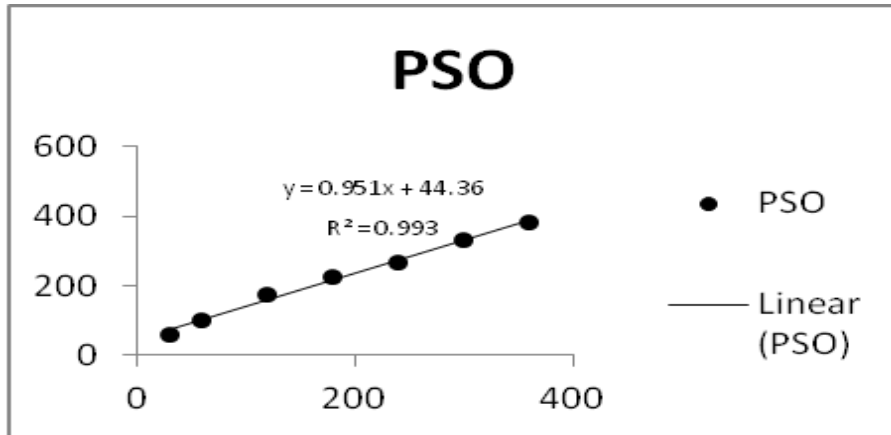
The pseudo-second-order (PSO) kinetic model in differential form is expressed as

$$\frac{dq_t}{dt} = k_2 (q_e - q_t)^2$$

where k2 [g/(mg·min)] is the rate constant of the pseudo-second-order adsorption and the other symbols are the same as those detailed under equation (3.7). After applying the boundary conditions, the integrated form of equation (3.10) becomes

$$\frac{t}{q_t} = \frac{1}{k_2 q_e^2} + \frac{t}{q_e} = \frac{1}{h} + \frac{t}{q_e}$$

$$q_t = \frac{k_2 q_e^2 t}{1 + k_2 q_e t}$$

8.3. Elovich kinetic model:
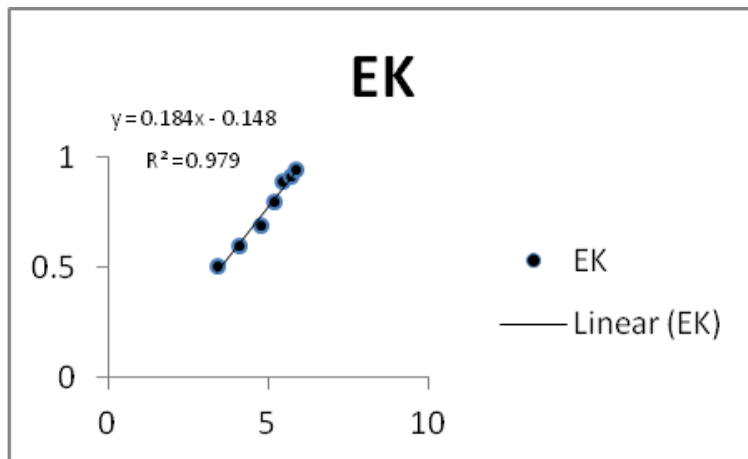
The Elovich (EL) kinetic model has been originally used for describing reactions involving chemisorption of gases on a solid surface. Nowadays, it is also used in solid–n liquid adsorption systems. The Elovich kinetic equation is generally expressed as follows:

$$\frac{dq_t}{dt} = \alpha \exp\left(-\beta_L q_t\right)$$

where α [mg/(g·min)] is the initial adsorption rate constant, β_L (g/mg) is another constant related to the extent of surface coverage. Applying boundary conditions after integration of equation (3.13), the following equation is obtained.

$$q_t = \frac{1}{\beta_L} \ln\left(1 + \alpha\beta_L t\right)$$

In further simplification of Elovich kinetic model, it is assumed that the product is much greater than a unit (i.e., $\alpha\beta Lt \gg 1$). Therefore, the Elovich equation in linear and nonlinear form is finally obtained as follows:

$$q_t = \frac{1}{\beta_L} \ln\left(\alpha\beta_L\right) + \frac{1}{\beta_L} \ln(t)$$

$$q_t = \frac{1}{\beta_L} \ln\left(\alpha\beta_L t\right)$$

By applying the isotherm and kinetic models in linear form, the model parameters can be determined from the slope and intercept of the straight line.

IX. CONCLUSION

The Limonia acidissima is easily available at cheaper cost and activated carbon derived from it has a surface area 326.09 m²/gm. Adsorption capacity of activated carbon is more for least soluble pesticide. The maximum adsorption capacity by Langmuir isotherm was found to be 0.4953 mg/g at 25°C. The kinetics of adsorption was studied using pseudo first order, second order and Elovich models. The Pseudo first order and Pseudo second order models best describes the adsorption process. The pseudeo second order model is found the best to explain the adsorption kinetics. The second order kinetic constant was calculated to be 1.05152 g/(mg min). Results of thermodynamic study indicate the feasibility and spontaneity of adsorption.

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A Research Based On Face Emotion Recognition for Future Expansion

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ABSTRACT

In latest years, with the recognition of social media, customers are an increasing number of eager to categorical their emotions and opinions in the structure of pics and text, which makes multimodal records with textual content and photos the con tent kind with the most growth. Most of the statistics posted via customers on social media has apparent sentimental aspects, and multimodal sentiment evaluation has end up an necessary lookup field. Previous research on multimodal sentiment evaluation have principally centered on extracting textual content and photograph aspects one by one and then combining them for sentiment classification. These research frequently bypass the interplay between textual content and images. Therefore, this challenge proposes a new multimodal sentiment evaluation model. The mannequin first eliminates noise interference in textual statistics and extracts greater necessary photo features. Then, in the feature-fusion section based totally on the interest mechanism, the textual content and pics study the interior points from every different via symmetry. Then the fusion elements are utilized to sentiment classification tasks. The experimental effects on two frequent multimodal sentiment datasets reveal the effectiveness of the proposed model.

Keywords: Data, Sentiment, Analysis, Classification, Multimodal

I. INTRODUCTION

In recent years, with the reputation of social media, customers are an increasing number of eager to specific their emotions and opinions in the structure of photographs and text, which makes multimodal records with textual content and photos the con tent kind with the most growth. Most of the data posted through customers on social media has apparent sentimental aspects, and multimodal sentiment evaluation has come to be an vital lookup field.

Previous research on multimodal sentiment evaluation have exceptionally targeted on extracting textual content and picture elements one by one and then combining them for sentiment classification. These researches frequently omit the interplay between textual content and images. Therefore, this venture proposes a new multimodal sentiment evaluation model. The mannequin first eliminates noise interference in textual records and extracts extra vital photo features. Then, in the feature-fusion section based totally on the interest mechanism, the textual content and photographs research the inner facets from every different thru symmetry. Then the fusion aspects are utilized to sentiment classification tasks. The experimental outcomes on two frequent multimodal sentiment datasets exhibit the effectiveness of the proposed model.

The aim of photo classification is to figure out whether or not an photograph belongs to a positive class or not. Different sorts of classes have been regarded in the literature, e.g. described with the aid of presence of sure

objects, such as vehicles or bicycles, or described in phrases of scene types, such as city, coast, mountain, etc. To remedy this problem, a binary classifier can be realized from a series of pix manually labeled to belong to the class or not. Increasing the extent and range of hand-labeled photos improves Tags: desert, nature, landscape, sky Tags: rose, red Labels: clouds, plant life, sky, tree Labels: flower, plant existence Tags: India Tags: aviation, airplane, airport Labels: cow Labels: aero plane. This motivates our pastime in the use of different sources of data that can resource the getting to know method the use of a restrained quantity of labeled images. With the growing reputation of social media, humans are increasingly more eager to specific their views or opinions on social media platforms. In social media, lots of thousands and thousands of records archives are generated each day. A giant extent of records is in the shape of textual content and photograph combinations, which represent a large quantity of multimodal data. Rich sentimental facts exist in the multimodal data.

II. LITERATURE SURVEY

Recognition methods based on deep neural networks have shown many advantages in terms of learning ability, high variability, and generalization. However, efficient algorithms still present several limitations when real-time operation is required, as well as in an unconstrained environments because it requires achieving high accuracy and computational efficiency. Therefore, face recognition still represents an important challenge in real-time applications, and it is an active research field in the context of computer vision, deep learning, real-time systems, etc. The complexity of face recognition systems depends on the interaction of several less complex sub-systems jointly operating to solve more complex tasks; in particular, we can generalize two fundamental operations involved in the facial recognition tasks: face detection and face recognition. A face recognition system is limited in minor conditions and required to detect faces in images (or videos) regardless of the facial object appearance. Secondly, face images are then processed; subsequently, face features are extracted with a feature extractor. Finally, the system compares the extracted features with the enrolled faces to make face matching. This is why faster algorithms can greatly benefit the system performance and achieve high recognition rates. [1]

Over the past few decades, interest in theories and algorithms for face recognition has been growing rapidly. Video surveillance, criminal identification, building access control, and unmanned and autonomous vehicles are just a few examples of concrete applications that are gaining attraction among industries. Various techniques are being developed including local, holistic, and hybrid approaches, which provide a face image description using only a few face image features or the whole facial features. The main contribution of this survey is to review some well-known techniques for each approach and to give the taxonomy of their categories. In the paper, a detailed comparison between these techniques is exposed by listing the advantages and the disadvantages of their schemes in terms of robustness, accuracy, complexity, and discrimination. One interesting feature mentioned in the paper is about the database used for face recognition. An overview of the most commonly used databases, including those of supervised and unsupervised learning, is given. Numerical results of the most interesting techniques are given along with the context of experiments and challenges handled by these techniques. Finally, a solid discussion is given in the paper [2]

Face recognition (FR) is an extensively studied topic in computer vision. Among the existing technologies of human biometrics, face recognition is the most widely used one in real-world applications. With the great advance of deep convolutional neural networks (DCNNs), the deep learning based methods have achieved

significant improvements on various computer vision tasks, including face recognition. In this survey, we focus on 2D image based end-to-end deep face recognition which takes the general images or video frames as input, and extracts the deep feature of each face as output. We provide a comprehensive review of the recent advances of the elements of end-to-end deep face recognition. Specifically, an end-to-end deep face recognition system is composed of three key elements: face detection, face alignment, and face representation. In the following, we give a brief introduction of each element. In the face representation stage, the discriminative features are extracted from the aligned face images for recognition. This is the final and core step of face recognition. In early studies, many approaches calculate the face representation by projecting face images into low-dimensional subspace, such as Eigenfaces and Fisher faces. Later on, handcrafted local descriptors based methods prevail in this area. For a detailed review of these traditional methods. [3]

With the rapid growth in multimedia contents, among such content face recognition has got much attention especially in past few years. Face as an object consists of distinct features for detection; therefore, it remains most challenging research area for scholars in the field of computer vision and image processing. In this survey paper, we have tried to address most endeavoring face features such as pose invariance, aging, illuminations and partial occlusion. They are considered to be indispensable factors in face recognition system when realized over facial images. This paper also studies state of the art face detection techniques, approaches, viz. Eigen face, Artificial Neural Networks (ANN), Support Vector Machines (SVM), Principal Component Analysis (PCA), Independent Component Analysis (ICA), Gabor Wavelets, Elastic Bunch Graph Matching, 3D morphable Model and Hidden Markov Models. In addition to the aforementioned works, we have mentioned different testing face databases which include AT & T (ORL), AR, FERET, LFW, YTF, and Yale, respectively for results analysis. [4]

Face recognition is a relatively mature technology, which has some applications in many aspects, and now there are many networks studying it, which has indeed brought a lot of convenience to mankind in all aspects. This paper proposes a new face recognition technology. First, a new Google Net-M network is proposed, which improves network performance on the basis of streamlining the network. Secondly, regularization and migration learning methods are added to improve accuracy. The experimental results show that the Google Net-M network with regularization using migration learning technology has the best

performance, with a recall rate of 0.97 and an accuracy of 0.98. Finally, it is concluded that the performance of the Google Net-M network is better than other networks on the dataset, and the migration learning method and regularization help to improve the network performance This have been in the era of big data, which has brought about an explosive increase in the amount of information, and in some access control and other aspects, people often use biometrics for identity authentication for a reason because people's faces or fingerprints are unique. In this regard, face recognition is the main recognition method, which brings great convenience to people's life. It mainly uses optical imaging of human faces to perceive and recognize people. [5]

Sentiment analysis uses information retrieval and computational linguistics. Sentiment analysis has advantages in various forms such as in marketing or for business purposes. In marketing, it is used to notice about the favorable or negative points about their new product which helps to determine how successful the new product is. A specific view or notion can be depicted as ideas prompted, opinions, judgements or coloured by emotions or emotions. In Computational Linguistics, the core is on feelings instead of sentiments, opinions or perceptions. The terms „opinion‟s and „sentiment‟s are frequently availed substitutable. In general, the information of a text is divided into two categories. 1. Based on text 2. Based on persuasion. Whereas actualities or facts are

observational utterances about events, entities and their opinions, characteristics are particular utterances that depict opinions of people, events and their properties, feelings towards entities or appraisals. A persuasion can be depicted by the following four terms: Sentiment, Claim, Holder and Topic . The Holder affirms a fact about a Topic, and frequently relates a persuasion, such as `bad' or `good', with the affirm. It depicts a persuasion as an implicit or explicit aspect in text of the holder's negative, positive or neutral notice into the requirement about the topic. Sentiment analysis suits with computational operation of persuasion, sentiment, opinion and individuality in text. The document inception is likely in the pattern of unstructured data. [6]

III. EXISTING SYSTEM AND TECHNOLOGIES

Traditionally the document classification was performed on the topic basis but later research started working on opinion basis. Following machine learning methods Naive Bayes, Maximum Entropy Classification (MEC), and Support Vector Machine (SVM) are used for sentiment analysis. The conventional method of document classification based on topic is tried out for sentiment analysis. The major two classes are considered i.e. positive and negative and classify the reviews according to that. In [5], Naïve Bayes is best suitable for textual classification, clustering for consumer services and Support Vector Machine for biological reading and interpretation. The four methods discussed in the paper are actually applicable in different areas like clustering is applied in reviews and Support Vector Machine (SVM) techniques is applied in biological reviews & analysis. Though field of opinion mining is latest technology, but still it provides diverse methods available to provide a way to implement these methods.

There is a large literature on semi-supervised learning techniques. For sake of brevity, we discuss only two important paradigms, and we refer to [5] for a recent book on the subject. When using generative models for semi-supervised learning a straightforward approach is to treat the class label of unlabeled data as a missing variable, see e.g. [1, 15]. The class conditional models over the features can then be iteratively estimated using the EM algorithm. In each iteration the current model is used to estimate the class label of unlabeled data, and then the class conditional models are updated given the current label estimates. This idea can be extended to our setting where we have variables that are only observed for the training data. The idea is to jointly predict the class label and the missing text features for the test-data, and then marginalize over the unobserved text features. These methods are known to work well in cases where the model fits the data distribution, but can be detrimental in cases where the model has a poor fit. Current state-of-the-art image classification methods are discriminative ones that do not estimate the class conditional density models, but directly estimate a decision function to separate the classes. However, using discriminative classifiers, the EM method of estimating the missing class labels used for generative models does not apply: the EM iterations immediately terminate at the initial classifier. Co-training [4] is a semi-supervised learning technique that does apply to discriminative classifiers, and is designed for settings like ours where the data is described using several different feature sets. The idea is to learn a separate classifier using each feature set, and to iteratively add training examples for each classifier based on the output of the other classifier. In particular, in each iteration the examples that are most confidently classified with the first classifier are added as labeled examples to the training set of the second classifier, and vice-versa. A potential drawback of the co-training is that it relies on the classifiers over the separate feature sets to be accurate, at least among the most confidently classified examples. In our setting we find that for most categories one of the two feature sets is significantly less informative than the other.

Therefore, using the classifier based on the worse performing feature set might provide erroneous labels to the classifier based on the better performing feature set, and its performance might be deteriorated. In the next section we present a semi-supervised learning method that uses both feature sets on the labeled examples, and we compare it with co-training in our experiments.
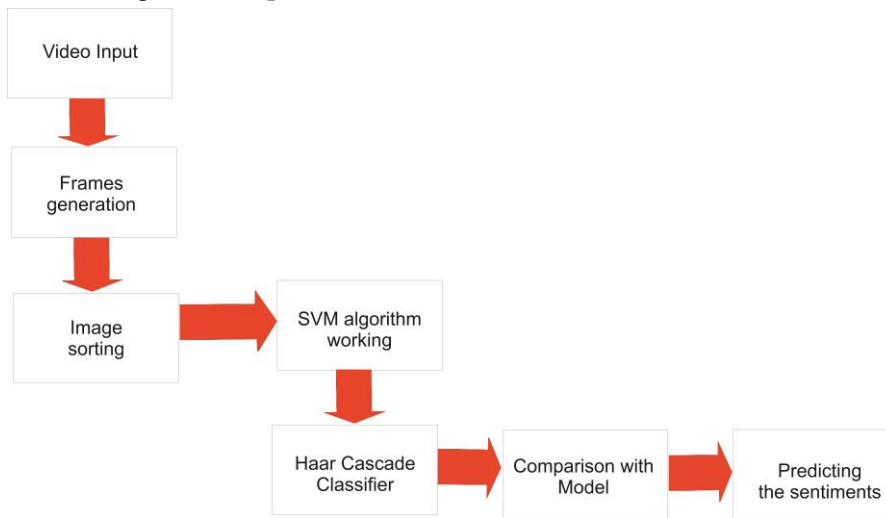
Fig. 4.1 Flow of the proposed system

IV. IMPLEMENTATION AND RESULT

Fig. 4.1 Angry Face detection
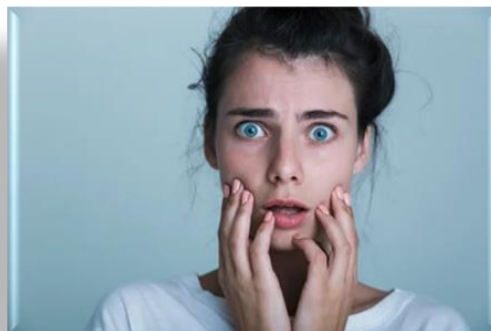
Fig. 4.2 Fear face detection

Fig. 4.3 Happy face detection
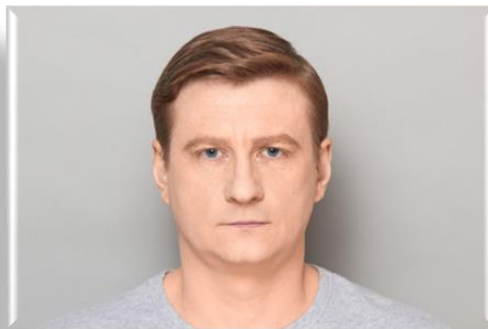
Fig.4.4 Neutral state of sentiment

Fig. 4.5 Sad Face of detection

Fig.4.6 Surprise face of detection

V. RESEARCH ASPECTS

Multimodal sentiment evaluation of social media is a difficult task. This machine proposes a multimodal sentiment evaluation mannequin based totally on the interest mechanism. This mannequin can successfully dispose of noise interference in the textual statistics of social media and gain extra correct textual content features. Combined with the interest mechanism, the photo aspects that are extra essential to sentiment classification are extracted. In phrases of function fusion, the interest mechanism is brought once more to fuse aspects in exceptional modes effectively, which learns the interactive facts between textual content and images. The mannequin used modal inside facts and modal interplay records to efficaciously acquire the sentimental characteristic illustration of multimodal data, precisely judged the sentimental polarity of users' tweets, higher published users' actual feelings, and helped us apprehend people's attitudes and views closer to sure activities on social media. The experimental outcomes on two open datasets show the feasibility and superiority of our proposed model. In future work, the goal is to enhance the present fashions and techniques and learn about extra modalities, along with audio, video, and so on.

5.1. Mood:

Similar to emotion, moods additionally show off a contagion effect. For example, a depressed individual will frequently make others experience depressed and a completely satisfied man or woman will frequently make others sense happy. Some researcher have proven that even a mere smiling or frowning face, proven so rapidly that the problem is now not aware of seeing the image, can have an effect on a person's temper and because of this bias judgment. From an interface standpoint, the implications for character-based dealers are clear: Moods exhibited via onscreen characters can also immediately switch to the user's mood. Onscreen temper can additionally lead to "perceived contagion" effects: One smiling or frowning face on the display can have an impact on users' perceptions of different faces that they consequently see on the screen, possibly due to the fact of priming.

5.2. Neurological Aspects:

The talent is the most critical supply of emotion. The most frequent way to measure neurological adjustments is the electroencephalogram (EEG). In a blissful state, the human intelligence reveals an alpha rhythm, which can be detected by way of EEG recordings taken via sensors connected to the scalp. Disruption of this sign (alpha blocking) takes place in response to novelty, complexity, and unexpectedness, as nicely as in the course of emotional exhilaration and anxiety. EEG research have similarly proven that positive/approach-related thoughts lead to higher activation of the left anterior vicinity of the brain, whilst negative/ avoidance-related feelings lead to increased activation of the proper anterior region. Indeed, when one flashes a image to both the left or the proper of the place a man or woman is looking, the viewer can discover a smiling face greater rapidly when it is flashed to the left hemisphere and a frowning face extra shortly when it is flashed to the right hemisphere. Current EEG devices, however, are pretty clumsy and obstructive, rendering them impractical for most HCI applications. Recent advances in magneto resonance imaging (MRI) provide tremendous promise for emotion monitoring, but are presently unrealistic for HCI due to the fact of their expense, complexity, and shape factor.

VI. CONCLUSION

Multi-modal Sentiment Analysis hassle is getting to know trouble that has been a lookup pastime for current years. Though lot of work is executed until date on sentiment analysis, there are many difficulties to sentiment analyzer on the grounds that Cultural influence, linguistic version and differing contexts make it fairly tough to derive sentiment. The motive at the back of this is unstructured nature of herbal language. The foremost difficult components exist in use of different modes; dealing with multi-modality entails the use of a couple of media such as audio and video in addition to textual content to beautify the accuracy of sentiment analyzers. Textual emotional classification is performed on foundation of polarity, depth of lexicons. Audio emotional Classification is performed on groundwork of prosodic features. Video emotional Classification is performed on foundation postures, gestures etc. Infusion, we can combine the outcomes of all these modes; to get greater accuracy. Future lookup should be devoted to these challenges. So we are shifting from uni-modal to multi-modal. At the same time some features related to mood and neurological aspects also been considered to explore the facts of multi modeling sentiment analysis

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Review on SQL Injection Prevention with Trust factor and Security

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ABSTRACT

SQL injection is a type of cyber-attack that has been around for over 20 years, but it is still a major threat to web-based applications. Despite technological advancements, hackers can still find vulnerabilities in web applications that allow them to perform SQL injection attacks. These attacks can give hackers access to sensitive information stored in electronic records in databases. However, there are ways to prevent SQL injection attacks. This paper looks at various techniques proposed in existing research to prevent SQL injection, and proposes the use of blockchain technology to prevent SQL injection attacks on database management systems via IP. Overall, SQL injection is a significant threat to web-based applications and it is important to take steps to prevent it.

Keywords— SQL injection attacks, Input validation, Prepared statements, least privilege, Encryption, Security, Data loss, Cybersecurity, Database security, Vulnerabilities, Risk management, Access control, Authentication, Authorization.

I. INTRODUCTION

SQL is a language used to interact with databases and manipulate stored data. SQL injection is a technique used by hackers to execute malicious SQL queries on a database server via a web-based application, and it is a common way for attackers to access sensitive information. MySQL is an example of a database system that has been vulnerable to SQL injection attacks. There are several vulnerabilities that can lead to data leakage in MySQL, including privilege escalation and root privilege escalation bugs. Login systems are particularly vulnerable to SQL injection attacks, but there are ways to prevent them. One approach is to use SQL injection sanitizers, which can detect intervention in web- based applications. Another approach is to provide firewalls for the SQL server. Several journal papers have been reviewed on the topic of SQL injection, which provide information on how to fight against and prevent these types of attacks. The National Security Agency (NSA) has identified SQL injection as the most common technique used by hackers, and even a major database organization like MYSQL has been hacked using this method. Attackers can exploit vulnerabilities in the database, such as privilege escalation bugs, to gain access to sensitive information and potentially compromise the entire server. The login system is a common target, with hackers using brute force or SQL injection to gain unauthorized access. SQL injection involves inserting code into login fields to bypass security measures, and if successful, the attacker can access the system without authorization. Preventing SQL injection attacks is crucial for maintaining the security and integrity of databases. SQL injection is a type of cyber-attack where an attacker injects malicious SQL code into a web application's input fields, tricking the application into executing

unintended actions. SQL injection attacks can lead to serious consequences, including data theft, data corruption, and unauthorized access to sensitive information.

Preventing SQL injection attacks is crucial for ensuring the security and integrity of web applications. There are several methods and best practices that developers can implement to prevent SQL injection attacks, such as input validation, parameterized queries, and stored procedures.

In this review, we will explore the various techniques and strategies used to prevent SQL injection attacks in detail. We will discuss the importance of understanding SQL injection vulnerabilities and how they can be exploited by attackers. We will also examine common prevention techniques and provide real-world examples of successful implementation. By the end of this review, readers will have a comprehensive understanding of SQL injection prevention methods and how to implement them effectively to protect their web applications from potential attacks.

According to National Security Agency (NSA), SQL injection is the most typically ways used by hackers, even the famous database organization MYSQL was hacked by these techniques on electronic records[1]. There is some vulnerability that will cause data leakage in MySQL because of the attackers accessing to the database and exposure the information or alter it. One of the vulnerabilities of it is privilege escalation or called it race condition bug. This bug allows the local system users access to the database and upgrade their privileges like change their id to 1 which can be an admin and alter or execute the information as their like. This will give an opportunity to an attacker access to the entire database server. The attacker might get fully compromise the target server. Besides that, there is another vulnerability which is root privilege escalation bug. This bug works with the previous vulnerability. Since the previous bug the attackers gain the privilege to access to the server and get upgrade user to administrator, the attacker can change a certain system file to a random file. Due to the present bug, it will cause the tied to an unsafe file. That's why, the attack can change the file easily because the bug is open a backdoor for the attacker to alter the file. Normally, the most common attack that will happen and threat the database system is the login system. For the login page, most of the attack will try using brute force with mean that guessing the password by trying every possibility like dictionary attack is consider as a type of brute force. Another attack is very common and use widely for attackers which is SQL injection. SQL injection is putting '1' OR '1' = '1' into username and password. If the system does not have any SQL injection prevention, if the attacker enters this code inside, the attacker can access to the system will authorization [1]-[4].

What is SQL Injection?

SQL injection is a type of security vulnerability that allows attackers to inject malicious code into SQL statements, which are used to communicate with a database. This can lead to unauthorized access to sensitive data, modification of data, or even deletion of entire databases. SQL injection attacks occur when an application does not properly validate user input before incorporating it into a SQL statement. Attackers can exploit this vulnerability by inputting malicious SQL code into an input field on a website or application, such as a login form, search field, or comment box. Once the attacker's SQL code is executed, they can access sensitive information, such as passwords, credit card numbers, or other personally identifiable information. They can also modify or delete data in the database, which can have serious consequences for businesses and organizations. To prevent SQL injection attacks, developers must ensure that all user input is properly validated and sanitized before being used in a SQL statement. This can be done through the use of prepared statements,

input validation, and input filtering. Additionally, regular security testing and code reviews can help identify and prevent vulnerabilities before they can be exploited by attackers.[3]

A database is a collection of organized data and information, structured into rows, columns, and tables, with an indexing system to facilitate easy access and retrieval of related data. The database is constantly updated, expanded, and purged to accommodate new data. Databases process workloads, run applications, and facilitate data inquiries. Unfortunately, as the usage of databases increases, so does the frequency of attacks against them. Data breaches pose a significant threat to organizations, causing more than just the loss of sensitive information. Therefore, organizations must prioritize database security to protect their data from malicious attacks. Database attacks are on the rise, driven by the increasing accessibility of stored data and information. databases are a way to organize and store data, which can be easily accessed and updated. As the use of databases has increased, so have the number of attacks against them, with hackers trying to steal sensitive information for illegal gain. Lack of awareness regarding database security can lead to loss of data integrity, confidentiality, and availability. To reduce these threats, various techniques have been proposed, such as improving existing security systems and using anomaly detection to detect insider attacks. Different types of attackers and attacks have also been identified, including intruders, insiders, and administrators, and direct or indirect, passive or active attacks. Finally, it's important to consider the security of databases in mobile devices.

What is SQL injection Prevention?

SQL injection prevention involves taking steps to prevent attackers from exploiting vulnerabilities in a web application's SQL code. The following are some common methods for preventing SQL injection: Input validation: Developers should validate all user input and ensure that it meets expected criteria. For example, an email input field should only accept valid email addresses. This can be achieved using regular expressions or other validation methods. Parameterized statements: [4] Developers should use parameterized statements instead of dynamically constructing SQL statements. Parameterized statements use placeholders for user input, which are then replaced with sanitized data. This makes it impossible for attackers to inject SQL code into the statement. Sanitization: Developers should sanitize user input by removing any special characters or other potentially malicious code. This can be achieved through the use of input filters or other sanitization methods. Least privilege: Database users should be granted the least amount of privilege necessary to perform their tasks. This reduces the potential damage that can be done if an attacker gains access to a user's account. Regular updates and testing: Developers should regularly update their software and test their applications for vulnerabilities, including SQL injection. This can help prevent attackers from exploiting newly discovered vulnerabilities. By implementing these SQL injection prevention measures, developers can help protect their applications and the sensitive data stored within them from SQL injection attacks.[5]

Importance of SQL Injection Prevention

- SQL injection is a type of web application vulnerability that allows attackers to manipulate a database by injecting malicious SQL statements through user input. These attacks can result in unauthorized access to sensitive data, data loss, data corruption, and other damages that can have serious consequences for individuals and organizations. Therefore, preventing SQL injection is crucial to ensure the security and integrity of web applications and the data they store.

- Preventing SQL injection attacks requires careful attention to the security of the application's code and database configuration. This can involve implementing input validation and sanitization to prevent malicious inputs, using parameterized queries or prepared statements to avoid dynamic SQL, and restricting database user permissions to limit access to sensitive data. By taking these steps, businesses and organizations can reduce their risk of SQL injection attacks and protect their data from unauthorized access and manipulation.

- The importance of SQL injection prevention is further highlighted by the fact that these attacks are a common and persistent threat. According to a report by the Open Web Application Security Project (OWASP), SQL injection is still one of the most critical web application security risks. Furthermore, the impact of SQL injection attacks can be severe, leading to financial losses, damage to brand reputation, and legal and regulatory compliance issues.

- In summary, SQL injection prevention is critical for the security and integrity of web applications and the data they store. By implementing effective prevention techniques, businesses and organizations can protect themselves from the damaging effects of SQL injection attacks and maintain the trust of their customers and stakeholders. [6]

Types of SQL injection attacks: -

- Union-based SQL injection: This type of attack involves exploiting a vulnerability that allows an attacker to append additional SQL statements to the
- original query using the "union" keyword. By doing so, the attacker can retrieve additional data that is not intended to be exposed.
- Error-based SQL injection: This type of attack involves injecting malicious SQL statements that generate an error response from the database. The error message often contains sensitive information that the attacker can use to further exploit the vulnerability.
- Boolean-based SQL injection: This type of attack involves exploiting a vulnerability that allows an attacker to use Boolean conditions to infer information about the database. For example, an attacker might use a series of Boolean conditions to determine the number of columns in a table or the contents of a specific column.
- Time-based SQL injection: This type of attack involves exploiting a vulnerability that allows an attacker to delay the database response by using time-based SQL statements. By doing so, the attacker can infer information about the database structure or content.
- Out-of-band SQL injection: This type of attack involves exploiting a vulnerability that allows an attacker to retrieve data from the database using an alternative communication channel. For example, an attacker might use a DNS lookup to retrieve data from the database.

Fig. SQL Injection Prevention

II. THE MATERIAL AND METHOD

Literature suggests that lack of awareness about database security is a major reason behind the increasing number of database attacks. Therefore, literature proposes different techniques to improve the database security system such as improving the existing security system, using anomaly detection to detect insider attacks, and categorizing the attackers and types of attacks. Moreover, literature also discusses the importance of database security in mobile devices and proposes ways to overcome security threats in mobile database systems. A thorough literature review is necessary for providing a theoretical and analytical base for any research in the area of database security.

TABLE I METHODS COMPARISON BASED ON EACH AUTHORS

Reference Number	Author	Method	Drawback
[1]	V. Verma and R. K. Singh	Minimize the privileges, Implementationof consistent coding standards	It does not have node tonode verifiedsignature
[2]	Singh, G., Singh, R., & Thakur, D.	Processinginput, , Managing Permissions, Tools to detectSQL injectionqueries	It does not have node tonode verifiedsignature
[3]	M. Ali, R. Mahmood, and A. Anwar	SQL injection commands datasets extraction, preprocessing,machine learning modelanalysis for SQL injection prediction and detection, testing and training,	It does not have node tonode verifiedsignature
[4]	Suman, S. S.,& Kumar, S	Entirely dependent onuser-defined approach (DUD) Threshold value	It does not have node tonode verifiedsignature
[5]	Zar Chi Su Su Hlaing , Myo Khaing	Filtering sending andreceiving mechanism	It does not have node tonode verified signature
[6]	A.A. Nedhaland A. Dana,	Web applicationfirewall	It does not have node tonode verified signature

Based on [8] attackers can be classified into three categories: intruders, insiders, and administrators. Intruders are anonymous individuals who illegally access computer systems to obtain valuable data and information stored in databases. Insiders are trusted users who abuse their privileges to obtain unauthorized access to data and information. Administrators are authorized individuals who have complete control over a computer system but use their privileges in an illegal manner to obtain system information. In addition, the literature also

discusses different types of attacks, including direct attacks, indirect attacks, passive attacks, and active attacks. Many web-based applications, such as those used by organizations, universities, and schools, have login forms that users can input data into. However, these forms can be exploited through SQL injection, which can lead to significant data breaches. there are different types of attacks that can be launched against a database, including direct attacks, indirect attacks, passive attacks, and active attacks. Attackers can be categorized as intruders, insiders, or administrators, and they may attempt to gain access to sensitive information and data stored in the database through various means, such as SQL injection or electronic attacks. It is crucial for organizations to implement robust security measures to protect their databases and prevent these types of attacks from occurring.

