JOURNAL OF ELECTRONICS ENGINEERING

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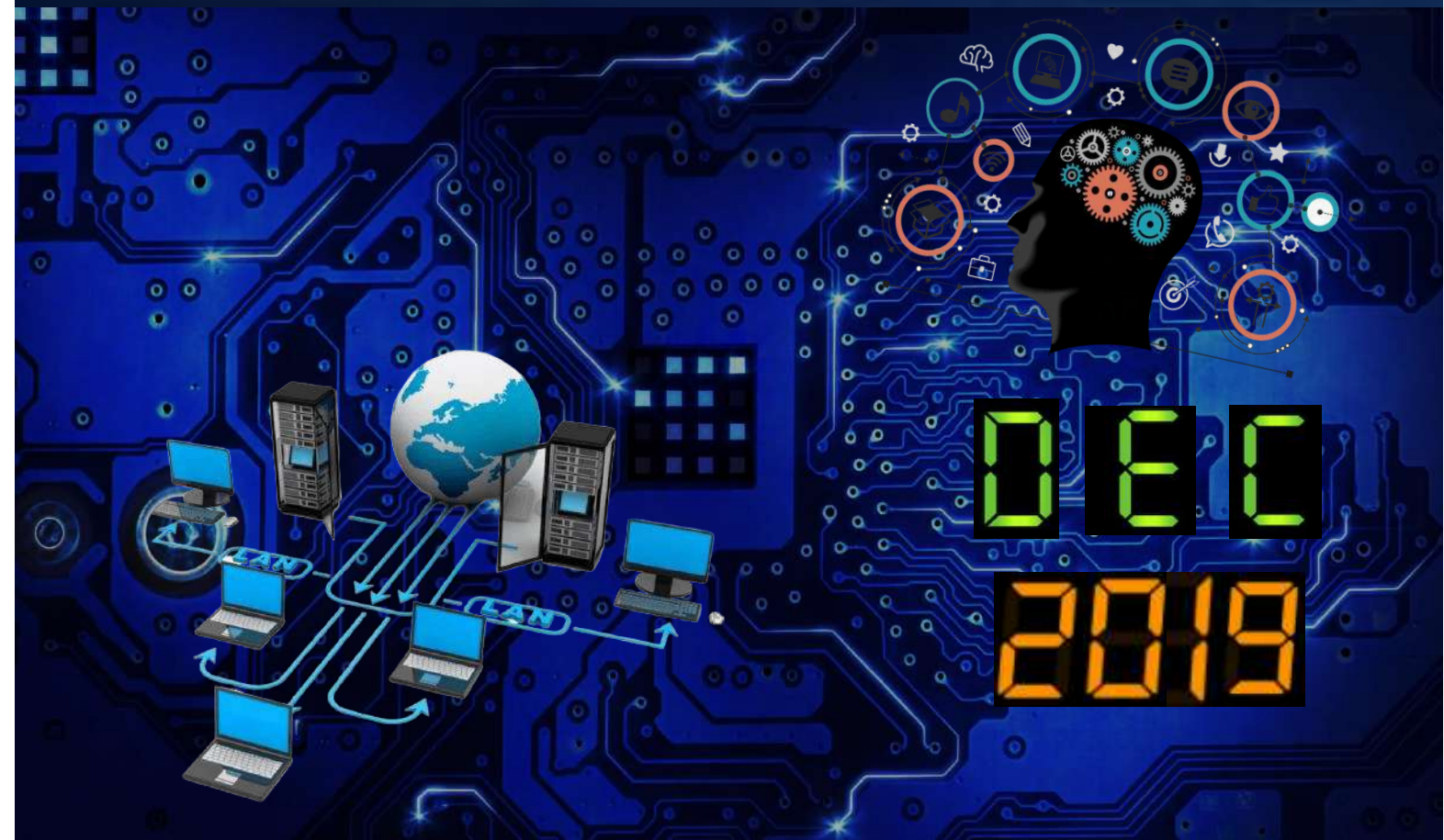PILLAI COLLEGE OF ENGINEERING

DEC 2019

COMMUNITY TALK

The technical journal team of Dec 2019 would like to congratulate students and staff members for their contribution of sincere efforts and hard work in departmental journal. We would like to thank our Principal Dr. S. M. Joshi and HoD of Electronics Department Prof. R. H. Khade for giving us this opportunity and freedom to express our views and ideas on departmental journal. We would like to extend our gratitude to the journal team who have worked tremendously hard to put everything together which made it possible for us to print the Dec 2019 issue.

This journal comprises of research papers and technical articles. The journal includes "IoT Based Air Pollution Monitoring System" where air quality is monitored through web server , "Smart Door Receptionist with Smart Lock System " which provides the visitor with options to choose from, stating the purpose of their visit, upon ringing the door-bell, "Digital Ticketing System for Remote Queuing at Retail Shops" where objective is to book queue tickets in online mode through an application, "COVID-19 Impact on Sustainable Development Global Economy " where goal is to stimulate a discussion related to the impact of COVID-19 on the sustainable development and the global economy, "Transportation Bot" where an automated-guided path following vehicle to transport goods from one place to another is designed, "Chatbot to Display COVID-19 Information", which presents working of AI ML based Chatbot , "AUTONOMOUS DRONE SURVEILLENCE", where viability of the Concept of a swarm of drones integrated with Image processing and autonomous flight saves the response time to spot and analyse the matter is explained and "IOT based Gas Leakage Detection System Using PIC16F877a" where a leakage detection method in which the leakage information is sent to first response team through wireless media is proposed. This is small briefing of our journal for this issue. We greatly appreciate the contribution from all our writers, without which this would not have been possible.

Readers, we really hope you find this worth enough to share it with your friends. Please send us your valuable feedback at pce.etrx.journal@gmail.com and help us for improvement !!!

Best Regards,
Managing Editor Board

MESSAGE FROM PRINCIPAL

I am happy to know that Department of Electronics Engineering is bringing out its Dec 2019 issue of Departmental Journal. The journal covers all major technical areas in Electronics and reflects the latest trends in those. The product is a synergetic output of team work involving teachers and students. Students who have given technical papers for departmental journal encompasses innovations and improvisations based on their projects. I express my compliments to Head of the Department of Electronics, editorial / reviewer board and publication team for their commitment and effort for bringing out this journal.

Best Wishes,
Dr. Sandeep M. Joshi

MESSAGE FROM HOD

It is my privilege to present Dec 2019 issue of our journal of Electronics Department. The main endeavor of this journal is to create appropriate environment that stimulates vision, research and growth in the area of Electronics. Engineers today have propelled the world to a new era of technological advancement. Blending curiosity with scientific temperament among students is the need of the hour. Hence we encourage our students to publish papers on their project work. Many students have contributed their ideas by means of papers. In this issue we have accommodated 8 technical papers. I thank my beloved students for writing good quality papers for this journal. Finally, I express my sincere gratitude to our editorial / reviewer board, publication team for their continued support and invaluable contributions and suggestions for the advancement of the journal. I hope you will enjoy reading this issue and we welcome your feedback on any aspect of our journal.

Best Regards,
Prof. R. H. Khade

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IOT Based Air Pollution Monitoring System

Suchitra Patil[1], Manisha Singh[2], Neha More[3], Rohit Koli[4], Sumin Mhatre[5], Aatish Mayekar[6]

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Abstract-**The level of pollution is increasing rapidly because of factors such as industries, urbanization, population growth, and vehicle usage, pollution levels are increasingly rising, posing a threat to human health. The Internet of Things-based Air Pollution Monitoring System is used to track the air quality through a web server. It will sound an alarm if the air quality falls below a certain threshold, which means there are enough hazardous gases in the air, such as CO2, smoke, alcohol, benzene, NH3, and NOx. It will display the air quality in PPM on the LCD as well as on the website, allowing for easy monitoring of air pollution.**

The system uses MQ135 and DHT 11 sensor for monitoring Air Quality as it detects most harmful gases and can measure their amount accurately.

Keywords- **Air Pollution, IOT, MQ135 Sensor, DHT Sensor, Arduino Uno, Thingspeak, Android App.**

I. INTRODUCTION

Air pollution is the most serious problem that any country faces, whether developed or emerging. Health problems have been increasing at a faster pace, especially in developing countries' urban areas, where industrialization and an increase in the number of vehicles has resulted in the release of a large number of gaseous pollutants. Mild allergic reactions such as inflammation of the mouth, eyes, and nose, as well as more severe issues such as bronchitis, heart disease, pneumonia, lung, and exacerbated asthma, are all harmful consequences of pollution. The IOT-based Air Pollution Monitoring System tracks air quality through the Internet and will sends out an alert if the air quality drops below a certain threshold, which means there are enough hazardous gases in the air such as CO2, smoke, alcohol, benzene, NH3, LPG, and NOx. It will show the air quality in PPM on the LCD as well as on the website so that it can be easily monitored. This machine, which is primarily used in homes, now features an LPG sensor.

Temperature and humidity will be shown by the device. The device can be mounted anywhere, but it is most commonly used in factories and homes where gases are present, and it sends out a warning message when the system's threshold limit is exceeded.

II. METHODOLOGY

A. Algorithm

As shown in Figure 1, the device overview procedure was divided into five (5) layers. The first layer consisted of environmental parameters obtained by calculation. The analysis of the sensors' characteristics and features was the second sheet. The third layer included decision-making, sensing, measuring, threshold valve fixing, sensitivity periodicity, timing, and space. The sensor data acquisition was the fourth layer. The ambient intelligence environment was the fifth layer. When the sensor was controlled by the micro controller, it collected data and sent it over the internet to be analysed via the Wi-Fi module. On their smartphones, users could keep track of calculated parameters.
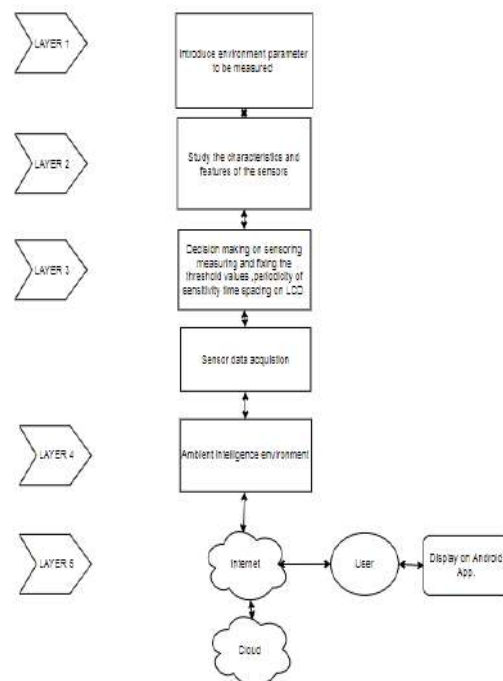

Figure 1: Over-viewed Proposed Diagram

III. DESIGN AND CALCULATION

A. Requirements

Hardware and Software requirement in building up the device.

1) Hardware Requirement:

1) MQ135 Gas sensor
2) DHT Temperature and Humidity sensor
3) Arduino Uno
4) Wi-Fi module ESP8266
5) 16x2 LCD
6) I2C Adapter
7) Breadboard
8) 1K ohm resistors
9) Buzzer

2) Software Requirement:

1) Arduino IDE Software
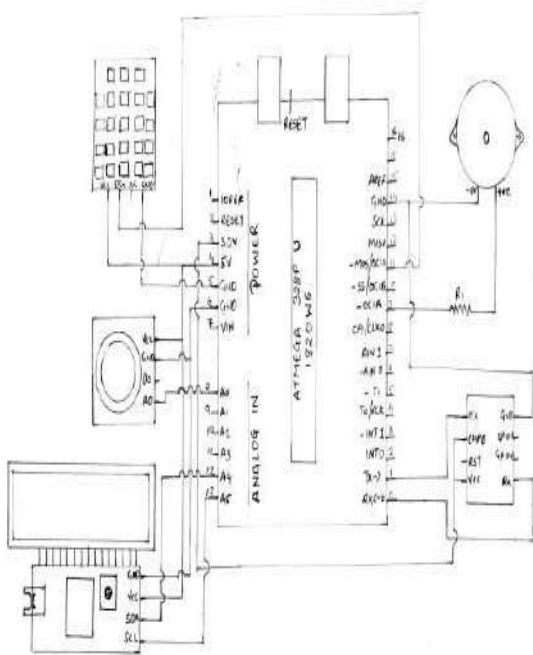2) Embedded C Language
3) Thingspeak software
4) MIT App Inventor

Figure 2: Circuit Diagram of Air Pollution System
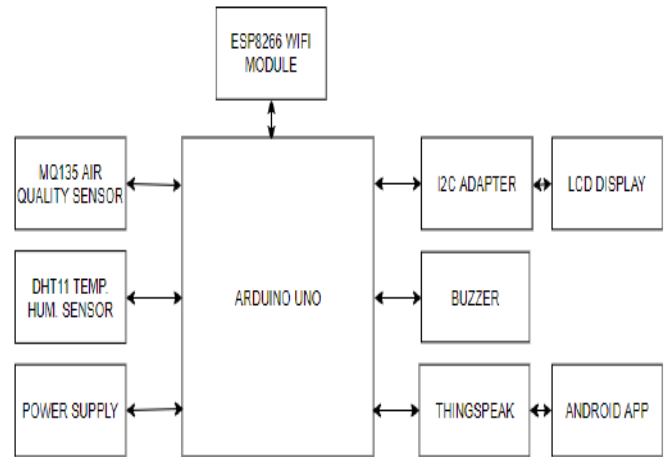
B. Block Diagram:

Figure 3: Block Diagram of Proposed Air Pollution Monitoring System

1) Working:

The Arduino library was loaded, and a message was displayed on the LCD. The MQ135 sensor was used to collect data on air quality. The analog output voltage of the calibrated sensor was proportional to the concentration of polluting gases in parts per million (ppm). The information is first seen on the LCD screen before being sent to the Wi-Fi module. The Wi-Fi by using the internet to send the calculated data value to the server. If the value of the calculated data exceeds the threshold value. The buzzer will then sound to alert the user. The data will be sent to the cloud using the ESP8266. The Wi-Fi module is set up to send calculated data to a remote server where an application named "Thing speak" is enabled. The online application allows anyone with an internet connection to access calculated data from anywhere in the world. The information sent to the remote server was updated using the data obtained from the sensor, which was translated into a string. The graph on Thing speak will assist us in displaying information on the Android App.

