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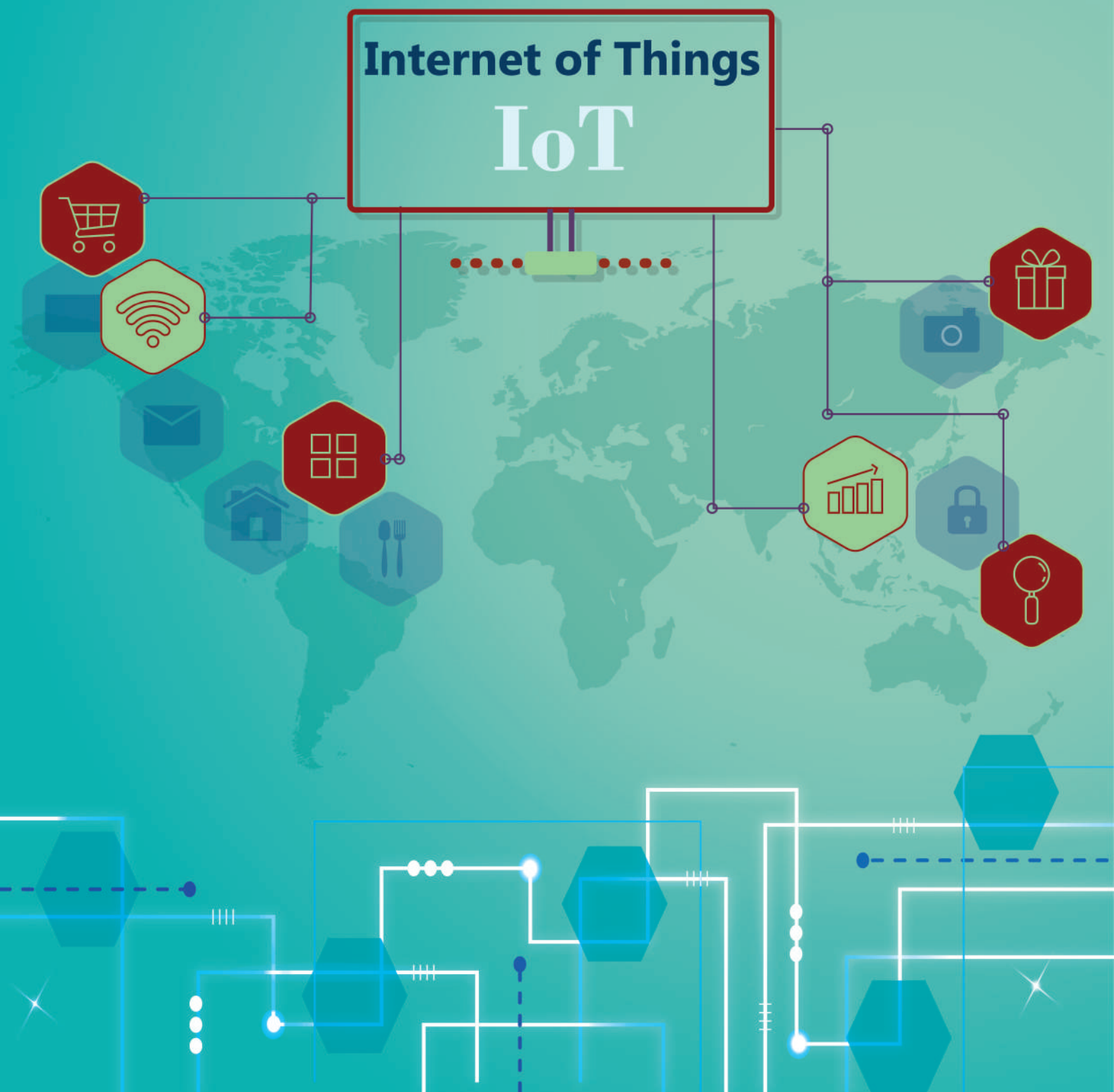

FROM THE PRINCIPAL'S DESK

I am glad that the faculty and students in the electronics and telecommunication department participated to create such a groundbreaking journal that portrays various technological advancements in the field of electronics and telecommunication. Continuous discovery and advancement is critical in today's engineering field, and it necessitates the highest level of imagination. As a result, in order to excel and progress toward more realistic goals, today's generation must find new ways to adopt new creative learning processes.