III. ADVANTAGES`

- Enhanced data security: SQL injection prevention helps to ensure that sensitive data is protected from unauthorized access and manipulation. By preventing SQL injection attacks, organizations can protect their databases from being compromised and prevent data breaches.
- Improved system performance: SQL injection prevention can also help to improve system performance by reducing the risk of malicious queries that can cause system crashes or slowdowns. This can help to improve the overall efficiency and effectiveness of the system.
- Reduced costs: Preventing SQL injection attacks can help to reduce costs associated with data breaches, such as legal fees, fines, and reputational damage. By proactively protecting sensitive data, organizations can avoid the costs and consequences of a data breach.
- Increased compliance: SQL injection prevention is essential for compliance with regulations such as the Payment Card Industry Data Security Standard (PCI DSS) and the General Data Protection Regulation (GDPR). By implementing effective SQL injection prevention measures, organizations can ensure that they are compliant with relevant regulations and standards.
- Greater customer trust: Effective SQL injection prevention measures can help to build greater customer trust by demonstrating a commitment to data security and privacy. This can help to enhance the organization's reputation and increase customer loyalty.

IV. FUTURE SCOPE

- Improved detection: Advanced techniques such as machine learning and artificial intelligence can be used to analyze user input and identify potential SQL injection attacks. These systems can also learn from past attacks and use this knowledge to improve their detection capabilities.
- Real-time prevention: Instead of simply detecting SQL injection attacks after the fact, future prevention systems may be able to stop them in real-time. This could be achieved through the use of active monitoring and automated responses.
- Integration with other security measures: SQL injection prevention systems can work alongside other security measures such as firewalls and intrusion detection systems to provide a layered defense against attacks.

- Better education: Educating developers and IT professionals on SQL injection prevention and the importance of secure coding practices can go a long way in preventing these types of attacks. Therefore, future systems may focus on providing better training and resources to help prevent SQL injection attacks.
- Integration with cloud-based services: With the increasing popularity of cloud-based services, SQL injection prevention systems will need to be adapted to work seamlessly with these services. This will ensure that security is not compromised when moving applications to the cloud.

Overall, the future scope of SQL injection prevention systems will focus on improving detection and prevention, integrating with other security measures, providing better education, and adapting to the changing technology landscape.[8]

V. RESULTS

In this study, it is emphasized that SQL injection is a serious threat to the security of web-based applications, as hackers can exploit vulnerabilities in the application to steal data from the database. To prevent SQL injection attacks, developers should prioritize the security of web-based applications and consider implementing blockchain technology. It is important to regularly test the security of web-based applications to ensure they are not vulnerable to SQL injection attacks. The study also highlights various types of database security threats, including insider attacks, internal attacks, and external attacks. However, there are solutions available to address these threats, such as access control, inference policy, user authentication, and data encryption.

VI. CONCLUSION

The main aim of this research is to investigate SQL injection, which is a technique used by hackers to gain unauthorized access to a database of a web-based application. The research also aims to identify and explore different types of database threats, including excessive privilege abuse, legitimate privileges abuse, privileges elevation, and platform vulnerabilities, and to provide solutions to overcome these problems. The use of Blockchain technology, specifically Nodes Verification with IP, is proposed as a solution to prevent SQL injection attacks. Furthermore, future work will investigate the use of Blockchain and Augmented Reality to prevent SQL injection and improve the potential for detecting injection attempts.

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Review on Text to Speech Synthesizer

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ABSTRACT

A speech synthesizer is an application that converts text into spoken word, by analyzing and processing the text using Natural Language Processing (NLP) and then using Digital Signal Processing (DSP) technology to convert this processed text in to synthesized speech representation of the text. Here, we developed a useful speech synthesizer in the form of a simple Web page that converts inputted text into synthesized speech and reads out to the user. The development of a speech synthesizer will be of great help to people with visual impairment and making through large volume of text easier. The quality of a speech synthesizer is judged by its similarity to the human voice and by its ability to be understood. A speech synthesizer allows people with visual impairments and reading disabilities to listen to written works on a home computer. [6]

Speech synthesis can be described as artificial production of human speech. A computer system used for this purpose is called a speech synthesizer, and can be implemented in software or hardware. Speech Synthesizer system converts normal language text into speech. Synthesized speech can be created by concatenating pieces of recorded speech that are stored in a database. Systems differ in the size of the stored speech units a system that stores phones audiphones provides the largest output range, but may lack clarity. [5]

Keywords—Text processing, Text-To-Speech synthesizer, Speech Enhancement.

I. INTRODUCTION

Digital speech plays an important role in modern communication research and practice. The main purpose of my speech is communication it means the transfer of information between humans and machines. Text to speech synthesizer convert text to speech with speech synthesizer. Build human language. The computer used for this purpose is called a speech synthesizer with both software and hardware based on an ARM7 microcontroller that converts text to speech and biblical word Text to speech system. Translate Standard words into the American and British English Proverbs. Persons with Average English communication skill cannot understand such an expression text to speech process is different from the production of live speakers. The production of human speech depends on the mechanics of the fluid complex, changes in lung function, and the sound of the cilia. The purposed of text reading is to roughly transform the written text into complete communication. Writing and speech production are two important parts of text in speech. The main purpose of text processing is to process the text and create the correct phoneme units. These speech units can be obtained by speech information in part or combination of parameters or selected units in the main speech. In order to combine sounds clearly, it is important that the notes together form the appropriate sound sequence linked to the notes. [1][3]

Figure 1 shows a diagram of the written content in the spoken sentence.

II. SPEECH SYNTHESIZER SYSTEM MAIN STAGES

1. Text Processing

The entered text is first analyzed, normalized and transcribed into a phonetic or some other linguistic representation. [1]
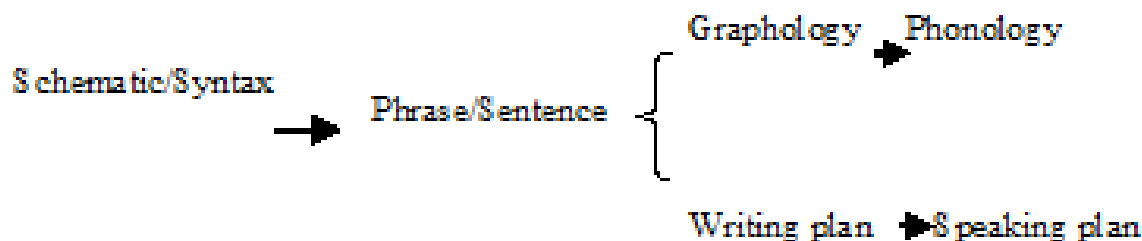
Fig-1 Text processing components

Parts of the text processing are about low quality to process issues such as the separation of sentences and words separation.

- Document the structure can be identified by translating the punctuation mark and paragraph formatting.
- Text familiarity handles abbreviations and acronyms. The goal of accustomed to match text e.g., Dr. can be offered as a doctor. The normal routine makes it great output.
- Language analysis includes morphological analysis of proper pronunciation and syntactic analysis to facilitate pronunciation and naming handling incomprehensible things in the text.

2. Speech generation

The speech generation component processes for generate the speech by using parameters as

- Speech analysis focuses on the phoneme level ofeach word. Every phone is packed with information about how it sounds and which sounds are of style and importance. Graph to Audio Conversion Determines the a ccuracy of each word in theintroductory sentence. Homograph Sharpening
whether the introductory sentence is used in the past or present tense. A rigid system for recognizing word s depends on the dictionary.
- Prosodic analysis can Analysis of prosody is very important. Because it provides the basis for marking the prosodic effect around our utterance plans i.e., phonological prosodic processing and after to arrive at suitable rendering strategies for the marked prosody i.e., phonetic prosodic processing. There are two approaches available in the prosody. Create an abstract descriptive system which characterizes observations of the behavior of the parameters of prosody within the acoustic signal and promote the system to a symbolic phonological role. Create a phonological system for input process which eventually result in an acoustic signal jugged by listeners to have a proper prosody. [1]
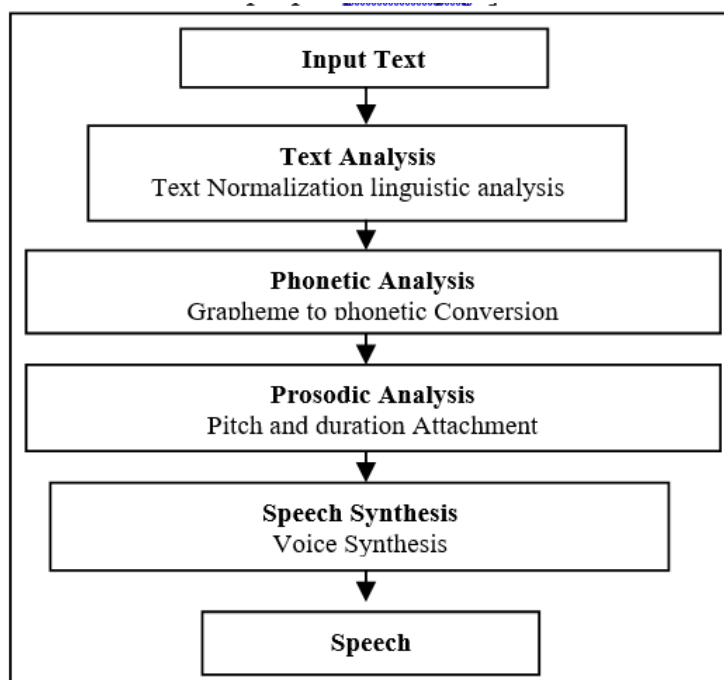
Fig-2 Block diagram of Speech generation

III. SPEECH SYNTHESIS TECHNIQUES

Symbolic prosody data is used by the synthesizer in produce a speech that uses a certain method. Three key stages of Speech Synthesis Techniques.[1]

1. Articulator synthesis

Articulator synthesis aims at computer simulation Neurophysiology and biometrics of speech production. Articulator synthesis uses a mechanical and acoustic model of speech production to integrate speech. This combination produces understandable synthetic speech, but its effect remains the same away from the noise of nature.[4]

2. Formant integration

In this program the representation of each speech parts is stored on a perimeter basis. Parameter are those of the minimum formant synthesizer for each Holmes part. There is one value for each parameter. This means one expression of the acoustic component.

3. Concatenative synthesis

Concatenative synthesis is a form of consolidation sound by Concatenative samples of recorded audio called units. The duration of the units is not strictly defined and is possible they vary depending on the implementation, approximately the grade from 10 ms to 10 seconds. Used in compound speech generate user-specific sequences on the website built on recording in another sequence[1][4].

Concatenative synthesis units

- The phone is a single unit of audio. Speech it is a sequence of such sounds.
- A diaphone is defined as a signal from or the centre of the phone or the area of small change inside the phone went to the same location on the next phone.
- Triphone is part of the signal to take in sequence from the middle of the phone completely next to the middle of the third.[5]

IV. TYPES OF SPEECH SYNTHESIS

Most speech engines can be classified according to how they convertphonemes into voice. Some notes for speec h synthesizer are listed below

1. Pre-recorded

In this text forspeech synthesizer system, we store the information of prerecorded speech. The main advantage of this method is the sound quality. But text messaging and large storage should make it less useful.

2. Formant:

Here voice is generated by the simulation of the behavior of human vocal cord. Unlimited vocabulary, need of low storage space and ability to produce multiple featured voices makes it highly efficient, but robotic voice, which is sometimes not appreciated by the users.[6]

3. Concatenated:

In this kind of Text to speech synthesizer systems, text is phonetically represented by the combination of its syllables. These syllables these syllables are concatenated at run time and they produce phonetic representation of text. Key features of this technique are unlimited vocabulary and good voice. But it can't produce multiple featured voices, needs large storage space. Various methodologies of implementation, prospects and challenges of implementation of a English Text to speech synthesizer engine with regard to speech synthesizer and its high level applications are presented here. The Implementation of this Text to speech synthesizer is done using the concatenation method. Integral parts of a Text to Speech engine are phoneme identifier, voice mapping and speech synthesizer.[7]

V. DEVELOPMENT OF TEXT TO SPEECH SYNTHESIZER

Synthetic speech has been a human dream for centuries. Find out how the system is represented and how devel opment began in its current form. This review may provide new researchers with information for further study. This article discusses the history of communication, from the earliest experimental machines to the programs t hat formed the basis of modern synthesizers.Be an intriguing word 100 years ago.[1]That year Gerert of Aurilla c built the first talking machine. In the next two centuries, inventors such as Albertus Magnus and Roger Bacon built machines called "talking heads." However, the first known device to try to mimic human speech was inve nted by Christian Kratzenstein in St. Petersburg in 1779. The machine could produce five long tons.Twelve yea rs later,Wolfgang Von Kempelen invented a machine that could produce certain sounds and words.[6]

The first speech synthesizer was introduced in the 1960s. Since then, there have been many improvements in t he accuracy and quality of textspeech synthesizer systems. Companies like IBM, Microsoftand Bell Labs created the free market.

The following are some Text-to-Speech synthesizer products.

1. MITalk

In 1976, Allen, Hunnicutt, and Klatt founded the MITalk in English. The Text to speech synthesizer used different levels to translate text into integrated speech. At first level, abbreviations, numbers, and symbols were converted into words. Then, with the help of 12,000 morph (beginning, roots, and suffixes) dictionaries, the words are changed to phonetic. Non-dictionary words are converted into phonemes by rules.[4]

2. DEC Talk

Digital Equipment Corporation Talk was based on the talk program available in USA English and Spanish. The DEC Talk system was later commercially available in 1983. The system is able to specify multiple correct words, email and URL addresses and supports a custom pronunciation dictionary. It also controls punctuation marks, height, and pressure and voice control commands are inserted into a text file used by DEC speaking software applications. Speech rate is adjustable between 75 and 650 words per minute.[4]

3. Mobile-based Text To Speech Synthesis

Now many day-to-day mobile phone manufacturers offer text-to-speech space. It is very useful for the visually impaired person; they can hear text from a cell phone screen and even read e-books. Google has launched Android-based Text to speech synthesizer mobile in English, Spanish, French and Italian etc.[5] SVOX corporation has launched its Text to speech synthesizer-based Android phone. Can read English text, e-book and can translate speech into another language. C-DAC Mumbai has developed Text to speech synthesizer based on Android phone in Marathi and Oriya languages.[4]

4. Text-to-Speech Program in Indian Language

IIT Hyderabad has developed a comprehensive framework For Hindi and Telugu languages to produce text processing modules and language resources that can be expanded to all Indian language.[4]

VI. CONCLUSION

The test-to-speech synthesizer is gradually evolved from a few decades ago to find the current situation. Three basic Ways to combine speech are Articulator, Formant and Concatenative synthesis used in various synthesizers. Many new applications are being upgraded, but they are Understandable and the comprehension of passive speech has not yet been reached acceptable level. Even in India some research organizations also work on translating text into speech in regional languages such as Marathi, Hindi, Telugu, Punjabi, Kannada etc. But all these programs do not repeat natural human speech. There is a great width in between integration development to achieve this high quality natural and emotional aspect.[1][3]

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Review on Entity Relationship Model of Crime Management System

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ABSTRACT

In this review paper examines crime management systems and how they affect crime rates. It gives a general review of the components and benefits of crime management systems as well as the challenges in putting them into implementation. In addition, the paper examines how technology affects crime control and how it helps to lower crime rates. This review study recognizes the value of modern crime management systems and their potential for further development through technological advancements.

Keywords— Technology, surveillance, public safety, resource allocation, data management, privacy, justice, recidivism.

I. INTRODUCTION

Due to the global rise in crime events, crime management systems have grown in important in modern times. With the use of these systems, criminal activity may be tracked, monitored, and managed effectively, improving public safety and lowering crime rates. This review paper's goal is to give an overview of crime management systems and how they contribute to crime rate reduction. The paper will look at the components and benefits of crime management systems, the challenges in putting them into practise, and how impacting crime management. This review paper aims to consider the importance of crime management systems and its potential for further advancement through technological advancements by reviewing these topics.

II. PURPOSED ALGORITHM

2.1. MODULES

2.1.1. Administrators Module: -

The module's focus will be on maintenance, including master data maintenance and the removal of dated and old data from the software, among other things.

2.1.2. Operator Module: -

- Each of the station must first register with the website.
- Once the prospective station registers with the website they can avail the existing records

2.2. Actors of the project

- **Administrator:**
  a) Adding New Operators.

b) Updating Operators.

c) Viewing Operators.

d) Delete Operators.

e) Administrator Operator

    i.   Insert New Data.

    ii.   Delete Data.

    iii.   Update Existing Data.

    iv.   Retrieve Data from Given ID.

    v.   Insert & Update Others Details.

    vi.   Delete Details.

    vii.   Retrieve Details.

    viii.   Retrieve All Details.

    ix.   Insert Split Image

    x.   Match Criminal Photo With Database

    xi.   Find Criminal Details By Eyewitness

- **Operator**:

a) Retrieve Data from Given ID.

b) Retrieve All Data.

c) Retrieve All Details.

d) Match Criminal Photo with Database.

e) Find Criminal Details By Eyewitness.

III. SYSTEM DESIGN

3.1. Waterfall Model
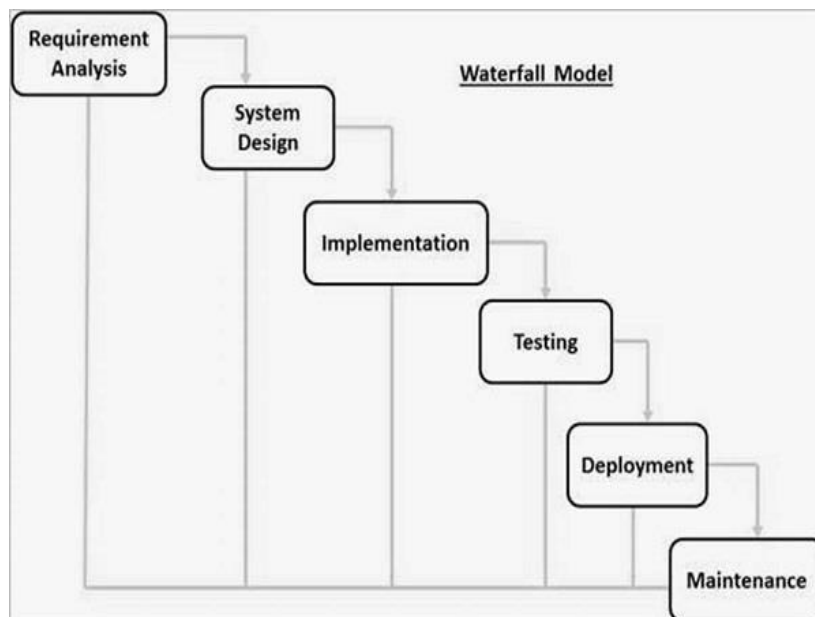
Fig: - 3.1 Waterfall Model

The waterfall models have phases such as Requirement Analysis, System Design, Implementation, Testing, Deployment, and Maintenance. And it is important to finish one phase first then move to the next phase this way you will face less tribal.

3.2. System Architecture
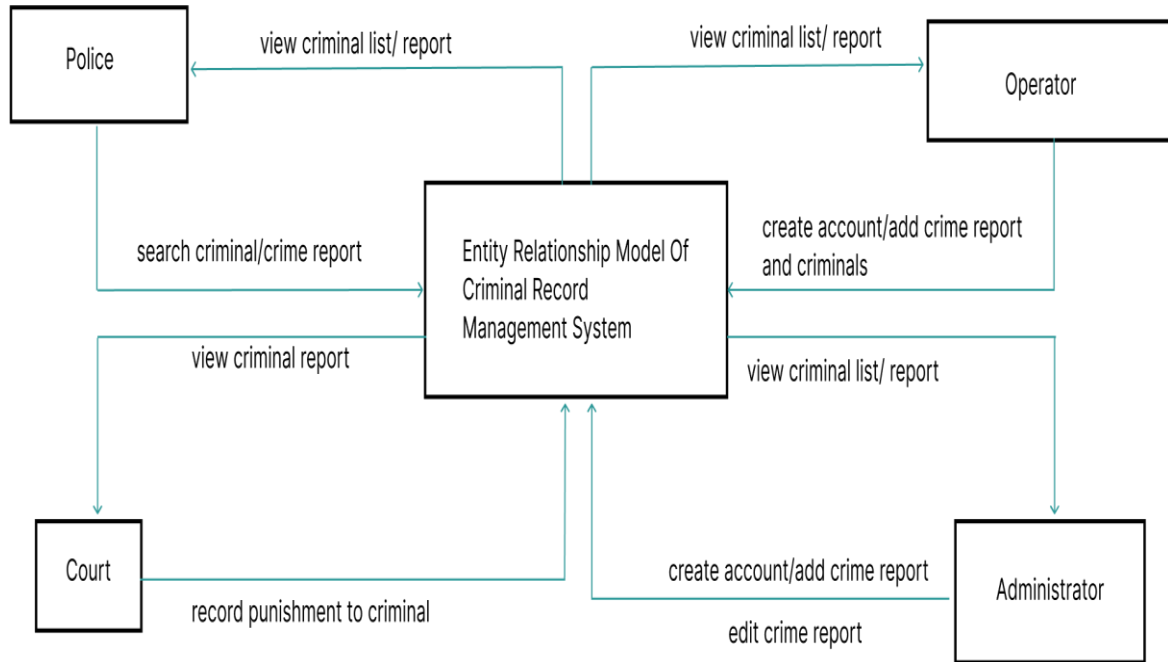
Fig:- 3.2 System Architecture

In this fig 3.2 shown the functionality with the help of systm architecture diagram. This figure shows which type of user have what types of rights while using this system. We develop this system on the basis of waterfall model, which is a part of the SDLC (Software Development Life Cycle

3.1 System Flow Diagram
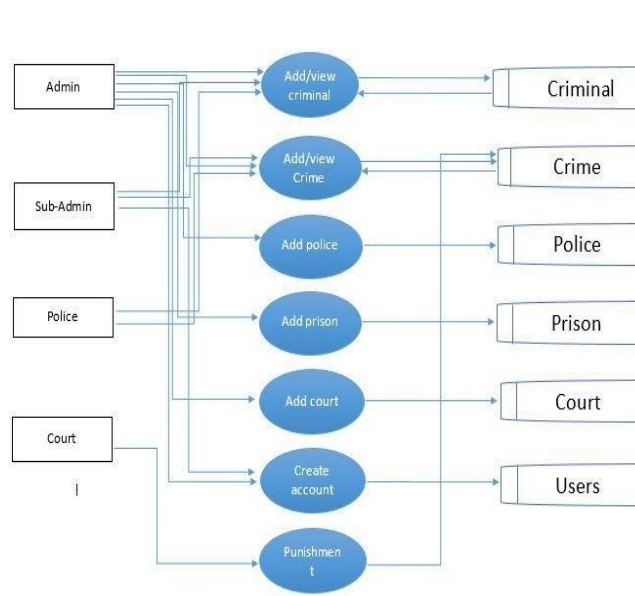
Fig:- 3.3 System Flow Diagram

Data flow gives the information about haw the data is flowing from different parts of the system as the system is being use by the different authorised person.

IV. ADVANTAGES

1) **Enhanced crime prevention:**

Crime management systems provide real-time monitoring and analysis of criminal activities, enabling law enforcement agencies to respond quickly and prevent crimes from occurring.

2) **Improved investigations:**

Crime management systems enable law enforcement agencies to gather and analyze vast amounts of data on criminal activities, making it easier to identify suspects and solve crimes.

3) **Efficient resource allocation:**

Crime management systems enable law enforcement agencies to allocate resources more efficiently by providing real-time information on crime trends and hotspots, enabling agencies to deploy resources where they are needed most.

4) **Increased public safety:**

Crime management systems enable law enforcement agencies to work more effectively and efficiently, resulting in increased public safety and a reduction in crime rates.

5) **Data-driven decision-making:**

Crime management systems provide data and insights that enable law enforcement agencies to make informed decisions and develop effective strategies for preventing and reducing crime.

V. FUTURE SCOPE

1) **Integration with emerging technologies:**

New technologies like artificial intelligence, machine learning, and predictive analytics could help crime management systems by improving their capabilities.

2) **Improved privacy and data protection:**

There is a need for better privacy and data security measures to prevent unwanted access and secure personal information as crime management systems gather and handle massive amounts of sensitive data.

3) **Collaboration between agencies:**

Promoting collaboration and information sharing between different law enforcement departments at the local, national, and international levels could improve crime management systems.

4) **Improved community engagement:**

By involving communities in the crime prevention and reporting process, enhancing public trust, and promoting community safety, crime management systems could become more effective.

5) **Evaluation of system effectiveness:**

The effectiveness of crime management systems in preventing and reducing crime must be regularly evaluated in order to identify areas for improvement.

VI. CONCLUSION

Crime management systems are important instruments for reducing crime rates and improving public safety, to conclude. The use of technology has further enhanced the capabilities of these systems, which offer efficient platforms for tracking, monitoring, and managing criminal activity. Although though crime management systems provide lots of advantages, implementing them can be difficult because of challenges with resource allocation and privacy. But, crime management can become even more successful in preventing and reducing criminal activity by continuously improving these systems and resolving these issues. In conclusion, this review paper emphasizes the important role of crime management systems and the potential for further technology advancements to enhance them, emphasising the need for continued research and development in this field.

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Screen less Display Technology

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ABSTRACT

Screenless display is an emerging new technology, allows users to display and transmit data without the use of a screen or projector has become a good prospect in the near future for a wide range of applications. As the name implies it deals with the display of several things without the use of screens using projector. It involves the following 3 different working principles. The Visual image, Virtual retinal display, Synaptic interface. This mainly illustrates and demonstrates how the screen less displays works and its applications in various fields of science. This technology would bring about the revolution in the field of displays and monitors that are costly, huge and are proven difficult to manage the power requirements and constraints. It is also the futuristic technological innovation. Screenless display is a developing display technology that allows users to display and transmit data without the use of a screen or projector.

Keywords— Image processing, Foot, Hologram, Hand, LCD, Screenless, voice.

I. INTRODUCTION

Screen less display is the present evolving technology in the field of the computer-enhanced technologies. It is going to be the one of the greatest technological developments in the coming future years. Several patents are still working on this new emerging technology which can change the whole spectacular view of the screen less displays. Screen less display technology has the main aim of displaying or transmitting the information without any help of the screen or the projector. Screen less displays have become a new rage of development for the next GEN-X. Screen less videos describe systems for transmitting visual information from a video source without the use of the screen. Screenless Display Technology was such an excellent thought that had come into many experts in order to solve the major problems related to the size of the device. For less space taking screen displays have made the need of Screenless displays more than ever. Screenless, by the word clearly means „no screen". So, Screenless Displays can be defined as a display which helps to display and even transmit any information without the help of screens. There are many types of Screenless display that are under development which are described below-

- Visual Image display
- Retinal Direct display
- Synaptic Interface.

VISUAL IMAGE

Visual Image screen less display includes any screen less image that the eye can perceive as shown in figure . The most common example of Visual Image screen less display is a hologram.

RETINAL DISPLAY

Virtual retinal display systems are a class of screen less displays in which images are projected directly onto the retina as shown in figure . They are distinguished from visual image systems because light is not reflected from some intermediate object onto the retina; it is instead projected directly onto theretina. Retinal Direct systems, once marketed, hold out the promise of extreme privacy when computing work is done in public places because most inquiring relies on viewing the same light as the person who is legitimately viewing the screen, and retinal direct systems send light only into the pupils of their intended viewer.
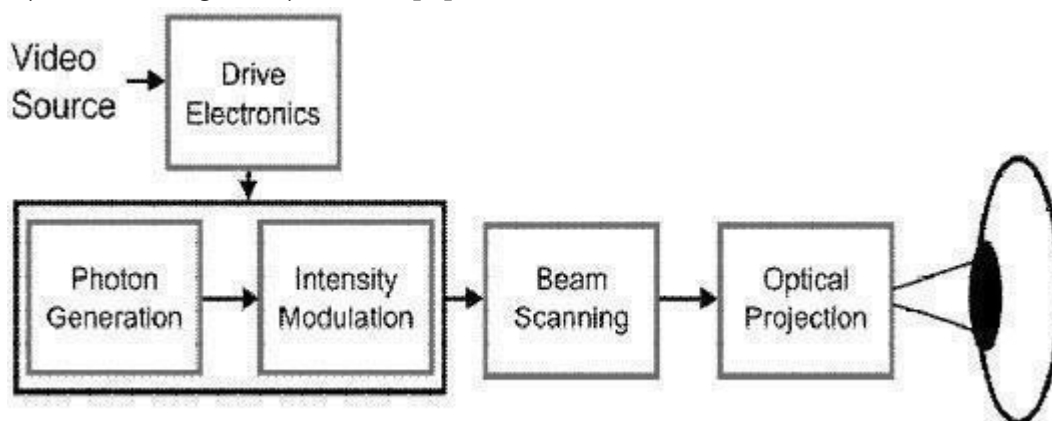
Fig 1 : Block Diagram of Retinal Display

To create an image with the VRD a photon source (or three sources in the case of a color display) is used to generate a coherent beam of light. The use of a coherent source (such as a laser diode) allows the system to draw a diffraction limited spot on the retina.

The light beam is intensity modulated to match the intensity of the image being rendered. The modulation can be accomplished after the beam is generated. If the source has enough modulation bandwidth, as in the case of a laser diode, the source can be modulated directly.

The resulting modulated beam is then scanned to place each image point, or pixel, at the proper position on the retina. A variety of scan patterns are possible. The scanner could be used in a calligraphic mode, in which the lines that form the image are drawn directly, or in a raster mode, much like standard computer monitors or television. Our development focuses on the raster method of image scanning and allows the VRD to be driven by standard video sources. To draw the raster, a horizontal scanner moves the beam to draw a row of pixels. The vertical scanner then moves the beam to the next line where another row of pixels is drawn.

After scanning, the optical beam must be properly projected into the eye. The goal is for the exit pupil of the VRD to be coplanar with the entrance pupil of the eye. The lens and cornea of the eye will then focus the beam on the retina, forming a spot. The position on the retina where the eye focuses the spot is determined by the angle at which light enters the eye. This angle is determined by the scanners and is continually varying in a raster pattern. The brightness of the focused spot is determined by the intensity modulation of the light beam. The intensity modulated moving spot, focused through the eye, draws an image on the retina. The eye's persistence allows the image to appear continuous and stable.

Finally, the drive electronics synchronize the scanners and intensity modulator with the incoming video signal in such a manner that a stable image is formed.

II. SYNAPTIC INTERFACE

Synaptic Interface screen less video does not use light at all.Visual information completely bypasses the eye and is transmitted directly to the brain. While such systems have yet to be implemented in humans, success has been achieved in sampling usable video signals from the biological eyes of a living horseshoe crab through their optic nerves, and in sending video signals from electronic cameras into the creatures' brains using the same method as illustrated in figure 2.3.

Fig 2: Synaptic Interface

III. THE WORKING PRINCIPLE

There are several new emerging ways for the technological development of the working principle of the screen less displays

[4]. Several software's are merging for the GEN-X wonder view. Any computer system that can run the Modoc software can present text that has been set in interactive movable type. Most of the Modoc that are consumed in the next few years will be consumed with conventional personal computers, e-book readers, and other kinds of display and projection devices that are now in use. Very soon it appears to be a new kind of input/output system will facilitate communication and interaction between the computer and the computer user. This new human/computer interface is the telereader terminal. Visual Image is a bitmap manipulation and composition product. Bitmaps can be manipulated independently, in the Image Mode or multiple bitmaps can becomposited Together in the Object Mode to create a "collage".

Visual Image can create and Manipulate images of any size: theonly limitation is the amount of memory resources your systemhas.

Creating Visual Catalog Files

Visual Image gives you the ability to create files in the EYE file format for use in the Visual Catalog program. These EYE files can be used to create catalogs of images in logical sub groupings: for example, you can create a catalog file in the EYE format that lists all images of building materials (brick, concrete, stone, etc.). The File, Export Project command creates an EYE file that refers to all of the images that are currently loaded into Visual

Image. When you select this command, you are prompted to enter a filename for the EYE file that is to becreated. If you have created any image in Visual Image that are not yet saved to disk you will be asked if you wish to include those images in the EYE file and if so, you are prompted to store those images as bitmaps. The File, Exports Editor Command in Visual Image allows you to pack and choosethose image files on disk that you wish to include in a catalog EYE file [5]. When you select File in Export Editor, a file browser appears from which you can choose the image files to include. Use this browser to select images to add to a project file for use in Visual Catalog.

- Additional Software and Hardware Requirements
  1. To facilitate the interactivity
  2. To optimize the user's perceptual and cognitive capabilities
  3. To provide the most healthful visual environment for the user.
  4. Responding to a variety of user commands (using voice, hand, foot, or other signal methods)
  5. Providing blink cues or blinks responses
  6. Modifying output to compensate for changes in user's physiology or reaction time, etc. The new software and hardware will enable the user and the system to better exploit.

IV. APPLICATIONS OF THE SCREENLESS DISPLAY

The main use of the screen less displays are used for the development of the mobile phones which are mainly used by the old and blind people as shown in figure 5.1. This type of the invention of the screen less displays was first done on the mobile phone named OWASYS 2CC. This model is very usefulfor the old, blind, and even for the people with less vision power.