C. Mathematical Analysis of Proposed Model

The level concentration of pollutants in the air is measured in parts per million (ppm) or percentage.

Conversion factors include the following:

1 ppm = 1.145 mg/m3

1 mg/m3 = 0.873 ppm

1% = 1/100

1 ppm = 1/1000000

1 ppm = 0.0001%

TABLE 1

PPM to PERCENTAGE CONVERTER

Parts per million (ppm)	Percentage (%)
0	0
5	0.005
50	0.005
500	0.05
1000	0.1

IV. RESULT and DISCUSSION

A. Project Setup

Fig 6 shows the experimental setup of detecting the air pollutant and monitoring it on LCD.
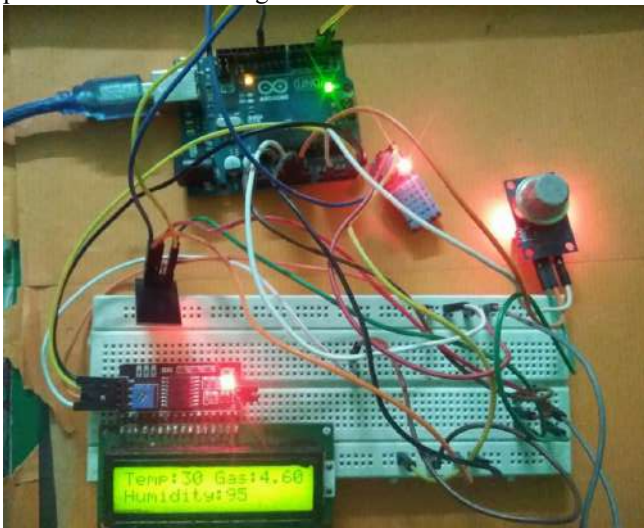

Figure 4: Setup of the IOT based Air Pollution Monitoring System

B. Thingspeak

The online application "Thing-speak" was used to evaluate air quality data collected from the sensors in this proposed framework. Thing-speak is an open-source internet of things application programming interface for storing and retrieving data from interconnected things over the internet or through a local area network using the hypertext protocol. It also allows you to connect to a variety of embedded devices and web services.

This makes it possible to create sensor logging apps that can be updated on a regular basis. The software "Thing-speak" was set up to collect data from a remote system. On a channel, the data was analyzed and released as scatter line graphs or bar charts. The channel receives updates from the remote sensor via the internet on a regular basis and displays the data as a scatter line graph online.
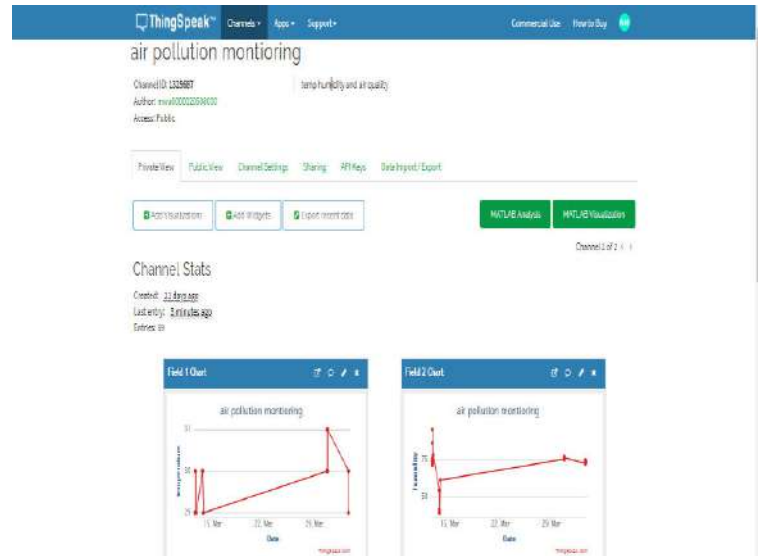
Figure 5: Thingspeak Channel and Sensor Stats

C. MIT App Inventor

Using a web browser and either a linked phone or an emulator, Software Inventor allows you to create apps for Android phones.

The App Inventor servers keep track of your projects and store your work. When you add pieces to your app, it appears on the phone step by step, allowing you to test your work as you go. When you're done, pack your software and create an install-able standalone application.

Figure 6: Working of MIT App Inventor

Mac OS X, GNU/Linux, and Windows operating systems, as well as several common Android phone models, are all supported by the App Inventor development environment. App Inventor-created applications can be installed on any

Android device. You should first set up your device and install the App Inventor Setup kit before you can use App Inventor.

D. Android App

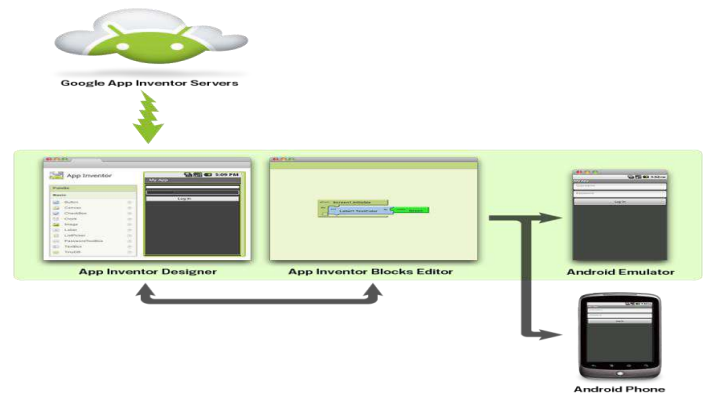First screen consists of the five location. After tapping any one location second screen is having the updated temperature, humidity and air quality data and stats.
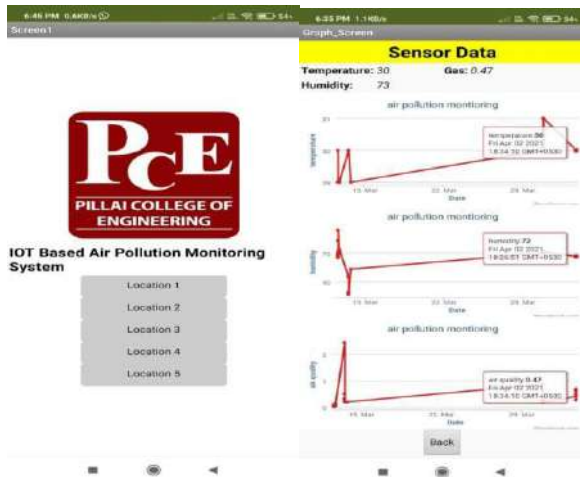Given below is the glance of Android App.

Figure 4: Glance of Android App

Applications:

1) Industrial perimeter monitoring
2) Indoor air quality monitoring.
3) Site selection for reference monitoring stations.
4) Making data available to users.

Advantages:

1) Easy to Install.
2) Updates On mobile phone directly.
3) Accurate Pollution monitoring.
4) Remote location monitoring.
5) Low cost and long life of sensor.

Disadvantages:

1) Security of the recorded data can be issue.
2) Only 2 sensors are used.

V. CONCLUSION

This project tries to direct the attention towards severe issue of air pollution for which this can be an alternate solution. In this project we are monitoring the concentration of gases in ppm which helps in maintaining the ppm concentration up to the mark as desired to be environmentally friendly. This approach is more convenient and low cost too. With the help of IOT it allows the storing of data on the internet where it can be accessible globally. Now anyone from anywhere can access the data very easily. The application of IOT allows the expansion with additional features and the choice of technologies to give different approach on the same concern but particularly in terms of capabilities by including more features, technologies and security to it our approach is more compatible

VI. ACKNOWLEDGEMENT

VII. REFERENCE

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Smart Door Receptionist with Smart Lock System

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Abstract— **A proposal for home security and ease of access in comparison to the traditional door bell and lock system. When a visitor attempts to enter the premise, the system alerts the owner through the application, such as Blynk App (used here) installed on the smart phone. The system provides the visitor with options to choose from, stating the purpose of their visit, upon ringing the door-bell. The option selected by the visitor is sent to the smart phone of the owner. The owner can then decide whether to grant permission for entry or not. Furthermore, the owner can visually monitor the visitor through webcam surveillance. The major advantage of the system is that it can be controlled from anywhere.**

Keywords— *Smart Door, Blynk App, IoT, Smart Lock, Security.*

I. INTRODUCTION

The goal of this project is to design a Smart Device which allows visitor identification for the user even if he/she is at home or not. This device is extremely handy when we need to know about the important expected visitors. If a person is not at home and a visitor visits, then the person who visits can specify his purpose of visit. The person who is visiting will see options being displayed on the screen and hear the same through voice playback module after which he/she can specify the purpose of visit for the owner. Followed by which the owner will also receive a notification in which he will receive the information about the visitor who is visiting. Some of the application area is mentioned below.

The Internet of Things is being used to come up with creative ideas and a vast construction area for smart homes to boost people's living standards. The Internet of Things will transform a variety of industries, including healthcare, automation, electricity, transportation, and more.

Suppose this device is used in a house whose owner is an elderly person or someone with walking disability, who cannot answer the door often without help, then the person would be able to receive information about the visitor on his/her smartphone. The application has extremely simple user- friendly interface making it an easy process for the user. The user will come to know about the person who has visited and accordingly can respond by opening or keeping the door closed for the visitor.

Another application would be for people living in large houses and or multiple entrances. If there's a visitor at a particular door which isn't quite accessible in short time then the owner can use this smart device to prompt a response for the visitor to know his/her purpose. This system can be used at multiple houses who have a designated space for delivery received products and for mailboxes. Smart Device is a signaling device typically placed at the entry point of office or house. Most devices give a ringing sound to alert the occupant of the building to a visitor's presence, when the visitor presses a button.

This system would focus on providing security to houses with larger premises or individuals spending longer hours out of their houses and needing to host a number of visitors on a daily basis. It would also be helping people who are restricted to minimum physical activities like the elderly people who might be staying alone as well as the people with physically challenging body conditions. The user will be using the system to directly or indirectly communicate with the visitor. They also decide whether access to the house is to be given to the visitor. The door to the house opens or remains locked depending upon the user's command.

II. LITERATURE REVIEW

The invention of the lock system dates nearly about 6000 years ago, back then it had only one job to do. In Ancient Times, the pin lock, wooden lock similar to the modern-day counterpart, was simple yet highly effective. The invention persevered over centuries, spreading from Egypt to Greece & Rome. These wooden locks however didn't hold up well against brute force. The Romans improved on it by incorporating metals to increase security. Further development occurred when portable keys were crafted and so people could freely carry keys. The Industrial Revolution, in the 18th century, majorly affected the lock system where the engineers launched products such as the padlock. Then came the Digital Age that introduced keyless life to the masses through the invention of PIN codes, RFID cards, fingerprints and many more, the security advancing alongside. Finally, to this era of Home Automation with the influx of IOT and Smart phones to meet the current needs and demands of the society.

This smart device is a signalling device typically placed near a door. Most devices emit a ringing sound to alert the occupant of the building to a visitor's presence, when the visitor presses a button. Many modern devices are electric.

Gyanendra Kumar Verma, Tripathi Pawan, "A Digital Security System with Door Lock System using RFID Technology", International Journal of Computer Applications, Vol. 5, No.11, August 2010. According to this paper, a digital door locking system is implemented and governed by RFID reader which authenticates and validates the user and opens the door automatically. It also keeps the record of check-in and check-out of the users. It's very important to authenticate the user before entering into a secure space and RFID provide this solution. The system enables user to check-in and check-out under fast, secure and convenient conditions. The system include door locking system which open when the user put their tag in contact with reader and the user information matched with the information already stored in database. The RFID controls the opening and closing of the door. In this study, RFID technology is used to provide solution for secure access of a space while keeping record of the user. Passive type of RFIDs are used here. These types of RFID are battery-less and they obtain power to operate from reader.

Lia Kamelia, S.R. Alfin Noorhassan, W.S. Mada Sanjaya, W.S. Edi Mulyana, "Door automation system using Bluetooth-based android for mobile phone", ARPN Journal of Engineering and Applied Sciences, Vol. 9, No. 10, October 2014. According to this paper, the device is a system to lock and unlock the door. Rather than using a key, it uses a command that is delivered digitally via Bluetooth on Smartphone and other mobile devices. The use of electronic lock using Bluetooth on Android smart phones in addition to providing ease of use, also provide better security than conventional key. The system designed to simulate an electronic key, which is controlled through a Bluetooth-enabled smart phone. Controlling conducted by sending a command via Bluetooth to the Arduino circuit that acts as a connection between Android smart phone and solenoid. Solenoid door lock is the electronic device that made for door lock and often use for automatic door locks. Solenoid will operate if the system has a voltage. The average of the solenoid door lock is 12 volts. In normal condition, the lever will be Normally Closed. If there is any voltage through the solenoid, it will unlock the door. Usually, the solenoids combine with electric key lock system with RFID and password. In this research, a combination of solenoid door lock with Bluetooth-based smart phone.

Akshay N. Patil, Rohit B. Ranavare, Dayasagar V. Ballal, Prof. P. P. Kotekar, "RaspberryPi Based Face Recognition System for Door Unlocking", International Journal of Innovative Research in Science and Communication Engineering, Vol. 2, Issue 3, March 2016. In this paper, a Face Recognition System is proposed which automatically identifies and/or verifies the identity of a person from digital images or a video frame from a video source. An OPEN CV library is used that can be formulated as given images of a scene identify or verify one or more persons in the scene using a stored database of faces. The basic flow of the face recognition system is the image is captured by camera. The PCA algorithm detects the face and extracts its features.