As Principal, I am dedicated to creating the best opportunities for students in an environment that fosters academic and co-curricular learning. Because of the guidance and help they got, students were given a forum to express their abilities. It brings me great joy to see the artistic expressions of the students who contributed to this journal.

This journal has exceeded my expectations, and I wish the department's staff and students continued success in their future endeavours.

With Best Wishes,

Dr Sandeep Joshi
Principal
Pillai College of Engineering

FROM THE HEAD OF DEPARTMENT'S DESK

It gives me immense pleasure to have witnessed the outstanding project work implemented by the final year students from the department of EXTC. I appreciate the students for their exceptional work and sheer dedication; they have created remarkable projects even amidst the COVID-19 pandemic . Along with the innovative ideas, they have also paid close attention to cost-effectiveness in their projects which is an important aspect of sustainable projects. The papers submitted to the journal highlight the dedication and efforts taken by the students. It is admirable to see the work done by the journal committee that makes sure the earnest effort done by our students is noticeable and much appreciated by the entire college through publishing the journal. I hope students keep on finding innovative approaches in the path of their lives. I wish all the students good luck in their future endeavours.

With Best Wishes,

Dr Avinash R. Vaidya
Head of Department
Electronics and Telecommunication Engineering

FROM THE TEACHER'S DESK

The Electronics and Telecommunication department's annual journal is a venue where the department's student's proposals are displayed in front of the entire campus. The papers that students write serve as an outstanding repository of knowledge that other students may turn to. The Journal committee has put in a tremendous amount of effort. The members of the committee not only planned the report but also assisted the students who were writing the articles. The punctuality with which they completed their work is truly commendable. The technical papers submitted this year demonstrate how creative the student's thinking has been, pointing to a bright future.
I wish the committee good luck and look forward to more marvelous issues of this journal in the future.

Prof. Jayashri D. Bhosale
Assistant Professor
Electronics and Telecommunication Engineering

Each of the projects this year has been both interesting and fruitful in its way. We came across numerous types of projects, each displaying the innovative and ingenious minds of our students. Project work is a learning experience designed to allow students to synthesize information from different fields of study and apply it critically and creatively to real-life situations. All of this was both cost-effective and innovative, demonstrating the students' ability to think outside the box. It's an in-depth investigation of a real-world topic that is worthy of students' attention and effort. The journal committee members have done an outstanding job of highlighting the potential of our department's students. The journal team worked quickly to meet deadlines to ensure that the papers submitted were flawless. I appreciate the teamwork and meticulous attention to detail that enabled us to streamline the entire process and achieve our objectives. I wish all the best to all the committee members and a good heart to keeping up the good work.

Prof. Suchitra Patil
Assistant Professor
Electronics and Telecommunication Engineering

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Intelligent Classroom Attendance Monitoring

Mayur Jawarkar, Dayanand Juwatkar, Deepti Khaire, Shivendra Pandey

***Abstract*-Modern day class rooms are equipped with electronic devices that have supporting software to improve and facilitate teaching methods. However, it is often seen that significant class time is wasted on taking attendance. Therefore, to overcome these problem a feasible system is created in this thesis project that will have no physical intervention from teachers, students or floor attendance. Thus, the system will facilitate the smooth running of the scheduled classes at our college, and minimize time loss. The automation system is to run a complex system smoothly and simplify the human efforts. IR sensors connected below the seats will detect the human presence and switch on the fans and lights above the seats and eeprom card will be used to mark the attendance of each student.**

***Index Terms*- IR Sensor, Microcontroller**

I. INTRODUCTION

1.1 Definition

Attendance Management System is software developed for daily student attendance in schools, colleges and institutes. It facilitates to access the attendance information of a particular student in a particular class. The information is sorted by the operators, which will be provided by the teacher for a particular class. This system will also help in evaluating attendance eligibility criteria of a student.

1.2 Objective

Our project has to be overall cost effective. While the idea to improve classroom is the priority of this thesis work, importance is made to ensure that this system is affordable to all those who need it. The setup cost may initially be a bit high, but in the long run it is expected that there will be a reduction in both electricity and paper cost and also it will save time.

1.3 Scope

The purpose for the developing of attendance management system is to computerize tradition way of taking attendance. Another purpose for developing this software is to generate the report automatically at the end of the session or in the between of the session.