Fig. 3 : Application applied to mobile Technology

Screen less displays technology is also implemented for the development of the screen less laptops. A laptop without an LCD can be a very useful portable solution when connected to CRT or fixed LCD monitors. Laptops without screens would also be a green solution, giving value to donated CRT monitors that would otherwise be heading for landfills. Portability means that volunteers, who don't always have the time to travel topeople's homes, can more easily maintain this computer.

Screenless displays are also widely applicable in the field of the holograms projection. Hologram projection is a result of a technological innovation that truly helps in touch less holographic interfaces. In fact, hologram

projection projects 3D images of so high quality that it feels as if one can touch them. However, holographic projection is still to achieve mass acceptance as until now, conventional holograms, which offer 3D images.

Latest laser technology are also implementing the special technique of the screen less display through the presence of the several 3D scope animation or the screen provides the advantage of being combined with the Laser Valve Video Projector that helps in projecting video images by the use of the laser light instead of the Xenon Arc lamps. Laser technologies have given an edge over the other technologies as the LVP gives the projector an excellent depth in the focus.

Fig 4: Virtual Sceen

Screen less display's major working principle can also be implemented in the emerging of the new screen less TV's. Imagine that watching the TV picture that seems to be magically appearing in the thin air. The picture just floats on in front of the viewer; this would be a latest emerging technology in the future.

V. ADVANTAGES

- **Low power requirements-** Only six diodes are required and a few of a watts to deliver their images to the user's eyes [3].
- **Higher resolution images-** The pixels in the images projected by the diodes can be made smaller than is possible with any CRT or flat panel display, so higher resolution can be achieved. With retinal projectors, the only limitation in the resolution of visual images will be the resolving power of the users' eyes.
- **Greater portability-** The combination of diodes, lenses, and processing components in a retinal projector system will weigh only a few ounces.
- **Wider angle of view-** Retinal projectors will be able to provide a wider field of view than is possible with display screens.
- **More accurate color-** By modulating light sources to vary the intensity of red, green, and blue light, retinal projectors can provide a wider range of colors – and more fully saturated colors – than any other display technology.
- **Greater brightness and better contrast-** Retinal projectors can provide higher levels of contrast and brightness than any other display system
- **Ability to present 3D images-** With their capability of presenting high definition image-pairs, retinal projectors can deliver the most highly realistic stereoscopic movies and still pictorial images to them users.

- **Ability to present far-point images-** The human visual system is a far-point system. With today's desktop and laptop computers users must employ their near- point vision. The excessive use of our near- point vision in using computers, reading, sewing, playing video games, etc., is making myopia avery common impediment. The use of the far-point images that can be provided by retinal projector systems could reduce the incidence of myopia and, hence, the growing need for and use of eyeglasses see figure 10.

- **Lower costs-** The present cost of retinal projector systems is high. Nevertheless, there are no hard-to-overcome manufacturing problems in mass-producing and low- cost components, so inexpensive systems will soon become available. Environmental and disposal costs of these tiny delivery devices will also be minimal because toxic elements such as lead, phosphorus, arsenic, cadmium, and mercury are not used in their manufacture [4].

VI. DISADVANTAGES

The principle disadvantage is that Virtual retinal display (VRD) is not yet available in the significant number. Prototypes and special experimental models are now being built, but their cost per unit is high.

The VRD technology is still under progress and development.

VII. FUTURE ENHANCEMENTS

For the future development of this emerging new technology, several researches are being conducted and the several renowned IT sector companies and other best labs present in the world are handling over the project of screenless displays.

Microsoft in 2001 began the work on an idea for an Interactive table that mixes both the physical and the Virtual worlds.

Multi touch is a human computer interaction technique and the hardwires devices that implement it, which allows users to compute without conventional input devices.

CUBIT is being developed for the future use of the multi touch use of the program.

Development of the enhancement of the micro vision also gives the improved and the futuristic view of the screen less displays. This technology of the micro vision is the very well useful in the Artificial Retinal Display properties.

Japanese scientists have invented the pair of intelligent glasses that remembers where people last saw their keys, handbags, iPod, and mobile phones.

Smart Google is developing the compact video camera which films everything the wearer looks at the information what the viewer wants will be directly being seen in through the glasses where there is no screen or projector present.

Several laboratories are working under progress on the electron beam lithography which includes the

advanced enhancement of the futuristic screen less display.

Adobe systems are also working out for the development and deployment cross platform of the several applications which are to be viewed without the actual screen.

VIII.   CONCLUSION

The paper has elaborately discussed screenless displays which is one of the most emerging computer technologies and has become a new exciting rage for the upcoming generations as a field of the futuristic technology. Due to the ability of having several advantages which are involved in the making, designing, coding of the screen less, this needs plenty of knowledge and process for the development is still under the improvement. May be in the future the world may be dominated with the screen less display technologies and this enriches the world of technological empowerment in the fieldof the computer technology. Screenless displays promise the cost effective aspect and also brighter future in the computer technology [7].

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Student Information System by Using Blockchain

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ABSTRACT

Now a days, student information system is very important to keep records of the student as all data is stored online. Also, in literature we have studied more models related to this system. But, using this system is little bit different of having the transparency in the data of students that can be viewed by faculty. In this paper, Student Information System by Using Blockchain is proposed. The system contains the user interface created by using react and the smart contract which works important for the student information system is created by using the solidity language which runs on the Ethereum platform. In this paper, we have tried to implement the system which can be useful for colleges to store students' information more secure and transparent.

Keywords—Blockchain, Ethereum, Smart Contract, Secure, Student Information System

I. INTRODUCTION

Education has undergone huge changes, from traditional classrooms to eLearning, and now we have moved on to blended learning. The COVID-19 pandemic has accelerated the adoption of digital education, and schools around the world have started using online platforms and learning management systems (LMS) to teach students. Blockchain technology is also poised to revolutionize the education industry. Blockchain has the potential to change the way academic data is managed and how teachers and students interact[1].

There are many students' information system present. But, in this model it is different as it provides more enhanced security and for the storage of data there is no limit. As there are numerous solutions for the most emerging student information system that will be able to deal with various challenges trying to adopt digital solutions for keeping records[4]. By doing a study on this existing model what can we do is to find the solution we can use blockchain technology for developing our system. The main objective of doing this is to provide the security, transparency, efficiency, and cost effectiveness for this system. A student information system is useful for university/educational institute administrators, professionals, and executives to analyze and focus processes and performance on domain stakeholders. Prevailing research on blockchain design has demonstrated the potential security of information in a decentralized ledger form. The researcher would like to study the blockchain based system more specifically the Student Information System and explore the mechanism, implementations, and some interesting findings of various researchers [2]. This one can consider designing a new framework addressing the limitations of existing systems and tracing the desired gap. Thus, preliminary research will help with the design of the framework and the identification of elements [2].

II. BLOCKCHAIN

Blockchain is the database of transactions that is updated and shared across many computers in a network. Each time a new set of transactions is added, it is called a "block" – hence the name blockchain. Most blockchains are public and you can only add data, not remove it. If someone wanted to change any information or cheat the system, they would have to do it on most of the computers on the network[4].

Blockchain store the data in the form of blocks and when the block is mined on one computer the copy of the block gets created on another computer connected to the chain.
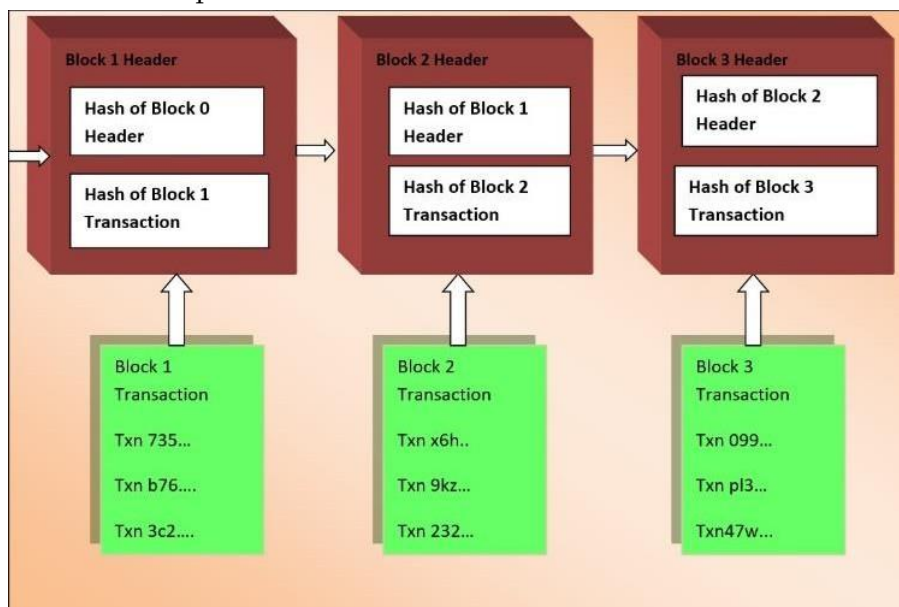
Fig 1. Blockchain

A block is one that contains transaction data and is ready to be connected to the network. A block contains information such as block ID, current hash, previous block hash, message, date, etc. depending on the application. The initial block in the blockchain is known as the Genesis block where the previous hash value of this block will be 0 because it has no previous blocks. The hash of this block will be the previous hash of the next block and so on[5].

This paper elaborates how we can implement blockchain technology in education. Blockchain is proving to be extremely beneficial in the education sector. It enables educational institutions to secure their students' data. They can take ownership of their credentials, awards, certificates, and academic identity. It builds trust and transparency between educators, management, and students. The main advantages of blockchain are decentralized storage, immutability of stored information, traceability, and transparency. The improvements that blockchain technology brings to education could provide opportunities for people from all backgrounds and nations [6].

A. Why Blockchain for student information system?

Blockchain is a technology that enables secure, transparent and decentralized storage of data and transactions. It was originally developed as the underlying technology for cryptocurrencies such as Bitcoin, but its potential applications go far beyond just digital currencies. We can use blockchain in education sector such as developing a student information system by using blockchain. Blockchain can be a useful technology for the Student

Information System (SIS) as it provides a secure and decentralized way to store and manage student data. Here are some of the reasons or benefits why to choose blockchain for developing student information system or to store students' data [2].
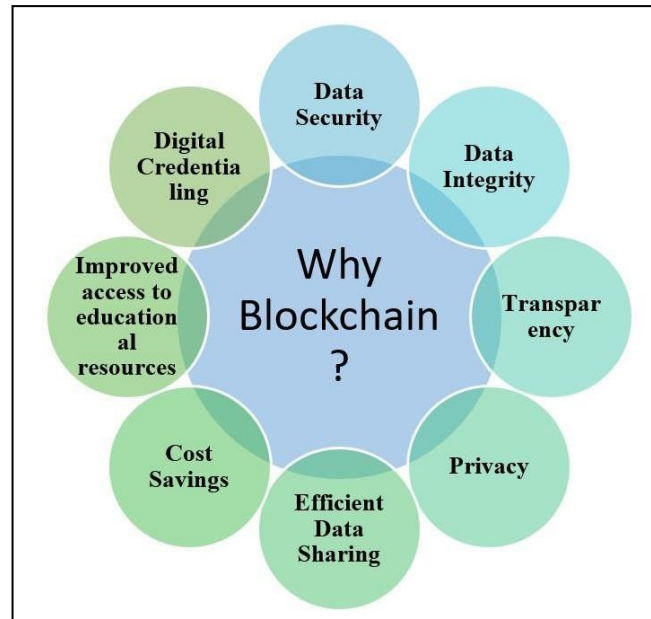
Fig 2. Why Blockchain?

- Data Security: The decentralized nature of blockchain means there is no central point of failure for hackers to target. This makes it much more difficult to steal or manipulate student data.
- Data Integrity: Once data is recorded on the blockchain, it cannot be modified or deleted. This provides a high level of data integrity and ensures that student data is accurate and reliable.
- Transparency: The transparent nature of the blockchain means that all participants can view and audit the data stored on the blockchain. This can help increase trust and accountability in the system.
- Privacy: Blockchain can be designed to ensure that only authorized parties have access to certain types of student data. This can help protect student privacy and comply with data protection regulations.
- Efficient Data Sharing: Blockchain can enable efficient sharing of student data between different organizations (such as schools, universities and employers) while maintaining data security and privacy.
- Cost Savings: By using blockchain to manage educational records, institutions can reduce the administrative costs associated with record keeping and data management.
- Improved access to educational resources: Blockchain can be used to create decentralized educational platforms that allow individuals to access educational resources from anywhere in the world.
- Digital Credentialing: Blockchain can be used to securely store and verify digital credentials such as diplomas, certificates, and transcripts. This can help prevent fraud and ensure that credentials are valid and recognized by employers and educational institutions.

III. STUDENT INFORMATION SYSTEM

Student Information System By using Blockchain is the system which is able to store, access and retrieve the data of student which doesn't have central authority to handle the data. In this paper we have tried to

implement this model to make ease for students and professors also. If any of the professor want to view the information, achievements of the student they can visit the system and just by giving the unique id of the student which is students Aadhar number which is registered during the registration process, the professor or faculty view the details. There are many more options provided in this system we can elaborate them one by one[3].

- Name
- Email
- Address
- Date of Birth
- Parent Name
- Mobile Number
- Parents Mobile Number
- Caste
- Aadhar Number
- 10th Marks
- 12th Marks
- If Diploma
- Results
- Admission Year
- Branch
- Fees Paid
- Scholarship Status
- Achievements
- Other Courses
- Paper Published
- Placements
- Hostel
- If Room
- Bus Facility

This are some common functions available in the student information system. Also, for more clarity student can upload the documents like fees receipts, scholarship form, etc. Also, we have one of the functions that is student can upload files on the system and the faculty is able to view the files.

A student information system using blockchain can provide a secure and transparent platform to manage all the information. Using a distributed ledger, the system can ensure that all stakeholders have access to the same data in real time, which can improve collaboration and communication between students, educators, and other stakeholders. In addition, the use of smart contracts can automate processes and enforce rules, making the system more efficient and reducing administrative burden [6].

A student Information System by using Blockchain has more advantage over traditional Student Information System. As in traditional student information system students' data is stored centrally that is central authority is there. But in the Student information system by using blockchain has the student's data stored in the form of

blocks on each node which is connected to it. Every student needs to have the system on their system for registering themselves.
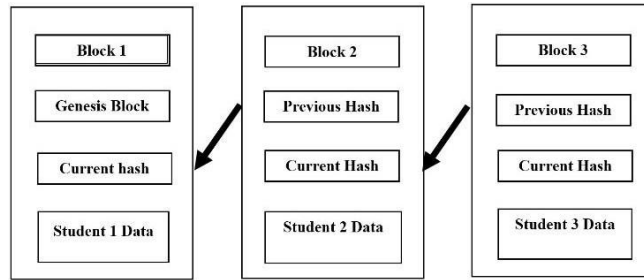
Fig 3. Blocks in Blockchain

A. How Student Information System Works ?

The activity diagram for student information System By using Blockchain elaborates the process of how the system works for the student. First, the student login into the system by using the login credentials. After that the system validates if the student is registered into the system or not. If the student account is not present it is suggested to create an account. After that, creating account directed student to fill the details of the student. After filling details students account is created and student can update the information. Also, the student can upload documents that are necessary or the professor instructed to upload.

A student information system using blockchain is a type of technology that enables secure and transparent management of student data. The system is distributed, meaning it is spread over a network of computers, with each computer (or node) having a copy of the ledger. This provides several benefits, including better security and resiliency because there is no single point of failure, and greater transparency and collaboration because all stakeholders have access to the same data in real time.

A student can handle all information regarding him himself by its own. The professor can only view the student information.
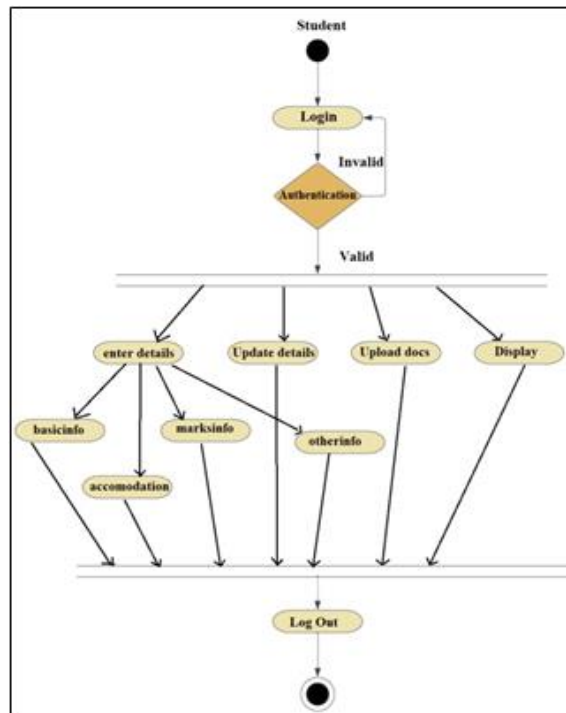
Fig 4. Activity Diagram

Each professor wants to see the information of the student need to visit the system and entering the unique key of the student the professor can view the details of the student. The professor does not have the authority to edit or update the information of the student. The professor can able to view the documents.

A student information system using blockchain offers a more secure and transparent alternative to traditional Student Information System. Instead of all data being stored in one place, blockchain allows data to be stored across multiple nodes, making it much more difficult for malicious actors to manipulate or corrupt data. In addition, the use of cryptography ensures that data is kept private and secure, and smart contracts can be used to automate processes and ensure data is accurate and up-to-date [1].

IV. TECHNOLOGIES USED TO IMPLEMENT SYSTEM

Technologies or platforms used to implement this system are for front end we can use react. In a student information system using blockchain, smart contracts can be used to automate processes like student enrolment, grading, and credential verification. Also, we use Ethereum platform for implementing the system in solidity language.

A. Ethereum Blockchain

Ethereum is a network made up of many communities and a set of tools that allow people to transact and communicate without being governed by a central authority. You don't have to hand over all your personal data to use Ethereum, you are in control of your own data and what is shared. Ethereum has its own cryptocurrency, Ether, which is used to pay for certain activities on the Ethereum network[7].

Ethereum is not controlled by any entity. It exists only through decentralized community participation and collaboration. Ethereum uses nodes (a computer with a copy of the Ethereum blockchain data) operated by volunteers to replace individual servers and cloud systems owned by large Internet providers and services. Smart contracts are simply computer programs living on the Ethereum blockchain. They are only executed when triggered by a transaction from the user (or another contract). They make Ethereum very flexible in what it can do and set it apart from other cryptocurrencies [7].

B. Solidity

Solidity is a programming language used to develop smart contracts on the Ethereum blockchain. Smart contracts are self-starting programs that can automate processes and enforce rules on the blockchain. In a blockchain-based student information system, smart contracts can be used to automate processes such as student enrolment, assessment, and credential verification. Solidity is a programming language used to write smart contracts on the Ethereum blockchain. Smart contracts are self-executing contracts that are stored on the blockchain and are automatically enforced when certain conditions are met. Solidity is used to create these smart contracts, which are used for a wide variety of applications, including decentralized finance (DeFi), supply chain management, voting systems, and more [8].

Solidity is an object-oriented language that is influenced by C++, Python, and JavaScript. It is statically typed, which means that variables must be declared with a specific data type. Solidity also supports inheritance, interfaces, and abstract contracts, allowing developers to create complex and modular contracts. Solidity has a syntax like JavaScript and C++, making it easy to learn for developers who already know these languages. However, Solidity has some unique features that are specific to blockchain development, such as the ability to

process financial transactions and the use of libraries to add additional functionality to smart contracts [8]. This is used to create smart contract for our Student Information System by Using Blockchain.

C. React Js

React is a declarative, efficient and flexible JavaScript library for building user interfaces. It is an open-source component-based front-end library that is only responsible for the display layer of the application. ReactJS is not a framework, it's just a library developed by Facebook to solve some of the problems we faced earlier. React is a declarative, efficient and flexible JavaScript library for building user interfaces. It is a library based on Model-View-Controller (MVC) architecture that plays the role of "V" which stands for view. It designs simple views for every state in your application and responds efficiently by updating and rendering the right component when your data changes. Declarative view makes your code more predictable and easier to debug[9]. React is based on the concept of a virtual DOM (Document Object Model), which allows for efficient user interface updates without requiring a full page reload. This makes it a popular choice for building fast and responsive web applications. React uses a syntax extension called JSX that allows you to write HTML-like code directly into your JavaScript files. It also provides a set of built-in hooks like useState and useEffect that allow you to manage your application's state and handle side effects. React can be used with a variety of other tools and libraries to create a complete front-end development suite, including tools for routing, styling, and state management. Popular tools commonly used with React include React Router, Redux, and Styled Components[9].

D. Hardhat

Hardhat is a development environment for Ethereum software. It consists of various components for editing, compiling, debugging, and deploying your smart contracts and dApps, all working together to create a complete development environment [10]. Hardhat provides the environment to localhost our blockchain. How to use hardhat for creating localhost environment for our blockchain? Hardhat is also integrated with the Hardhat Network, a local Ethereum network designed for development. It allows you to deploy your contracts, run tests, and debug your code.

First, need to install hardhat by using command npm install –save-dev hardhat. After that run the hardhat by using command npx hardhat. This command runs the hardhat in our system and create the environment for our blockchain. By using these commands anyone can create hardhat environment for local blockchain [10].

E. Metamask

MetaMask is a web browser extension and mobile app that allows you to manage your Ethereum private keys. This serves as a wallet for Ether and other tokens and allows you to interact with decentralized applications, or dapps. Unlike some wallets, MetaMask does not store any information about you: not your email address, not your password, not your Secret Recovery Phrase or other private keys.

Users can store and manage their bitcoins, ethers and other cryptocurrencies using a blockchain wallet, which is available as a digital or online wallet. The blockchain wallet enables cryptocurrency transfers, prevents theft of crypto assets, and allows users to convert them back to their local currencies when needed. MetaMask enables to confirm transaction every time to confirm security [11].

F. Web3

Web 3.0 has the potential to be as disruptive and a significant paradigm shift as Web 2.0. The basic ideas of decentralization, openness and increased consumer utility form the basis of Web 3.0. Web 3.0, often known as Web 3, is the next step in the evolution of the Internet. Web 3 library works as to connect the user interface

that is frontend to the backend. Web 3.0 is another turning point in the development of the Internet, allowing it to understand data in a human way. Connecting the web3 to our crypto wallet like MetaMask need to create with web3. Also, need to install ether.js library for connecting the wallet to the web3. First you need to set up web3 provider. Then, after integrate web3 into your frontend by using ether.js like libraries.

V. ADVANTAGES

A student information system by using blockchain have several advantages for using blockchain in student information system.

1) Streamlined Processes: Blockchain can enable the automation of certain processes, such as credential verification and student identity management, which can reduce processing times and improve efficiency.

2) Reduced administrative costs: By using blockchain to manage student records, institutions can reduce the administrative costs associated with record keeping and data management.

3) Enhanced Verification: Blockchain can be used to create tamper-proof records of educational attainment and certifications that can be easily verified by third-party organizations such as employers.

4) Efficient Data Sharing: Blockchain enables efficient sharing of student data between different organizations such as schools, universities and employers, while maintaining data security and privacy.

5) Privacy: Blockchain can be designed to ensure that only authorized parties can access certain types of student data, protecting student privacy and complying with data protection regulations.

6) Transparency: Blockchain provides transparency by allowing all participants to view and audit data stored on the blockchain. This helps increase trust and accountability in the system.

7) Data Integrity: Once data is recorded on the blockchain, it cannot be modified or deleted without the network's consent. This ensures that student information is accurate and reliable.

8) Security: Blockchain provides a high level of security by encrypting data and storing it in a decentralized network. This makes it difficult for unauthorized parties to access or modify student information.

This are the advantages of blockchain for student information system [3].

VI. RESULT
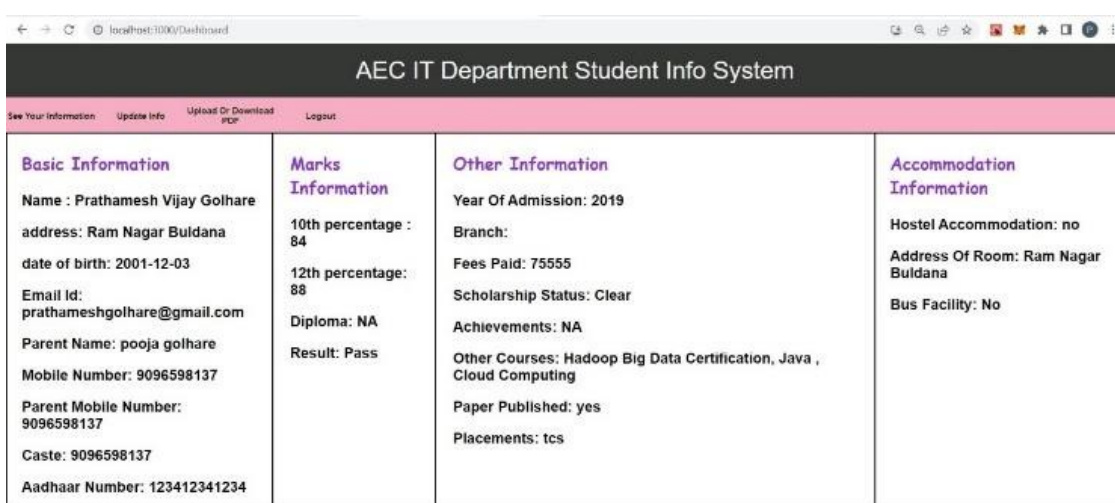
Fig 5. Displaying Student Information

Student Information System displays the student's information as a result. This is students' information displays for student and professor.

VII.   CONCLUSION AND FUTURE VISION

A student information system using blockchain provides numerous benefits to universities, such as improved accessibility, collaboration, efficiency, data security and decision-making. It enables students, faculty, and staff to access information from anywhere, anytime, using any Internet-connected device, and automates many routine administrative tasks, saving time and reducing errors. In addition, this system can improve collaboration between different departments and stakeholders, facilitate transparency, and provide real-time data and analytics to enable informed decision-making. When a student information system is based on blockchain technology, it provides additional benefits such as improved data integrity, transparency, security, empowerment, more efficient processes, and reduced costs. It ensures the accuracy and reliability of student records, provides a transparent and auditable system for managing student information, and enables students to own and access their own records.

A student information system by using blockchain can be integrated with emerging technologies such as artificial intelligence, machine learning, and the Internet of Things (IoT) to create a more intelligent and responsive student information management system. A student information system using blockchain can include more advanced privacy and security features such as multi-factor authentication, zero-knowledge proof, and homomorphic encryption to further protect sensitive data and prevent unauthorized access.

One of the future scope of this model is A blockchain- powered student information system can provide more personalized and customized learning experiences by leveraging data analytics and machine learning to better understand individual student needs and preferences and provide tailored recommendations and feedback.

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Machine Learning and Python Talkbot

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ABSTRACT

The chatbot is designed to simulate a conversation with a human user. It is built using the Python programming language and several libraries, including the Natural Language Toolkit (NLTK) and Keras. The NLTK library provides tools for natural language processing, including tokenization and lemmatization, while Keras is a high-level neural network API. To train the chatbot, a dataset of predefined intents and their corresponding responses is needed. This dataset is usually in the form of a JSON file, which contains a collection of intents, each of which has a set of training phrases and a list of responses. For example, an intent might be "greetings", with training phrases like "hello", "hi", and "how are you?", and possible responses like "Hello there!", "Hi, how can I help you?". The model reads in the intents and their corresponding training phrases and responses, and learns to associate each intent with the appropriate response. During training, the model uses bag of words and lemmatization techniques to generate probabilities for each possible intent based on the user input. To interact with the chatbot, a user enters text into a graphical user interface (GUI) that has been created using the Tkinter library. The input is then processed by the model, which generates a response based on the most likely intent. The response is then displayed in the GUI for the user to read. Overall, this chatbot project demonstrates how natural language processing and machine learning techniques can be used to create a program that simulates human conversation. The use of a GUI makes the chatbot more user-friendly and accessible, and the ability to customize the intents and responses allows the chatbot to be tailored to specific use cases or industries.

Keywords— Natural Language Processing (NLP), Python NLTK (Natural Language Toolkit), TensorFlow, Keras, GPT (Generative Pre-Trained Transformer), Neural Network)

I. INTRODUCTION

The chatbot is designed to simulate human conversation using Python programming language and libraries such as NLTK and Keras. NLTK provides tools for natural language processing, while Keras is used for building neural networks. The chatbot is trained on a dataset of predefined intents and their responses in a JSON file format. Each intent has training phrases and possible responses. During training, the model uses bag of words and lemmatization techniques to generate probabilities for each intent based on user input. The chatbot has a graphical user interface (GUI) created using the Tkinter library for user interaction. The user enters text into the GUI, which is processed by the model to generate a response based on the most likely intent. The response is displayed in the GUI for the user to read. The chatbot's intents and responses can be customized for specific use cases or industries, making it adaptable to different scenarios. This project demonstrates the use of natural language processing and machine learning to create a user-friendly chatbot with a GUI. To interact with the

chatbot, a graphical user interface (GUI) is created using the Tkinter library. The GUI allows users to input text and receive responses from the chatbot in a visually appealing and user-friendly manner. Users can type their queries or statements into the GUI, and the input is processed by the model to determine the most likely intent. The chatbot then generates a response based on the selected intent and displays it in the GUI for the user to read.

One of the strengths of this chatbot project is its flexibility and customization. The intents and responses can be easily customized to suit specific use cases or industries. For example, in a customer service scenario, the intents may include "complaints", "product inquiries", and "returns", with corresponding responses tailored to address those specific issues. This customization allows the chatbot to be adapted for various scenarios and industries, making it a versatile tool for different applications. This chatbot project demonstrates the application of natural language processing and machine learning techniques in creating a user-friendly chatbot with a graphical user interface. The use of NLTK and Keras libraries enables the model to process user input, determine intents, and generate appropriate responses. The customization of intents and responses allows the chatbot to be tailored for specific use cases, making it adaptable to various scenarios and industries. The graphical user interface enhances the user experience and makes the chatbot more accessible to users.

II. LITERATURE REVIEW

The literature survey on building a chatbot using NLTK and Keras reveals that these two libraries are widely used for natural language processing and deep learning tasks, respectively.[1] NLTK provides a range of tools and coffers for tasks similar as tokenization, stemming, tagging, parsing, and semantic logic. It is used for building Python programs to work with human language data.[2] On the other hand, Keras is a high-level neural network API that provides a high-level API for building and training deep learning models.[3] It is used for tasks such as image classification, object detection, speech recognition, and natural language processing. The chatbot is trained using a dataset of predefined intents and their corresponding responses in the form of a JSON file. The model reads in the intents and their corresponding training phrases and responses, and learns to predict the intent of a message and select a response from the list of responses associated with that intent in the JSON file.[4] The chatbot can be integrated into a graphical user interface (GUI) for user interaction using a Python GUI library such as Tkinter, PyQt, or wxPython. , which provides tools for creating windows, buttons, input fields, and other graphical elements to design a user-friendly interface for the chatbot.[5]. Other common approaches for building chatbots include rule-based systems, sequence models (such as LSTM or GRU), and transformer-based models (such as BERT or GPT). Rule-based systems involve defining rules or patterns to match user inputs and generate responses, but may lack the ability to handle complex language understanding and generation tasks. Sequence models and transformer-based models, on the other hand, are capable of capturing contextual information and generating more coherent and contextually relevant responses, but may require larger datasets and more computational resources for training.[6]

In addition to NLTK and Keras, there are other popular libraries and tools available for building chatbots, such as spaCy, TensorFlow, PyTorch, and Dialogflow. spaCy is another powerful natural language processing library that provides tools for tasks such as tokenization, named entity recognition, and dependency parsing.[7] TensorFlow and PyTorch are popular deep learning frameworks that offer flexibility and scalability for building complex neural network models.[8] Dialogflow, on the other hand, is a cloud-based platform that provides

natural language understanding and conversation management capabilities for building chatbots and virtual assistants.[9]

When building a chatbot, it's important to consider ethical and legal considerations, such as data privacy, security, and fairness. Chatbots may handle sensitive user information, and proper measures should be taken to protect user privacy and data security. Additionally, chatbots should be designed to be unbiased and fair, avoiding any discriminatory behavior or biased responses.[10]

In conclusion, building a chatbot using NLTK and Keras, along with a graphical user interface (GUI) library, can be a powerful approach for creating a conversational agent. However, it's important to consider other popular libraries, tools, and ethical considerations when choosing the best approach for your specific chatbot application. Conducting a thorough literature survey and understanding the strengths and limitations of different techniques can help in building an effective and user-friendly chatbot.

III. PROPOSED SYSTEM

Proposed system for building a chatbot using NLTK and Keras, along with a graphical user interface (GUI) library:

➤ Data Collection: Gather a dataset of predefined intents and their corresponding responses. This dataset will be used for training the chatbot model. The dataset can be in the form of a JSON file, where each intent is associated with a list of training phrases and responses.

➤ Data Preprocessing: Use NLTK to preprocess the training data. This may involve tasks such as tokenization, stemming, and converting text into a bag-of-words representation. NLTK provides various functions and tools for these preprocessing tasks.

➤ Model Training: Use Keras to build and train a deep learning model for text classification. The model should take the bag-of-words representation of the input message as input and predict the intent of the message. The model can be trained using the training data collected in the previous step. The trained model can be saved as a file, such as 'chatbot_model.h5', for later use.

➤ GUI Integration: Choose a GUI library, such as Tkinter, PyQt, or wxPython, to integrate the chatbot into a graphical user interface. The GUI should provide an input field for the user to enter messages and a display area for the chatbot's responses. The GUI can also include buttons or other elements for user interaction, such as sending messages, clearing the chat history, etc.