After the extraction, system matches the captured images with data 5 base images. In the decision box the result of the matching is decide which is face match or the no face match. After that SIM300 GSM module sends an security alert to the authorised person which is entry successful or unauthorised person trying to unlock. Tools used are normal and widely applied for current applications and python as the main programming language & Linux based operating system, one can use C, JAVA or Perl also. On being successful, with further optimizations and improvements, the system may be implemented in real time systems requiring user authentication such as attendance systems, ATM security, Network security, In Bank locker, Home automation.
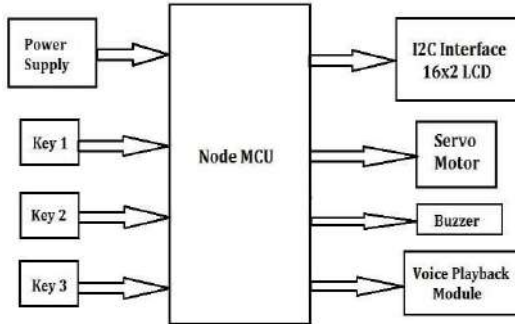
III. METHODOLOGY

A. BLOCK DIAGRAM

Fig. - Block Diagram of Smart Door

Fig. 1 Block Diagram of the system

The project uses Node MCU ESP8266 development board as its processing system. The ESP8266 is a 30-pin processor and uses Tensilica Xtensa 32-bit LX106 RISC microprocessor. It has a 4mb flash memory and 64kb SRAM. Pin number 15 of the processor is connected to the power supply while Pin 14 is grounded. Pin number 1, 3, 20 and 21 are connected to the voice playback module. Pin number 22 is connected to the speaker and 23 to the servo motor (to open or close the door). Pin 29 is connected to the clock and pin 28 to the data line (to the LCD screen). Pin 26, 27 and 30 are connected to the push buttons.

The processor comes with a built in Wi-Fi module. Hence, it makes it easy to build an IOT based system such as this one. This Wi-Fi is connected to the available hotspot for the, availing its control.

The voice IC used is APR33A3. Supply voltage of 12V AC/DC is required by the voice module. It provides a total of 11 minutes of total recording time for 8 channels. It can record a total of 8 messages making it 1.3 minutes for each channel. It has an on-board microphone to record the messages. The channel on which we want to record the message should be grounded and using the provided switch, we can record the message. Using the same switch, we can play the recorded message.

We are using a pre-existing application 'Blynk' to control the system. We have created an OPEN/CLOSE button on the app which we can use to control the opening and closing of the door. We have also created a text window which we can use to notify the user of the incoming visitor as well as an interacting window.

At the same time, the LCD screen and the buzzer are used as the interacting devices for the visitor. Blynk is an IoT platform that allows you to monitor Arduino, ESP8266, Raspberry Pi, and other devices over the Internet using iOS and Android apps. Drag and drop widgets to build graphical interfaces by downloading the Blynk app and constructing a project, then specifying the microcontroller that will assign the Auth code to your email address. Allocate a digital pin to each button and title it as per Widget Box's relay connections. After entering the Wi-Fi id and password, copy / paste the Auth Token from the email into your Arduino code, then select the ports and module in the Arduino tools section, then compile and upload the Arduino code.

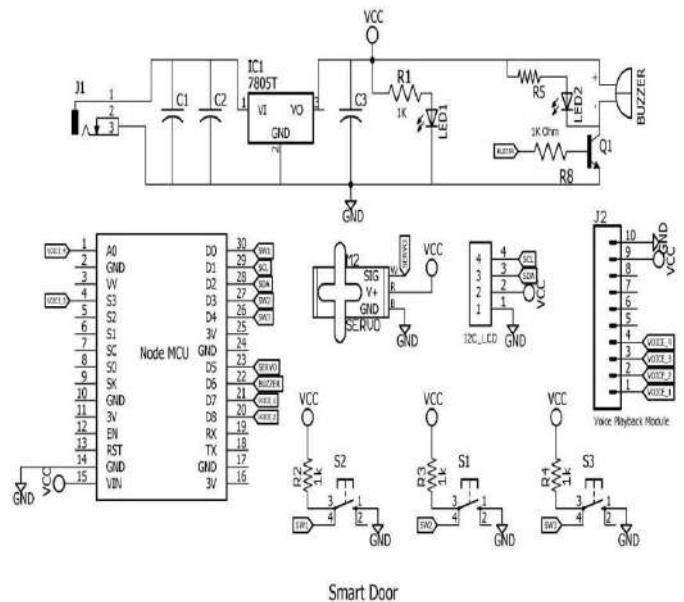### B. CIRCUIT DIAGRAM

Smart Door

Fig. 2 Circuit Diagram

Among the three push buttons provided, the first one acts as the doorbell while all the three buttons together act as selection buttons. Now, when a visitor rings the doorbell, a notification is sent to user on the Blynk app. At the same time, the LCD displays the message and the buzzer plays the pre-recorded audio. The message provides the visitor to select their purpose of visit giving them three options, among which we have provided an option of a courier boy, the watchman and of another random purpose. The selected option is sent to the Blynk app. If the visitor selects the option of random purpose, then another message is displayed by the LCD stating to contact the user on the given phone number.

When the user selects the option of opening or closing of the door, the message is processed by the processor and the servomotor opens/closes the door.

In this system we are also using ESP32-CAMwhich comes with an inbuilt Wi-Fi camera. It has a 32Mbit built in flash and 512KB RAM. This camera, we are using for continuous monitoring of the door, which works on LAN kind of network. So, the camera and the monitoring device need to be connected to the same Wi-Fi network.
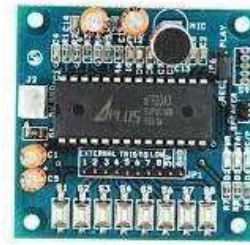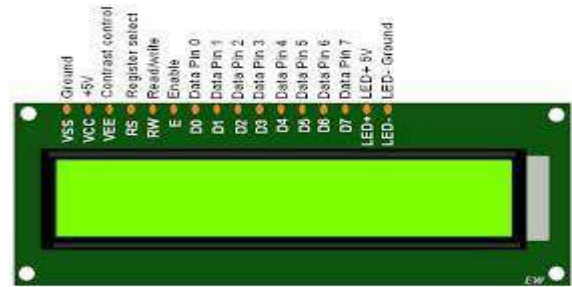
IV. HARDWARE DEVELOPMENT

A. Microcontroller – NodeMCU ESP8266:

It is an open-source Lua based firmware and development board specially targeted for IoT based applications. It includes firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware that is based on the ESP-12 module. It has 30 pins. It can be powered through the USB port and has three 3.3V voltage supply pins. Regulated 3.3V can be supplied to this pin to power the board. It has 4 Ground pins and 1 External Power Supply (Vin). EN and RST are two control pins, which resets the NodeMCU. It has one analog pin A0 that is used to measure analog voltage in the range of 0-3.3V. It has 16 general-purpose input-output pins on its board (GPIO1 to GPIO16). It has four pins available for SPI communication (SD1, CMD, SD0, CLK). It has two UART interfaces, UART0 (RXD0 & TXD0) and UART1 (RXD1 & TXD1). UART1 is used to upload the firmware/program.

B. Voice IC APR33A3:

It requires an operating voltage of 3 to 6.5V. This device is a voice recording and playback module that includes an in-built microphone. It will facilitate high quality recording and playback with 8 channels where each channel can be recorded up to 1.3 minutes each. On whole we can record up to 11 minute audio at 8 KHz sampling rate with 16 bit resolution. It has a non-volatile flash memory technology so there is no need for battery back-up.

C. 16x2 Liquid Crystal Display:

Liquid crystal Display (LCD) displays temperature of the measured element, which is calculated by the microcontroller. CMOS technology makes the device ideal for application in hand held, portable and other battery instructions with low power consumption. The operating voltage of this LCD is 4.7V-5.3V. It includes two rows where each row can produce 16-characters. The utilization of current is 1mA with no backlight

D. Servo motor:

Servo motor is a type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. These are proposed for low speed, medium torque and accurate position application. A servo motor will have mainly three wires, one is for positive voltage another is for ground and last one is for position setting. The RED wire is connected to power, Brown wire is connected to ground and YELLOW wire is connected to input signal. Servo motor works on PWM (Pulse width modulation) principle, its angle of rotation is controlled by the duration of applied pulse to its Control PIN. They can turn 0 - 180degree from either direction from its neutral position. The

pulse of 1 ms (1 millisecond) width can rotate the servo to 0 degrees, 1.5ms can rotate to 90 degrees (neutral position) and 2 ms pulse can rotate it to 180 degree.

E. LM2596 Buck Converter:

LM2596 Power Supply is a step-down(buck) switching regulator, capable of driving a 3-A load with excellent line and load regulation. These devices are available in fixed output voltages of 3.3 V, 5 V, 12 V, and an adjustable output version. The LM2596 series operates at a switching frequency of 150kHz, thus allowing smaller sized filter components than what would be required with lower frequency switching regulators.

F. ESP32 Cam:

The ESP32-CAM has a very competitive small-size camera module that can operate independently as a minimum system with a footprint of only 27*40.5*4.5mm and a deep sleep current of up to 6mA. ESP-32CAM can be widely used in various IoT applications. It is suitable for home smart devices, industrial wireless control, wireless monitoring, QR wireless identification, wireless positioning system signals and other IoT applications. It is an ideal solution for IoT applications.

ESP-32CAM adopts DIP package and can be directly inserted into the backplane to realize rapid production of products, providing customers with high-reliability connection mode, which is convenient for application in various IoT hardware terminals.
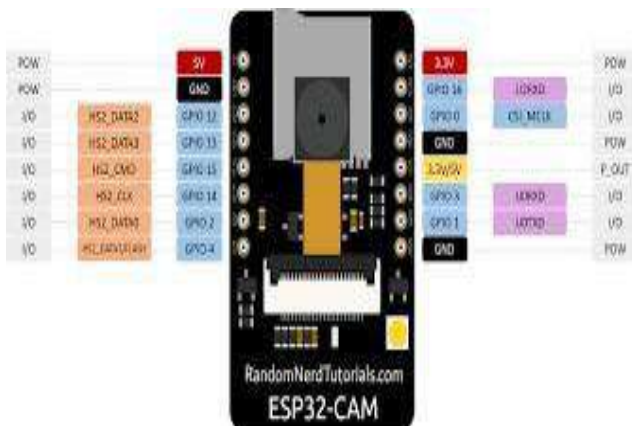
G. Buzzer:
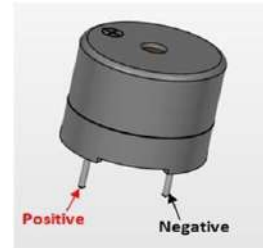
A compact 2-pin structure that can be used by simply powering it using a DC power supply ranging from 4V to 9V. A simple 9V battery can also be used, but it is recommended to use a regulated +5V or +6V DC supply. It is normally associated with a switching circuit to turn ON/OFF the buzzer at the required time and interval. Buzzer's positive terminal is paired to NodeMCU's D3 pin, while the negative terminal is grounded.

V. SOFTWARE DEVELOPMENT

Arduino IDE:

The Arduino integrated development environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards. It supports the languages C and C++ using special rules of code structuring. It supplies a software library from the Wiring project, which provides many common input and output procedures.

Blynk Application:

It can control hardware remotely, display sensor data, store data, visualize, etc. There are three major components in the platform:

i. Blynk App - allows creating amazing interfaces for projects using various widgets.

ii. Blynk Server - responsible for all the communications between the smartphone and hardware. You can also use Blynk Cloud or run your private Blynk server locally. It is open-source, could easily handle thousands of devices, and can even be launched on a Raspberry Pi.

iii. Blynk Libraries - enables communication with the server and process all the incoming and outcoming commands for all the popular hardware platforms.

Blynk Application set up:

- After downloading the Blynk app, first login with your Gmail address and in the New Project window, write the name of the project.

- Select the hardware (microcontroller), after which the app assigns the Auth code to the Gmail address registered.

- Select the buttons as per the relay connections from the Widget Box.

- Assign a digital pin to each button and name it.

- Copy and paste the Auth Token from the mail to Arduino code, and enter your Wi-Fi name and password likewise.

In Arduino tools, select the ports, the module, and then compile and upload the code.

Who Uses My WiFi- Network Scanner:

The application is used to connect the Webcam to the monitoring screen, so as to see the live footage of the surveillance camera.

The application scans for the Webcam's IP, which when added on the google search bar produces the live footage of surveillance.

VI. RESULTS AND DISCUSSIONS

The main aim of this paper is to provide safety and minimize the human effort by making day-to-day life easy and leisurely. The system meets the required expectations satisfactorily, producing desired results and outputs. The advantage of using such an effective system is the highly reliable security. The connection is secure in all instances.
The system provides high stability, comfort especially for people with walking disability and the elderly, and is truly reliant.In this report, the study of 'Smart Door Receptionist with Smart Lock System' is presented. This project tries to throw light on the Smart Lock System which can be used to modify the old security system and make it more efficient and usable, especially for elderly and specially-abled people.
This implementation brings together all the features which can be needed to make sure that the services provided by it make the system independent. This paper describes a new way of implementing a Smart Lock which can be operated without the use of old methods only a command of lock/unlock on a webpage/application is enough to get access. Smart lock allows the user to check in whenever needed. It provides ease to the user in management of visitors or relatives at

home. It ensures the convenient authentication and unlocks accordingly, so the user does not have to worry about losing or forgetting keys which is a drawback seen in the traditional lock-key system.

CONCLUSIONS AND FUTURE SCOPE

In today's technologically advanced world, autonomous systems are gaining rapid popularity and so the advancement in latest technology is continuously developing. One such great innovation is the automatic door lock security system. This high-tech security system overcomes the demerits seen in the traditional lock and key system by providing advanced level of security and creating a safer environment.