II. HARDWARE COMPONENTS

1. Atmega 328P microcontroller
2. IR proximity sensors
3. LCD 16*2
4. 5V Relay
5. 24C32 EEPROM IC
6. AC Transformer
7. Voltage Regulator

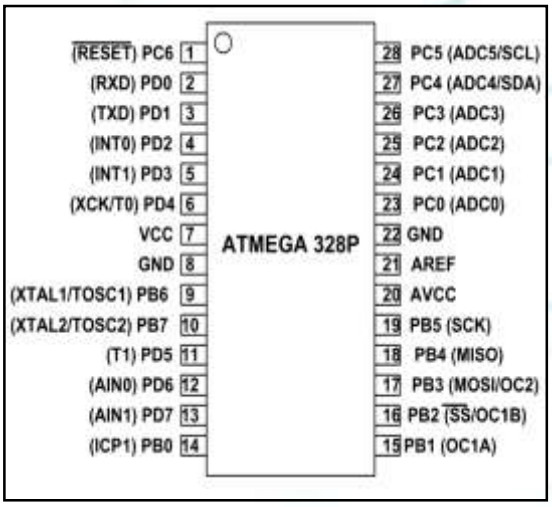


Figure 2.1 ATMEGA 328P Pin Configuration

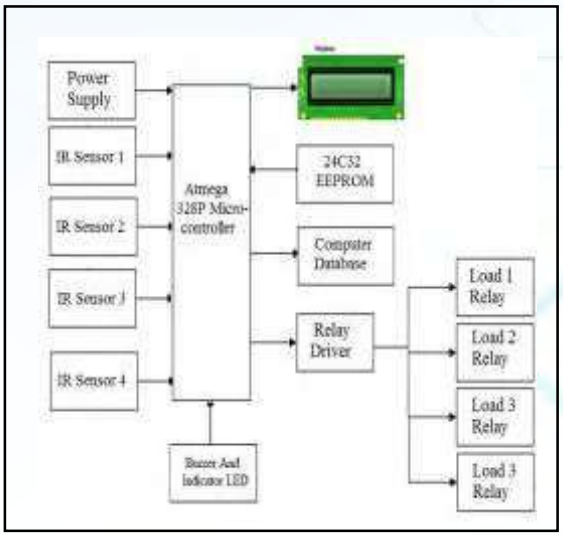
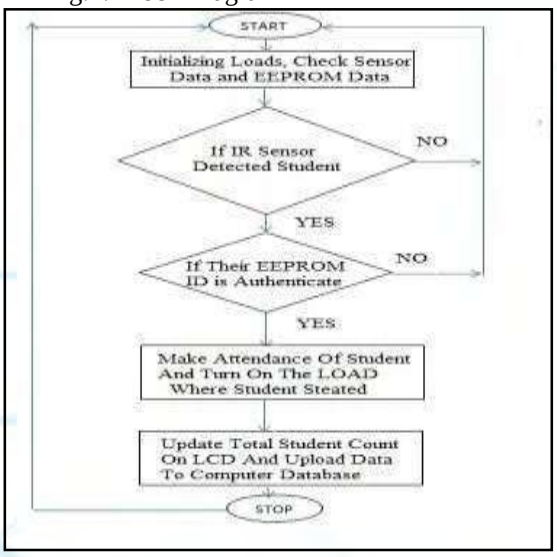


Fig.1: Block Diagram



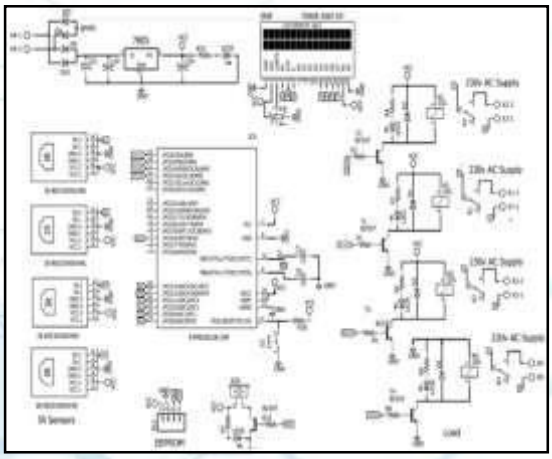


Fig. 3: Circuit Diagram

III. WORKING

The heart of this project is Atmega microcontroller 328p which has built in memory of 32kb and has 28 pins which is connected to LCD which display attendance of the students in which pin 18 and pin 19 are oscillator pins at which a crystal oscillator is connected. Two 22pf capacitors are connected to the oscillator and are then grounded. Crystal frequency is 11.0592Mhz. This will generate a clock. rs pin is connected to the ground, enable pin is connected to the 8th pin of microcontroller and d4,d5,d6,d7 is connected to 10,11,12,13 pin respectively. Four IR sensors are connected under the seat which detects whether someone is present on the seat. Each IR sensor is connected to Relay. Each Relay has a driver circuit to protect the relay and it consists of transistor, resistor and a diode. Transistor will act as a driver switch between the microcontroller and relay, microcontroller will switch transistor and then transistor will switch the relay so if the problem occurs it will not damage the microcontroller. Two crystal oscillator of 12Mhz is connected to generateoscillations.