➤ User Interaction: When a user enters a message in the GUI, the input text can be passed to the chatbot model for intent prediction. The model can use the bag-of-words representation of the input text to predict the intent of the message. Based on the predicted intent, the chatbot can select a random response from the list of responses associated with that intent in the JSON file.

➤ Response Generation: Once the intent is predicted and a response is selected, the chatbot can display the response in the GUI's display area. The response can be generated using the selected response text from the JSON file, and can be displayed in the GUI using the appropriate GUI library functions.

➤ Error Handling: Implement appropriate error handling mechanisms in the GUI and the chatbot model to handle cases where the input text is not recognized or the intent cannot be predicted with high confidence. This may involve displaying error messages, asking for clarifications, or providing default responses.

- Deployment: Once the chatbot is fully implemented and tested, it can be deployed on a suitable platform, such as a local machine, a server, or a cloud-based service, depending on the requirements and resources of the project.
- Maintenance and Enhancement: Regularly monitor and maintain the chatbot system to ensure its smooth functioning. Continuously improve and enhance the chatbot by updating the training data, retraining the model, and incorporating new intents and responses as needed.

Enhancing the capabilities of a chatbot involves several key aspects. First, intent recognition can be improved by leveraging advanced natural language processing (NLP) techniques such as word embeddings, named entity recognition, and part-of-speech tagging. These techniques enable the chatbot to better understand the meaning and context of user queries. Second, response customization can be achieved by extracting relevant information from user input using NLP techniques such as entity extraction and sentiment analysis, allowing the chatbot to provide personalized and relevant responses. Third, maintaining context-aware conversations is crucial for a natural interaction, and the chatbot can achieve this by storing and updating conversation history, including user input, responses, and intent predictions. Fourth, collecting user feedback and incorporating it into the model can continuously improve the chatbot's performance. Fifth, error handling and fallback responses should be implemented to handle cases where the intent is ambiguous or uncertain, ensuring smooth interactions. Sixth, multilingual support can be extended by incorporating multilingual NLP techniques such as language detection and translation. Seventh, integration with external APIs can enhance functionality by allowing the chatbot to access real-time information or perform specific tasks. Eighth, ensuring security and privacy of user data through encryption, authentication, and compliance with data protection regulations is essential. Ninth, thorough testing and debugging procedures should be implemented to identify and fix any issues or bugs in the system. Lastly, comprehensive documentation and user support resources should be provided to assist users in interacting with the chatbot and resolving any issues they may encounter, ensuring a user-friendly experience.This proposed system provides a high-level overview of the steps involved in building a chatbot using NLTK and Keras, along with a GUI library for user interaction. The actual implementation details may vary depending on the specific requirements and resources of the project.

IV. FEASIBILITY STUDY

The chatbot project aims to develop a conversational agent that simulates human conversation using Python programming language, NLTK and Keras libraries, and a graphical user interface (GUI) created with Tkinter. The chatbot will be trained on a dataset of predefined intents and their corresponding responses in a JSON file format. The goal of the feasibility study is to assess the viability and potential success of the chatbot project, taking into consideration various aspects such as technical, economic, operational, legal, and scheduling factors.

- Technical Feasibility:

The technical feasibility of the chatbot project will be assessed based on the availability of required resources and technologies. The project requires expertise in Python programming language, as well as knowledge of natural language processing (NLP) techniques and neural networks using Keras. The availability of the NLTK and Keras libraries, which are widely used and well-documented, makes the project technically feasible. Additionally, the availability of a dataset of predefined intents and responses in a JSON file format is crucial for

training the chatbot model. The development of a GUI using Tkinter is also technically feasible, as Tkinter is a standard GUI library for Python.

➢ Economic Feasibility:

The economic feasibility of the chatbot project will be evaluated based on the cost and benefits associated with its development and implementation. The project requires resources such as hardware, software, and human expertise. The cost of hardware and software will depend on the existing infrastructure and tools available. The cost of human expertise will depend on the skills and experience of the development team. Additionally, there may be ongoing costs for hosting and maintaining the chatbot, as well as potential costs for updates and improvements. The benefits of the chatbot project include increased efficiency in handling user queries and reducing the need for human intervention in certain scenarios. The potential benefits can be measured in terms of improved customer service, cost savings, and increased user satisfaction. Conducting a cost-benefit analysis will help determine the economic feasibility of the project.

➢ Operational Feasibility:

The operational feasibility of the chatbot project will be assessed based on its compatibility with existing systems and processes. The chatbot will need to integrate with the existing Python environment, NLTK and Keras libraries, and the Tkinter GUI. It should also be compatible with the dataset of predefined intents and responses in a JSON file format. The operational impact of the chatbot on existing workflows, user interactions, and system performance needs to be considered. The training and deployment process of the chatbot should be feasible in terms of time and resources. Adequate training data and resources should be available to train the model effectively. The operational feasibility of the project will also depend on the availability of necessary data and infrastructure for hosting and maintaining the chatbot.

➢ Legal Feasibility:

The legal feasibility of the chatbot project will be assessed based on the compliance with relevant laws, regulations, and ethical considerations. The chatbot should adhere to data privacy and security regulations, such as General Data Protection Regulation (GDPR), and ensure that user data is handled securely. The use of predefined intents and responses should comply with copyright and intellectual property laws. The chatbot should also adhere to ethical considerations, such as avoiding bias and discrimination in responses. It is important to ensure that the chatbot does not engage in any illegal activities or violate any legal or ethical standards during its operation.

➢ Scheduling Feasibility:

The scheduling feasibility of the chatbot project will be assessed based on the timeline and resources required for its development and implementation. The project timeline should be realistic, taking into consideration the time required for training the model, developing the GUI, testing, and deployment. The availability of skilled personnel, hardware, and software resources should be considered to ensure that the project can be completed within the expected.

V. CONCLUSION

In conclusion, the chatbot project demonstrates the application of natural language processing and machine learning techniques to create a user-friendly chatbot with a graphical user interface. The use of NLTK and Keras libraries enables the model to process user input, determine intents, and generate appropriate responses.

The customization of intents and responses allows the chatbot to be tailored for specific use cases, making it adaptable to various scenarios and industries. The graphical user interface enhances the user experience and makes the chatbot more accessible to users. The project also highlights the importance of data preparation and training in the development of a chatbot. The dataset of predefined intents and their corresponding responses is crucial for training the model to understand and respond appropriately to user input. The use of bag of words and lemmatization techniques improves the accuracy of the model by generating probabilities for each intent based on the user input. Future work for the chatbot project could include integrating it with other technologies such as voice recognition or sentiment analysis to enhance its capabilities. Additionally, the chatbot's intents and responses could be further customized and expanded to improve its effectiveness in specific scenarios or industries.

VI. FUTURE SCOPE

The chatbot project has a promising future scope with potential enhancements in NLP techniques, integration with other platforms, machine learning for continuous improvement, multilingual support, personalization and user profiling, integration with backend systems, voice and speech recognition, conversational flow management, analytics and insights, and customization for specific industries or use cases. These future enhancements would further improve the functionality, usability, and effectiveness of the chatbot, providing a valuable tool for businesses and users to enhance their interactions and experiences.

➢ Enhanced NLP Techniques: As natural language processing (NLP) techniques continue to evolve, there is potential for incorporating more advanced NLP techniques into the chatbot project. This could include sentiment analysis, entity recognition, and language generation, which would allow the chatbot to better understand and respond to user queries in a more nuanced and personalized manner.

➢ Integration with Other Platforms: The chatbot can be integrated with other platforms, such as social media, websites, and mobile apps, to provide a seamless and consistent user experience across different channels. This would enable users to interact with the chatbot through their preferred platform and expand the reach of the chatbot to a wider audience.

➢ Machine Learning for Continuous Improvement: The chatbot can be further trained and improved using machine learning techniques, such as reinforcement learning, to continuously optimize its responses and learn from user interactions. This would allow the chatbot to become more intelligent and provide more accurate and relevant responses over time.

➢ Multilingual Support: Expanding the chatbot's capabilities to support multiple languages would increase its usability and accessibility for users from different regions and language backgrounds. This could involve training the chatbot with multilingual datasets and incorporating language-specific NLP techniques.

➢ Personalization and User Profiling: Implementing user profiling and personalization techniques would enable the chatbot to tailor its responses based on individual user preferences, past interactions, and demographic information. This would result in a more personalized and engaging user experience.

➢ Integration with Backend Systems: Integrating the chatbot with backend systems, such as customer relationship management (CRM) or enterprise resource planning (ERP) systems, would enable the chatbot to access and retrieve information from these systems, providing users with real-time and accurate information.

➢ Voice and Speech Recognition: Incorporating voice and speech recognition capabilities would allow users to interact with the chatbot using voice commands, making it more convenient and user-friendly for users who prefer voice-based interactions.

➢ Conversational Flow Management: Implementing advanced conversational flow management techniques, such as context-aware conversations and multi-turn conversations, would enable the chatbot to engage in more dynamic and meaningful conversations with users, leading to a more natural and intuitive user experience.

➢ Analytics and Insights: Incorporating analytics and reporting capabilities would allow for tracking and analyzing user interactions with the chatbot, providing valuable insights into user behavior, preferences, and needs. This would enable continuous improvements and optimizations of the chatbot's performance.

➢ Customization for Specific Industries or Use Cases: The chatbot can be customized to cater to specific industries or use cases, such as customer support, e-commerce, healthcare, or finance, by tailoring the predefined intents and responses to the specific domain and requirements of the industry or use case.

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Unfold Events

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ABSTRACT

Event management system is an application to manage and arrange events. The proposed work involves the study of identifying the target of budget cost and analysis. The aim of this paper is to discuss the services that will provide quality in the process of event management. Our goal is not only to provide quality but also to make it customized. One can plan and customize the event according to their theme and ideas, which they can use to make their moment more special and memorable. The event is planned and presented as per once budget and likings. The proposed system will provide searching facilities based on various factors such as event booking, venue package and other factors. This system aims to use Android applications to effectively manage all phases of the event management process. This project intent to alleviate the problem of traditional event managing processor such as lots of paper work, or long queue at the registration desk. The main objective of this service is to provide users with the possibility to create any event they desire and to invite other users.
Keywords: Event management, android, customized services.

I. INTRODUCTION

The Unfold Events app is suitable for a wide range of events, from weddings and partiesto corporate events and conferences. The app's user-friendly interface, payment gateway, and event manager features make it easy for users to plan and book events, while the other features provide a comprehensive event planning solution. The app is available on both iOS and Android platforms and is free to download. Users can book events and pay for them through the app, making the process of event planning fast, efficient, and stress-free. The traditional method of event planning involved a lot of effort and coordination, with event planners having to contact different vendors and suppliers to get quotes for various aspects of the event. This method was not only time-consuming but also involved a lot of back-and-forth communication [1]. In addition, it was difficult to keep track of all the different vendors and their quotes, which often led to confusion and errors. Unfold Events app's vendor management system ensures that the event is executed seamlessly. The app assigns an event manager who is responsible for coordinating with vendors and suppliers, keeping you updated every step of the way. The app's real-time notification system keeps you informed about the progress of your event planning, allowing you to make informed decisions and providing you with peace of mind. The Unfold Events app is an innovative solution to the problem of event planning. The app provides a comprehensive solution for event planners, from weddings and parties to corporate events and conferences. The app's user-friendly interface, payment gateway, and event manager features make the process of booking an event stress-free. Food related issues and proper management.

II. LITREATURE SURVVEY

Event planning is a complex and challenging task that involves multiple stakeholders and requires careful coordination and management. In recent years, the use of technology in event planning has become increasingly prevalent, with the emergence of event planning software, mobile apps, and online platforms. These tools offer a range of features and functionalities that can streamline the event planning process, increase efficiency, and improve the overall user experience. One study by Li et al. (2018) investigated the use of mobile event planning apps and their impact on user satisfaction. The study found that mobile apps significantly improved user satisfaction and reduced the time and effort required for event planning. The study also highlighted the importance of app features such as real-time communication, personalized recommendations, and vendor selection, in enhancing the user experience. Another study by Xiang et al. (2015) examined the role of social media in event planning and its impact on user engagement [2]. The study found that social media platforms such as Facebook and Twitter were effective tools for promoting events, generating user interest, and increasing attendance. The study also highlighted the importance of user-generated content and peer recommendations in influencing user behavior and shaping the success of an event.

III. PROBLEM STATEMENT

Every Organization, whether big or small, has challenges to overcome and managing every event [1].
Solution- Management System has different event needs, so we design exclusive Event Management System. This is designed to assist in strategic planning, and it will help to ensure that your organization is equipped with the right level of information and details of your future goals. Also for those busy executive who are always on the go, Our system come with remote access features, which will allow you to manage your workforce anytime. This system will ultimately allow you to better manage resources [3].

IV. TECHNOLOGIES USED

The Unfold Events app will be developed using the following technologies:
- Front-end: XML, Android Studio, Java
- Back-end: SQLite

Overview of technologies used:
A. **Front End:**
a) **XML:** XML (Extensible Markup Language) is a markup language that is used to design user interfaces in Android apps. It is a language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable. In Android app development, XML is used to create the user interface (UI) of an app. The user interface consists of a collection of layouts, views, and widgets that are arranged to form the overall look and feel of the app[5].
b) **Java:** Java is a programming language that is used in Android app development to implement the business logic layer of the app. It is a class-based, object-oriented language that is designed to be portable and

platform-independent. In the Unfold Events app, Java is used to implement the functionality of the app, such as event booking, payment processing, and event management [6].

B. **Back-End:**

a) **SQLite:** SQLite is a popular open-source relational database management system that is widely used in mobile app development, including in the development of the Unfold Events app. It is a lightweight and efficient database system that is designed to be embedded within an application, which makes it an ideal choice for mobile app development. SQLite provides a number of key features that make it a powerful tool for managing data within an app [7]. These include:

- Relational Database Management: SQLite is a relational database management system, which means that it organizes data into tables that are linked by common fields.

b) **Android Studio:** Android Studio is an integrated development environment (IDE) created specifically for developing applications for the Android operating system. It is the official IDE for Android app development, and it is developed and maintained by Google. Android Studio provides a comprehensive set of tools for building Android apps, including a code editor, visual layout editor, project management tools, debugging tools, and a variety of other features to help developers create high-quality, performant apps for Android devices. Overall, Android Studio is a powerful and feature-rich tool that helps developers create high-quality Android apps quickly and efficiently [8].
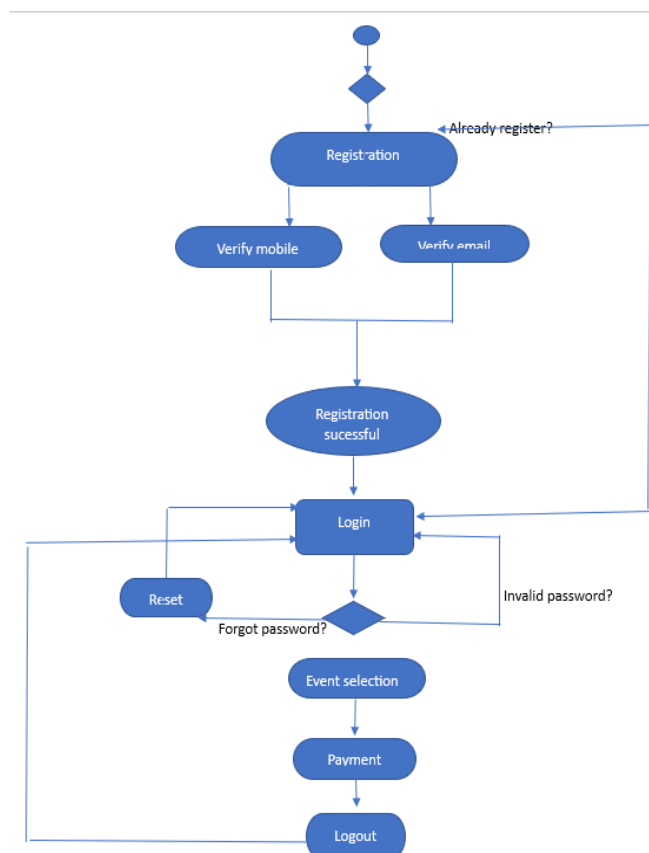
V. ACTIVITY DIAGRAM

Fig. 1. Activity Diagram

The above diagram explains the basic flow and interface of the application.

- As it starts from the user sign up page, firstly the user needs to sign up by entering his basic details such as name number email address and password.
- After sign up the user can login by entering the mail and password
- After login the user can go to the book event button and after that the user can select the event type.
- After selecting the event type, the user needs to fill the event details such as number of guests, budget, food, venue, date etc.
- Further the payment is done by entering the account details.
- And then you are assigned with the coordinator who will further co-ordinate with you for further communication.
- You can see your booking details by clicking on the booking detail buttons which will show all the booking details.
- You can even cancel your event by clicking on the cancer event button.

VI. RESULT AND OUTCOME

The working of Unfold Events app can be divided into the following steps:

1) **Registration:** First, the user needs to create an account on the app by providing theirbasic information such as name, email address, and phone number. Once the account is created, they can log in to the app.

2) **Event Selection:** After logging in, the user can search for events based on their preferences such as location, type of event, and budget. They can browse through the list of available events and select the one they want to plan.

3) **Planning Details:** Once the user selects an event, they need to provide the details such as the date of the event, number of guests, preferred food type, and venue. They also need to specify their budget for the event.

4) **Event Manager:** The app connects the user with an event manager who will plan the event according to their preferences and budget. The event manager will suggest different options for the user to choose from such as venue, catering, decorations, etc.

5) **Budget Management:** The event manager will keep the budget in mind while planning the event and will suggest options that fit within the user's budget. They will also provide regular updates to the user regarding the expenses incurred during the event planning process.

6) **Payment:** Once the event planning is complete, the user can make the payment through the app. They can choose to pay online or through other payment options available on the app.

7) **Event Execution:** On the day of the event, the event manager will oversee the execution of the event and ensure that everything goes smoothly. They will coordinate with the vendors and ensure that the user's requirements are met.

8) **Cancellation:** In case the user needs to cancel the event, they can do so through the app. The event manager will provide information regarding the cancellation charges and refund policy.

9) **Improved event planning and execution:** By providing users with tools to manage guest lists, budget, and logistics, the application can help ensure that events run smoothly and meet the needs of all stakeholders.

10) **Stronger vendor relationships:** By serving as a reliable and efficient platform for event bookings, the application can strengthen relationships with vendors and lead to more successful partnerships.

Overall, the Unfold Events app provides a hassle-free and convenient way for users to plan and execute events. By connecting them with experienced event managers, the app ensures that the user's requirements are met, and the event is executed smoothly[4].
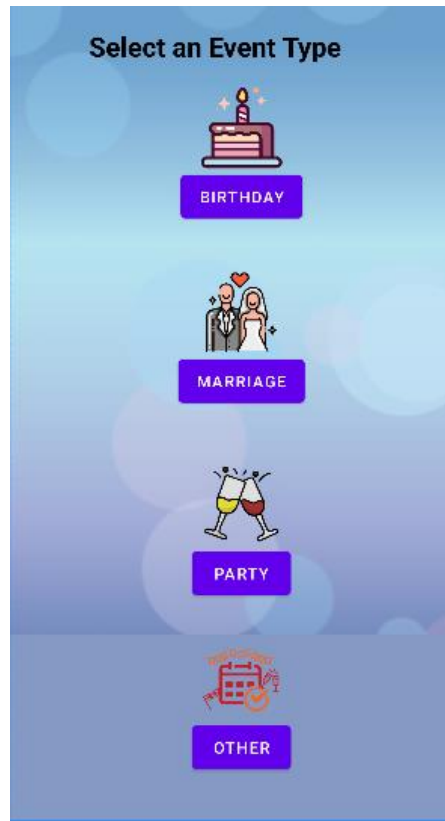
Fig. 2. Select Module

VII.   FUTURE SCOPE

Future scope of Event Management is very high as even also events will be organized. Many people want to rest and peace during their events so for such relaxants they need an event management organization that can organize their event in the best professional manner.

- The scope of event management as career in India is vast. It is a thrivingindustry and is home to a million people.
- We have seen significant shifts in trends over the year in event planning, aimed at bettering the services offered to the guests and redefining the entire industry.

VIII.   CONCLUSION

In conclusion, Unfold Events is an app designed to streamline the process of booking events, from weddings to corporate gatherings. By providing a user-friendly interface and customizable options, the app aims to simplify

the event planning process and provide a seamless experience for users. The app is built using a variety of technologies, including Java, XML, SQLite, and Android Studio. The app's objectives include reducing the time and effort involved in event planning, providing a wider range of options to choose from, and improving the overall user experience. Through extensive research and development, the app's features were carefully crafted to meet these objectives, while ensuring that the app remains efficient, secure, and user-friendly. The implementation of the app involved several stages, including planning, design, development, and testing. During each stage, attention was paid to ensuring that the app met its objectives and performed well, both in terms of speed and user experience. To that end, various performance metrics were monitored, such as loading times, error handling, and code optimization. Overall, Unfold Events represents a significant step forward in the field of event planning and management. By leveraging the power of mobile technology and providing users with a user-friendly platform, the app has the potential to revolutionize the way that events are planned and booked. Going forward, the app's developers will continue to monitor its performance and improve its features, ensuring that it remains a reliable and valuable tool for event planners and organizers.

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Waste Food Management System and donation Application

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ABSTRACT

Food waste is something that affects us all. It affects people everywhere like in our homes, at schools, at restaurants, the grocery store, in production and even in transportation. This application use of mobile technology to reduce waste food and allow hotels to donate leftover food to needy people. Using this app user can register, login and aslo view, add, remove items from the cart and then logout in a system. This app also stored Real time database. In this app donor can add the food details and volunteer of the NGO can see the food images donated by the different donors

Keyword: Donor, Volunteer, Food Donation, Waste Food, Android app, And data. Firebase.

I. INTRODUCTION

The sharp increase in huge amount of wastage of food makes the need for donation of food. In highly populated country like India, food wastage is a big problem. Waste food is major issues that food shortage, we can see than many people throw foods in dustbin even the food eatable condition. This issue is not only wastage food even wastage of money also. It causes many environment problems such as pollution, causing global warming and climate change. Food wastage is not only a sign of pollution or hunger, but also of many economic problems. This product is android based application for NGO's it is a platform for donating remaining food for needy people. This app developed a common combination by connecting to a donor and a volunteer from the NGO where the donor add all the food information which contain food type, location where the food is available, cooking and expiry date/time of food Selecting a Template.

1.1. Motivation

As per the knowledge the technology is going advances and growing day by day. Our main motto is to help needy people. The idea behind over project can be use by many people who wish to donate things to needy organizations. Also, many organizations like to ask for various things required by them such as clothes, food grains, books, utensils, etc.

1.2. Basic Concept

In this mobile app, we have tried to reduce restaurant food wastage by giving waste food to NGOs. NGOs will add to a request, in case of any leftover food hotels have. This request is sent to the restaurant manager of that specific restaurant. The NGO Manager then accept the request and assigns it to one of the NGO employees for takeaway and forwards the request to the restaurant. The remaining food at the hotel can be given to NGOs at

the end of the day. The admin can detect the history of restaurants and NGOs for the leftover foods. Orphanages, old age house owner can give a rating of food item which will help other persons to select the food item. Sentiment analysis using scrkit_learn library

Fig 1: User register diagram

II. LITERATURE SURVEY

According to [2], food waste is a important issue around the world. It is predicted through a survey that more than 58 percent of food that people generated for consumption is wasted every day. Thus, more than 60 percent of people in the third world countries are dying in malnutrition without proper food for a living. Therefore, the technologically developed countries are articulate more on this issue. Therefore, that limited food can be wasted and can be distributed to the needy people. According to in the age of modern era, where we are developed through artificial intelligence, people are more depending on the smartphone. There are different applications, which are developed to control the more wastage of food, and it give the opportunity to send that extra food to the people who need it. There are many applications, which control food waste.

'Mobile phone Based Waste Food Supply Chain for Aurangabad Using GIS Location Based and Google Web Services', published in 2014, it combines the client server GIS and mobile application to make a craving free city. The application for client side gives the option to donate food to the people in demand. Donors enter the easy information such as quantity of food and what type of food it is with amount and their respective contact number. NGOs or any social working organization can take up that food and deliver to hungry people. When the registration will be finished it will be placed on the server side database from where the organizations can store the data of donors and the optimal path of donor's location to the nearest NGOs or any establishment along with direction will be shown. So that hungry people can get food on time [3.

A new online-based application that provide a platform for donating leftover food to all or any needy people/organizations [4]. It give details about the motivation to return up with such an application, thereby describing the prevailing donation system and the way the proposed product works for the improvement of society. The recent depression has grow the amount of individuals living in conditions of food poverty, especially in developed regions. At the client side App give facility to donate food to the charity for the assistance of hungry people.

is a Mobile phone Android program that gives donors and NGOs with a assembly to donate and collect food once they have successfully logged into the system. The system consists of three primary donor, NGOs and admin modules. The donor completes tasks like registration/login and adds items to the donation request to be contributed and viewed. The recipient does tasks such as requesting items, displaying requested items and declare donations. The manager will track the collection and improve it. The administrator and the donor also look the position of the recipient. The donor-donated items will be displayed to other users as a reminder in the donation tab and the message will be saved in the backend folder [5]. In the base paper, an automation is built with four modules which focus on accounting the quantity of food being wasted, it is focused on creating an awareness by feeding the live data on how much food is being wasted, it uses a database to store the quantity of food being wasted each day and later the presented data is represented in graphs in order to encourage the students to reduce the wastage of food. The automation elements are connected to the central data store, the people counter module calculate the number of people eating followed by the weighing scale module records the weight of the food waste and forward the details to the central data store using the Wi-Fi dongle.

III. ANALYSIS OF EXISTING APPLICATION

At present, the requirement of the system is done using websites which are not accessible quicker and provide no awareness about the service to the world. There is no actual interaction between the donor and NGOs since everything reveal by intermediates. Another reason includes there is no active mobile application available in place

IV. PROPOSED SYSTEM

4.1. Implementation

Donor Side:
Step 1: User can register using personal details.
Step2: User can login in his personal account using id and password.
Step 3: Create a new food item with details of quantity, location, address contact.
Step 4: Add images to the food items.
Step 5: Add multiple food items to cart for booking.
Step 6: After adding details about food user can logout the system.

Volunteer side:

Step 1: User can register using personal details. Step 2: User can login in his personal account using id and password. Step 3: Search location wise and book the food items with time.

Step 4: After accepting the request from donor side   Step 5:After accepting the food volunteer will give feedback about food taste and quality. Step 6: Volunteer can logout the system.

V. ALGORITHM
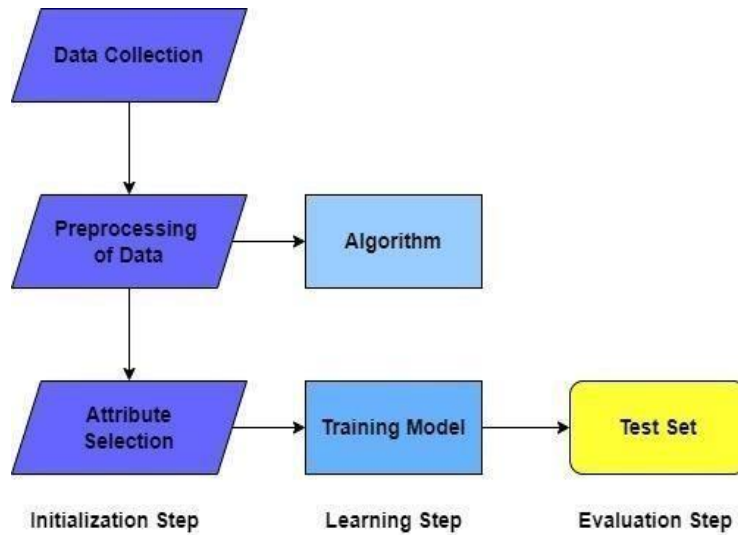
Fig 2 : Algorithm Step by Step Process 6.

SYSTEM MODULES
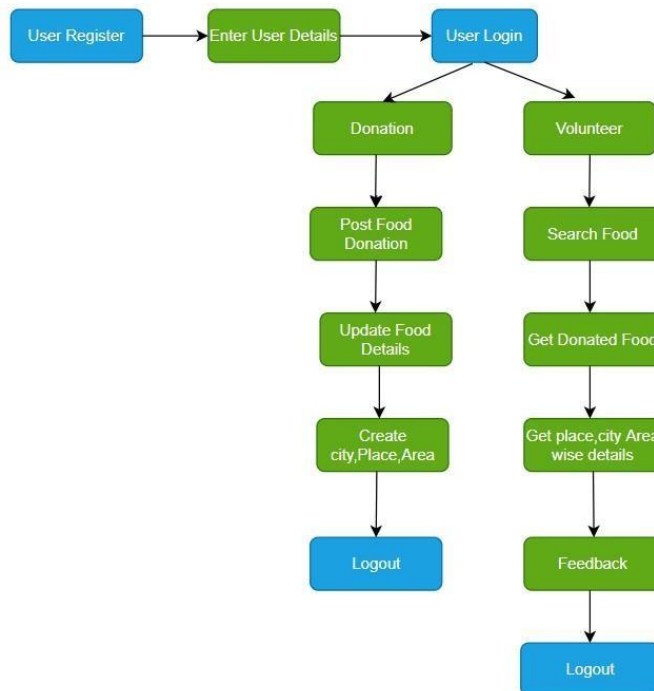
Fig 3 : Architecture Diagram

VI. ACKNOWLEDGEMENT

VII. ADVANTAGES

- Advantage will be both the restaurant (reducing food wastage), and the needy.
- Keep track of waste food for restaurant.
- User can play character in saving food wastage and help the needy.
- You can gift food from home easily.
- Easy to used and user friendly.
- Food waste will be reduced.

VIII. FUTURE SCOPE

- Also we extend our app to have many types of donating users likewise from organizations such as restaurants, family or a single user
- Adding the location facility to our apps. The donating user should identify the location of the share food.
- Adding the time and date of each snack shared by users
- Making the app supports multiple platforms

IX. CONCLUSION

Our study has look into the problem of food waste that has many serious side effects economically and socially. However, the waste of the food can be prevented or at lowest decreased using political rules and technology. Mobile application technology is helpful for food waste management. The app objective to encourage better food management. Our proposed solution should reduce food waste by facilitating food sharing in group using mobile technology. This work is an first step towards design a better system to reduce daily food waste.

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Food Management System

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ABSTRACT

This research paper is about to present "FOOD WASTE MANAGEMENT" system.

i. Everyday people used to waste foods. In order to avoid that food wastage problem through an android application I planned to do this project. In this project, android-based Food Waste Management system can assist in collecting the leftover food from hotels & restaurants to be given to NGOs which can further distribute it to needy and hungry people.

ii. NGOs that are helping poor communities to battle against starvation & malnutrition can raise a request for food supply from restaurants through this application. Once the request is accepted by Admin, the NGOs can collect the food from the restaurants for its distribution.

iii. In this way this android-based food waste management system will help restaurants to reduce food waste and will help in feeding the poor and needy people

Keyword: Donor, volunteer, food Donation, Waste food, Android app, and data, Firebase

I. INTRODUCTION

Presently, in this era, wastage of food being a serious concern, we can see eatables wasted on daily basis at different places like restaurants, weddings, schools-college canteens, social events and other occasions. As per a survey, on daily basis 40% of food is getting squandered in India on different occasions. People generally donate food manually to organizations operating on such a purpose or to needy people to minimize the food wastage. This paper presents "Food Waste Management", is a new android application through which mankind can donate food in order to reduce the issue of food wastage. The proposed system consists of 3 modules in this application: admin, restaurants and NGOs. This application furnishes a portal for restaurants to give away the leftover food to organizations/ NGOs so that food wastage can be avoided. This application gives you an option to order food from restaurants as per your desired budget to donate the food. The admin module has access to modify, delete the profiles and make changes in application. Admin will substantiate the restaurant information. In the restaurant module first they"ll get themselves enrolled if, they are not already enrolled, which can be done through email address or can connect from Gmail or Facebook. For sign-in the options will be same as registration. There are choices to place orders according to the budget, also users can track their orders. Restaurants can add on their information or update their profiles. The NGOs module will get notified from where to receive the order and drop the orders to destination.

INDEX TERMS— Food wastage, Android Application, Authenticate, Android Studio, Firebase Database, Gmail, Facebook, java, XML Extensible Markup Language)

II. LITERATURE REVIEW

The Paper „Smartphone Based Waste Food Supply Chain for Aurangabad City Using GIS Location Based and Google Web Services", published in 2014, it describes the client-server GIS and a mobile application to make a hunger free city. The application for client side gives the option to donate food to the needy peoples. Donors put on the simple information such as food quantity and what type of food it is with amount and their respective mobile number.

The NGOs or any social working organization will pick-up the food and deliver it to hungry people. When the registration will be completed it will be updated on the server-side database from where the organizations can store the entries of donors and the best possible path of donor's location to the nearest NGOs or any organization along with direction will be visible. So that hungry people can get food on time.

The paper „Beyond food sharing: Supporting food waste reduction With ICTs", published in 2016, guaranteed that the quality of food is one of the keys to live a better life with good health for natives at all levels. As present economic issues have been raised, people are going through more problems like food poverty especially in well-established regions. Regardless of an increased awareness of importance to minimize food wastage among people and managing extra food, the part of ICTs in this domain is still blurry and hardly documented. According to this paper to recover excess food we use the ICT tools to recover food excess at various stages of the supply mechanism and it also states the way forward for a combined set of ICT tools to minimize waste from producers to needy families.

According to the paper „Food donation portal", which was published in 2015, summarizes that the variation in food donation activities provides a way that helps to connect food donors to social working organizations or NGOs. Awareness for a food donation link is presented, and respective influence on society through this path is mentioned. The only drawback in this paper is that there is no GPS tracking available forcing the donors to find nearest organizations of their area physically.