The system is designed in a way that a constant check can be kept from anywhere. It is desirable for working parents who leave their children at home, in such cases parents can monitor who/when visits the house and can allow/deny the entry of the visitor accordingly. The system has minimal requirements, beneficial in many ways and is easy to use and understand even to a layman.

The system is highly stable and secure. The implementation brings together all the features which are needed to make sure that the services provided by the application make the system independent. The research papers and applications prove system's worthiness in today's immensely growing and evolving society. One of the greatest achievements of the system is its cost effectiveness and user-friendly interface.
Through such developments in lieu of IOT and other technologies, the hope for better and adequate solutions is strengthening.

ACKNOWLEDGMENT

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Digital Ticketing System for Remote Queuing at Retail Shops

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Abstract: - **The project objective is to book queue tickets in online through an application. The Ticket Reservation system is an Internet based application that can be accessed throughout the Net and can be accessed by anyone who has a net connection. This application will reserve the tickets. This online ticket reservation system provides an app for retail shops where any user of internet can access it. User is required to login to the system and needs to put his credentials for booking the tickets. Booked tickets would be available digitally in their smartphones.**

Shop owners would be able to see the customer booking details and would accordingly manage the crowd in a simple way, making it easier for both, the consumers and the shop owners. This pandemic has led people to maintain social distancing as well as to stay at home for most of the time and this app would just make it easier for the people to book tickets for the queue at any retail shops nearby avoiding the overcrowding. This app provides complete information regarding all the nearby shops. Our online ticket reservation system is very useful for the current requirement of the people keeping in mind the situation. People can book tickets online at any time day or night.

KEYWORDS: Ticket Reservation, online, pandemic, shop owners, overcrowding, Android App.

I. INTRODUCTION

During this covid-19 situation the retail shops provide only few members inside the store. This results into big queues outside the shops. To avoid this situation digital ticket plays an important role. As we are aware of the guidelines imposed by our government for our benefit to maintain social distancing and also to stay at our respective homes and only move out if the situation demands to do us so. But on the other side we also need our essential goods and groceries for our daily consumption and we are also aware that D-Marts and such wholesale shopping complexes do not allow much customers inside and due to this people tend to rely more on the local retail stores and general stores for their needs. Keeping all these factors into consideration we are making an app which the user would use to book a ticket for the queue outside the shop he/she needs to visit ultimately resulting into less crowding and also a sort of social distance being maintained and definitely making an ease for the shopkeepers to manage their customers and fulfil their needs.

II. LITERATURE REVIEW

Virtual queuing is about managing customer journeys in the digital space, so they have minimal close interactions with staff and fellow customers. Customers do virtual check in and wait remotely, and staff can also keep their distance when serving.

Specifically, for the current situation regarding Covid-19, a virtual queue management system helps reduce the risk of virus spread on premises, and therefore keeping staff and customers safer from the risk of infection. All the general considerations kept in mind the app developed here helps you to book a ticket for queuing at any retail stores which has not been implemented by many so far. This will help the user to book a ticket for queue at any retail store of their choice and also would prompt that how many more customers are in front of him to estimate the time for him/her to reach the store. The customer also has an option to view his booked tickets and also to cancel any ticket which has been already booked and he/she does not wish to visit the store. The time slots are available to book queue ticket according to their convenience.

On the other side the shop owners would be able to see the booked ticket and would get an idea that how many customers are going to visit their shop. There would be no hassle for the shop owners as there won't be much people waiting and yelling outside his/her store.

III. METHODLOGY

The name of the project is "Digital Ticket System for Remote Queuing at Retail Shops". During this covid-19 situation the retail shops provide only few members inside the store this results into big queues outside the shops. So to avoid this situation digital ticket plays an important role. Here the user can book a ticket from an app or a website and reserve his/her place to enter the shop. Customers can also understand how many customers are in front of him and the predicted timing to reach the shop.

This app in general would consist of two interfaces: One for the users or the consumers. And the other for the Retail shop owners. The users would be able to view all the information of the shops around their locality and reserve ticket according to their convenience.

And for this we have used two software:
One is the Android studio for creating the application and designing its user interface and java and xml coding are also executed in this software.
The second is the Firebase for storing all the database like the shop details, the areas selection, the time slots, the shops available in the locality, etc. Mobile Ticket is the virtual ticket provided to customers or visitors using mobile phones.

With Mobile Ticket, customers don't need to have a physical ticket, and they get real-time data and updates about their place in the queue. With this, customers have greater flexibility as they can wait anywhere. The customer's place in the virtual queue is secured by an identifier like a printed ticket, or managed through their mobile phone with an SMS, mobile ticket or queuing app. The identifier is often given upon arrival but can be provided in advance when booking an appointment. Because the place in the queue is secured, there is no need for a physical waiting line.

Requirements: -

Software Requirement: -

1) Android Studio

2) Firebase

Android Studio will be used to DESIGN the User Interface and also writing the CODES for the application. Firebase will be used to maintain the data for the application.

The Firebase Real time Database is a cloud-hosted database. Data is stored as JSON and synchronized in real time to every connected client. When you build cross- platform apps with our iOS, Android, and JavaScript SDKs, all of your clients share one Real time Database instance and automatically receive updates with the newest data.

The Firebase Real time Database lets you build rich, collaborative applications by allowing secure access to the database directly from client-side code. Data is persisted locally, and even while offline, real-time events continue to fire, giving the end user a responsive experience. When the device regains connection, the real-time Database synchronizes the local data changes with the remote updates that occurred while the client was offline, merging any conflicts automatically.

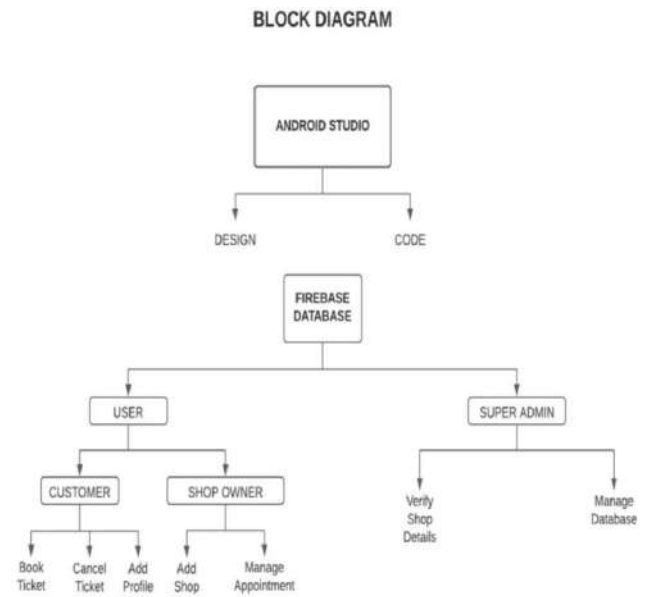Figure 1: The Android studio main window

IV. BLOCK DIAGRAM & WORKING

Figure 2 : Block Diagram of Proposed Digital TicketingSystem

Working:
This is the very first stage to develop any project. Itactually defines the aim and the
concept of the project. The aim of **"Digital Ticket System For Remote Queuing At Retail Shops"** is to design an app which would be used for booking tickets for the queue outside the retail shops. The Owner would book the ticket from this app to reserve his/her place in the queue and would visit the store according to the time slot selected by them. The shopowner would get to know the customer will arrive at a particular time and be ready to serve them their needs without any overcrowding and trouble.
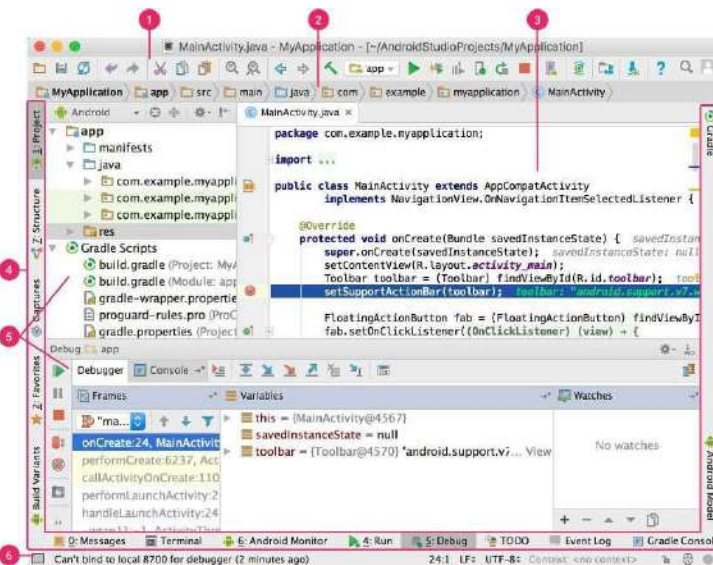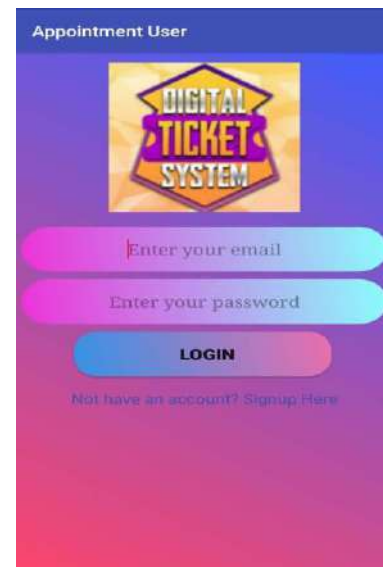

Figure 3: Login Page

V. RESULT AND DISCUSSION

At this stage we have categorized the whole system into different individual modules.

These modules (block diagrams) will be helpful in understanding the concept and working of the application. It also simplifies the entire customer, super user and shop owner roles in this application. The different software used for different purposes is also cleared in the block diagram itself. So theresult was the block diagram of the project. This time we tested our project for actual working, after loading the application into the
smartphone. The application was running smoothly and also the data stored were possible to view. Any errors found were removed successfully.

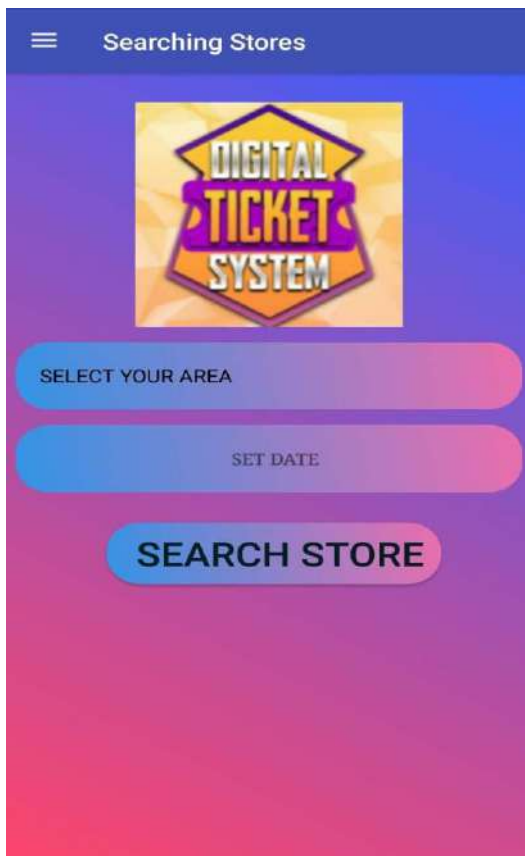This is the last and final stage of development of our project.

Figure 4: Location Search Page

After the studying of the software we write the code for all the individual parts in the project. Coding is done in Java and XML.

The code is implemented on the computer in the android studio app, so the compilation also is done in the softwareitself. Android Studio is a software which is widely used in the development of applications. From there the smartphone is connected to the computer from where when the code is run it gets installed inside the smartphone.
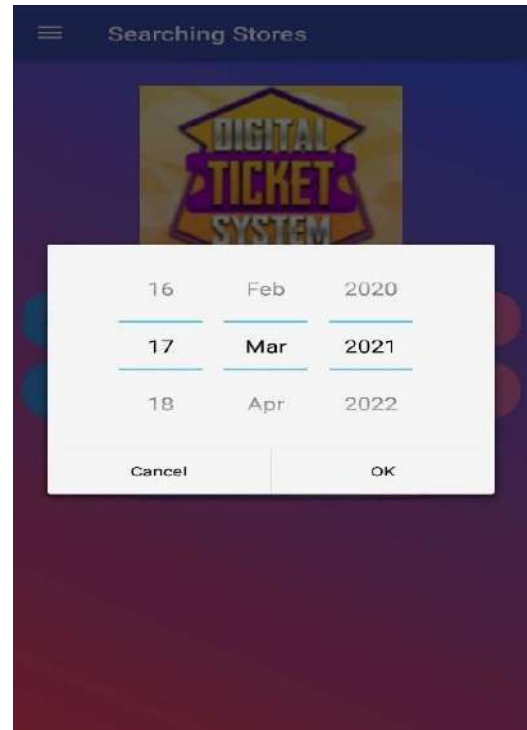
Figure 5: Date Selection Page

Study of the software here used was also a veryessential part as there are two software used here: **The Android Studio** and **The Firebase.** So the android studio software was used for the app layout creation, its UI and also for the entire coding purpose. While the Firebase software was used for storing andviewing the data that comes in from the app, when it is used.
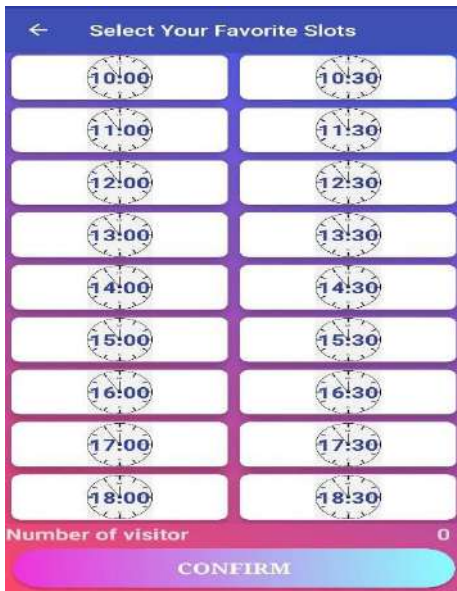

Figure 6: Available shops page

Figure 7: Time slots page

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WEBSITE LINKS:
www.wikipedia.com
www.business2community.com
www.navipartner.com
www.softwareadvice.com
www.cybertill.com
www.capterra.com

VI.   CONCLUSION

This app that we have designed is keeping the covid crisisin mind. This will reduce the overcrowding in the retail stores.