The eeprom card is used to put the attendance of students which consists of four pins- 1st and 4th pin is connected to Vcc and ground, 2nd and 3rd pin is connected to SDA and SCLwhich is used for communication. Each card consists of AT243C2 ic and a resistor. It stores information of each student like name, roll no, div, id no, seat no. LED is connected between Vcc & Gnd so when we insert the card the led lights up as an indication that the card is inserted.

For power the supply transformer is connected with input of 230V which will step down and give the output of 12V dc. But we need dc voltage supply so to convert the voltage from ac to dc a bridge rectifier is used. Button is used to mark the attendance. If we press the button once the attendance is marked, if we press the button for a one sec then the data is erased and if we press the button for 2 secs it will update the data in the excel sheet. Connector is used to upload the data in the excel sheet.

ACKNOWLEDGEMENT

It gives us great pleasure and immense satisfaction to present this report on our project the “Attendance Monitoring Intelligent Classroom”, which became possible due to the unstinted guidance and focused direction of, Prof.- Sneha Chikodi and Prof.- Dinesh Tiwari from the Electronics & Telecommunication Department.

We express our sincere gratitude to our Prof. Dr. Avinash R.Vaidya , HOD, from the Electronics &

Telecommunication Department without whom it would not have been possible to successfully accomplish our project.

Furthermore, we are also indebted to the Principal Dr.Sandeep Joshi whose constant encouragement and motivation inspired us to do our best. Last, but not the least, we sincerely thank our family members, colleagues and all the others who directly or indirectly contributed in making our task easier.

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[2] Journal of the Institution of Electrical Engineers -Power Engineering Published from 1941-1948, the Journal of the Institution of Electrical Engineers - Part II: Power Engineering included all specialized papers on power engineering that were presented to the Institution. It was aimed at those members who were particularly interested in electrical measurements in their professional capacities as instrument specialists or who desired to obtain guidance in electrical measurements that were required for other purposes.

[3] Infrared Intrusion Detector System, issued Nov 21 1972 to Herbert L. Berman,contains a very clear explanation in this paper, the PIR based security system which saves the power consumption and the memory space of the recording system hasbeen proposed.

[4] Oklobdzija, Vojin G. (2008). Digital Design and Fabrication. CRC Press. In response to tremendous growth and new technologies in the semiconductor industry, this volume is organized into five, information-rich sections. Digital Design and Fabrication surveys the latest advances in computer architecture and design as well as the technologies used to manufacture and test them.

Automatic Disinfectant Spraying Machine

Zaid Khan , Neha Jhansi , Abhay Nair , Aditi Chaudhri

***Abstract*— Viruses such as COVID-19 are transferable through touch and contact. There are WHO guidelines to clean or sanitize places regularly to reduce the risk of infection. Dispensing of sanitizer from the bottle and storage would require manual intervention. In this paper we propose a novel design of touch-less disinfectant spraying machine to reduce the risk due to contact. The system consists of live streaming and controlling it from an end user. The controller processes the sensor data & actuates the pump and solenoid valve. The sanitizer liquid dispenses through the mist nozzle and sanitizes the whole place accordingly.**

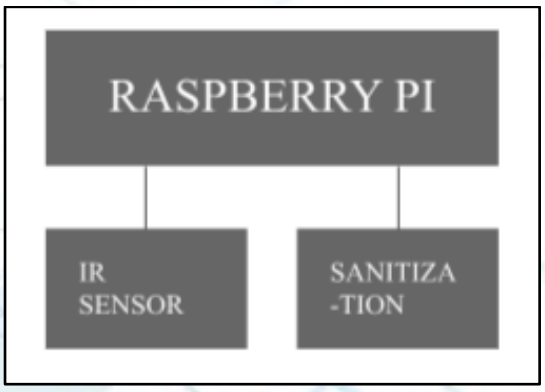
***Index terms*— Disinfectant, Sanitization, COVID-19, Automatic machine**

I. INTRODUCTION

Hygiene is an important aspect to remain healthy. There are various aspects of hygiene. A clean place is one of them. COVID-19 began to spread from the year 2019 and the pandemic has been ongoing for several months. As the famous phrase goes 'necessity is the mother of inventions'- and one of the biggest necessities right now is to be able to maintain effective sanitisation. The machine does not have human control and is being operated with the help of IR sensors and microcontrollers. The following include Objective, Scope and outline of the project.