The paper „Helping Hands", published in 2016, this project focuses on internet application which enables an innovative plan for donating not needed food to hungry people and organizations. It motivates to invent such application, describes the purpose of this donation and how will the proposed system will be effective towards the betterment of society The main disadvantage of this application is that it does not have dashboard on system resulting that, at the end of month it don't show any record of donation given or received. In the paper „A New Approach to Reduce Food Wastage using Ubiquitous Technique", which is published in 2015, Every day the quantity of food getting waste is increasing continuously, becoming a consequential social, environmental and financial concern.

Each day huge amount of food is being wasted in several restaurants and social gatherings. In a country, a massive number of citizens are unprivileged that they do not have basic necessities to live, like food, clothes, etc. There are various organizations working on such cause where they feed so many under-privileged individuals and take care of their needs, but in this extremely populated nation, it's nearly impossible to reach out to all. So, the proposed

system links them together so that the food can be distributed conveniently to hungry people without being wasted, and can be fed to the maximum number of people.

III. METHODOLOGY

The motivating factor to launch this application is to reduce food wastage as much as we can, and to feed those people who do not have sufficient food even for one time to feed themselves. It"s a big hassle for them to roam in search of food every day to feed themselves as well as their families, and also for donors to reach out to them. To resolve this, we have developed an android application, which aims to connect restaurants and the NGOs or organizations working on these cause/needy households to increase the excess of food donation. As cell phones have a strong wide impact on today's society. In past few years Android has become the most known platform for mobile-phones, according to a research android is being used in more than 190 countries on millions of smartphone devices. Android is the most installed operating system for most of the smart devices, and the number of Android users can be seen increasing day by day. Later almost 1 million users on daily basis buy new Android devices and start using it immediately to get digital content such as games, application, and many other services.

For developing the front-end of our application we used Android Studio as, it has a strong tool to edit developing creative UI and emulators for various versions to test and simulate sensors without having actual Android devices.

To create back-end we used firebase, and the languages used are java and XML. Application consists of three modules:

3.1. ADMIN

First module is an admin that has the complete application. The admin can make changes in application whenever they feel to, can add or delete a profile. Admin will validate the information provided by the restaurants and then will allow them to make an account.

3.2. RESTAURANT

Firstly, restaurants have to get themselves registered, which can be done through Gmail or Facebook. After logging into their respective account, they will update the details of the food like description of food, quantity of food, budget for donation, pickup time which will be verified by admin. If the admin finds the details of food as well as restaurant appropriate then the admin will give approval to this donation, getting it uploaded on the dashboard of N

3.3. NGOs

NGO will open their dashboard after successful registration, here, the list of food items approved by admin to get distributed will be GOs. visible. As per the demand and need, the NGO will either accept or reject the food. When the NGOs accept the food offer, they will be directed to fill a form regarding the details of employee-his name ID proof, who will be allotted to receive the order.

After that, all above updated details will be made available to restaurants which is mentioned by NGO. Restaurants will verify the details and immediately the system will generate an OTP, updating OTP by restaurant confirms the order. The employee of an NGO allotted will pick the order from the restaurant and drop it off at the desired destination i.e. NGOs or any other social organisation.

IV. EXPERIMENTS & RESULT TABLE

TABLE 1 Status of Food waste

State	Population in million	Solid Waste generation/day in tons
Uttar Pradesh	199,812,341	9,900
Maharashtra	112,374,333	7,500
Bihar	104,099,452	
West Bengal	91,276,115	4,900
Madhya Pradesh	72,626,809	4,400

Describes the status of food that is waste on daily basis in different state of India
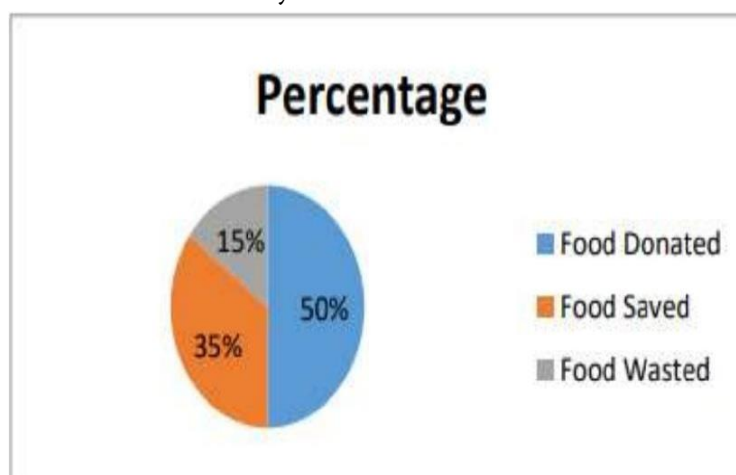
Fig 2. Graphical representation of food preserve through application.

Fig 2 show the future assumption that 50% food will be donated, 35% food will be kept saved from that, and 15% food that as wasted.

V. ADVANTAGES

Donation of food can be done from home easily. Wastage of food will be minimised. Enabling GPS system will make it convinent to locate nearest organizations or restaurants. Easy to use and understand. User friendly

VI. CONCLUSION & FUTURE WORK

The main purpose of the proposed application is to make reduction in food wastage as much possible as we can, and to feed needy and hungry peoples who are not capable to manage even one-time servings for themselves. It's a big difficult job for them to search food every day to feed themselves along with their families, and also for donors to reach out to them. This application comprises of three modules: admin, user, and rider. The software used to develop our android application is android studio and firebase for database, hoping that this application will help in decreasing the food wastage, and people begin to donate excess food to needy people or organizations.

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Deep Fake Video Detection using Machine Learning

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ABSTRACT

In recent months, free deep fake- grounded software tools have eased the creation of believable face exchanges in videos that leave many traces of manipulation, in what they're known as" Deepfake" (DF) videos. Manipulations of digital videos have been demonstrated for several decades through the good use of visual goods, recent advances in deep literacy have led to a drastic increase in the literalism of fake content and the availability in which it can be created. These so- called AI- synthesized media (popularly appertained to as DF). Creating the DF using the Instinctively intelligent tools are simple task. But, when it comes to discovery of these DF, it's major challenge. Because training the algorithm to spot the DF isn't simple. We've taken a step forward in detecting the DF using Convolutional Neural Network and intermittent neural Network. System uses a convolutional Neural network (CNN) to prize features at the frame position. These features are used to train a Recurrent Neural network (RNN) which learns to classify if a videotape has been subject to manipulation or not and suitable to descry the temporal inconsistencies between frames acquainted by the DF creation tools. Anticipated result against a large set of fake videos collected from standard data set. We show how our system can be competitive result in this task results in using a simple armature.

Keywords: - Deep fake, AI-synthesized media, Convolutional Neural Network (CNN), Recurrent Neural Network (RNN), Temporal inconsistencies, Machine learning.

I. INTRODUCTION

The increasing prevalence of Deep Fakes poses a significant threat to the credibility of digital media and can potentially cause irreparable harm to individuals and organizations. The detection of Deep Fakes is an urgent need for ensuring the integrity of digital media and preventing the spread of misinformation.

The proposed method for detecting Deep Fakes is based on the recognition of artifacts introduced during the generation process. The use of Res Next CNN and RNN with LSTM is a powerful combination for detecting temporal inconsistencies in Deep Fake videos. By training the model to recognize resolution inconsistencies introduced during the affine face wrappings, the proposed method can accurately distinguish between real and fake videos.

It is worth noting that Deep Fakes are not limited to just replacing faces in videos. They can also be used to alter audio and even generate entirely synthetic videos that are almost impossible to distinguish from real ones. Therefore, the proposed method may need to be extended to handle these types of Deep Fakes as well.

Moreover, the development of effective Deep Fake detection techniques is just the first step towards combating this problem. Efforts are needed to educate people about the existence of Deep Fakes and how to identify them.

Additionally, social media platforms and content-sharing websites must take proactive measures to prevent the spread of Deep Fakes and remove them from their platforms. Collaborative efforts from various stakeholders, including researchers, policymakers, and tech companies, are needed to address this growing threat to digital media integrity.

The consequences of Deep Fake videos can be severe, ranging from political manipulation to identity theft and cyberbullying. The use of Deep Fakes in spreading fake news and propaganda can have a significant impact on public opinion and undermine trust in institutions. The proposed method for detecting Deep Fakes can help mitigate these risks and ensure the authenticity of digital media.

In addition to the technical challenges of detecting Deep Fakes, there are also ethical concerns that must be addressed. The use of Deep Fakes for malicious purposes raises questions about privacy, consent, and accountability. It is essential to establish ethical guidelines and legal frameworks to regulate the creation and dissemination of Deep Fakes.

Furthermore, the development of Deep Fakes is not solely a technical problem. It is a societal issue that reflects broader concerns about the impact of technology on our lives. Therefore, addressing the root causes of Deep Fakes requires a multi-disciplinary approach that includes education, media literacy, and public awareness campaigns.

II. LITRETURE SUEVEY

Deep fake detection has emerged as a critical research area to combat the spread of misinformation and disinformation; as deep fake technology continues to advance rapidly. Researchers have proposed various deep fake detection methods, each relying on different approaches. Some methods aim to detect face warping artifacts, while others rely on detecting physiological signals such as blinking or use capsule networks. However, the challenge lies in developing a method that is both efficient and robust against different scenarios, such as varying content, resolution, and quality of the videos. Additionally, it is crucial to ensure that the method preserves the biological signals and does not compromise the findings.

To overcome these challenges, researchers are exploring new deep learning-based approaches that can effectively distinguish deep fake videos from real ones. These approaches use dedicated CNN models to compare the generated face areas and their surrounding regions to detect artifacts or rely on physiological signals such as blinking or teeth enchantment. Other methods utilize capsule networks to detect forged images and videos and extract biological signals from facial regions on authentic and fake portrait video pairs to detect synthetic portrait videos.

Despite the progress made in developing deep fake detection technology, deep fakes remain a significant threat, with attackers continuously improving their techniques to evade detection. Therefore, developing robust and effective deep fake detection methods remains a critical area of research.

One promising approach is the use of capsule networks, which have shown effectiveness in detecting forged images and videos in various scenarios. However, some studies have pointed out that the use of random noise in the training phase may not be reliable, and further research is required to develop more robust capsule network-based methods.

Another promising approach is to use biological signals to detect synthetic portrait videos. This approach extracts biological signals from facial regions on authentic and fake portrait video pairs, captures the signal

characteristics in feature sets and PPG maps, and trains probabilistic SVM and CNN to determine whether the video is fake or authentic. However, formulating a differentiable loss function that follows the proposed signal processing steps can be a challenging task.

Furthermore, some studies have used eye blinking as a clue for deep fake detection, but other parameters such as teeth enchantment and wrinkles on faces should also be considered. A proposed method that considers all these parameters may lead to more accurate and reliable deep fake detection.

One example of a deep fake detection method is Fake Catcher, which detects fake content with higher accuracy independent of the generator, content, resolution, and quality of the video. However, due to the lack of a discriminator, preserving biological signals may lead to a loss in their findings, and developing a differentiable loss function that follows the proposed signal processing steps can be a challenging task.

III. PROPOSED SYSTEM

Detecting deepfakes (DF) is becoming increasingly important in today's world. While there are many tools available for creating DF, there is a shortage of effective tools for detecting them. Our team is working on a web-based platform that allows users to upload a video and determine whether it is real or fake. Our ultimate goal is to create a browser plugin that can automatically detect DF.

A. **Dataset:** Our project is unique in that we aim to detect all types of DF, including replacement DF, retrenchment DF, and interpersonal DF. To accomplish this, we are using a mixed dataset consisting of equal amounts of videos from various sources, such as YouTube, Face Forensics++[14], Deepfake Detection Challenge Dataset[13], and Celeb-DF. We have split the dataset into 70% training and 30% testing sets.

B. **Pre-processing:** In order to prepare the dataset, we split the videos into frames and then detect and crop the frames with a face in them. We have calculated the mean number of frames across the dataset and have created a new processed face-cropped dataset containing the same number of frames. For the purpose of our experiments, we will use only the first 100 frames of each video for training the model.

C. **Model:** Our model consists of a ResNext50_32x4d followed by one LSTM layer. The Res Next CNN classifier is used for feature extraction, and we will fine-tune the network by adding extra layers and selecting an appropriate learning rate to converge the gradient descent of the model. The 2048-dimensional feature vectors from the last pooling layers are then used as the sequential Long Short-Term Memory (LSTM) input.

D. **Res Next CNN for Feature Extraction:** To address the challenge of recursively processing a sequence of Res Next CNN feature vectors in a meaningful way, we will use a 2048 Long Short-Term Memory (LSTM) unit with a 0.4 chance of dropout. The LSTM will process the frames sequentially, enabling temporal analysis of the video by comparing the frame at time t with the frame at time t-n, where n can be any number of frames before t. Figure 2 depicts the simple architecture of the LSTM.

E. **LSTM for Sequence Processing: Once** the model is trained, a new video can be passed to it for prediction (real or fake). The video is pre-processed to match the format of the trained model by splitting it into frames, detecting and cropping the frames with a face in them, and passing the cropped frames directly to the model for detection (see figures 3 and 4).

F. **Predict:** Our approach has several advantages, including scalability, accuracy, and reliability. We believe that our project can make a significant contribution to preventing the spread of DF over the internet.

Furthermore, we hope that larger applications like WhatsApp and Facebook will integrate our project into their platforms to facilitate easy DF detection before sending videos to other users.

G. **Evaluation Metrics:** To measure the performance of our proposed system, we will be using the standard evaluation metrics such as accuracy, precision, recall and F1-score. We will also be using the area under the receiver operating characteristic curve (AUROC) to evaluate the model's performance.

H. **Future Work:** In future, we plan to improve the performance of our proposed system by incorporating more advanced techniques such as attention mechanisms, adversarial training and ensemble learning. We also plan to expand our dataset to include more diverse deepfake videos and improve the preprocessing steps to handle low-quality videos.

I. **Ethical Considerations:** We recognize the potential for misuse of our system for malicious purposes and therefore emphasize the importance of responsible use. We will also be implementing measures to prevent abuse and ensure the privacy and security of user data.

J. **Impact:** Our proposed system has the potential to significantly reduce the spread of deepfake videos and their harmful consequences. By providing an easy-to-use platform for detecting deepfake videos, we hope to empower users to identify and avoid misinformation

Using the Template
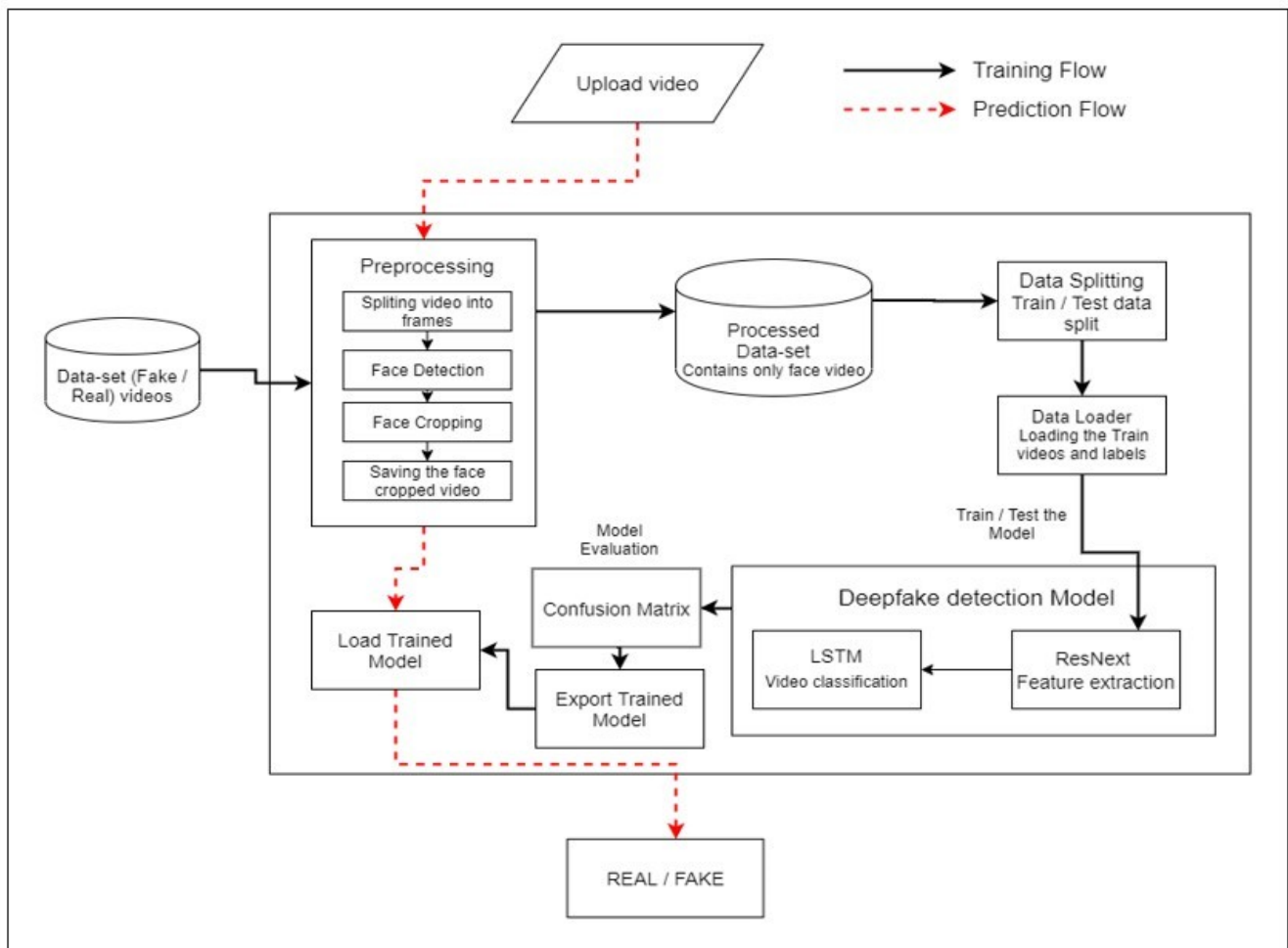
Fig.1 System Architecture
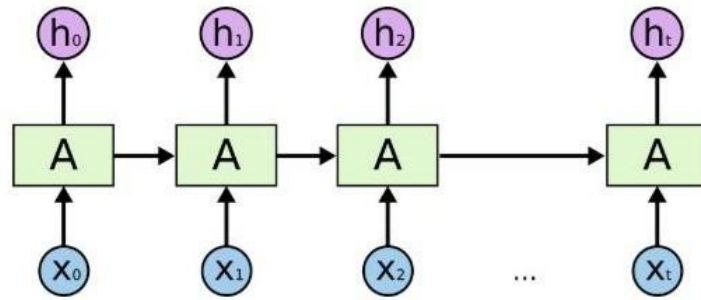
Fig.2 Long Short-Term Memory (LSTM) Architecture

Fig.4 Predicti on Flow
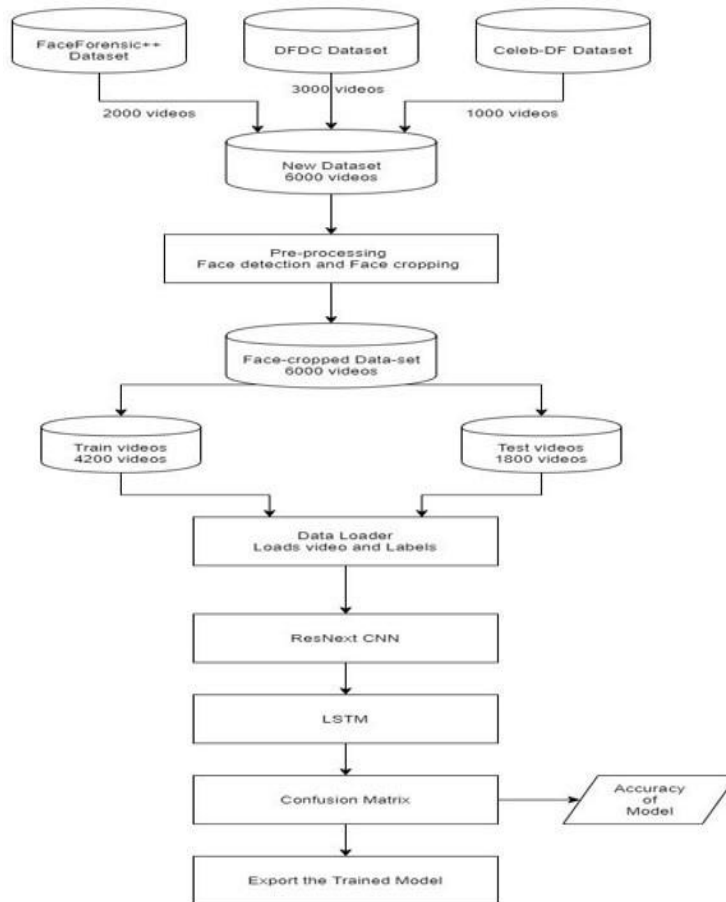
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Analytical Research on Big Data and Hadoop

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ABSTRACT

In this world of knowledge, the term BIG DATA has emerged with new opportunities and challenges to accommodate the huge amount of knowledge. BIG DATA has earned an area of great importance and is becoming the selection for brand new research. To seek out useful information from a large amount of knowledge to organizations, we want to analyse the information. 'Big Data' describes techniques and technologies to store, distribute, manage and analyse large-sized datasets with high velocity. Big data are often structured, unstructured or semi-structured, resulting in the incapability of conventional data management methods. For managing the info massive data there are many techniques are used. One of these systems is Hadoop. Hadoop can handle a large amount of data, it's very cost-effective, and it can handle a huge amount of information so processing speed is incredibly, and also it can create a reproduction copy of data in case of system failure or prevent the loss of data. This paper contains an overview of big data, an introduction to Hadoop, problems associated with big data, the architecture of big data and Hadoop. This paper also concentrates on the application of Big Data in Data Mining.

Keywords— Big Data; Hadoop, Map Reduce, HDFS, Data Mining.

I. INTRODUCTION

BIG DATA is a vague topic and there is no exact definition that is followed by everyone. Data that extra-large Volume comes from a Variety of Sources, Variety of formats and comes at us with a good Velocity is normally asked to as Big Data. Big data will be structured, unstructured or semi-structured, which isn't processed by the conventional data management methods. Data can be generated on the web in various forms like texts, images or videos or social media posts. So as to process this large amount of data in an inexpensive and efficient way, parallelism is used [1]. There are four characteristics of big data. They are Volume, Velocity, Variety and Veracity in Figure 1.

Versions of Big Data

A. **Volume** - Data volume refers to the quantity of data. At present the volume of data stored has grown from megabytes and gigabytes to petabytes and is meant to extend to zeta-bytes in nearby future.

B. **Variety** - Variety refers to the various kinds of data-– text, images video, audio, etc and sources of data. Data being produced isn't of a single category because it not only includes the normal data but also the semi-structured data from various resources like websites, Web Log Files, social media sites, e-mail, documents

C. **Velocity** - Velocity in Big data could be a concept deals with the speed of the data coming from various sources. This characteristic isn;t being limited to the speed of incoming data but also the speed at which the data flows and aggregated.
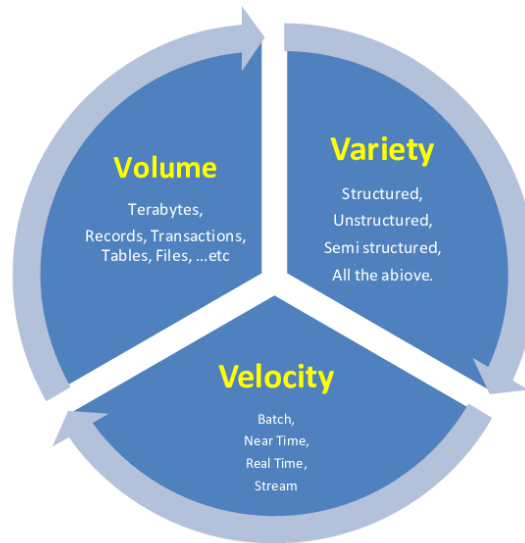
Figure 1. - 3V's of Big Data

II. METHODOLOGY

2.1 ARCHITECTURE OF HADOOP

Hadoop may be execution framework where large datasets are processed in a distributed environment. It's an open-source framework developed by Apache and it's has two components namely the MapReduce programming framework and HDFS (Hadoop Distributed File System). It's has been written in Java and we can work with huge amounts of data. It absolutely was inspired by Google File System (GFS) and MapReduce. Hadoop can run on different platforms and it is fault-tolerant as it is able to detect and handle failures. It provides scalability. Hadoop is used by Facebook to handle its 2.5-petabyte data warehouse.

Hadoop architecture (see Figure 2) consists of a specific number of nodes and each node has a well-defined role in a Hadoop exceedingly. The components of Hadoop are Name Node, Data Node, Node Manager, Resource Manager and Application Master. The system that has the Name Node is the master node and it is responsible for managing the file system, regulation of access and file system operations. There will be only one Name Node in each cluster.
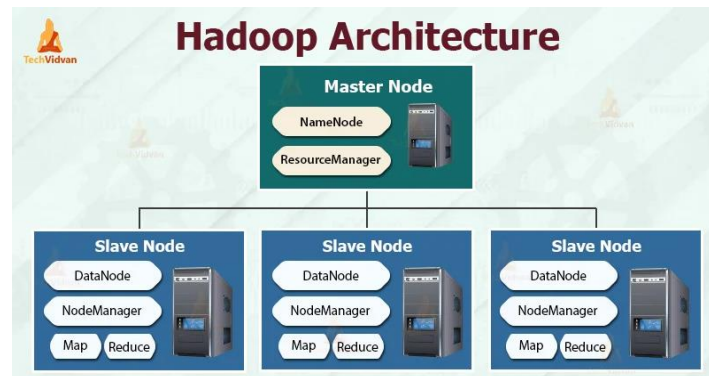
Figure 2. - Hadoop Architecture

2.2 HDFS ARCHITECTURE

HDFS is the Hadoop Distributed File System which is employed to store large datasets. These huge datasets are broken into chunks and stored across various servers so on to provide fault tolerance and parallelized processing. (See figure3)

Data Node - The system has one Data Node for every node within the cluster this node is the slave node. This node is responsible for storing data and creating and replication of blocks.

Node Manager - It manages the node and is answerable for keeping the Resource Manager updated.

Resource Manager - It determines the resources that are available and manages the distributed applications on YARN.

Application Master - It manages the appliance lifecycle and interacts with both the Resource Manager and Node Manager.

Hadoop contains a distributed file system that's used for storing large volumes of data. This method is fault-tolerant and scalable because it divides huge datasets into smaller blocks and then processes them. HDFS consists of the data node and the name node wherein Name Node (or master node) maintains all the metadata and has the main points about the various Data Nodes while Data Node (or slave node) maintains the 5 records about the stored and replicated data and reports to the Name Node.

The huge amount of data is divided into blocks which are further replicated thrice and stored in numerous data nodes and the also the node keeps a tab about all the data nodes. The block size in HDFS is 64 MB and this reduces the metadata storage that's required for each file and thus increases the streaming process.

The working of HDFS is as follows:

1. As HDFS uses Java so the client can access (using read operation) the HDFS file by using the standard file input stream which is processed within the background.
2. The Name Node takes decision about granting permission to let the client access the file. Just in case the permission is granted, the block IDs of the file to be accessed are retrieved and every one of the Data Nodes that store those blocks are retrieved. This information is shipped to the client.
3. Now the closest Data Node is accessed by the client and the therefore the block ID is requested and this block is then delivered to the client.
4. Just in case the client wants to write in an HDFS file, the standard file output stream is used.
5. The stream is processed within the background and each 64 MB block is broken into smaller blocks of 64 KB data and then these blocks are queued in a FIFO manner.
6. Another thread takes care of de-queuing these blocks from FIFO and works with the Name Node to include block IDs and to send blocks to the Data Nodes.
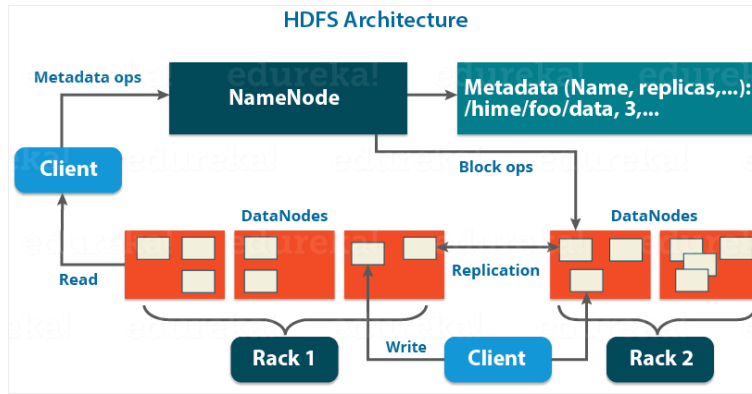
Figure 3. - HDFS Architecture

2.3 HADOOP MAPREDUCE

MapReduce could be a data processing framework introduced by Google and it consists of three stages namely the mapping stage, the middle stage followed by reducing stage. The thought of MapReduce is to split the file into several files and then into sub files so as to perform mapping on them followed by sorting and shuffling the files and then reducing the result to realize the ultimate output. This framework uses key-value pairs where secret's a novel identifier for a few data item and value is the data that's identified or located. MapReduce provides flexibility, scalability and fault tolerance because it is schema-free and index-free. (See figure 3).

The varied stages of MapReduce are described below.

1. **Mapping Stage/Function** - This is the primary stage and therefore the data is transformed into key-value pairs by applying mapping it. The initial computer file isn't modified by it and only a brand new output is generated by it. This function provides a sorted key-value pair because the input for the following stage.

2. **The center Stage** - This stage consists of shuffling, sorting and aggregation wherein the list that is obtained from the mapping stage after data processing of chunks of data is shuffled and then aggregated so on to get some new patterns from the list and so the list is shipped to the reducing stage.

3. **Reducing Stage/Function** - The different patterns that are obtained after the second phase are analyzed and merged during this phase so on to obtain the ultimate result.
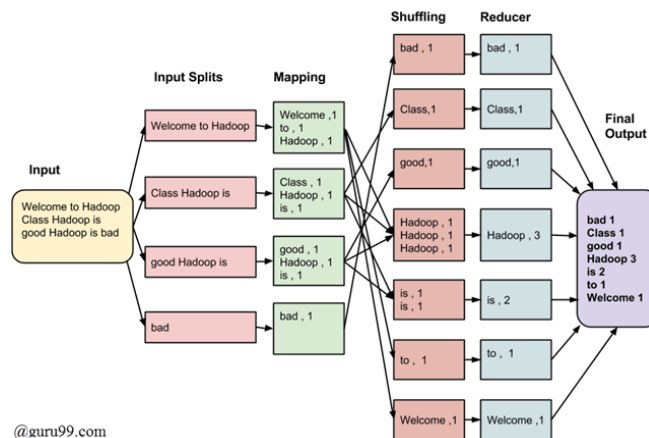
Figure 4. - Map Reduce Architecture

III. TOOLS ASSOCIATED WITH HADOOP

Hadoop tools are defined because the framework needed to process a large amount of data distributed in form and clusters to perform distributed computation. Few of the tools that are used in Hadoop for handling the data is Hive, Pig, Sqoop, HBase, Zookeeper, and Flume where Hive and Pig accustomed query and analyze the data, Sqoop is used to manoeuvre the data and Flume is employed to ingest the streaming data to the HDFS.

Hadoop tools are:
1. Hive
2. Pig
3. Sqoop
4. HBase
5. Zookeeper
6. Flume

IV. APPLICATIONS OF BIG DATA

Big Data has a huge volume and has various forms of data, so it has some classes like storing, sourcing, formatting, staging and processing. Sourcing consists of varied data sources from which data is collected. The format consists of various sorts of data. Storing and organization consist of various ways of storing data and extracting, transforming and loading processes. There are sizeable amount number of applications of Big Data. These are described below.

1. **Analytical tools for E-Science Data Management**

The data that has been published should be accessible to theguy scientists and it should even be secure enough. Quite a lot of data has been automated and re-purposed to hold out research in several scientific domains.

2. **Tools for improvement in healthcare facilities**

Many research is underway within the Healthcare Industry and Big Data is being employed to investigate the overall pattern in large datasets. It's being employed in research associated with DNA and genomes. Bigger healthcare facilities are analyzing the data collected from numerous patients so as to achieve in depth insight into the data. Smart fitness devices like bands and watches also help us in monitoring our heartbeat, fitness level and calories by analyzing the collected data for better lifestyle choices.

3. **Optimizing Business performance**

Walmart acquired Inkiru Inc. and this has helped Walmart in increasing sales because it analyzes trends before launching a product, and provides a customized experience to every user by customized recommendations for products. It also analyzes the sales of assorted products in line with regions or areas.

4. **To analyze user demands and preferences**

In 2012, retail giant Walmart started employing a 250-node cluster and because it started analyzing Big Data to form decisions and analyze customer preferences, this led to a sustantial increase in the online sales of Walmart. As the data needs to be processed in real-time, so Walmart uses Mupd8 (Map Update Application) so as to handle faster data. Mupd8 is able to tackle huge load and data distribution across multiple CPU cores.

5. **Improvement in Science and research facilities**

NASA generates huge amounts of information thanks to the various missions. This data is then wont to generate meaningful knowledge which results in new findings and discoveries.

V. CHALLENGES AND OPPORTUNITIES

There are 800 million web pages on the Internet giving information about Big Data. Big Data is the that big thing after Cloud [11]. Big data comes with plenty of opportunities to deal with health, education, earth, and businesses but to deal with the data having a large volume using traditional models becomes very difficult. So, we want to seek big data challenges and design some computing models for efficient analysis of data [13].