Customers can book a ticket for queue outside the retail shop of their own choice and also select a time slot in which they would find it convenient to visit the shop. Thecustomer would be able to identify by what time he/she has to visit the shop so that there is no overcrowding andeveryone maintains social distancing by default. Customers can also view their booked ticket in the show ticket option and also they can cancel their booked ticketin case they don't need to visit the shop from the cancel ticket option.

This will definitely reduce the overcrowding situation thatwe all face nowadays for getting our basic need productsand also maintain a sort of social distancing

ACKNOWLEDGEMENT

COVID-19 Impact on Sustainable Development Global Economy

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*Abstract: -*The goal of this project is to stimulate a discussion related to the impact of COVID-19 on the sustainable development and the global economy. For meeting this goal, we have devised a software model in form of a webpage which will have data regarding the effect of COVID on sustainable development alongside the measures to achieve it further on. Also, the webpage will also have data regarding the effect of COVID on the global economy and the goals that have to be achieved to maintain a healthy economy. Suppose we need to get information regarding COVID in context of economy and sustainability, then instead of browsing to two different pages, the information will be made available on one page itself which will save the user from the hassle.

I.   INTRODUCTION

Sustainable development is the combination of three aspects: economic, environmental, and political, suggesting that current standard of life should be maintained in order for future generations to be able to enjoy the same quality of life. The United Nations has indicated the sustainable development goals which are based on 17 targets, and the novel coronavirus outbreak at the global scale at the beginning of 2020 has caused a reciprocal impact on the economy and agitated social problems, severely affected the growth and development of many of these targets. The pandemic has also overwhelmingly harmed the global economy: consumers stay at home, businesses lose revenue and lay off workers, and unemployment levels rise sharply. Irrespective of the economic categorization, many countries are struggling to prevent further economic damage caused by this pandemic. Moreover, as the COVID-19 crisis potentially inflict long-lasting emotional trauma and disturb the psychological well- being of employees, it will ultimately affect the comfortability level within the organizations. In addition to imposing severe stress on individuals, from the perspective of the macro level, this pandemic has also ruined the psychology of sustainability, namely the sustainable development for wellbeing in organizations. Keeping all these factors into consideration, we are making a webpage which the users can access for getting the information regarding all these pointers at one place instead of browsing through several different pages.

II.   LITERATURE REVIEW

Sustainable development is the combination of three aspects: economic, environmental, and political, suggesting

that current standard of life should be maintained in order for future generations to be able to enjoy the same quality of life. The United Nations has indicated the sustainable development goals which are based on 17 targets, and the novel coronavirus outbreak at the global scale at the beginning of 2020 has caused a reciprocal impact on the economy and agitated social problems, severely affected the growth and development of many of these targets. The pandemic has also overwhelmingly harmed the global economy: consumers stay at home, businesses lose revenue and lay off workers, and unemployment levels rise sharply. Irrespective of the economic categorization, many countries are struggling to prevent further economic damage caused by this pandemic. Moreover, as the COVID-19 crisis potentially inflict long-lasting emotional trauma and disturbance. The psychological well-being of employees, it will ultimately affect the comfortability level within the Organizations. In addition to imposing severe stress on individuals, from the perspective of the macro level, this pandemic has also ruined the psychology of sustainability, namely the sustainable development for Wellbeing in organization.

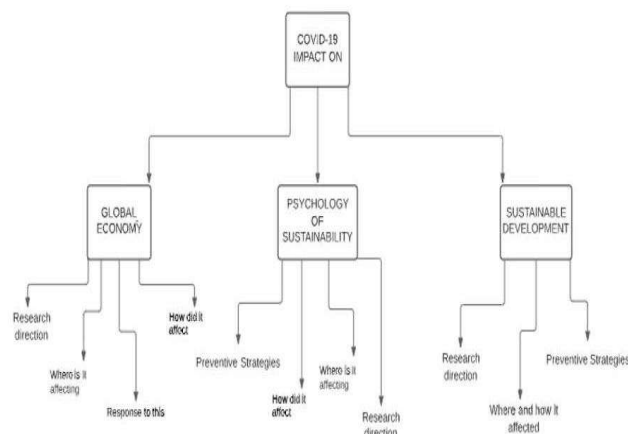## III.   METHODLOGY

BLOCK DIAGRAM

Fig. No. 1 Block Diagram

This is the basic block diagram of our research paper. As mentioned in the title we have to discuss on covid19 in respect to the global economy, psychology and sustainability, so, we have divided our research content to three sub-parts that are covid-19 impact on:

- Global Economy
- Psychology of Sustainability
- Sustainable development

After this division we have made research in four parts:

- Research direction- this part will give the reader an overview of regarding the content that we have discuss in the research paper.
- Where it is affecting- in this part discuss regarding the sectors have been affected due to covid-19 pandemic
- Response to this- here we have discussed regarding the measures taken by the different nations to tackle the impact of covid-19. Only the response of the powerful countries like India, USA and Germany were discussing.
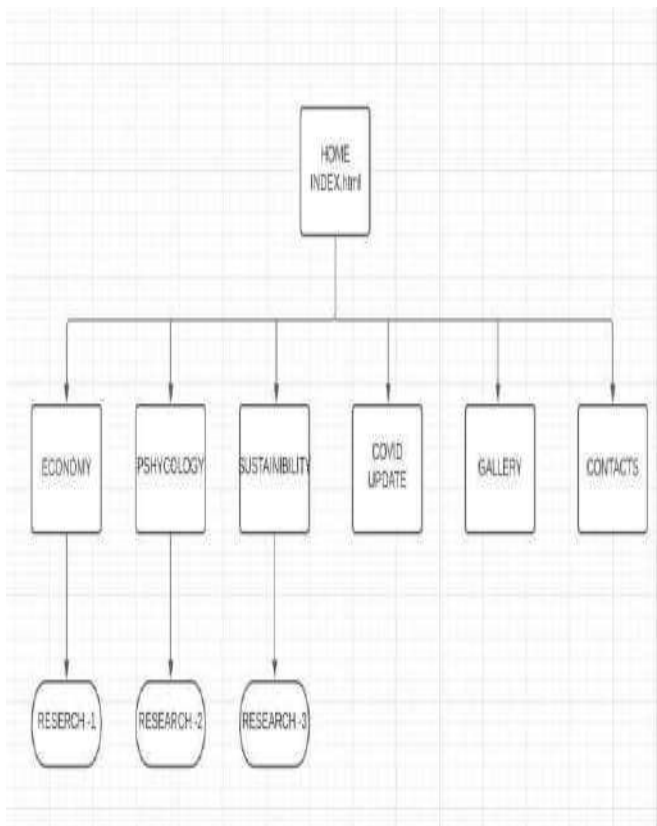
SITE MAP

Fig. No. 2 SITE MAP

This site map will give the user the flow of our website. Here we have home page which will contain index, some graphic content and basic information of covid-19. Under the index section we have four buttons- Economy, psychology, sustainability and covid update. Each button after pressing will take the user to our research content that we have attached to it. This research content is easily downloadable. We have also provided a covid update button where the user can get the daily updates. Contact section will give the user some information about our group members. We have also provided links of WHO, World Economic Forum and SDGs.

Requirements: -

Software Requirement: - Eclipse

Java Development Tool

Java IDE will be used to design the webpage user interface and also for writing the codes for the webpage. The JDT project contributes a set of plug-ins that add the capabilities of a full-featured Java IDE to the Eclipse platform. The JDT plugins provide APIs so that they can themselves be further extended by other tool builders. Using the tools provides by the JDT, we can write the code for the page, code for CSS styling, add images and add bootstrap files. All these can be carried out simultaneously using this one software. After the compilation and execution of the files is done, the final output can be viewed on a webpage.
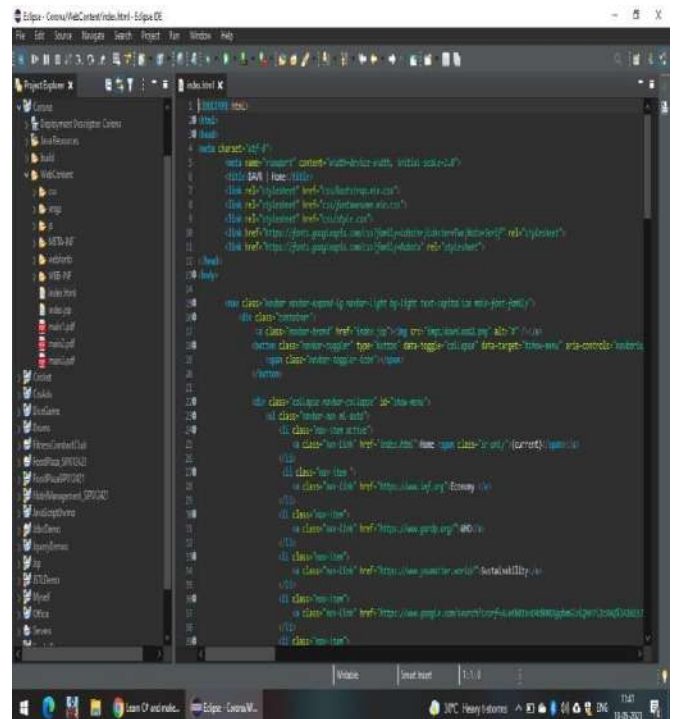

Fig. No. 3 Eclipse IDE main window
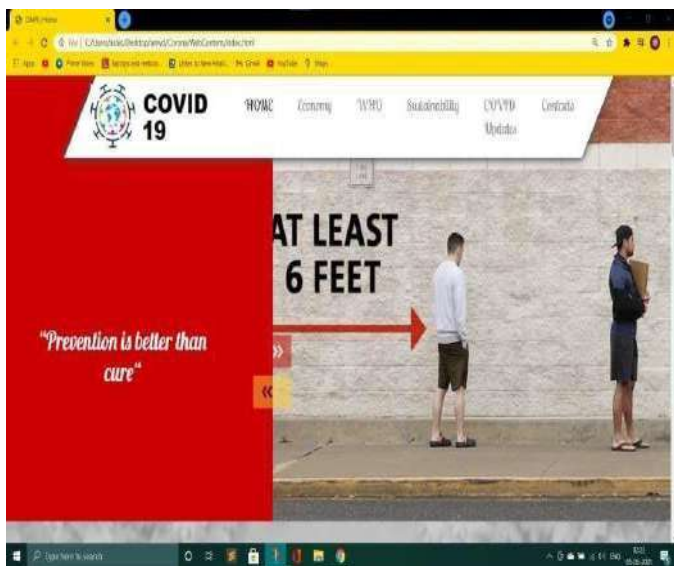
IV. RESULT AND DISCUSSION

Fig. No. 4 Home Page

The above image shows us the look of the home page of our webpage containing the buttons which redirect the user to the corresponding content on the internet. In addition to these buttons, the research that we have done regarding these topics is also present on the webpage in the form of pdf files that can be accessed by the user just by the click of a button.
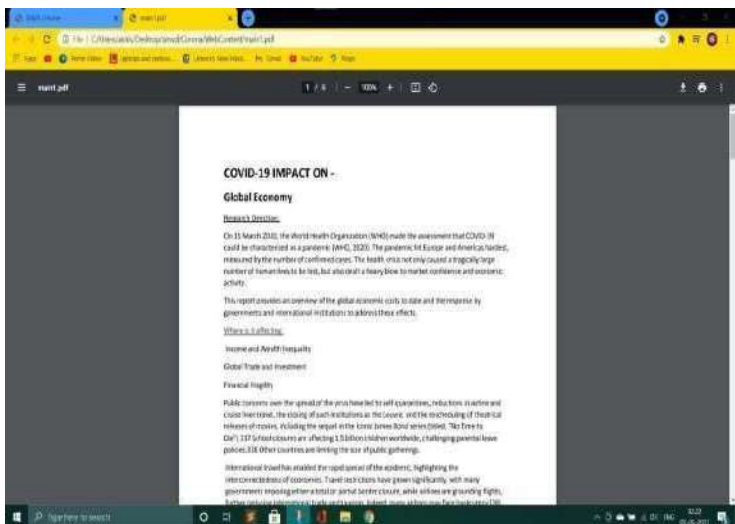

Fig. No. 5 Research PDF

The above image shows us research pdf opened when the user accesses the research by clicking on the button present on the webpage.

V. CONCLUSION

In this report, the study of the application and the purpose for which it is being built due to the current demand of the situation is specified. The techniques or the advantages of the application are mentioned through the literature survey as well. The basic functioning in broad and the architecture by means of which the complete functionality of the application depends are also presented. Input and output specifications along with the software specifications which are used to build the application's user interface are clearly mentioned in the report.

Therefore, timely collection of information from different papers resulted in the culmination of our research outcome which is packaged into this neat little website.

VI. ACKNOWLEDGEMENT

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Transportation Bot

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Abstract—**As society experiences more demand for rapid order fulfilment and accuracy in supply chain management providers must come up with the demand. The scope of our project is to use an automated-guided path following vehicle to transport goods from one place to another. Robot is operated without wire guidance and controlled by a microcontroller. AVGs are material handling systems typically used for repetitive tasks in distribution centres, storage and warehouse, manufacturing, and assembly plants. Transportation bot can complete more amount of work in less amount of time.**

Keywords—Transportation, cost-effective, AGVs, autonomous , microcontroller, Communication, Line Following.

1. Introduction

Transportation bot comes under the Robotics discipline which is concerned with building systems that automatically transfer goods from one place to another. A Transportation bot is basically an automated guided vehicle which will transfer goods using dedicated path and it will map the path using various sensing device as well as it communicates with the administrating device using communication device. In recent years a great deal of time and effort has been spent on developing systems to enable an autonomous robot to be used in transporting goods in big godowns of e-commerce businesses. Not surprisingly, the majority of this research has been towards modifying, or designing from scratch, full size robotic vehicle so that it can transport to its defined destination without human supervision. Guided vehicles are unmanned vehicles used to transport unit loads, large or small, from one location to another. Automated the factory floor to another. These vehicles are powered by a computer and can be run with or without wire guidance. The Transportation bot are battery-powered, equipped with manual or automated pick-up and drop-off mechanisms as well as with automated obstacle-detection capability. An on-board computer in a mobile robot stores path and machine function instructions and triggers the drive and steering systems to guide the machine to follow a desired path. A laterally scanning laser transmitter-receiver mounted on the vehicle is part of an enhanced guidance system for holding the vehicle on the specified course.

2. Literature Survey

A. Literature Survey on "Line Follower Robot for Industrial Manufacturing Process."

Abhijit Pathak ,Refat Khan Pathan , Amaz Uddin Tutul Nishat Tahsin Tousi , Afsari Sultana Rubaba, Nahida Yeasmin Bithi et al. [1] used line following technique for navigation purposes. For controlling the robot Arduino Uno is used. Motors are a very important part of robots, because the movement system is the main part of the line following. Author used a 4V DC motor due to this it can't take payload more than 2Kg. No communication or tracking devices are used in robots.

B. Literature Survey on "Development and Applications of Line Following Robot Based Health Care Management System."

Deepak Punetha, Neeraj Kumar, Vartika Mehta [2] used LDR; IR Proximity sensor; Microcontroller 89c51 ; Comparator; DC motor; Motor driver for making of the line following robot. LDR is a technique that allows a robot to follow a line drawn on the floor.. IR proximity sensors used to stop the robot when any object came to its path. Comparator circuit is used for setting a threshold value from which it can set logic when it detects the light. Motor driver is used for controlling the motor. An actuator is used to make the system dynamic. A GSM module can be installed in the line following robot so that if anything goes wrong, the device can call the doctor.

C. Literature Survey on "Design and Implementation of RFID Line-Follower Robot System with Color Detection Capability using Fuzzy Logic."

M. B. Nugraha, Rizki Ardianto P, Denny Darlis et al. [3] crafted a line-follower robot that can detect different colour lines that indicate different routes and limit the operator's authorization. This system uses a microcontroller with fuzzy logic implementation, using the Mamdani model inference method. The robot is fitted with an LED and LDR-based colour sensor, as well as an RFID-based identification/authorization device, to detect lines. The system's output is robot movement, allowing the robot to obey the guide lines.

D. Literature Survey on "Design of an Autonomous Mobile Robot Based on ROS."

Murat Köseoğlu, Orkan Murat Çelik, Ömer Pektaş et al. [4] By considering both the hardware architecture and electronic communication protocols, an autonomous mobile robot (AMR) adapted for robot operating system (ROS) is planned. They have designed a mobile robot for a hard and smooth surface indoor environment. The basic mechanical parts of the designed robot consist of the chassis, two motors and four wheels. The basic components of a power system are a battery and a power control system. They have used a Lithium-Polymer Battery (LiPo). It is made up of two separate computers that operate in tandem and are interdependent. One of the computers is a single board computer (SBC) which is the center of the decision-control system. Different control systems can be run on SBC. The other unit, which uses a 32-bit microcontroller (MCU), is used to power peripherals and sensors. A real-time operating system (RTOS) is embedded in MCU.

2.1 Summary of Related Work

Literature	Advantages	Disadvantages
bhijit Pathak ,Refat Khan Pathan , Amaz Uddin Tutul , Nishat Tahsin Tousi , Afsari Sultana Rubaba, Nahida Yeasmin Bithi et al. [1]	By using the Line Following method, Robot can reach its destination with less error of collision.	No communication device is attached like RF,NRF,ZigBee etc. A 4V DC motor is used, which can carry a payload less than 1kg.
Deepak Punetha, Neeraj Kumar, Vartika Mehta et al.[2]	From the test results can be seen that the optimal conditions for the system is on the PWM value of 100% and a detection rate of 70ms which will result at a speed of 0,083m/s, the robot moves from the starting point to the destination point. This speed will make robot movement when following the line to the destination point success rate at 100%.	System brightness and reflectiveness of some tracks are not usable
M. B. Nugraha, Rizki Ardianto P, Denny Darlis et al. [3]	The system is capable of detecting different color lines with 100% accuracy in 10-bit ADC value. It is also capable to restrict operator authorization in pair with the stated	No details like payloads, motor, communication, battery are provided.

	RFID cards with 100% success result.	
Murat Köseoğlu, Orkan Murat Çelik, Ömer Pektaş et al. [4]	Robotic operating system is used which make this robot advance This Robot can make 2D map of its Working Environment.	Because the map is already made,Collision can occur if something new comes into the working environment.

3. Proposed Work

The project aims at developing a cost-effective transportation bot which will help organizations in transporting goods from one location to the destination location.Transportation bot can be used in various places such as warehouses, hotels, hospitals, etc… As it is having a dedicated path which reduces the congestion that occurs while transporting. When it comes to reliability, transportation bot uses communication devices to notify the administrator whether goods have reached to its destination or not.
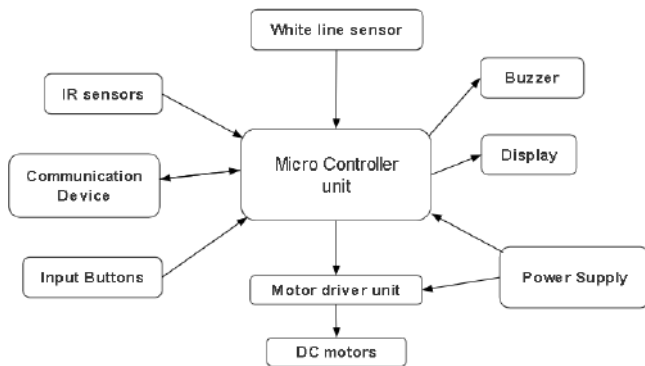
3.1 System Architecture

Fig. 1 Proposed system architecture

A. Microcontroller unit

Microcontroller Atmega2560 has 256Kb flash memory. the controller needs 3 things to work i.e. power supply, clock and reset. It is 40 pins. controller. Pin number 62 is grounded. Pin 28 and pin 29 are oscillator pins at which a the crystal oscillator is connected. Two 22pf capacitors are connected to the oscillator and are then grounded. Crystal frequency is 16 Mhz.This will generate a clock. Pin number

9 is reset and 1 capacitor and 1 resistor is connected and power is given to act as a power reset.

Atmega 2560 microcontroller has mainly 3 registers DDRx, PORTx and PINx. DDRx register is used to set port as input port or output port. 1 is given to the DDRx register to set it as an output port and 0 is given to DDRx to set it as an input port. PORTx register is used to send values to the output components and PINx register is used to read the data from external components.

B. IR Sensor / White line sensor

Line following technique,IR sensor module is used. Three IR sensors are placed in such a way that they locate the robot in the middle of the black line and take the bot to its destination without leaving the black line. These three IR sensors are connected to the PORTF of the Atmega2560 microcontroller . Pin PF0, PF1& PF2 are connected to the left, center & right IR sensors respectively. By adjusting the potentiometer on the IR sensor module these IR sensors can distinguish between black and white surfaces easily. For white surface it will send 1 to the microcontroller and for black line it will send 0 as an output.

C. Input Push button

Transportation bot is used to transfer goods to the specific destination location. Destination location can be set using push buttons. Push buttons are connected to PORTA0 to PORTA3 of Atmega2560 microcontroller. Push buttons connected from PORTA0 to PORTA3 define four destination locations respectively.

D. Motor

In transportation bot, four 12V,100 RPM DC geared motors are used with two L298N motor drivers. All pins of PORTC of Atmega2560 is connected to L298N motor driver to drive the motors. PC0 to PC7 pins are used to rotate all motors in different directions.

E. Motor Driver

This L298N Motor Driver Module is a high-performance motor driver for DC and Stepper Motors. An L298N motor driver IC and a 78M05 5V regulator make up this module. Up to four DC motors can be controlled by the L298N Module, or two DC motors with directional and speed control.

F. Communication Device

Nrf module is used to control communication between bot and the administrator side. When the robot has reached its destination Nrf module will send the message to the administrator side "Robot has reached its destination". When any obstacle is detected Nrf module will send "Obstacle detected" message to administrator side. This will Help to track the robot and increase the reliability of the robot.

4. Requirement Analysis

The experiment setup is carried out on a ATmega2560 microcontroller and a metal chassis which has the different hardware and software specifications as given in Table 4.1 and Table 4.2 respectively

4.1 Software

Table 4.1 Software

Integrated development environment (**IDE**)	Atmel Studio and Arduino IDE
Programming Language	Embedded C

4.2 Hardware

Table 4.2 Hardware

Processor	Microchip 8-bit AVR® RISC-based microcontroller combines 256 KB ISP flash memory, 8 KB SRAM, 4 KB EEPROM.
IR sensor	5VDC Operating voltage. I/O pins are 5V and 3.3V compliant Range: Up to 20cm
Motor	100 RPM Side Shaft 37mm Diameter High Performance DC Gear Motor. Operating voltage 4v to 12v
NRF module	Frequency Range-2.4 GHz ISM Band. Operating Supply Voltage- 1.9 V to 3.6 V
LCD	16X2 LCD display. Operating voltage (4.7V – 5.3V)
Buzzer	Operating Voltage: 4-8V DC Sound Type: Continuous Beep
Li-ion battery	Capacity:2750mAh Rated Voltage:4.20V Maximum 1375mA Standard 2750mA Maximum
L298N	12V input from DC power Source Maximum Power (W): 25W

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.Dept. of Electrical-Electronics Engineering, Inonu University, Malatya, Turkey 2 Havelsan Hava Elektronik Sanayi A.Ş., Ankara, Turkey Note that the equation is centered using a center tab stop. Be sure that the symbols in your equation have been defined before or immediately following the equation. Use "(1)", not "Eq. (1)" or "equation (1)", except at the beginning of a sentence: "Equation (1) is . . ."

Chatbot to Display COVID-19 Information

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Abstract— The primary point is to give legitimate reaction to user's queries on latest pandemic "Coronavirus". Chatbots easily connects with you to help solve your queries, from providing life-saving health messages to checking the weather forecast to purchasing a new shirt. A chatbot is a program or service that easily connects with you to help solve your queries. The services that a chatbot can deliver are quite diverse, from providing important life-saving health messages to checking the weather forecast to purchasing a new pair of shoes. While interacting with a chatbot, you should feel as if you are talking with a real person. As the Coronavirus continues to exponentially spread across the globe, software developers around the world are doing the best they can to ensure the distribution of secured and trusted information concerning the Novel Coronavirus. For instance, numerous open-source API projects have been started to provide data to track the number of infected people, recovery rate, and unfortunately, the number of deaths recorded in different countries. Commonly, to stay up-to-date with the statistics in your country or neighboring countries requires a browser and surfing the internet to get what is sometimes accurate information.

Keywords— Chatbot, Interaction, Covid, Lifestyle, Statistics.

I.   INTRODUCTION

One of the major challenges that India as a country faces is to cater to good quality and affordable healthcare to its growing population. The World Health Report issued by WHO has ranked India's healthcare system at 112 out of 190 countries. This inaccessibility of healthcare facilities especially in rural India and the intricacy in accessing means of transport further causes patients to postpone their treatment, or opt for medical facilities that may be closer but at the same time are not cost-efficient and well-matched to their medical needs. To seek more efficient ways to provide timely medical care, access and quality treatment to the patient, the role of Telemedicine comes into play which connects patients with healthcare providers and healthcare information.

Due to the recent "COVID-19" pandemic, social distancing will stay in India for a long time, especially for patients with chronic diseases, thereby imposing a hindrance for the population to access healthcare facilities.

The data released by the National Health Mission [2], amid COVID-19 shows that there has been a fall in other acute illnesses being reported during the lockdown in India. This data indicates that a reduced hospitalization case indicates a lack of access to healthcare, rather than a lack of illness. In this alarming situation, telemedicine acts as a boon for people. By using conversational artificial intelligence, healthcare providers can diagnose and treat patients without the need for a personal visit, whilst promoting social distancing and reducing the risk of COVID-19 transmission.

In the current growing age of digitization, Artificial Intelligence (AI) powered chatbots are playing a leading role by exemplifying the function of a virtual assistant that could manage a conversation via speech or textual methods. It makes use of voice queries to get answers, perform actions and recommendations according to user needs. They are adaptable to the user's individual language usages, searches, and preferences with continuing use. A conversational bot with a voice and/or chat interface can play a principal role by overcoming the current barriers towards making primary healthcare affordable, accessible, and potentially sustainable in the new digital economy. With the advent of AI, virtual assistants can be seen penetrating to the nook and corner of the world. The instant service and personalized user experience provide a significant opportunity for the utilization of conversational AI for delivering Tele-health. Voice assistants make use of a natural language interface to communicate via speech. There is a requirement for wellbeing associations to computerize whatever number reactions to these requests as would be prudent to let loose HR to manage more perplexing issues in the battle against this pandemic. A chatbot is a computerized reasoning (AI) programming that can mimic a discussion (or a visit) with a client in common language through informing applications, sites, versatile applications or through the phone. With the assistance of a similar innovation we are building up a chatbot to show covid 19 data. Chatbots are outlined with a predesigned dialog box based on a natural language processing system.