A) Challenges with Big Data

1) **Heterogeneity and Incompleteness -** If we wish to research the info, it should be structured but when we deal with the Big Data, data may be structured or unstructured likewise. Heterogeneity is a big challenge in data Analysis and analysts need to address it. Consider an example of a patient in the hospital. We will make each record for each medical test. we'll make a record for every medical test. This will be different for all patients. This design isn't well structured. So managing the heterogeneous and incomplete is required. A good data analysis should be applied to this.

2) **Scale -** As the name says Big Data is having a large size of data sets. Managing large data sets is a big problem for decades. Earlier, this problem was solved by the processors getting faster but now data volumes are getting huge and processors are static. The world is moving towards Cloud technology, due to this shifted data is generated at a very high rate. This high rate of increasing data is becoming a challenging problem for data analysts. Hard disks are used to store the Data. They are a slower I/O performance. But now Hard Disks are replaced by solid-state drives and other technologies.These are not in slower rate like Hard disks, so new storage system should be designed

3) **Speed -**Size matters the speed. If there's the larger the dataset having the massive information the then it'll take longer time to response.

4) **Privacy And Security -**Privacy of data is a huge issue that arises in big data. In the US there is great fear regarding the inappropriate use of the personal data.

B) Analytical Challenges

The most analytical challenging questions are as follows

What if data volume gets so large and varied and it's not known the way to deal with it?

Does all data need to be stored?

Does all data have to be analyzed?

A way to see which data points are really important?

How can the data be used to the best advantage?

Big data brings together with it some huge analytical challenges. The kind of analysis to be done on this huge amount of knowledge might be unstructured, semi-structured or structured increase in the online sales of Walmart. As the data needs to be processed in real-time, so Walmart uses Mupd8 (Map Update Application) so as to handle faster data. Mupd8 is able to tackle huge load and data distribution across multiple CPU cores.

Improvement in Science and research facilities

NASA generates huge amounts of information thanks to the various missions. This data is then wont to generate meaningful knowledge which results in new findings and discoveries.

VI. CONCLUSION

The data, as predicted, is growing at a quick rate and also the various organizations are attempting to figure at its pace so as to yield the simplest results out of this growth. The organizations are striving to use this data to the simplest of their potential so on to help them understand and gain an insight into their key demographics and also to assist them in making a far better and informed decision. Hadoop provides a framework to handle datasets that are large and sophisticated with MapReduce being one of the foremost popular ones. It also provides other specialized tools like Spark, Pig, Hive etc. to work on these datasets. Hadoop is an easy to use platform with scalability and parallelization as its main features. Thanks to its cost-effectiveness, high availability, fault tolerance, and fast data analytics, Hadoop seems the most effective solution for managing and extracting valuable information from Big Data.

VII.   FUTURE SCOPE

Hadoop has good market prospects in many industries. With the arrival of the digital universe, the world is coping with the data explosion. As time passes, new technologies are continuously emerging, contributing to a pool of knowledge. Hadoop has emerged as a pioneering solution for processing and storing large amounts of data. The Hadoop market is distributed across different industry verticals. It is evident that no industry is abandoned from being part of the Hadoop market. From Computing IT sector industries to industries like hospitals and health care, education, finance, telecommunication, retail, etc. all have Hadoop applications running on them. With the conclusion of the benefits of Big data analysis, the adoption of Hadoop is increasingly exponentially.

The reason for the growing Hadoop market is its cost-effectiveness, high availability, fault tolerance, and fast data analytics. Even though there are many other Big Data Analysis tools like Apache Spark, Flink, etc. are evolving to handle Big Data challenges, but it seems these tools cannot replace Hadoop in upcoming years as they are doing not have their own storage and depend upon Hadoop for that.

When comparing the performance of Hadoop, Hadoop DB and two commercial data processing databases namely Vertica and DBMS-X. Just in case of data loading, because the nodes are increased, Hadoop DB and Vertica scaled up but DBMS-X took the longest time. But when pre-processing is completed, the load time is increased for Hadoop and Hadoop DB. In case of fault tolerance, there were lesser slowdowns for Hadoop and HadoopDB and just in case of node failures (i.e. n=10) these have higher fault tolerance but they also discovered out that Vertica's total query interval time was low. So, it is better for smaller node systems.

For systems with higher nodes, the robustness of Hadoop and HadoopDB is basically useful because of the utilization of low granular chunks.

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Cancer Cell Detection using Digital Image Processing

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ABSTRACT

According to all accounts, lung cancer is the important cause of death for people worldwide. Increased chances of survival can result from early detection of lung cancer. If lung illness is detected early, the 5-year survival percentage for patients increases from 14 to 49%. despite the fact that CT might sometimes be more useful than X-ray. However, a problem seemed to have emerged since it took so long to diagnose the few lung diseases that were present using the limited diagnostic techniques that were used. Therefore, a digital image processing-based cancer detection method is used to order the existence of malignant tumour development in CT images. Each technique used in this study has made use of MATLAB. Processes including feature extraction, binary conversion, and image pre-processing have all been well studied in the context of image processing operations. By utilising various improvements and techniques, we hope to achieve more precise results.

Keywords— CT, Binary conversion, Feature extraction, Enhancement

I. INTRODUCTION

One of the most parts serious medical conditions on the globe is CANCER. In comparison to all other cancer types, lung cancer has the highest fatality rate. One of the worst tumours on the globe, lung cancer has one of the lowest survival rates following diagnosis and a constant rise in fatalities. The development of lung cancer at the time of diagnosis is clearly correlated with survival.

The likelihood of receiving a successful therapy increases with time since discovery. Cigarette smoking is predicted to be the cause of 85% of lung cancer cases in men and 7% of lung cancer cases in women. Nearly one death in every four in the US is caused by cancer, which continues to be the second most common cause of mortality. For a variety of cancers, the average survival rate is 63%.

Even if lung cancer is treated with surgery, radiation therapy, and chemotherapy, the total multi-year survival rate for all stages combined is just 14%. Nothing has changed in this aspect during the previous three decades. Lung cancer typically progresses along this path because lymph normally follows a path to the focal point of the chest after leaving the lungs.

When a cancerous cell spreads from its original location and travels via the blood stream to a lymph node or another area of the body, it is said to have metastasized. Lung cancer with a critical stage 1 origin is a tumour. Lung cancer comes in a variety of different forms, but it may be divided into two main categories: small cell lung cancer and non-small cell lung cancer. Carcinoma, Aden carcinoma, and Squamous cell carcinomas are the three subtypes of non-small cell lung cancer.

By applying several improvement and segmentation approaches, such as thresholding and watershed transform, this work aims to identify the malignant cells that are present in the CT images of the lung.

II. LITERATURE SURVEY

To implement our LCDS, the literature survey includes study of various research papers. Following research papers were based on image preprocessing, morphological operations and Feature extraction.

Anita Chaudhary and Sonit Sukhraj Singh employed convolution filters with Gaussian pulses in paper [1] to smooth the pictures of the cells. The image's contrast and colour are then enhanced. Next, thresholding is used to segment the pictures' nuclei. After that, characteristics are extracted from the pictures of the nucleuses using morphologic and colorimetric approaches.

Tanushree Sinha Roy, Neeraj Sirohi, and Arti Patle's study in paper [2] is primarily focused on how lung pictures are grouped according to whether or not they are affected by cancer. In their suggested method, a lung CT scan picture is used as an information image, the specific concerned region is separated using an active contour model, and then some crucial characteristics are deleted in order to categorise the image.

Prof. Anuradha S. Deshpande and Dhanesh D. Lokhande's article [3] R. P. Mundhe In order to increase the quality of the data, Juilee M. Ghatole gathered the CT and MRI pictures from a database and then combined both of them. This helped to integrate the relevant information from a group of images into a single image that has more information than any of the input images. Since there are many different types of noise in images, noise reduction was used. They modified the digital image using the image enhancement process to obtain findings that were more suited for presentation or additional image analysis. Finding the key attribute of an image makes it more appropriate.

Then the watershed approach is utilised to divide the distinct areas. Support Vector Machine (SVM) Algorithm is used to identify the various phases of defective nodule.

III. SYSTEM MODEL

The report uses four basic processes: binary conversion, morphological operations, eccentricity filtering, and noise reduction using median filtering. Every procedure created during the project uses MATLAB. Fig. 1 shows the process involved with the project's lung cancer identification framework.
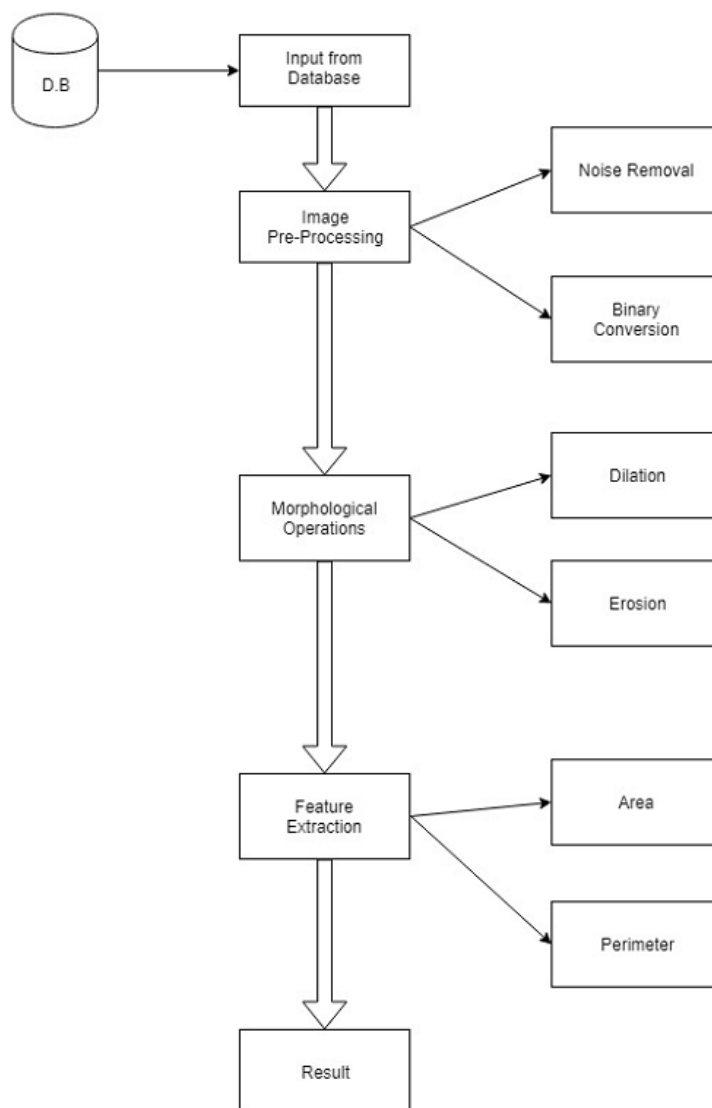
Fig. 1 Block Diagram for System Model

The median filter in the LCDS architecture is used to blur the cell images. The photos have improved colour and contrast. At that moment, thresholding is used to segment the image's nuclei. These are typical and simple methods for processing digital images. From that point on, LCDS extracts features from the picture using morphologic approaches. The average intensity, area, and perimeter of the nucleuses are among the separated morphologic properties. In order to determine if cancer cells are present in the instances or not, it is based on this concept that a lung cancer cell recognised nodule is used to analyse those characteristics. The LCDS's whole conclusion process is apparent in figure 1

3.1 Image Database

The CT scans must be included in the System's necessary database. In comparison to other types of imaging, the CT image is more reliable. Normally, dicom-formatted medical pictures like CT scans must be converted into readable format. There are several instruments available to aid with the job.

3.2 Image Pre-Processing

Techniques used in pre-processing include picture segmentation, image enhancement, and image smoothing. In order to eliminate the noise from an image, numerous additional filters or approaches are available in image processing. In this study, noise is removed using median filtering.after your paper is styled.

3.3 Median Filter

A nonlinear technique for removing noise from photographs is median filtering. Since it effectively reduces noise while keeping edges, it is commonly employed. The median filter operates by going pixel-by-pixel across the image and replace each value with the median of its neighbours. The neighbourhood pattern is referred to as the "window" and it moves pixel by pixel over the entire image. The median is determined by inserting the pixel under consideration in place of the middle (median) pixel value after numerically ordering all of the pixel standards from the window.

$$B = medfilt2(A,[m,n]) \qquad (1)$$

The median value in the m x n neighbourhood around each output pixel in the picture is contained in each output pixel. The median values for locations within half the neighborhood's width ([m,n]/2) of the edges may seem distorted because Medfilt2 pads the picture with 0s on the edges.

3.4 Binary conversion/Thresholding

The simplest technique for segmenting images is thresholding. Thresholding may be used to produce binary pictures from a grayscale image. Image thresholding is a straightforward yet efficient technique for separating an image's foreground from its background. By transforming grayscale photos into binary images, this image analysis approach is a sort of image segmentation that separate objects. The best photos for image thresholding are those with high contrast levels.

Selecting a Threshold 'T' that separates these modes is an obvious way to remove the things from the backdrop. Any point (x, y) at that time for which f(x, y) > T is referred to as an object point; in general, the fact is referred to as a backdrop point. After achieving the threshold value, which will rely on this method and fall between 0 and 1, we may segment a picture accordingly.

IV. MORPHOLOGICAL OPERATIONS

4.1 Dilation

Dilation is one of the two fundamental operators in mathematical morphology. It is used with binary pictures, while some versions can function with grayscale images. Its main impact is to expand the borders of White-colored pixel areas.

4.2 Erosion

Erosion is one of the two fundamental mathematical morphology operators. It is used with binary pictures, while some versions can function with grayscale images. Its primary function is to dissolve the borders between areas of pixels, namely White pixels.

4.3 Feature Extraction

The primary idea behind feature extraction is to start with a base set of exact data and develop derived values that are meant to be useful and non-redundant, hence easing the learning and generalisation processes that follow. Dimensionality reduction and feature extraction are connected.

To find and isolate different desirable areas or forms of an image, algorithms are utilised. The tumor's area and perimeter are retrieved from the picture.

V. RESULT

5.1 Result for Image Pre-Processing

Pre-processing is mostly used to improve picture data by enhancing some crucial visual elements or suppressing undesired distortions in figure 2
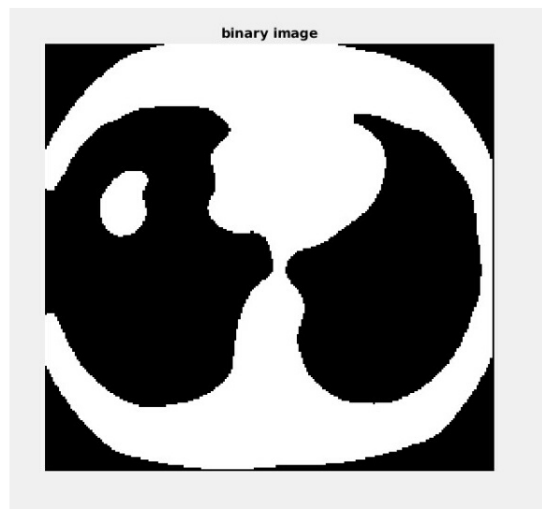

FIG. 2 Result of median filter and binary conversion

5.2 Result for Morphological operations

Morphological operations are used for extracting and describing image component regions in fig3 and fig4.
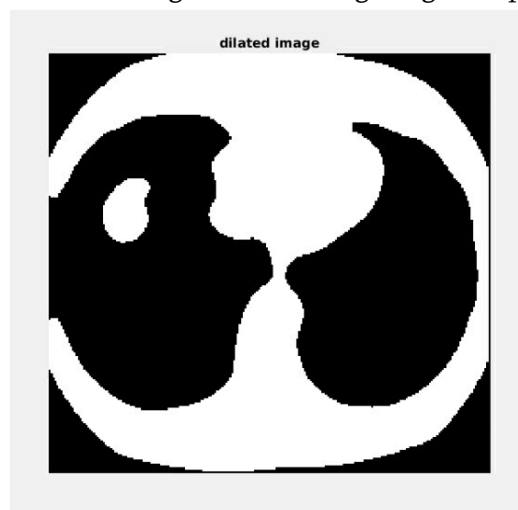
FIG. 3 Dilated Images
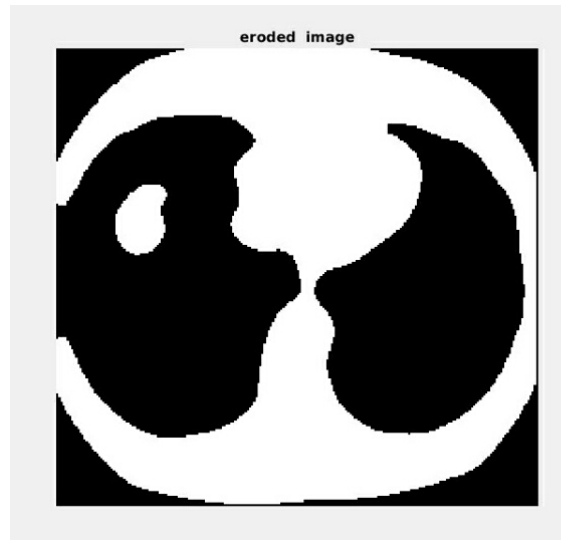
FIG. 4 Eroded Images

VI. CONCLUSION

According to the stage at which cancer cells are discovered in the lungs, lung cancer is the mainly severe and widespread disease in the world. This tells us that the method of locating this disease is crucial in preventing serious stages and lowering its prevalence globally. In order to get more exact results, we divided our work into three stages: image enhancement, image segmentation, and feature extraction. There are many improvements that may be made to Lung nodule Recognition in CT Scans to make it more effective. This is an active area of study that is always improving.

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Green Manufacturing- Future Prospects of Sustainable Manufacturing

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ABSTRACT

Green manufacturing also referred to as Sustainable manufacturing or eco-friendly manufacturing, is receiving more attention in the process manufacturing world. Sustainable manufacturing includes- Avoiding causing harm to the local environment, reducing pollution and emissions, cutting waste of raw materials and other resources, reducing consumption of energy, water, and other limited substances, Increasing safety for workers and nearby communities.

Supply chain is an integral element of green manufacturing. With a refined supply chain & Logistics, manufacturing companies can raise their reliability and lower delivery times, thereby improving their reputation with customers. An optimized supply chain also supports better forecasting, enabling plants to produce the right amount of product at the right time and thus reduce the expense of unwanted products.

This paper presents an exploratory study of the relationships between specific environmentally sustainable manufacturing practices. This paper addresses the present problems which are compelling industries to adopt green manufacturing processes and its contribution towards a sustainable environment. Findings suggest that environmentally sustainable manufacturing practices may be positively associated with competitive outcomes..

I. INTRODUCTION

Manufacturing is the largest sector of the Indian economy. It stands at the center of our country's success and contributes to many job opportunities throughout the land of India. From retail to construction, transportation to utilities, the manufacturing sector is closely connected with all other thriving industries across the nation today.

Manufacturers can reduce their impact on the environment and find their path to sustainable production by using intelligent edge solutions to collect, analyze, and act on data across their organization in near real-time to increase efficiency, reduce waste, and identify areas for sustainable innovation.

SUSTAINABLE MANUFACTURING
Sustainable Manufacturing Processes

Fig 1: Aspect of Sustainable Manufacturing Process

II. PRINCIPLE OF GREEN MANUFACTURING

Its main goals are to make products by concerning product life cycle with clean manufacturing process, not over-packaging, less in transportation, disposal and recyclability that keep minimum negative environment impact and use of resource efficiently.

It depends upon the process cycles which includes material extraction, processing of raw materials, manufacturing, transportation and distribution, use/reuse/maintenance, recycling and disposal.

Green manufacturing involves transformation of industrial operations in three ways:

(1) using Green energy,

(2) developing and selling Green products and

(3) employing Green processes in business operations.

III. IMPACT OF GREEN MANUFACTURING ON SUSTAINABILITY

Green manufacturing processes have helped many energy intensive companies to implement lean processes to minimize waste and enhance energy efficiency. Green Manufacturing being adopted in many industries helps in promoting energy efficiency and reduces industrial carbon emissions into the atmosphere thus minimizing air pollution. The common issue of water pollution and water scarcity has been fought out using green processes. Water consumption and waste generation has also been addressed as one of the big levers of Green. It is possible to reduce water consumption by better control of processes, recycling water and embracing new water-saving technologies. Manufacturing plants can minimize waste generation by redesigning their press tools and machines to reduce the scrap they produce and by improving scrap collection and recycling.

Thus these methods not only help us in reducing pollution and waste generation but in turn help us in preserving our environment to bring about a sustainable development of nature and mankind.

IV. CHALLENGES IN ACHIEVING SUSTAINABLE MANUFACTURING

Though companies have already started to recognize the impact of sustainability initiatives on consumer behaviour and their role in solidifying the brand's image and reputation, there are still numerous barriers in practicing and achieving them.

- Lack of standardized metrics or performance benchmarks. Some companies that do engage in sustainable manufacturing have poor systems for monitoring and evaluating the performance of their initiatives, which can lead to inefficiency and inaccuracy in tracking their development.
- Lack of sustainability concepts locally conducted programs awareness, and innovation. Access to sustainability-oriented research and programs is essential in implementing sustainable manufacturing practices as more information and support broadens the ideas and the capabilities of companies to achieve them.
- Lack of consumer awareness for green projects. According to industry professionals in the manufacturing sector that are one of the respondents of this study, companies should properly address this, considering that there's already a high demand for green products and green practices from the market.

In conclusion, companies must develop a streamlined process and framework for implementing sustainable manufacturing practices and develop models that would directly tackle these challenges.

V. GREEN MANUFACTURING PROCESS

One area of green manufacturing where the industry can excel at is in recycling and reusing waste materials. Many service centers and manufacturers have processes in place to collect, reuse, and recycle scrap material. This can be as simple as collecting scrap in designated bins or boxes and recycling the material at designated intervals.
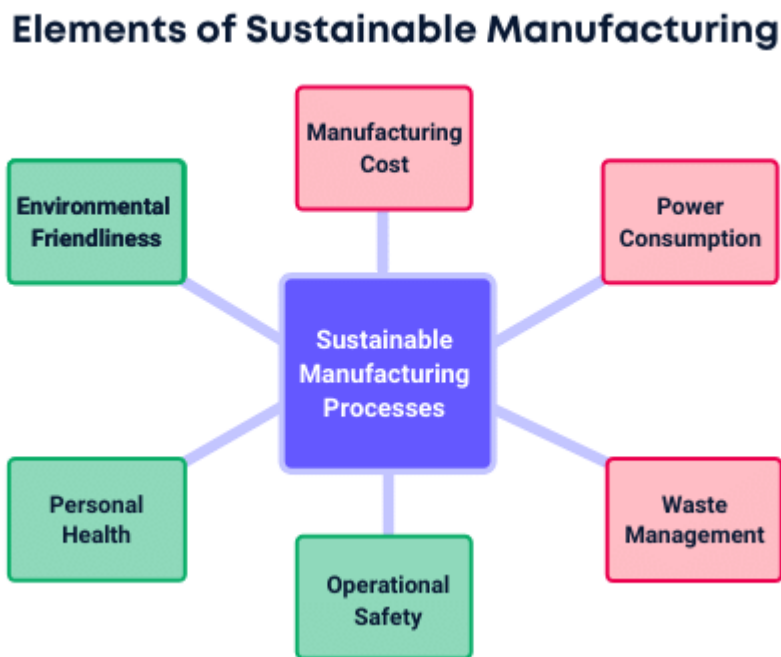
Fig 2: Element of Sustainable Manufacturing

VI. ELEMENTS OF SUSTAINABLE MANUFACTURING

- **Manufacturing cost** – the amount used to manufacture the product.

- **Power consumption** – the amount of energy used to produce.

- **Waste management** – how the waste is disposed, re-used, or recycled.

- **Personnel health** – how it ensures that workers in the operations aren't at risk.

- **Operational safety** – how it ensures the safety of production process.

- **Environmental friendliness** – how it ensures that the product is not environmentally harmful.

VII. BEST PRACTICES OF SUSTAINABLE MANUFACTURING

More and more enterprises are engaging in sustainable manufacturing and they have various ways of measuring its level of success and efficiency. Below are just some of the best practices companies can follow when observing sustainability:

- **Reduce inputs in production** – Find alternatives for supplies that are either harmful to the environment or require a huge amount of materials. Revaluate processes to identify if there are more opportunities for waste reduction.

- **Revaluate the use of fossil fuels** –Decreasing energy consumption not only reduces carbon emissions, but also cuts energy costs.

- **Improve efficiency in facility** – Modifications in operations can also reduce excess waste and help in identifying more efficient processes in production.

- **Recycle** – Recycling is the most basic but also the most important green manufacturing process. An effective recycling system can help companies reduce waste, reduce cost, and have a positive environmental impact.

- **Decrease pollution** – Reduce the use of environmentally-unfriendly materials and utilize equipment that could help in reusing resources such as water treatment plants.

VIII.   BENEFITS OF GREEN MANUFACTURING

Green manufacturers research, develop, or utilize technologies and practices to lessen their impact on the environment. As detailed report states, workers at green companiesmust have specific manufacturing training in green technologies and practices such as:

1. **Energy from renewable sources**. Workers may generate electricity, heat, or fuel from renewable sources for use within their establishment. These sources may include wind, biomass, geothermal, solar, ocean, hydropower, landfill gas and municipal solid waste.

2. **Energy efficiency**. Workers will utilize specific technologies and practices to improve energy efficiency within their establishment.

3. **Pollution reduction and removal, greenhouse gas reduction, and recycling.** Workers will use green technologies and practices to:
    ♦ Reduce or remove the creation or release of pollutants in their operations
    ♦ Reduce greenhouse gas emissions
    ♦ Reduce or eliminate the creation of waste materials
    ♦ Collect, reuse, recycle or compost waste materials

4. **Natural resources conservation.** Workers will use specific technologies and practices to conserve natural resources, such as those related to organic agriculture, land management, and soil, water, or wildlife conservation.

IX. IMPLEMENTING SUSTAINABLE MANUFACTURING IN PROCESS PLANTS

i.   Recycling-

The recycling recommends increasing the percentage of used materials involved in the production process. A closed-loop approach, or circular process manufacturing lifecycle, means that when the product reaches the end of its lifecycle, it is collected to be reused into the new product. In this way, manufacturers can optimize the use of energy, raw materials, and other resources, and reduce waste and emissions.

ii.   Renewable energy-

Replacing fossil fuels with renewable and/or green energy like green hydrogen, solar, wind power, or biomass can help improve the plant's sustainability profile. Every plant activity that can be powered by renewables helps it become more eco-friendly.

iii.   Predictive analytics-

Advanced predictive analytics tools, including predictive monitoring and predictive maintenance, can help reduce energy consumption and raw materials' waste by ensuring the plant is operating at optimal efficiency.

iv. Smart systems-

Today's smart plant software uses data from Industrial Internet of Things (IIoT) devices, artificial intelligence (AI), and machine learning (ML) to quickly spot variations in water and energy consumption. Early alerts enable teams to fix leaks or bottlenecks before they result in large-scale waste.

v. Automation-

Automation such as cobots and robotic process automation (RPA) helps lower the risk of waste due to human error. With AI, automation, and IIoT, plants are increasingly adopting "lights out" manufacturing, which cuts energy consumption by removing the need to run light and heating for human employees.

vi. Conservation

Toyota, one of the leaders in sustainable manufacturing, goes a step further and includes tree planting and other conservation activities as part of the remit of a green plant. Enhancing the natural environment and helping to preserve local ecosystems takes sustainable manufacturing beyond merely avoiding harm and brings it to active eco-friendliness.

X. CONCLUSION

Adoption of Green Manufacturing technologies is not just a social obligation but a growth catalyst. Moving towards a green manufacturing has the potential to achieve sustainable development and eradicate poverty on an unprecedented scale with speed and effectiveness. This would require leaders, society and leading businesses to collaboratively engage in this transition. It will require a sustained effort on the part of policy makers and their constituents to rethink and redefine traditional measures of wealth prosperity and wellbeing. A green manufacturing economy substitutes clean energy and low carbon technologies for fossil fuels, which addresses climate change, creates jobs and reduces import dependencies. New technologies promoting energy and resource efficiency provide growth opportunities in new direction. One possible solution would be investment upon establishment of eco-industrial parks. Government will also need to consider ways of supporting the greening of manufacturing through institutional support and soft technology approaches.

However there are many risks and challenges along the way for the industries as well as for the government. To make green jobs a reality, implementation of a strategy to train manufacturing workers on the principle of energy and resource conservancy is imperative so that the manufacturing sector avoids waste of resources and ensures a healthy environment.

As investments in safety, energy reduction, pollution and quality control have shown tremendous cost reduction, the investments in green manufacturing will also have its own benefits.

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Semi-integrated Solar LED Street Light

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ABSTRACT

Solar energy is one of the most significant and promising renewable sources of energy, and it has a lot of potential in street lighting systems. Solar street lights have become increasingly popular in recent years due to their many advantages over traditional street lights. An LED lamp is powered at night by a rechargeable battery that is charged by solar panels. As everyone knows, foreign nations have dominated our Indian market. It is past time for India to be self-sufficient in these items and to support the Government of India's Make in India effort. Furthermore, the items should not be harmful to the environment. Use of natural resources such as sunlight and wind are a must. So Semi-integrated solar LED street lighting is proposed. This Semi-Integrated Solar Street Lights have dusk to down sensors, has an adjustable brightness setting, is water resistant, has good energy storage and has a long battery life. The lamp technology uses solar energy to generate electrical energy from solar radiation during the day and then uses that energy to generate light at night. This makes it less expensive and easier to install. Because it is solar-powered, it may also be deployed in remote areas. This undertaking will be focused on maximizing usage and minimizing possible energy loss.

Keywords—Solar panel, LED street light.

I. INTRODUCTION

According to research, majority of the Indian market is dominated by Chineseitems. It's time to wean our country off of Chinese imports and back the Make in Indiaprogram of the Indian government. India has a wealth of natural resources, including solarand wind energy. Governments across the world are focusing on sustainable and renewableenergy sources to reduce carbon emissions and combat climate change. This has led to anincreased demand for solar-powered products, including semi-integrated solar street lights,which can help to reduce energy consumption and carbon footprint. Consequently, it ismore economical to use natural resources as opposed to synthetic ones. A solar street lampis a type of lighting system that makes use of solar cells to harvest electrical energy fromsolar radiation inthe day time and use it to provide light at night. The recommended smartsolar LED street light could be utilized for free if the solar panels have enough time tochargethem.

The dependability of the system will increase by using the auto change over method, inwhich the utility supply is automatically switched from the streetlight. if not, enoughcharge has been applied to the battery storage. During the day, the battery starts to chargeusing a PV solar panel. At dusk, street lights are turned on automatically with a 30%intensity and battery depletion starts due to the light sensor. Every time a person orvehicle moves, the light intensity will increase for a predetermined period of time, from30% to 100%. The

intensity will gradually decrease to 30% after this set period. Theintensity will again increase if any movement is detected in the interim. This ensures bothoptimal lighting and energy efficiency. This automated solution requires a battery with asubstantially smaller capacity than conventional solar LED lamps. Semi-integrated bulbsare more affordable and convenient to install with this arrangement, making themidealforrurallocations.Ingeneral,thereare3categoriesofsolarstreetlights lamps:

(1) Unintegrated lamp
(2) Fully integrated lamp
(3) Semi-integrated lamp

- Anun-integratedstreetlighthasitslight,solarcell,controller,andbatteryallseparatefromoneanother.
- Asemi-integratedsolarstreetlightonlyhasasolarcell,controller,andbatteryintegrated; the lamp is connected to other lamps via a cable. Semi-integrated lamps aremoreaffordableandconvenient toinstallwiththisdesign.
- Fully-integrated lamp has integrated all the components of each lamp, because they are notconnected, they are readily stolen. The danger of theft is increased since it has a largermonetary value than standard street lighting. Snow, dust, and moisture may collect onhorizontal PV panels. Asa result, energy production is decreased or completely halted.
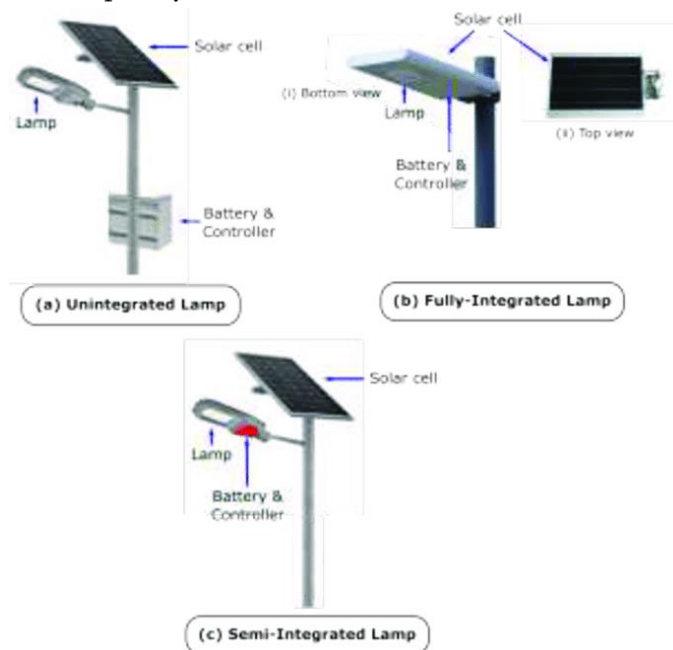
Fig.1. Different types of solar street lamps[13]

A semi-integrated solar street lamp only has a solar cell, controller, and battery integrated;the lamp is connected to the lamp via a cable. Semi integrated lamps are more affordableand convenient to install with this design. Semi-integrated solar street lights are a type ofoutdoor lighting system that uses solar energy to power its lighting fixtures. These lightsare designed to provide illumination for streets, pathways, and other outdoor areas, whilealsobeingenergy-efficientandenvironmentallyfriendly.Furthermore,thesolarstreet[3].lamps power was determined to fulfill the lamp's energy demands up to 12 hours. A Semi-Integrated Solar Lamp is designed differently from a standard solar street lamp. The typical solar street lamp isolates every component, such as the bulb, solar cell, controller, and battery. However, as a result, this solar lamp can be readily put on the lamp pole. This design allows for greater flexibility in terms of placement and installation, as the solar

panel can be positioned to capture maximum sunlight and the lighting fixture can be mounted at the most suitable height and angle for optimal illumination. The controller circuit will be linked to the battery and solar cell through a wire. When the battery is charged and the light is switched on, the flow of current is controlled by the lamp controller. Several DC lamps powered by photovoltaic (PV) power in the prototype smart street lighting system are presented in this study. When a solar panel generates more power than it needs, a panel is added to store the extra energy so it can be used at night or when it's cloudy or otherwise. In other weather, to prevent the battery from being overcharged and to regulate the operation of the whole system, a charge controller is used. Overall, semi-integrated solar street lights are a versatile and reliable option for outdoor lighting, offering the benefits of solar energy while also providing high-quality illumination for various outdoor applications [4].

II. LITERATURE SURVEY

LiewPokHuaiet al. [1] researched solar streetlight systems. This research paper is to explain a proposed Solar Street Light (SSL) design for energy efficiency development for managing facility planning. For commuters and nighttime pedestrians alike, street lighting is an essential public utility that creates a safer atmosphere. However, there are several drawbacks to conventional street lighting (CSL), including excessive energy usage and instances of electrocution. Therefore, in light of the issues, this research aims to create a new framework for creating a contemporary SSL design. The study also examined the two forms of street lighting in depth, finding that SSL has the potential to save 64.7% of the whole cost compared to CSL. One of SSL's distinctive qualities is its DC 12V operating voltage, which is stable and ensures human safety because there is no risk of electrocution. This study so presented a framework consisting of a 30 m separation distance between street light poles, a 9 m height, a light management system, a 90 W LED bulb, a 5.4 kWh volume of rechargeable battery, and a 2 ft2 solar panel.

Badri Narayan Mohapatra, etal.[2] researched on power saving solar streetlight system. This research paper aims to discuss a proposed power-saving Solar Street Light; the idea of guaranteeing optimal use and least loss of available energy serves as the basis for this article. The streets are illuminated at night using solar energy that is abundantly accessible during the day and is stored in solar cells. The system also provides a power-saving mode of operation by modifying the automation strategy. A dark sensor and a light sensor enable the street lights to automatically switch on when necessary (i.e., when the surrounding area is dark) and off when necessary (i.e., when there is enough light in the area). The auto intensity control system has again been employed, this time with the aid of a microcontroller, to control the luminaries' light output according to the circumstance. The energy waste brought on by the unnecessary glare of the street lights may therefore be avoided.Shaik Shushma, etal.[3] researched solar street lightsystems. This research paper is to explain a proposed Solar based led street light with auto intensity control this paper is based on the idea of maintaining maximum utilization and minimum loss of available energy. A solar cell stores a significant amount of solar energy that is accessible during the day, and this energy is then used to illuminate the streets at night. By adjusting the automation approach, the system also offers a mode of operation that conserves energy. The street lights' automated "ON"/"OFF" capability is provided by a dark sensor and a light sensor. This means that the street lights will automatically switch on when necessary (i.e., when the surrounding area is dark) and turn off automatically if there is enough light in the area. In order to adjust the luminaries' light intensity in

accordance with the situation, the auto intensity control mechanism has once again been used with the aid of a microcontroller. Therefore, the loss of it is possible to prevent the energy used by superfluous street lighting.

Fares S. El-Faouri, etal.[4] researched on solar streetlight system. In this study, an automatic intensity-controlling smart solar street light is presented. Several DC lamps are powered by a photovoltaic (PV) source in the prototype smart street lighting system shown in this study. When a solar panel produces more energy than it needs, a battery is added to store the extra energy so that it may be used at night or when clouds or other types of shade are blocking the sun. To prevent the battery from being overcharged and to regulate how the system functions as a whole, a charge controller is employed. A motion-sensing circuit and a dust-cleaning circuit are also added to the system, which further expands its capabilities. As a whole, the system produces smart, effective street lighting that may be used independently of the grid. As a component of a larger system, it may be linked to the rest of the grid.

III. PROPOSED ARCHITECTURE & METHODOLOGY

The objective of this system is to develop an approach including procedures and methods for a Semi-Integrated Solar Street Light.

Proposed system block diagram is shown in Fig.2, Solar panel is composed of Photovoltaic modules. During the day, the sunlight hits the solar panel and solar energy is collected from the sun. Then, it is transformed into electrical energy by solar cells, which are then stored in the battery. Before the battery is charged, the Photovoltaic module's generated electricity passes via a charge controller circuit.
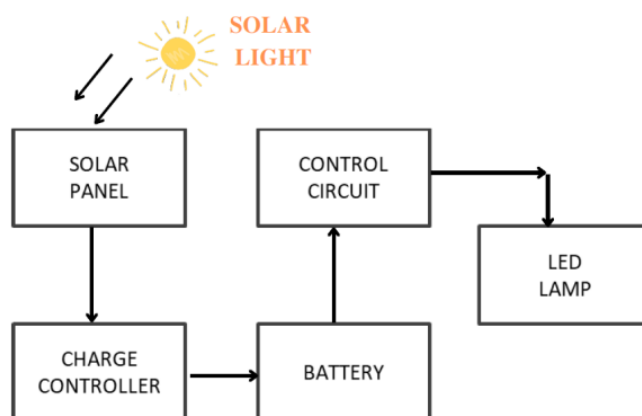
Fig.2. Proposed system Block Diagram of Solar LED Street light

The solar panels collect Solar Energy composed of PV models and receive light throughout the day.The solar street light operates based on solar cells. Solar cells transfer this solar energy into electrical energy, which is then stored in the battery. It takes around 5 to 6 hours for the battery to fully be charged. The in-charge controller in the IC CN3722 protects the battery from overvoltage which might shorten in lifespan. The LED Street light turns ON at night and uses the energy that has been stored in the battery. Sensors are installed on the street light to detect any motion. When there is no motion lightintensity of the LED street light is at 30% when motion is detected, its intensity increases to a maximum of 100%. By doing this a lot of electricity is saved. And this cycle repeats.

IV. HARDWARE COMPONENTS

Various hardwarecomponents used in this project areexplained below in brief:

1) **Polycrystalline solar panel:** The Fig.3, Polycrystalline solar panels are made up of multiple polycrystalline silicon crystals, giving them a distinctive blue colour and a square shape. These panels contain many cells, with each cell made up of many silicon crystals. Because of this, there is a limit to the amount of electron mobility within the cells. When sunlight hits the solar panel, the PV cells within it collect energy from the sun's rays. This energy causes electrical charges to move, creating an internal electrical field that allows electricity to flow. This flow of electricity can then be harnessed for a variety of applications, including powering homes, businesses, and other types of infrastructure.

Fig.3. Polycrystalline Solar Panel[8]

Polycrystalline solar panel working principle: As shown in Fig.3, Solar panels consist of multiple photovoltaic cells, each of which comprises silicon crystals functioning as a semiconductor device. As photons from the sun hit the PN junction, they energize the electrons and enable them to flow as an electric current. P-type materials have fewer electrons, whereas N-type materials have an excess of electrons. the PV cells have two electrodes, with the top electrode comprising small wires and the bottom electrode resembling foil.

2) **IC CN3722 Module:** The CN3722 is a maximum power point tracking photovoltaic cell that can power a PWM switch-mode battery charger controller. It is made to charge lithium- ion or LiFePO4 batteries in a constant current and constant voltage mode for single or multiple cells. The external resistor divider controls the regulation voltage when operating in constant voltage mode. Using a single current sense resistor, the constant charging current may be programmed. For deeply drained batteries, the CN3722 additionally offers a trickle charging feature that charges them at 15% of the programmed constant charging current until the cell voltage is more than 66.7% of the regulation voltage. When operating in constant voltage mode, the charging current gradually declines, and the charge cycle is finished when it reaches 9.5% of the initial charging current. the current at its maximum. In constant voltage mode, a new charge cycle will begin automatically if the battery voltage drops below 95.8% of the regulatory voltage. Under voltage lockout, battery temperature monitoring, and status indicator are further characteristics of the CN3722. The CN3722 is a well-liked option for a variety of battery 16-pin design.
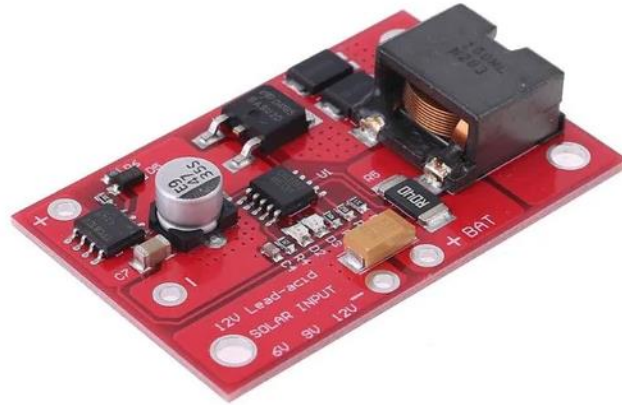
Fig.4.IC CN3722Module [12] [1c7]

On visiting several industries and gaining knowledge about all the equipment one of the industry-The Tropical Electronic Equipment factory, Mumbai, Maharashtra they suggested using an IC module, i.e. CN3722 Module.

Specifications of CN3722 MPPT Module

There are several great features of this IC such as:

1. Maximum Power Point Tracking (MPPT) capability by input Voltage regulation
2. Programmable MPPT setting
3. 5-V to 28-V Input solar panel
4. 600-kHz NMOS-NMOS Synchronous buck controller · Resistor programmable float voltage
5. Accommodates Li-Ion/Polymer, LiFePO4, and lead acid chemistries
6. Accuracy –

   ±0.5% Charge voltage regulation

   ±3% Charge current regulation

   ±0.6% Input voltage regulation

3) **Arduino Nano:** The ATmega328P microprocessor-based Arduino Nano is a compact and versatile development board that shares the same specifications and connectivity as the widely recognized Arduino Uno board. However, it comes in a smaller form factor and is designed to be user-friendly and highly modifiable.

Fig.5. Arduino NanoSensor [14]

4) **Nrf24l01:** The Nrf24L01 is a single-chip 2.4GHz transceiver engineered for wireless applications that demand ultra-low power consumption. It is equipped with the Enhanced Shock Burst baseband protocol engine.the Nrf24L01 is intended to operate in the 2.400 - 2.4835GHz global ISM frequency band. The global ISM frequency band, which is frequently used for wireless communication, is where the Nrf24L01 wireless transceiver module works. It is made for ultra-low power wireless applications and transmits data using GFSK modulation. The module uses an active radio frequency to broadcast and receive data.

Fig.6.Nrf24l01[15]

5) **PIR Sensor:** PIR sensors are an importantcomponent of many security and automation systems, as they provide a reliable and cost-effective way to detect motion and presence without the need for complex or expensive equipment. They work by detecting the heat energy emitted by living beings and converting it into an electrical signal that can be used to trigger an alarm, turn on lights, or activate other devices. PIR sensors are a popular option for both residential and business applications since they are simple to install and require little upkeep.

Fig.7. PIR Sensor[10]

6) **Lithium-ion Battery**: Lithium-ion, is a type of rechargeable battery that uses a cathode made of lithium-ion phosphate. Lithium-ion batteries are known for their high energy density, light weight, and long lifespan. Lithium-ion batteries are considered safer due to their inherent stability and resistance to

overheating and are widely used in various applications such as electric vehicles, renewable energy storage systems, portable electronic devices, and backup power supplies.

Fig.8Lithium-ion Battery[9]

7) **LED PCB:** A light-emitting diode (LED) PCB (Printed Circuit Board) shown inFig.9 is a circuit board that is specifically built to accommodate the placement andfunctioning of LEDs. LED PCBs feature a unique architecture that allows for optimalLED positioning, allowing them to output lightefficiently and effectively.LED PCBscanbeconstructedinarangeofshapesandsizes,andtheycanbeusedinbothsingleLED applications and larger LED arrays. These boards are often built of a hard material,such as fiberglass or Aluminum, which aids in heat dissipation and keeps the LEDs coolduring operation. LED PCBs are often designed using copper lines and pads that connectthe LEDs to the power source, as well as additional components like as resistors andcapacitors that may be required for the circuit to function roperly. LED printed circuitboards are widely utilized in a wide range of applications, including lighting, signage,automotive,and electronics.

Fig.9 LED PCB

V. FLOWCHART

The flowchart of working process is shown below in Fig.10, Energy produced by a solar panel is harnessed throughout the day and stored in a battery.When the microcontroller receives commands from the Dark sensor. The light will be turned off in accordance with the instructions when it is daylight. If it is nighttime, the dark sensor will pass the command to the motion sensor, which will then carry it out and turn the LED on to 30% of its maximum intensity if there is no motion beneath the streetlight.
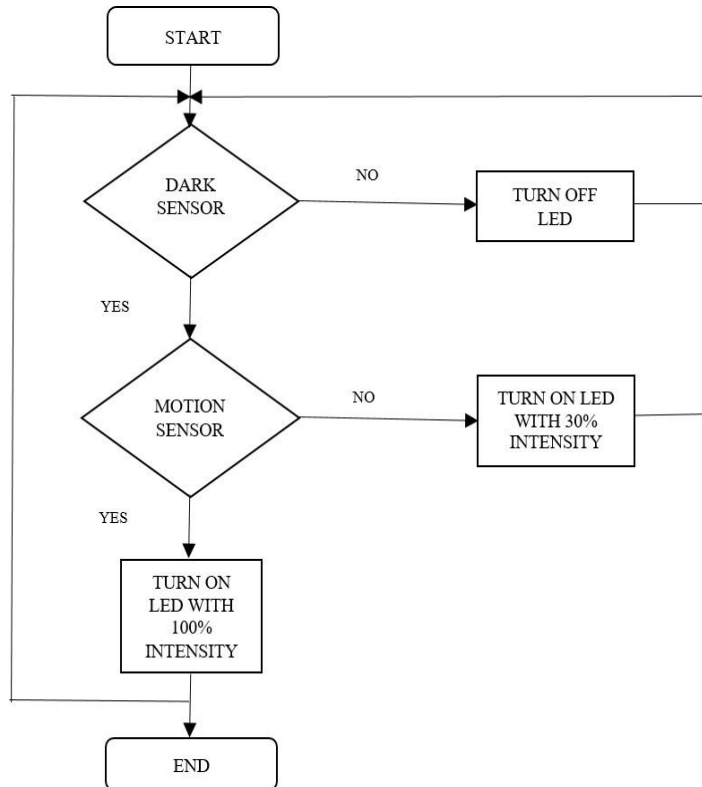
Fig.10Flow Chart of working process of Solar LED Street lightT

Whenever a human or vehicle passes by a nearby streetlight, the motion sensor triggers and sends an instruction to the microcontroller to increase the brightness to 100%.If no movement is observed during the predetermined period, intensity to 30% reduction over time. The street light will switch off in the early hours when the Nrf sends an instruction to the microcontroller. In the normal course of things, streetlights run on battery-stored power. Furthermore, if the battery is not fully charged due to overcast weather, an automatic switchover to the utility supply will occur for the streetlight.

VI. RESULT

Results of the proposed system consist of the schematics, LED with its controller design and overall layout view of the semi integrated solar streetlight.

Schematics of implemented system: The hardware implementation involves assembling the required components, including the micro controller, sensors, and power supply. The sensors include a PIR, a voltage and current sensor, the various components were interfaced with the Arduino. The system works on a 12Vbattery and is charged through solar panels. The Fig.11 shows the schematics of thesystem.
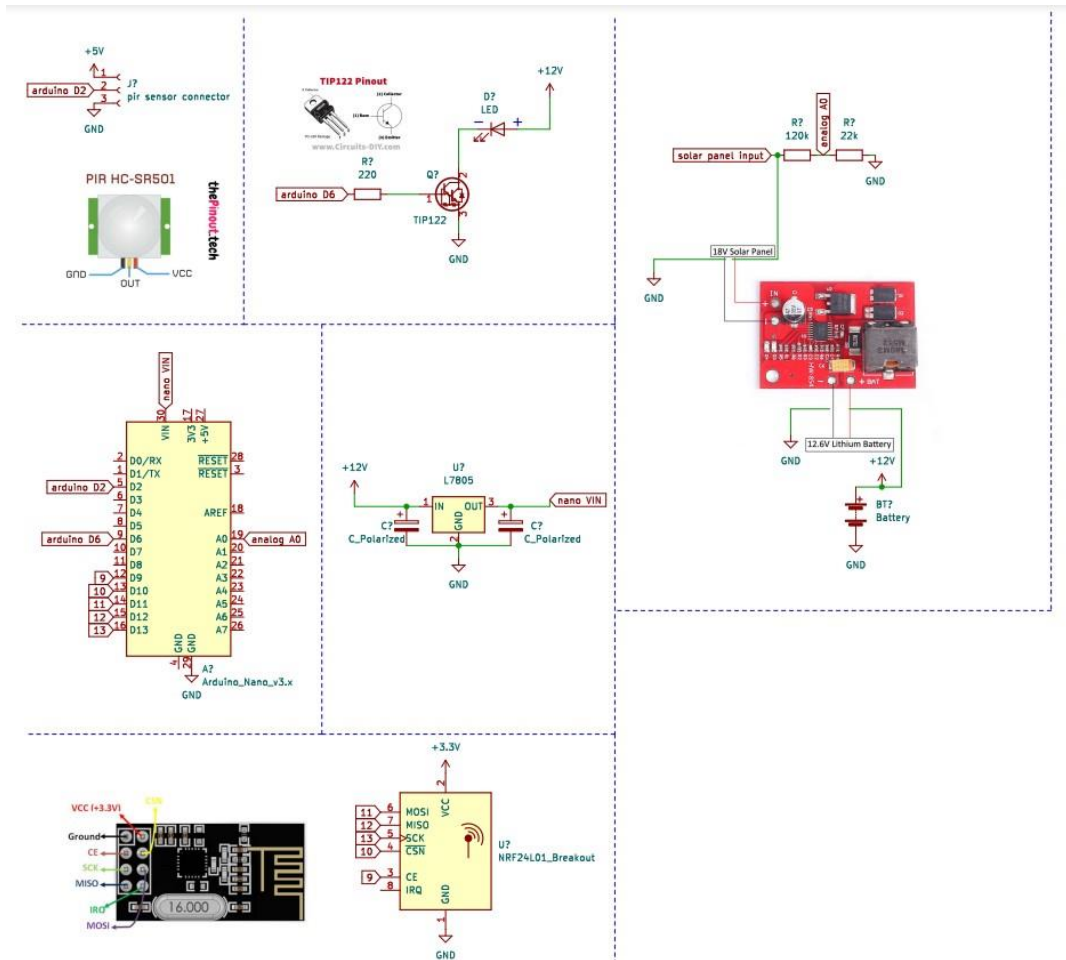
Fig.11:Schematicsofimplemented system

LED Controller Design: In Fig.12 PCB with all the components installed over it the PCB was first designed using Ki-CAD software and then further implemented on PCB. The MPPT controller is connected to theArduinoNano andalso themotionsensor is connected to the controlcircuit
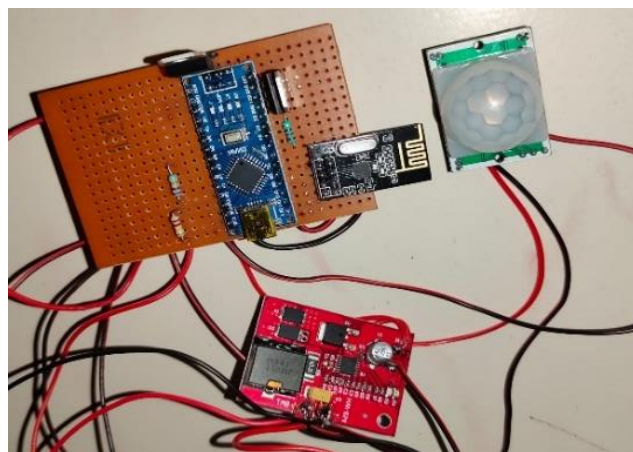
Fig.12 LEDController Circuit

Semi-Integrated Solar LED Street Light*:* In Fig.13 a semi-integrated solar LED streetlight is a type of outdoor lighting system that uses solar energy to power an LED lamp. The system includes a solar panel, which

captures sunlight and converts it into electrical energy, and a lithium-ion battery, which stores the energy generated by the solar panel. The LED lamp provides illumination during the night, while the controller manages the charging and discharging of the battery to ensure optimal performance and a longer lifespan. The solar panels are separate from the LED lamp, making it easier to install and maintain the system. The solar LED streetlight provides a reliable source of illumination while reducing energy consumption and costs and can improve safety and visibility on streets.

Fig.13Semi-Integrated Solar LED Street Light

VII.   CONCLUSION

Among the various renewable energy sources, solar energy is considered one of the most significant and promising. It holds immense potential for application in street lighting systems. In recent years, solar streetlights have gained popularity owing to their numerous benefits over conventional Streetlights. These Solar streetlights use photovoltaic cells to convert solar energy into electrical energy, which is then stored in batteries for later use. This Semi-Integrated Solar Street lights have dusk to down sensors, has an adjustable brightness setting, is water resistant, has good energy storage and has a long battery life. Overall, solar streetlights are an innovative and sustainable solution for street lighting.

The future scope of semi-integrated solar streetlights is promising and is expected to grow due to several factors. Future versions of this system may have a circuit that alerts the appropriate authorities if electricity is stolen. The GSM/GPRS system can be password secured to prevent tampering by outsiders

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Path towards Herd Immunity : Predicting Herd Immunity of Covid-19 Pandemic Using a Machine Learning Algorithm

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ABSTRACT

Machine Learning and Data analytics have been used immensely in the fight against COVID-19, from helping us to tackle and monitor the spread of the virus, it has helped governments globallywith policy formulation as well as speeding up research in vaccination and treatment of the virus. In the past 2 years, Covid-19 has sequenced from a mere virus to an endemic and later to a global pandemic, with it has come the need for vaccination, and rightfully so, many vaccines have been developed like the Pfizer-BioNTech, Moderna etc. These vaccinations have been integral to the fight against COVID-19, the rise in the number of vaccinated persons globally and the length and different waves of the pandemic will eventually lead us to the point of herd immunity. This paper uses different machine learning methodologies to predict when the world is likely reaching the point of herd immunity, what are the likely path to reach this point of herd immunity before others and the underlying factors that will influence reaching the herd immunity.We determined the likely time periods and what needs to happen to reach this time sooner. Herd immunity is an age long adaptation strategy that human evolution has developed as it interacts with a world of viruses and different bacteria's that can be detrimental to his health, understanding this with respect to Covid-19 becomes quintessential as we continue to look at the topic of Covid-19.

Keywords: Machine Learning, COVID-19, Data Analytics, Herd Immunity, Virus.

I. INTRODUCTION

The subject of herd immunity as a panacea to outbreaks is an old scientific approach to solving pandemics, epidemics and even other contagious disease that are novel or man is yet to develop scientific or empirical understanding of it to be able to attempt a cure. Herd immunity occurs when a large percentage of members of a defined sample group have developed enough immunity such that every member of that defined group become protected and immune to that particular disease, because spread from one person to another is near zero. Herd immunity is a very important topic in the area of immunology and virology, because an absolute condition where each and every member of a community has an immunity against a disease is a near impossibility, the weak have always depended on the strong, in the biological web cycle that defines human to human interaction. To protect the weak amongst us herd immunity is very important.

The weak in the biological cycle are not necessarily those without strength or only those with underlying threatening health conditions, with respect to disease especially viral SAR-V ones of which the Covid-19 belongs to, they are people who due to their dispositions are more prone to the effect of a virus or disease as compared to others. These can be genetic dispositions, age, body mass, race, habitats, underlying health conditions etc. These and many more are amongst reasons that a person can be categorized as weak and need some level of communal protection from the community through means of herd immunity.

The importance of herd immunity can be seen in the current COVID-19 situation globally, when the pandemic started, the elderly mostly, were the demography mostly affected, people from age of 65 and above were highly affected, some of these persons had underlying health conditions which made vaccination a difficult decision for them, even as at today as at the time of this research paper, the official data states that only about 62.6% of global population have received at least one dose vaccination against Covid-19 and of these persons only about 55% have received the second dose of vaccines. But a deeper look at the data reveals a trend that is even more revealing, of the 62.6% of the vaccinated population only 12.6% are from low-income countries, children between 5 to 11 have less vaccination rate, because in most countries, that demography is not allowed to be vaccinated yet, and so far for children aged 0 to 5, all over the world, Covid-19 vaccines are not made available to them. The point here is not to downplay efforts of governments and stake holders globally in their vaccination drive, but to show how herd immunity is an important scientific discourse even amidst the development of vaccines. Because there will always exist several reasons why 100% vaccination may not be possible, some of it can be due to age reasons like it has been explained in the cases of children aged 0 to 11, or economic reasons as we have witnessed with low-income countries, or several other reasons that may not be captured here, but all of this points to the importance of herd immunity in fighting pandemics and outbreaks.
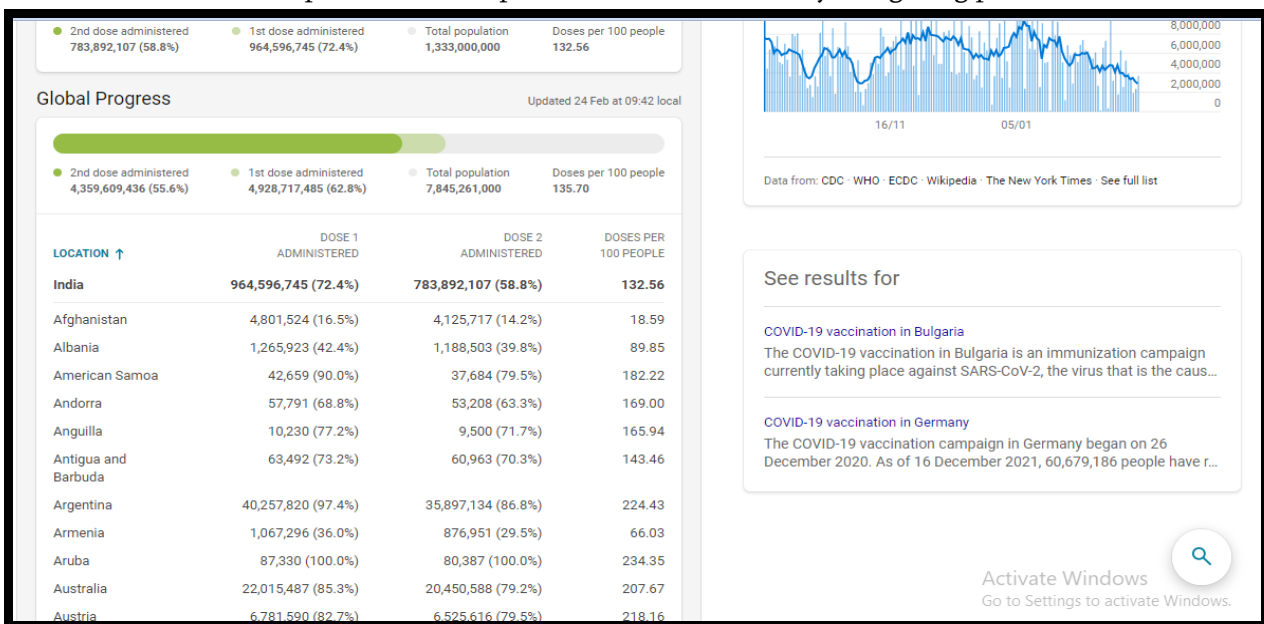
Fig1: An overview of Covid-19 vaccination progress globally

The concept of Herd immunity is not a novel concept, natural immunity has been an age long survival practice in man's interaction with viruses, diseases in his biological web. Let's take a look at measles, measles, it first appeared in the 10th century and was reported to have taken about 2.6 million lives annually, with an almost 90-99% infection rate yearly for children below the age of 5, up until the MRR vaccine was developed in the 1980s. After the development of the vaccine and the vaccine gaining a near 90% vaccination rate globally, the

annual infection rate of measles reduced drastically, now today the probability of a child under 5 developing measles is 24.3 per 1,000 child [1]. Another classic example is that of small pox which according to the WHO was eradicated in 1980[2], and that of polio which type two and type 3 was declared by the WHO as eradicated in 2015 and 2019. These are classic examples that vaccines lead to herd immunity, and herd immunity is where we should collectively work towards in cases of a pandemic.

At different epoch in our history with diseases and outbreaks, we have reached that inflection point, where the number of vaccinated persons or of infected persons are more than a particular threshold and because of this we can reach herd immunity, and significantly reduce the effect and influence of such disease on us. In this paper we will be making attempts to predict when we will be reaching this point, this study becomes a little more complex due to the complexity of the Covid-19 virus. In about 2 years, we have had about 4 waves of the pandemic with different mutations of the SAR-COV variant of the virus, some of the variant has been resistant to even 2 vaccinations hence the need for booster dose of the vaccines. This study will put all these into consideration, in order to predict when we will reach herd immunity with respect to this virus globally.

II. LITERATURE REVIEW

Several literatures and research work has been done by researchers in the wake of the pandemic, looking into the topic of herd immunity and the Covid-19 pandemic. A review showed a trend of interest that started in the early 2020 and peaked in the mid-2021, as many researchers try to understand when and how we will reach the point of herd immunity. Among the many researchers these few stood out while reviewing the body of research on this topic.

[1] Roy M Anderson et al in their work challenges in creating herd immunity to SARS-CoV-2 infection by mass vaccination, discussed on the difficulty researchers are having with predicting herd immunity, according to them this challenge stems from the fact that for Covid-19 single dose vaccination may not be fully effective, they asserted that if vaccine efficiency of 0.8 then a full vaccination of 70-80% will be enough to reach herd immunity among the population. In their research they asserted that failure to reach this level of efficiency and wide coverage, will make Covid-19 to become an epidemic, with seasonal high during the winter.

[2] Haley E. Randolph et al in their paper titled Herd Immunity: Understanding COVID-19 tried to examine what it will be like to reach mass immunity without a vaccine, their method was to predict the infection rate assuming that R0 =4, this assumption was derived from the fact that every one person would eventually infect 4 persons, to reach a natural herd immunity would mean that most of the population get infected and recover, they opined that herd immunity without vaccines was theoretically possible, but a path that should not be traded because of the devastating implication it can have, according to them the number of infected persons that must be infected to reach that point was too high, considering the high mortality rate of Covid-19 this path is not worth using.

[3] Kamran Kadkhoda et al did a case wise prognosis of the possibilities of reaching herd immunity in their publication Herd Immunity to COVID-19 Alluring and Elusive, they looked at covid-19 using different infection modalities and efficiency, and they created hypothetical cases and predicted the herd immunity base on those hypothetical cases and efficacies. According to them assuming that R (The effective rate when an infected person enters a community already exposed to the virus) is 0.99 we need a vaccinated population of 60-72% to stop the transmission, however this case only works in the case that the vaccine efficacy is =1, if it is

anything lower than 1 let's assume it is 0.95 then R becomes 63-78%, and at 0.5 it goes to between 80-90%. The key take away here from their publication is that herd immunity is largely dependent on the vaccine efficiency, the life time immunity of the vaccine.

[4] David García-García et al in their paper Caveats on COVID-19 herd immunity threshold: the Spain case, they tried to determine HIT (Herd immunity threshold) of Covid-19 in Spain, using 3 data sets from January to November 29th 2020, with these data infections were estimated using the REMEDID algorithm. In their research, they concluded that calculating HIT in Spain was not an easy task due to the influx of new variants, but from the results of their calculations 70% was estimated to be a good upper bound threshold using the REMEDIED algorithm and 80% as a good position for upper bound threshold using the official data collected of the initial variant. According to them one of the biggest offset to this calculation is time, as the values are not fixed over time, this makes the calculations not to be fixed as well.

III. METHODOLOGY

In this paper we will be predicting when herd immunity will be likely reached using the exponential smoothing model. The exponential smoothing model is one of the time series models that is used in predicting the next series based on the data from the precious serious. The exponential smoothing model was ideal for this particular research because one of the peculiarities of the exponential smoothing model is in its ability to give more weight to the recent past data, unlike moving average model and other time prediction models. Exponential smoothing uses the formula

$F_t = \alpha A_{t-1} + (1-\alpha)F_{t-1}$

Where in our cases

F_t = the forecast cases for month t

α = the smoothing constant

A_{t-1} = previous total cases

F_{t-1} = the previous periods forecast demand

Herd Immunity Calculations:

The formula for herd immunity was developed centuries ago it states as follows:

If $R_0(1-P) < 1$ then $P > 1 - 1/R_0$

Were

R_0 = Basic Reproduction number

P= Immune population

1-P= Not immune population

The larger the R_0 the more contagious a disease or virus is said to be, the less the R_0 the less contagious it is.

If R_0 is less than 1, then the disease eventually ebbs out

If R_0 equal 1, then the disease is endemic

If R_0 is greater than 1, then the disease is a pandemic

In our approach it was needless calculating R_0 and P, we simply had to take cue from works of previous researchers to determine the effective R_0 and P that will determine the threshold of exposure for a herd immunity to be reached. According to the WHO, when the pandemic began, R_0 was estimated at 2.5, but as it became more viral it was estimated by WHO to be in the range of 3.0 to 3.5. Using this R_0 value, researchers

have been able to calculate P, which is the population of persons infected by the Covid-19 virus to be able to reach the point of herd immunity, most of the researches like Roy M Anderson et al, and other group of researchers have put P at 75-90%. We took P to be 80% of the population for the sake of this research. We arrived at 80% taking the mean of some of the effective P, calculated by other researchers.