II. METHODOLOGY

Conversational Bot assists in the form of an automated conversation between the user and computer in the form of chat. Tele-Health is poised to tailor the health service to users' needs to improve their health condition by offering valuable consultations and information to patients at the comfort of their home. Application of Human-Machine interaction in the domain of healthcare is pivotal in aggregating the services of a doctor, thus, overcoming the challenges of accessibility, feasibility as well as communication for the patients. Our application bridges the gap between patients and a lack of access to healthcare facilities during pandemics by leveraging telehealth.
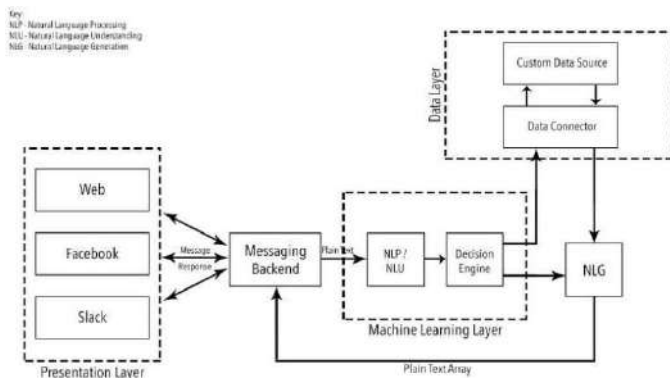
BLOCK DIAGRAM

Figure1 Block diagram

Transforming conversational intent definitions to a Tensorflow model. Next, building a chatbot framework to process responses. Context incorporation into response processor. Transform Conversational Intent Definitions to a Tensorflow Model.

A chatbot framework needs a structure in which conversational intents are defined.

With our intents JSON file loaded, we can now begin to organize our documents, words and classification classes.

We create a list of documents (sentences), each sentence is a list of stemmed words and each document is associated with an intent (a class).

Building Chatbot Framework

A contextual chatbot framework is a classifier within a state-machine. After loading the same imports, we'll un-pickle our model and documents as well as reload our intents file. Remember our chatbot framework is separate from our model build.

Contextualization

We will add the notion of 'state' to our framework. This is comprised of a data-structure to maintain state and specific code to manipulate it while processing intents.

III. FUNCTIONALITY

AI-enabled chatbots function based on a network of bot flows that interact with each other, leading to more dynamic and agile conversations. These chatbots understand human intent, learn from historic conversations, and provide responses that are more human-like. For instance, when a customer asks if the zoo is open on Saturdays, an AI-enabled chatbot can respond to that, and also ask the user if they would like to buy tickets. The point of "Building a Chatbot" is to plan a model which will store client messages and will address the inquiries dependent on the info gave to the model. The Chatbot will likewise furnish clients with the fitting and applicable information about the progressing Coronavirus pandemic and will help clients with appropriate direction.

The functioning model will likewise feature the Coronavirus cases all throughout the planet to give an essential thought how the nations have been influenced during the pandemic.

The model cannot take the raw data. It must go through a lot of pre-processing for machine to easily understand. During the testing iteration, we have added almost 150-200 patterns along with descriptive responses to make our model more user friendly.

When working with text data, we need to perform various preprocessing on the data before we make a machine learning or a deep learning model. Based on the requirements we need to apply various operations to preprocess the data.

Now, we will create the training data in which we will provide the input and the output. Our input will be the pattern and output will be the class our input pattern belongs to. But the computer doesn't understand text so we will convert text into numbers.

We have our training data ready, now we will build a deep neural network that has 3 layers. We use the Keras sequential API for this. After training the model for 200 epochs, we achieved 100% accuracy on our model. To predict the sentences and get a response from the user to let us create a new file 'chatapp.py'.

We will load the trained model and then use a graphical user interface that will predict the response from the bot. The model will only tell us the class it belongs to, so we will implement some functions which will identify the class and then retrieve us a random response from the list of responses.

To predict the class, we will need to provide input in the same way as we did while training. So, we will create some functions that will perform text preprocessing and then predict the class. Now we will develop a graphical user interface. Let's use Tkinter library which is shipped with tons of useful libraries for GUI. We will take the input message from the user and then use the helper functions we have created to get the response from the bot and display it on the GUI.

The Chatbot can be ran by firstly running file 'train.py' followed by running 'app.py' file which in turn will display a user-friendly GUI which built using Tkinter and we will add responses in the designed chat window.

IV. RESULT

The Chat response from chatbot and user queries are shown on GUI successfully. The chatbot justifies the use of AI by rapidly responding to the queries asked by the user. It was determined that chatbot performed at a very high standard and provided reliable answers to the user about the calamity and measures to be taken. The average time spent interacting with the chatbot is very low as it is quite efficient.
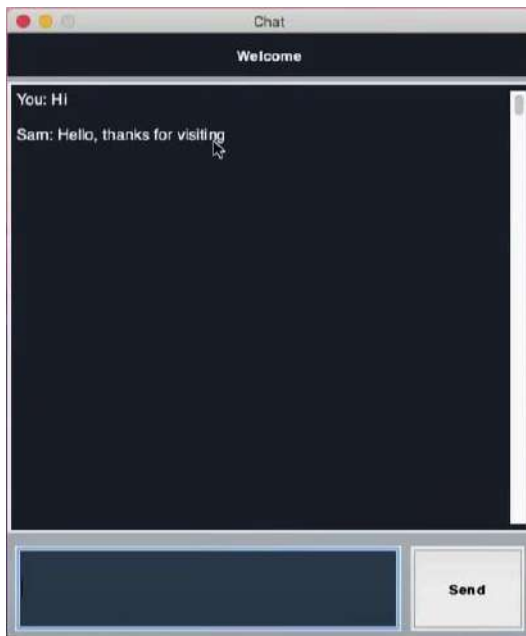

Figure2 Output Snapshot

V. CONCLUSION

This paper presented working of AI ML based Chatbot. The software implementation was successful and the dataset were connected to actual training model. The low interaction time reflects the high understanding and text recognition rates, offered through the adoption of conversational user interfaces thus allowing users to freely interact with the chatbot to meet the demands at times of crisis. The chatbot has proven to fulfil the demand of users wanting instant access to and availability of information. Chatbots can reach out to a large audience on messaging apps and be more effective than humans. They may develop into a capable information-gathering tool in the near future. It takes practice and a deeper understanding of underlying concepts to get the design right and build bots that give users a great experience. The user should be able to get the job done by having a conversation with the bot without having to think too much and with a smile on their face. Great conversational experience, the experience that the user gets when interacting with or at the thought of doing so, is what we should always aim for. And only with practice and mindful design can we achieve that.

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AUTONOMOUS DRONE SURVEILLENCE

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ABSTRACT

The recent terror incidents make us question if the prevailing surveillance systems are still the simplest solution. CCTVs have proven to be an answer for giant scale surveillance but when it involves solving crimes, CCTVs have played a really minimal role. The concept that's proposed during this paper is a thought that's set to beat these shortcomings and revolutionize the surveillance systems. Based on the framework of a quadcopter with autonomous flight capabilities and auto-tracking feature, the drone uses image processing algorithm of Probability Hypothesis Density (PHD) filtering employing a Markov Chain Monte Carlo (MCMC) implementation. To efficiently control the swarm of quadcopters we use an Energy Efficient Coverage Path Planning (EECPP) problem. The concept explained during this paper integrates a swarm of drones which may act autonomously with Image processing and may be the key for the longer term of public monitoring and security when made into a full-scale device, saving precious lives at times.

I. INTRODUCTION

Closed Circuit Television (CCTV) has proven to be an efficient way for surveillance publicly places and personal properties. However, thanks to lack of advancement of the surveillance infrastructure with the growing technology, they appear to possess lost their penetration into public safety and security. A survey by the Police Department of Mumbai, India showed that 16% of the habitual offenders committed crime even after they knew that a CCTV/Surveillance system was in place whereas 31% did not care if such a system was in place. This brings us to the cross roads to spot a replacement technology to up the ante within the surveillance systems. Quadcopters (drones) are widely utilized in both military and civilian applications. However, the cooperation of small and mini drones during a network is capable of further improving the performance and therefore the coverage area of those UAVs. Discussing the use of Quadcopter based network surveillance system is the base of this paper. These small drones are going to be integrated with the prevailing system of Surveillance cameras. The Central Management Centre (CMC) has the access to all or any the video feeds from the prevailing system also because the newly installed drones. By using the concept of Object detection and Object tracking, the drone tracks all the humans by using the tactic supported probability hypothesis density (PHD) filtering with a Markov chain Monte Carlo (MCMC) implementation. Social force model (SFM) is used for describing the interaction between the targets is used to

calculate the probability within the MCMC resampling step in the prediction step of the PHD filter, and a 1 class support vector machine (OCSVM) is then utilized in the update step to mitigate the noise within the measurements, where the SVM is trained with features from both colour and oriented gradient histogram. This system has a foothold over the prevailing systems because it describes the social forces between targets to calculate likelihood values within the prediction stage of the particle PHD filter. An MCMC resampling step is used to improve the prediction part of the particle PHD filter. An OCSVM classifier is accustomed by features from both colour and oriented gradient histograms to mitigate measurement noise in background subtraction results, thereby further reducing the probability of false alarms and hence improving the performance of the PHD filter. The upcoming sections decode the varied concepts and methodologies applied to convert a drone into a closed-circuit television.

II. PATH PLANNING

An emergency response requires some pre-requisites. One such important thing is to maximize the flight time of the drone. With a typical flight time of 25-30 minutes, the trail taken by the drone to follow the chosen human must be optimized for a far better response. This is done by utilizing dynamic programming to maximize the coverage of the area by a camera mounted on the drone. First, they generate a polygonal partition of the area that takes into account the capabilities of each individual drone, such as flight range. Each polygon in the partition is assigned to a drone that will cover it during a zig-zag pattern (i.e., a raster scan) employing a sweep direction that minimizes the number of turns. Environmental obstacles aren't considered. The approach is to hide a neighborhood using multiple drones supported a depth-limited search with back tracking. First, a task scheduler partitions the target into k non-overlapping areas for the k drones. The partitioning procedure is predicated on a negotiation process during which each drone covers the maximum amount area as possible. Then, the wave front algorithm is employed to hide each subarea. as long as the appliance objective stated above is analogous to ours, we've implemented a version of this algorithm in performance comparisons with reference to computational time also as solution accuracy within the results. Torres et al. proposes a coverage path planning solution for 3D terrain reconstruction with one UAV. They decompose the world into

one or more polygons and have the UAV cover each polygon employing a raster scan.
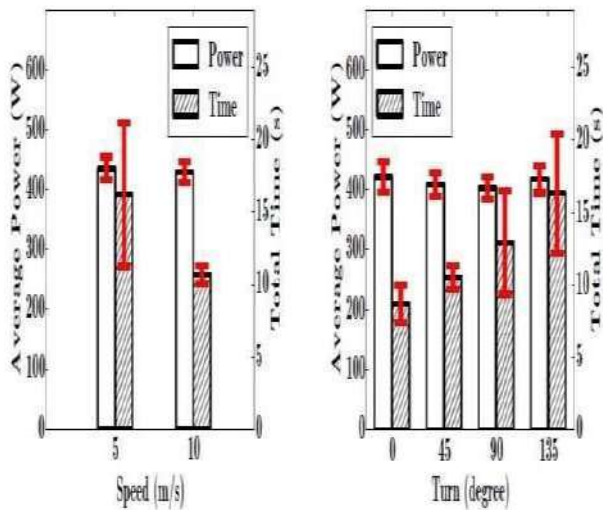

Fig. 1. Power vs Speed/Time Graph

They try to minimize the number of turns by calculating the optimal line sweep direction. We further formulate the Energy Efficient Coverage Path Planning (EECPP) problem in this section. The problem is split into two sub- problems: (i) fairly dividing the given area among the drones, and (ii) assigning minimum energy path planning (MEPP) for every drone. The formulation allows drones to start out in several locations and requires each drone to return to its start line like the TSP. Based on these sectional problems we adapt a conventional algorithm which uses both of the concepts explained above so as to achieve Energy efficient path planning algorithm for an increased efficiency in dynamic path planning. The drone thus now have a far better communication with the remainder of the swarm during a particular area to follow the human while also dividing the areas between the drones dynamically so on not lose track of the human.

III. HUMAN SECURE VERIFICATION OF POSITION

The drone must think within the same manner as a person's trying to flee, finding the shortest possible answer . The drone is pre-fed with the subsequent algorithms to assist the drone achieve this. Three path planning algorithms for secure positioning and secure position verification are used here: 1) Localizer Bee, 2) Verifier Bee, and 3) Precise Verifier Bee. Localizer Bee securely determines the position of a group of devices. Verifier Bee securely verifies the position of a group of devices. In contrast with Localizer Bee, Verifier Bee assumes to understand the untrusted position of the devices, which must be verified. PreciseVerifierBee is an extension of Verifier Bee which

guarantees a bound on the positioning error, at a price of an extended path. The drone follows a path, touching a sequence of waypoints. At each waypoint the drone acts as an anchor, and performs one or more distance bounding protocols with the nodes on the bottom. If the drone measures a node on a waypoint, by extension we are saying that such waypoint measures that node, or that such waypoint may be a measuring waypoint for that node. The mechanism just described solves the scalability problems with verifiable multiliteracies. the matter is the way to find a convenient path for the drone so as to securely measure a group of positions. The nodes are required to be static, or a minimum of two not move during the period of time from their first distance bounding execution to the last one. Such an estimated position might not correspond to any of the positions that the node assumed in time. the matter of drone-based verifiable multiliteracies within the presence of mobile nodes is interesting, but it falls outside the scope of this paper. during this paper, we consider the nodes to be static, and that we specialize in the trail planning problem. These multiliteracies algorithms help us to secure position locking the Human/Object that the drone is following supported the Human tracking algorithm statedbelow.
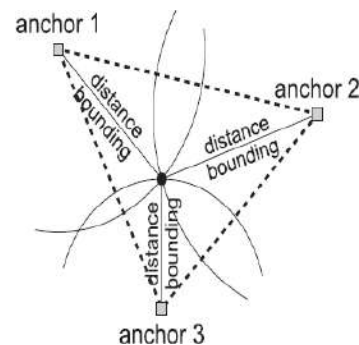

Fig. 2. Virtual Triangle of verifiable multiliteracies

IV. HUMAN TRACKING

The base crux of this concept is human tracking and mapping technique employing a video camera. Humans or pedestrians during a particular location are identified and marked for selection via the video processing unit on the drone. The empty background image is employed as a reference and therefore the particular humans are filtered and detected separately by the video processing unit. First, static background information is collected with different illumination, with none dynamic object. A stream of realtime images, with this background, ('frames'), are fed and want to detect human movement. A frame rate of 10 fps is taken because it gives an honest balance between observations and reduces the time complexity. within the following stage, any unidentified object that has appeared within the static background is identified. To detect any change between real time frames and therefore the static background image two image matrices are compared with an off level of fifty as deduced from the coefficient of correlation. If the result's positive then the static background and therefore the frame are again compared pixel-wise with a replacement image called DIFF being created. so as to trace a variable number of targets,.