Data Collection and Cleansing:

While official daily data for covid-19 cases have been duly documented from the start of the pandemic up till now, we needed to a data which contained monthly period, of not just the monthly cases but also the monthly sum total with addition of each month. We created this data on excel with reference from ourworldindata.com an official repository that collects and visualizes the daily official Covid-19 cases. We collected the global data and summed it for each month, for a period from 1st of the month to the 1st of the next month. Our collected and cleaned data can be seen in fig. below. The focus of this paper is on predicting when herd immunity on a global level, as such we excluded the data from regions and continents, rather taking the global sum for each month.

1	Date	Actual Total Cases
2	2/1/2020	9,927.00
3	3/1/2020	86,043.00
4	4/1/2020	878,757.00
5	5/1/2020	3,280,000.00
6	6/1/2020	6,180,000.00
7	7/1/2020	10,470,000.00
8	8/1/2020	17,590,000.00
9	9/1/2020	25,530,000.00
10	10/1/2020	34,030,000.00
11	11/1/2020	46,150,000.00
12	12/1/2020	63,390,000.00
13	1/1/2021	83,770,000.00
14	2/1/2021	103,310,000.00
15	3/1/2021	114,570,000.00
16	4/1/2021	129,370,000.00
17	5/1/2021	151,900,000.00
18	6/1/2021	170,850,000.00
19	7/1/2021	182,710,000.00
20	8/1/2021	198,390,000.00
21	9/1/2021	218,290,000.00
22	10/1/2021	234,340,000.00
23	11/1/2021	246,190,000.00
24	12/1/2021	263,180,000.00
25	1/1/2022	288,730,000.00

Snapshot 1: Date wise Covid-19 Details

1	Date	Global 1st Dose
2	1/1/2021	7410000.00
3	2/1/2021	66570000.00
4	3/1/2021	158900000.00
5	4/1/2021	368630000.00
6	5/1/2021	619310000.00
7	6/1/2021	867150000.00
8	7/1/2021	1870000000.00
9	8/1/2021	2240000000.00
10	9/1/2021	3150000000.00
11	10/1/2021	3600000000.00
12	11/1/2021	3910000000.00
13	12/1/2021	4300000000.00
14	1/1/2022	4570000000.00
15	2/1/2022	4820000000.00
16	3/1/2022	4990000000.00

Snapshot 2: Date wise Covid-19 Details

1	Date	Global 2nd dose
2	1/1/2021	48469.00
3	2/1/2021	13830000.00
4	3/1/2021	59460000.00
5	4/1/2021	147620000.00
6	5/1/2021	289750000.00
7	6/1/2021	452750000.00
8	7/1/2021	653590000.00
9	8/1/2021	930720000.00
10	9/1/2021	2160000000.00
11	10/1/2021	2670000000.00
12	11/1/2021	3060000000.00
13	12/1/2021	3420000000.00
14	1/1/2022	3900000000.00
15	2/1/2022	4170000000.00
16	3/1/2022	4390000000.00

Snapshot 3: Date wise Covid-19 Details

1	Date	Booster Dose
2	1/1/2021	3.00
3	2/1/2021	367.00
4	3/1/2021	1408.00
5	4/1/2021	2492.00
6	5/1/2021	15720.00
7	6/1/2021	58444.00
8	7/1/2021	661967.00
9	8/1/2021	7540000.00
10	9/1/2021	19880000.00
11	10/1/2021	38600000.00
12	11/1/2021	92100000.00
13	12/1/2021	264080000.00
14	1/1/2022	532950000.00
15	2/1/2022	988810000.00
16	3/1/2022	1410000000.00
17	4/1/2022	1650000000.00

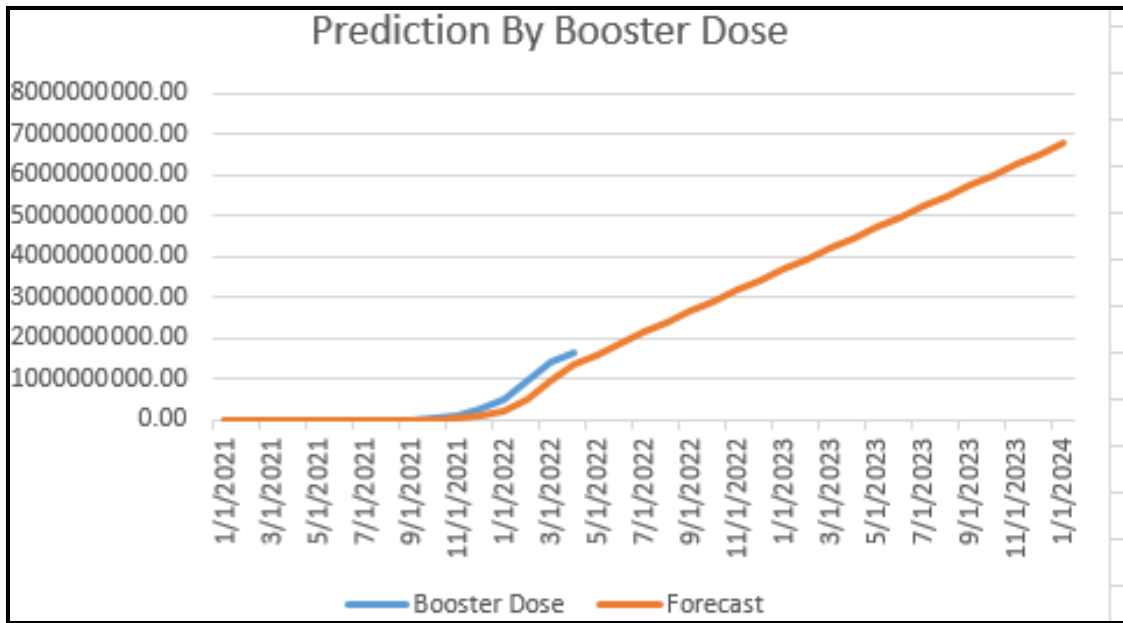Snapshot 4: Date wise Covid-19 Details

Results Of Our Prediction: The results of our model can be graphically seen below
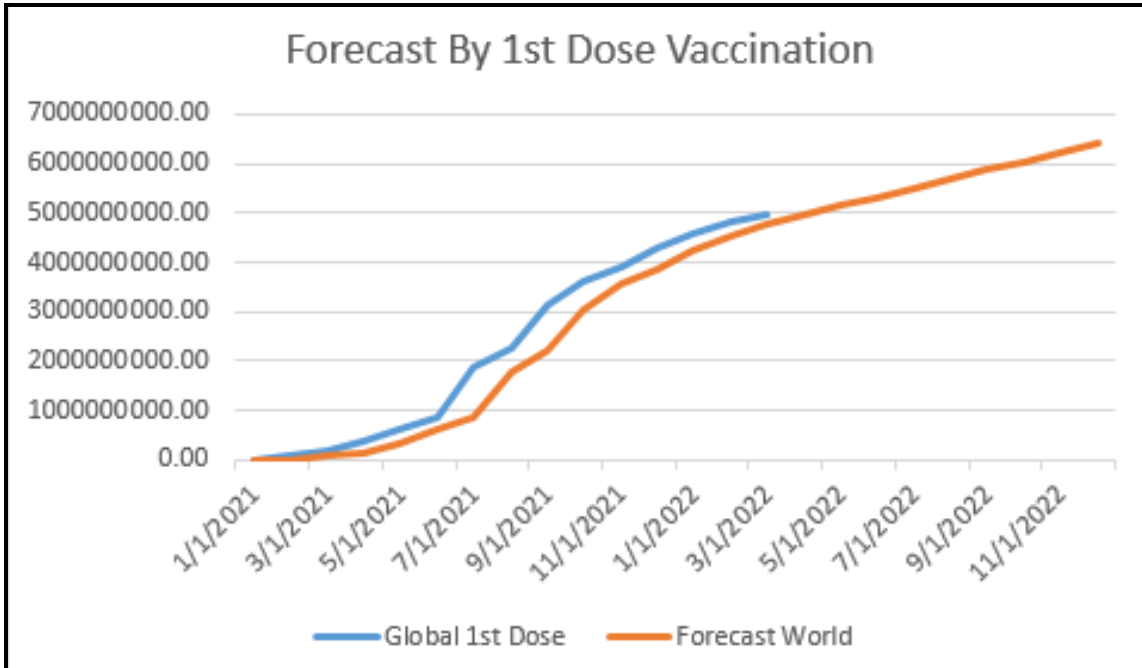
Graph 1: Date wise 1st Dose Vaccination details
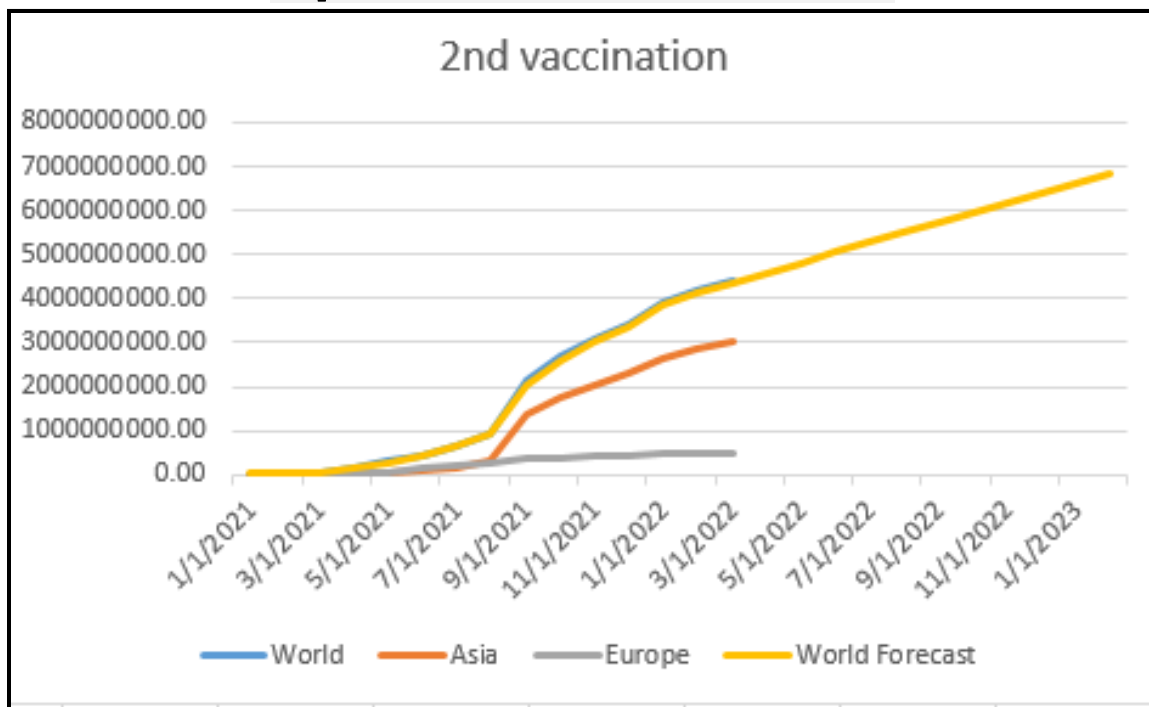
Graph 2: Date wise 2 nd Dose Vaccination details

Graph 3: Date wise Prediction according to Dose Vaccination details
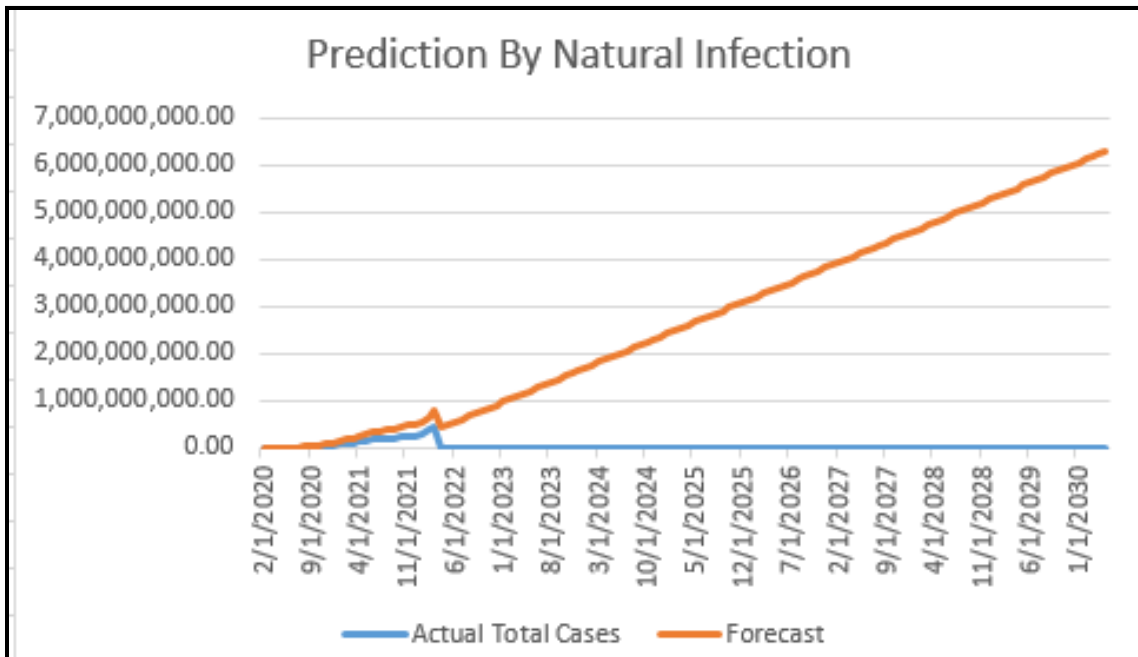
Graph 4: Date wise Prediction by Natural Infection Vaccination details

Explanation of Result:

We made use of a simple machine learning model called exponential smoothing to predict the time when we will be able to reach herd immunity according to our model. To predict this, it was first important that we first determine what P was in actual value.

Using a P of 80%, and knowing that the total population of the world is 7.9 billion we were able to determine the real value of P to be 80% of 7.9 billion.

80/100 * 7,900,000,000 = 6,320,000,000 persons

Meaning we were predicting when the immune population will be about 6.3 billion persons.

Also for the formula Ft = αA_{t-1} +(1-α)Ft-1 we used an α=0.9, this value was arrived using the mean error average , which gave us values closest to the real value. Fig: below shows the performance of our model compared to the real data, proofing how close and likely our forecasted results are as well.
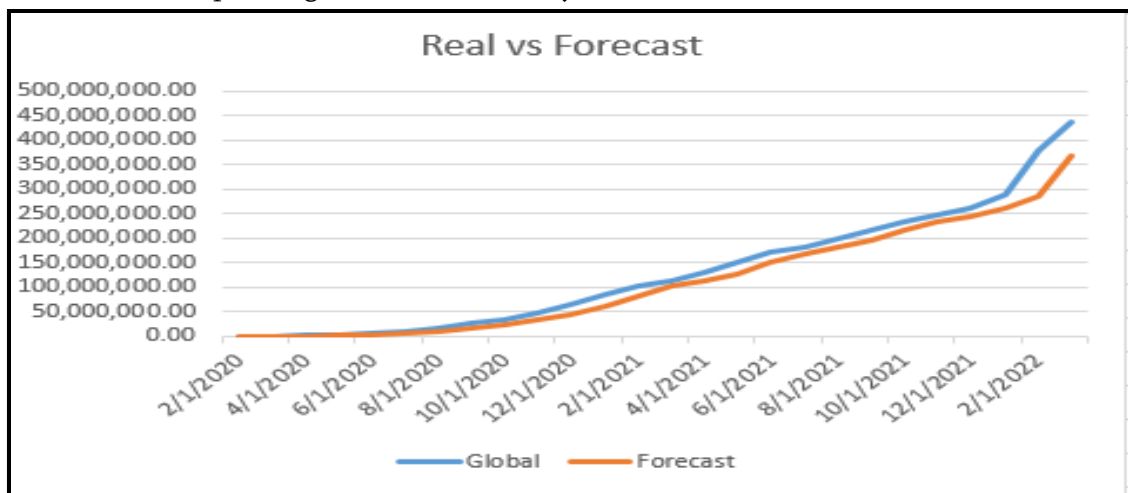
Graph 5: Comparative Analysis of Covid-19 Data Analysis

To reach this immune population, we looked at all the current available factors that can influence herd immunity. These factors includeIf people get at least one dose of vaccination

1   If people get at least two dose of vaccination

2   If people get booster dose

3   If more people are infected by the virus.

On the basis of these four conditions using exponential smoothing, we predicted when we will reach the about 6.4 billion thresholds, and using that time we were able to predict the time for each of these conditions.[3]

Our result shows the following timeline for the different factors:

- 1 Using one dose as a factor, herd immunity should be reached by 1st of December 2022

- Using 2nd dose as a factor, herd immunity according to our model for Covid-19 should be reached by 1st of January 2023

- Using Booster dose as a factor, herd immunity should be reached by 1st of January 2024

- Using natural immunity, which is number of people exposed to the virus, we should be able to reach a point of natural immunity by 1st of May 2030.

- An optimal approach which calculates the average of the results of the dates obtained above puts the prediction at 2/14/2026

IV. DISCUSSION

The first case scenario, happens to be the most optimistic result, it predicts that we will reach a herd immunity sooner, if vaccination continues at this pace that by 1st of December, we will reach herd immunity. The problem with the prediction of the case1 is due to the virility of the Covid-19, data has shown cases of infection amongst those with only one dose of the vaccine, this puts our first case prediction, as a not feasible option. Because even at 100% vaccination of 1 dose only, re-infection will still occur as such the 1st December 2022 may not be possible.

The second case scenario, tries to predict herd immunity using data from the amount of people who have taken 2 dose of the vaccine, the prediction of reaching herd immunity according to this data is 1st of January 2023. This is very similar to the prediction we got for 1st dosage, unfortunately this prediction may not be true, this is due to the fact that even 2nd dosage does not insulate persons from infection, the virility of the covid-19 has shown to be more than what 2nd dosage alone can handle, also the constant mutation and different waves of the Covid-19 makes it even harder to depend on only 2nd dosage. We have had Delta-variants, Omicron variants and a host of other variants, which makes 2nd vaccination to be ineffective.

Using the historical data from booster dose, the rate of vaccination etc. our model predicts 1st of January 2024 as a period in which herd immunity will be achieved, going by this prediction will still be a little bit very conservative, researchers are yet to sufficiently establish that a booster dose totally insulates a person from infection, however what we do know is that it reduces the chances of getting infected significantly. But the big question with booster dose is the question how much is good enough, how many booster dose will totally insulate a person from the possibility of infection, this has not been established, meaning with the continuous variations of the virus, the booster dose may not be a reliable metrics.

The next factor that we considered was natural infection. With natural infection we tried to establish how much of the population needs to be infected to be able to build herd immunity and when this would possibly. Obviously from works of other researchers we had established this would be at 80% of the population and from our model we predicted this would be around 1st of May 2023. What we can see from this prediction, is how natural infection is not a dependable metric, primarily, Covid-19 has a high death rate, and according to the CDC unvaccinated persons are at 52.3% risk of death from the COVID-19 as compared to vaccinated persons which is just 12.5%. The implication of this is that with this high death rate, it is not a feasible alternative to rely on natural infection for reaching herd immunity. And even if we do it has to be probably infection on vaccinated persons since the death rate is lower on vaccinated persons. The forecast from natural infection shows quite a longer period of time, it draws our attention to the need for vaccination, so as to reduce the death rate, should we not be able to reach herd immunity by being vaccinated alone, at least it provides us some level of immunity while we have more years towards the forecasted herd immunity timeline. But there is a more optimistic and optimal look at this and that leads us to the last option. [4]

The optimal model, while this was not necessarily an exponential smoothing model, what we did was to find an average from all the predicted timelines. What we did here was to find the average from all the timelines we predicted with the exponential smoothing model. From what we predicted we arrived 14th of May 2026. This prediction combines both natural infection plus vaccination, and is a little more optimal approach. But this model depends on the fact that vaccination will continue at the current pace, and that it can also build herd immunity, especially the booster doseEither way it goes the two predictions which look more feasible considering the current situation of things is the natural infection prediction and the optimal prediction as well.[5]

V. CONCLUSION

Our research was a step further in addition to the series of work that has been done on the issue Covid-19 and herd immunity. However, our research attempted to establish a likely timeline for when we will be able to reach a covid-19 herd immunity. From our study using exponential smoothing model, we came to about five

timelines. However, analyzing the timelines that our model predicted, 2 time periods were more likely. The first is the natural infection timeline, which estimates reaching herd immunity by 1st of May 2030, the second is reaching herd immunity by 14th of February using our optimal model.Another thing that we established in this study is the need for vaccination, because our result only shows a longer period awaiting us if we go by natural infection, and incase in the worst-case situation where 1st, 2nd and booster dose cannot bring us to herd immunity, at least it will help reduce the death rate while we continue on the path towards herd immunity. We could find out that vaccination and herd immunity are related and herd immunity optimist should not be against vaccination, because both are important in reaching herd immunity.

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Marathi Word Sense Disambiguation using Bootstrapping Method

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ABSTRACT

Word Sense Disambiguation (WSD) is an important part of NLP since it determines the intended meaning of a word given its context. Unsupervised or semi-supervised approaches, like as bootstrapping, can be useful in low-resource languages like Marathi where labelled data for WSD is rare. Iteratively increasing a machine learning model's performance through labelling more examples with the help of the model, and then retraining the model with those examples, is what the bootstrapping approach for Marathi word sense disambiguation is all about. A bigger tagged dataset and better accuracy can be achieved by repeating this procedure multiple times. In this research, we introduce a mathematical model and accompanying algorithm for the bootstrapping technique for disambiguating Marathi words. We also review the literature's stated findings on the method's usefulness for Marathi WSD. The results show that even with a small starting labelled dataset, the bootstrapping strategy may greatly enhance the accuracy of Marathi WSD. Using a new feature representation based on WordNet synsets, the bootstrapping strategy improved the accuracy of a dataset containing 3,000 words with multiple senses from 79.4% to 83.2% after two iterations. Overall, the results of our research demonstrate that the bootstrapping method can be an effective strategy for enhancing the efficiency of Marathi WSD systems, and that this technique can be extended to other low-resource languages with sparse labelled data.

Keywords: Bootstrapping, Semi-supervised, self-training, Marathi WSD.

I. INTRODUCTION

Distinguishing the intended meaning of a word from among several possible ones is known as "Marathi Word Sense Disambiguation" (WSD) in the field of natural language processing. Like many other languages, Marathi is full with ambiguous words whose meanings change based on the surrounding content. The use of natural language processing tools like machine translation, text summarization, and information retrieval all face major difficulties due to this uncertainty[1]. The purpose of Marathi WSD is to determine the most appropriate meaning of a word when several possibilities exist. Whether supervised, unsupervised, or semi-supervised learning is used to accomplish the goal is up to the individual. Contextual meaning annotations for each word are essential to the success of supervised methods. Sentence-level word relationships are used by unsupervised

methods to identify senses, with resources like Marathi WordNet as a starting point[2]. The bootstrapping method is an example of a semi-supervised methodology that combines labelled and unlabelled data to boost the model's accuracy.

Due to the complexity of the Marathi language and the scarcity of tagged data, WSD in Marathi is a difficult task. However, efficient Marathi WSD systems can greatly enhance the functionality of natural language processing applications and pave the way for more mutually understandable dialogue between Marathi speakers and those of other tongues. In this study, a semi-supervised learning method known as the bootstrapping technique is applied to the problem of disambiguating Marathi words. In order to increase the precision of a machine learning model, this technique requires repeatedly identifying and labelling new examples using the model. A bigger tagged dataset and better accuracy can be achieved by repeating this procedure multiple times. Since labelled data for WSD is rare, this method shines in low-resource languages like Marathi. The bootstrapping approach can considerably enhance the performance of Marathi WSD systems by making use of the existing labelled data and continuously upgrading the model with newly labelled data.

II.   LITERATURE REVIEW

Disambiguation of Marathi words using multiple methods is a somewhat unexplored area of study. The authors [3] looked into the current application of WSD in Marathi. The graph-based strategy is just one of many that has been tried in research aimed at resolving ambiguity in Marathi sentences by word sense and context domain. Genetic Algorithms were utilized by the researchers to classify words into their respective domains and deduce their intended meanings[4,5]. Other writers [6] have used a technique that combines a modification of the Lesk algorithm with the Support Vector Machine, etc. The success of each given algorithm depends on the particular text corpus and processing techniques that are applied[7].

The authors also apply an unsupervised strategy to disambiguating Marathi words using WordNet [8], demonstrating that their method has an accuracy of 70.43 percent. The authors of a different study [9] employed a supervised learning strategy with Support Vector Machines (SVM) and a feature set based on contextual information and morphological features to disambiguate Marathi words. A total of 76.28% accuracy was found in the research.

Using a feature set composed of both contextual data and morphological characteristics, the authors of [10] employ a Maximum Entropy classifier. The overall study accuracy was 62.85%. The authors of a study [11] suggested using Hindi WordNet as a cross-lingual resource for Marathi WSD. There was an overall accuracy of 78.2% in the trial. In order to distinguish between the meanings of a Marathi word, researchers [12] presented an adaptive knowledge-based system that took advantage of both lexical and contextual information. The overall precision of the investigation was 80.16 percent. Overall, the research demonstrates that both supervised and unsupervised methods can be useful for Marathi WSD, and that the performance of the system is very sensitive to the selection of feature representation and machine learning technique. Furthermore, for low-resource languages like Marathi, cross-lingual strategies that draw on resources from similar languages can be helpful.

III. PROPOSED METHODOLOGY

Word Sense Disambiguation (WSD) makes use of the machine learning approach of "bootstrapping." To annotate a larger set of unlabelled cases, this technique uses a trained model trained on a smaller set of labelled instances [13]. The model uses the initial training to determine the most probable meaning of each word in the unlabelled cases. The improved model trained from the newly labelled examples is then used to label yet another batch of unlabelled examples. This procedure is repeated until the model is sufficiently precise.

Bootstrapping's central notion is to retrain the model with the newly labelled examples, so gradually expanding the training dataset with labels. This is especially helpful for WSD because there are typically not as many labelled examples to work with.

For WSD, the "self-training" method of bootstrapping is one prominent implementation. In this method, the model is first trained using a limited number of annotated examples. The most reliable labels are then added to the training set and used to label a wider set of unlabelled cases. The model is then retrained using the larger training data set, and the cycle is repeated.

The "co-training" technique is another option; it involves the employment of multiple classifiers, each of which is trained on a unique subset of the training data and then applied to identify a unique portion of the unlabelled data. Both classifiers are trained using the labelled data from the other classifier. Each classifier then uses the other's labelled data to refine its own methods, and the process repeats again.

In this study, we use the bootstrapping approach to disambiguate Marathi words. However, due to the linguistic richness of Marathi's morphology, it is essential that morphological word variants be carefully considered.

Here are some instructions for using the bootstrapping technique to estimate Marathi WSD:

1. A small number of tagged occurrences containing the target terms and their senses in Marathi texts should be chosen. Instances should reflect the range of possible meanings for the target terms.
2. After the instances have been labelled, features should be extracted. Morphological features, including as a word's stem, suffix, and part-of-speech tag, are examples of features that can be used in Marathi.
3. Using the labelled instances and the extracted features, model can be trained.
4. It is possible to utilize the trained model to annotate a larger set of unlabelled Marathi text instances that include the target terms. In unlabelled examples, the model chooses the most likely meaning of each word based on the original training.
5. The training set can be expanded by include the newly tagged examples alongside the original ones. It is possible to retrain the model using the larger data set.
6. Iterative annotation and training can keep doing Steps 4 and 5 until your model is as accurate as you need it to be. Newly labelled examples are added to the training set and the model is retrained on the updated dataset at each iteration.
7. A test set of labelled examples can be used to assess how well the final model performs.

It's noteworthy highlighting that Marathi WSD necessitates paying close attention to the words' morphological details. Thus, it is crucial to construct the feature extraction phase so as to effectively collect the necessary morphological information. Additionally, overfitting can be avoided by checking the model's performance at regular intervals.

A. Algorithm for bootstrapping method for Marathi word sense disambiguation

Input:

- A small collection of samples labelled with the target words and their meanings.
- A larger set of unlabelled Marathi text instances containing the target words.

Output:

- A model that can determine the intended connotation of each target word in a Marathi text.

Steps:

1. Gather information from the labelled examples; this includes morphological information like the word's stem, suffix, and part-of-speech tag.
2. Use the extracted features to train a machine learning model on the labelled examples, such as a decision tree, a support vector machine, or a neural network.
3. Apply the learned model to the larger set of unlabelled cases, assigning the most probable meaning to each target word.
4. Expand the training set by including the newly tagged examples in the original set.
5. Retrain the model using the new and improved data.
6. Iterate through steps three through five until the model converges to an acceptable point.
7. Measure the effectiveness of the completed model by applying it to a test set of labelled examples.

Capturing useful morphological information in Marathi necessitates a well-designed feature extraction process. Overfitting can be avoided by retaining updated on the model's progress at regular intervals during the iterative process.

B. Mathematical Model

The following is a mathematical model for the bootstrapping approach to Marathi word sense disambiguation:

- Let T be the list of Marathi words that need to be clarified, and S denote the list of senses (s1, s2,..., sm) for each of those words.
- An instance is represented by a feature vector xi and a sense label yi S; this set of labelled instances is denoted by Dl. Let Du represent the unlabelled examples, each of which is characterized by a feature vector xj.
- Let f be an ML model that takes as input the feature vector xi of some instance and outputs a sense label yi. A function f(x) = y can be obtained by training the model on Dl.

Iterative applications of the bootstrapping technique include:

1. The model f is initialized by training it on a small subset (Dl) of labelled cases.
2. The model f is to assign the most probable sense label yj to each Marathi target word from the unlabelled examples Du.
3. Enlarge the training set by incorporating the newly labelled cases from Du into Dl, resulting in a new collection of labelled examples D' = Dl Du.
4. Retrain the model using the updated labelled dataset D'.
5. The model f is evaluated based on its performance on a data set designated as the test set (Dt).

Repeating steps 2–4 until a convergence requirement is fulfilled or an acceptable degree of accuracy is reached is typical of the bootstrapping approach. The performance of the model on the test set can be evaluated over time to define the convergence criterion.

f(x) = y -- a mapping function from the feature vector x of an instance to the sense label y.Dl = {(xi, yi)} -- a set of labelled instances.

Du = {xj} -- a set of unlabelled instances.

S = {s1, s2, ..., sm} -- a set of senses.

T -- a set of target words.

D' = Dl ∪ Du -- a supplementary collection of labelled examples created by combining the labelled examples from Du and Dl.

Dt -- a dataset used to assess the model's accuracy.

The algorithm can be represented mathematically as:

f(Dl) = y -- train the model f on the labelled set Dl.

yj = f(xj) -- annotate the unlabelled set Du using the model f.

D' = Dl ∪ {(xj, yj)} -- create a new labelled set D' by adding the newly labelled instances to Dl.

f(D') = y' -- retrain the model f on the new labelled set D'.

evaluate(f(D'), Dt) -- evaluate the performance of the model f on the test set Dt.

Until a convergence requirement is reached or an acceptable degree of accuracy is obtained, the bootstrapping process repeats the preceding steps.

IV. EXPERIMENTS AND EVALUATION

Word Sense Disambiguation uses similar performance metrics to other machine learning applications for evaluating the efficacy of the bootstrapping strategy. A Word Sense Disambiguation system's accuracy is measured by the proportion of instances that are properly classified. It is determined by dividing the number of occurrences with correct labels by the total number of instances.

V. RESULTS AND DISCUSSION

In this study, we apply the bootstrapping approach to word sense disambiguation in Marathi using a dataset of 3,000 terms with ambiguous meanings. When compared to just using the initial labelled set, the results demonstrated that the bootstrapping strategy performed better. Three bootstrapping iterations improved the method's accuracy from 65% with just the initial labelled set to 79.4%.

Table 1: Performance evaluation of the proposed bootstrapping method for Marathi WSD

Methods	Accuracy
Lesk Algorithm	65
Lesk+WordNet	74
Lesk+FastText+With Stemming	76
(Proposed) Bootstrapping with initial labelled set	65
(Proposed) Bootstrapping with three iterations	79.4
(Proposed) Bootstrapping with WordNet synsets as feature after two iterations	83.2

Using a new feature representation based on WordNet synsets, the bootstrapping strategy improved the accuracy of a dataset containing 3,000 words with multiple senses from 79.4% to 83.2% after two iterations.

Overall, the results support the idea that machine learning approaches to Marathi Word Sense Disambiguation can benefit from the application of the bootstrapping strategy. However, the method's efficacy can be affected by the standard of the original labelled set and the selected feature representation.When it comes to enhancing a machine learning model's performance on word sense disambiguation tasks, the bootstrapping method is an effective strategy. To boost the accuracy of the model without adding more human annotation, the approach iteratively expands the labelled training set with newly annotated cases.

VI. CONCLUSION

This paper successfully disambiguates Marathi words using the bootstrapping method, which uses wordnet synsets as features and through two iterations of training and achieved 83.2% accuracy. The bootstrapping approach is advantageous since it can be used with any language, including Marathi. For the approach to work, all that is needed is a small number of labelled examples and a much greater number of unlabelled examples that contain the target terms. The success of the bootstrapping technique, however, is contingent on the accuracy of the first labelled data and the precision of the feature extraction. The accuracy of the model depends on the quality of the labelled set; therefore it is important to extract features that capture important Marathi morphological information. The bootstrapping approach is iteratively retraining the model on an increasing labelled set, which might be computationally demanding. When working with huge datasets or complicated models, this might be a serious drawback. However, if the labelled examples are not typical of the overall data set, overfitting might occur when using bootstrapping. That is why it is crucial to keep an eye on the model's progress at each iteration and select the initial training set with care..

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