The PHD filter is used thanks to its low computational complexity and good tracking performance. There are typically two sorts of implementation of PHD filtering. One is predicated on numerical solutions of the integrals within the prediction and measurement updating step of the PHD filter. subsequent is that the Sequential Monte Carlo (SMC) approach supported the particle PHD filter. Here the SMC- PHD method is employed because it performs well within the scenarios of non-Gaussian noise and nonlinear models; besides, it offers the flexibility to include an OCSVM classifier to enhance the update of the PHD filter within the presence of noisy measurements.
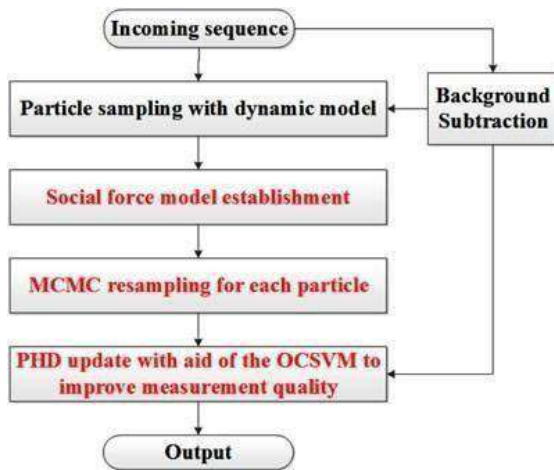

Fig. 3. Flow chart of Human tracking method

Thereby, the human tracking algorithm helps in just tracking the human who has been selected or identified by the controller. The regular CCTV footage is employed for this purpose. of these footages are monitored by a nodal center where the operator has an access to those footages. Once an abnormal incident is observed, the operator immediately gives a command that alerts the closest drone to the CCTV where the incident occurs. The drone does a visible survey of the world for an unusual activity. Once the operator finds the anomaly, he can select the person on screen. The drone identifies the person's traits and starts to follow the person.

V. AUTO CHARGING PLATFORM FOR THE MCCTV

The drone sits on a charging platform in the least times except when commanded otherwise. The platform is meant to charge the drone as soon because the drone lands on the platform. When a command is given to the drone, it lifts and moves to the pointed location. All the cases are analyzed here for the safe functioning of the drone.

First, the trail planning algorithm is integrated with the 'Dijkstra' algorithm to seek out the shortest path for the drone from the start line, which incorporates the coordinates of charging platforms, to the destination. to try to this, we used 'Dijkstra' algorithm to easily find the shortest path. During the flight, if the drone flight can't

be maintained thanks to the remaining battery capacity, the drone must find the closest auto charging platform from its current position. As a result, the drone looks for a charging platform nearest to its current position with an easy line distance calculation. it's possible because the drone has the GPS coordinates of the charging platforms and knowledge on the direction during which the charging platforms face. then, the drone approaches the charging platform and tries auto landing. Figure below shows the general sequence of the flight.
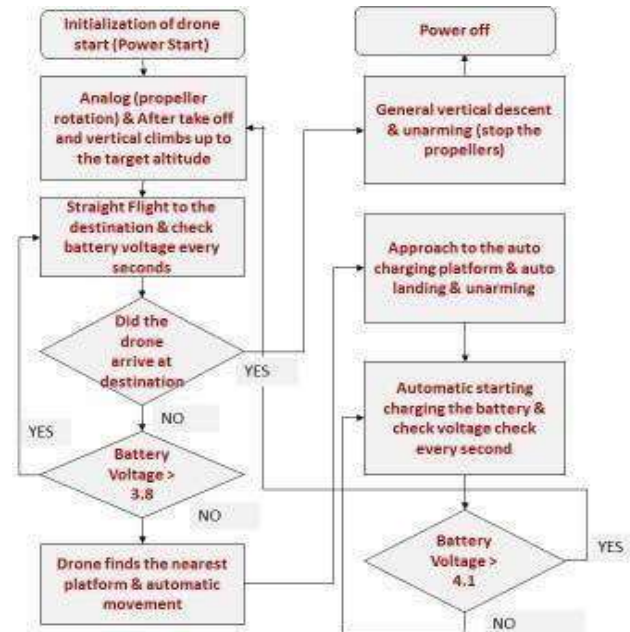

Fig. 4. Flow chart of Dijkstra algorithm

The remaining battery capacity are often measured by the voltage change (3.7 V ~ 4.2 V). it'll find the auto charging platform beforehand before the battery is fully discharged. When the drone lands on the auto charging platform, by image processing, it performs marker-based feature point matching between the already stored image of charging platform and therefore the captured images from the camera in real-time. After finding the auto charging platform supported feature point matching, the drone can find the virtual rectangle and therefore the coordinates of the center point of the charging platform.

The drone precisely determines the trail to maneuver from the difference between the position of the charging platform and therefore the center point of the captured image. After the drone adjusts its position as charging platform is confirmed within the center of captured image, the drone tries to descent. The drone repeats the image processing and movement per meter descent. After landing, the drone battery is charged automatically. After charging, the drone flies and continues the flight to the destination.

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CONCLUSION

The paper explains the viability of the Concept of a swarm of drones integrated with Image processing and autonomous flight saves the response time to spot and analyze the matter. It tracks and follows any human/object when commanded to trace supported live video relay. It transmits the present position to the local Police and alerts about the trail the human/object is taking allowing the police to right away follow and investigate the human/object. this concept when implemented is sure to reduce the crime happenings publicly places and also sometimes save precious lives

ACKNOWLEDGEMENT

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IOT based Gas Leakage Detection System Using PIC16F877a

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Abstract—**Gas leakage is a major problem in industries, residential premises and gas powered vehicles. The leakage if not detected may lead to explosion and cause severe damages to life and environment. The conventional leakage detection system uses on-site alarms for warning. In this paper, we propose a leakage detection method in which the leakage information is also sent to first response team through wireless media. This ensures preventive actions immediately even in the absence of people on-site. The detection system uses PIC 16F series microcontroller and MQ-9 Gas sensor to detect the presence of gas and the output can shown to user via Node MCU ESP8266 Wi-Fi Module.A prototype of the gas leakage detection system has been developed and tested in Proteus. The experimental results show that the system is able to detect the leakage in less than a minute.**

Keywords—*PIC, Sensor, Node MCU, ADC, leakage, Proteus.*

Fig.1 Overview of the gas leakage detection system

I. INTRODUCTION

Toxic and inflammable gases are widely used in industry, heating systems, home appliances and vehicles [1]. This includes combustible gases like propane, ethane, butane, methane, ethylene etc. Liquefied Petroleum Gas (LPG), also referred to as propane or butane are normally stored in pressurized cylinders in liquid form and vaporize at normal temperatures. A leakage can ignite and cause explosion. Therefore, the leakage detection of gases has gained more interest in recent years especially in fields of safety, industry, environment, and emission control [2]-[4]. A conventional gas leakage system uses on-site alarms as a warning to indicate the leakage [3]. The drawback of the conventional leakage system is that it becomes ineffective in the absence of first response team on-site. This may delay the preventive actions causing damage to life and environment. Therefore, there is a need for a system to detect the leakage and send the information to the first response team through wireless media. A leakage detection system that initiates a warning call or SMS will be more effective in the absence of people on-site. Moreover, the leakage warning call can be sent to fire station as well. Gas leakage detectors built with microcontrollers to detect and send information through wireless media is presented.

In a first approach gas detection instruments are products of safety technology and are used preferably to protect workers and to ensure plant safety. Gas detection systems are dedicated to detect dangerous gas concentrations, to trigger alarms and – as far as possible – to activate counter measures, before it can come to a hazardous situation for employees, assets and environment. [5],[7].
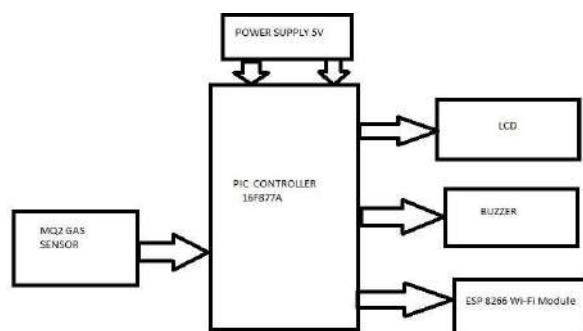
In this paper, we propose a leakage detection system that uses PIC16F877a to detect the leakage with a warning meassage initiating feature to the first response team. Methane is used to test the system. The paper is organized as follows. An overview of the gas leakage detection system is explained in section II. The operation and call initiation is explained in section III and section IV explains the experimental setup and the conclusion is given in section V.

II. MQ-9 GAS SENSOR

An overview of the gas leakage detection system is shown in Fig.1. It consists of a sensor, 5v power supply, PIC16F877a micro controller, LCD, Buzzer and a ESP8266 Wi-Fi module. The sensor detects the gas leakage. Here, MQ-9 sensor is used as it is suitable for sensing Methane concentrations in air. They are also suitable for detecting L.P.G and propane. It can detect gas concentrations anywhere from 300 to 10000 ppm and has fast response time. The sensor's output is an analog resistance. The Below Fig 2. is basic test circuit of the sensor. The sensor need to be put 2 voltages, heater voltage (VH) and test voltage (VC) . VH used to supply certified working temperature to the sensor, while VC used to detect voltage (VRL) on load resistance (RL) whom is in series with sensor. The sensor has light polarity, VC need DC power. VC and VH could use same power circuit with precondition to assure performance of sensor. In order to make the sensor with better performance, suitable RL value is needed: Power of Sensitivity body(Ps): [6]
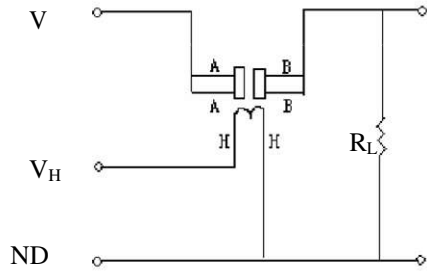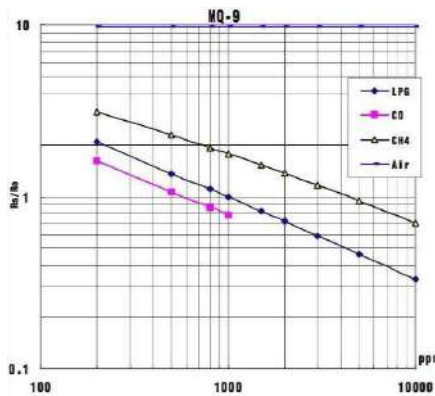
Fig 2. Basic Test Circuit

Fig.3 Gas concentration measurements

III. PIC16F877a AND NODE MCU Wi-fi MODULE

A. ESP8266 Module

ESP8266 is a small module which allows TCP/IP stack capacity communication developed by Espressif Systems The use of Node MCU esp8266 is to detect the output from the controller and pass it to the server based on Thing speak from where the user will get notified. With Node MCU Thing Speak is used. It is an open source IOT and API to store and retrieve data from things using the HTTP protocol over the internet or via Local Area Network

Fig.4 Node MCU ESP8266

B. PIC16F877a Micro Controller

Fig3. Represents the pin diagram of the controller. The PIC16F877A CMOS FLASH-based 8-bit microcontroller is upward compatible with the PIC16C5x, PIC12Cxxx and PIC16C7x devices. It features 200 ns instruction execution, 256 bytes of EEPROM data memory, self-programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wireSPI or 2-wire I2C bus, a USART, and a Parallel Slave Port. The analog signal from the sensor is feed to the controller using in-built ADC, where if the detection range goes above the Threshold Range, the controller sends the output to the user through Node MCU via Thing Speak

Fig 5 . Pin diagram of PIC16F877a

The operation has been performed in Proteus Software where the simulation is observed, the sensor is generated in the software to let it verify the presence of gas. A serial port is used in the simulation to generate the message in the software.
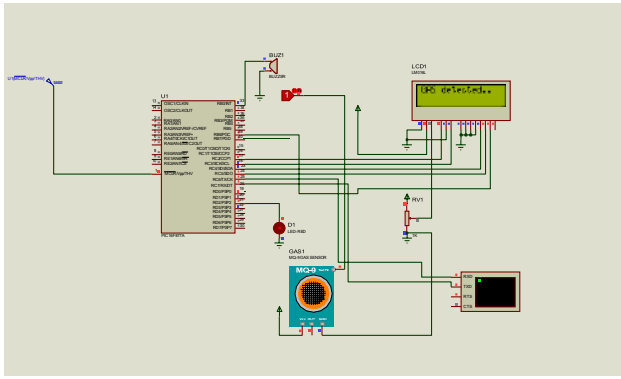
As shown in Fig 6.

Fig.6. Experimental setup of the gas leakage detection system

V. CONCLUSION

An IOT based gas leakage detector with a warning call initiating feature to the first response team is presented. The Sensor detects the leakage and initiates a warning call through a Node MCU module. A prototype of the gas leakage detector has been developed and successfully tested in simulation. The detector is able to send the warning call to the serial port of wifi module which can be stored in the system in less than a minute. The proposed leakage detection with warning callinitiation can be extended to send calls/SMS to multiple people and can be directly linked to the fire station as well using GSM Module.

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