A.Objective

The role of unmanned robots for cleaning and sanitization purposes is increasing worldwide. Disinfection and hygiene are two integral parts of any safe environment, and these factors have become more critical in covid-19 like pandemic situations. The machine is designed in such a way that it will be operational during the working hours i.e. 16 hours a day and will provide sanitization wherever required.



MODEL DIAGRAM

B. Scope

Poor or inadequate hygiene is known to be problematic in hospital settings, and is a major source of infections contracted while patients are admitted to a hospital. While cleaning of places and maintaining hygiene policies and training are important and can be effective in reducing the spread of infections, the problem of infections due to unsatisfactory hygiene of staff, medical professionals, along with patients continues to be problematic. The mechanical disinfectant spraying machine can be used in the examination rooms, hallways, lobbies, and even patient rooms. However, such systems are purely mechanical and are incapable of providing an automated means of establishing good hygienic practices. During the fourth quarter of 2019, a collection of unusual pneumonia cases went from a local concern to a global pandemic in a matter of 70 days. The infamous Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the virus that was first reported in Wuhan, China in December 2019, and was announced as a pandemic by the WHO (World Health Organization) in March 2020.

The need for a touchless automatic dispenser is identified after observing that it is the point of contact for contamination. In this paper we present a novel design of an automatic disinfectant spraying machine which will be useful even after the end of this pandemic to maintain hygiene in various places.

II. LITERATURE REVIEW

A. History

Automatic Spraying of disinfectant is used to spray disinfectant over a targeted surrounding to stop the spread of infections and viruses. This system is scaled up to spray disinfectant over a huge area whilst making a path for its movement. This system is designed in such a way that the system will detect its obstacle and then will opt for a different path for its movement if any obstacle is detected. This unmanned vehicle will sanitize the place. Due to which it will prevent the spread of viral infection and often disinfect.

Scientific control of liquid output, intelligent control of liquid spraying, consumption saving is achieved.
Spray robot can effectively provide sanitization to a large number of people before the spraying process, but because of the constraints of large disinfectant robot, delicate and complex nature of the job objects, the complexity of the operating environment and the operation target price particularity and development issues automatic spraying disinfectant seems just the right option to opt for. Automatic disinfectant spraying robots can find a breakthrough on these issues.

Wireless control applications in real life appear more and more, especially in a pandemic like situation. Industry plays a vital role. WiFi (Wireless Fidelity) with its high transmission speed, flexibility and mobility can be put into use to make the process hassle free. It can be paired with the smart home, industrial control, mobile handheld devices and other applications. The subject of this work is

a system capable of distributing inputs (provide sanitization, render the body temperature) in an efficient, sustainable, and safe way, in environments.

On the basis of configuration embedded software studies, Smart control simulation model is proposed for the spraying of disinfectant.

B. Comparison with existing implementation

This automatic disinfectant spraying robot decreases the spread of viruses and infections and improves the work's pace and precision. This robot has been created to improve application precision and yield. As a microcontroller, Raspberry pi is used. For movement of robot DC motors are used and for the detection of obstacle IR sensors are used.

Earlier, no path detector was in use in order to determine any obstacle. The robot was designed to follow a particular path and spray the disinfectant without taking the deviation of obstacles along the robot's movement into consideration. This created an unavoidable problem. For every hault of the robot there needed an individual to personally chase the robot and change its path of movement. This wasn't practically possible every time.

So in order to prevent that, this smart device was designed. This will not only detect the obstacle but also choose its path of motion on detection of any obstacle and thus sanitize the entire area without any hassle.

C. Problem Definition

The name of the project is "Automatic Disinfectant Spraying Machine". This fully automated vehicle will sanitize the place. Due to which it will prevent the spread of viral infection and often disinfect.This system is designed in such a way that the system will detect its obstacle and then will opt for a different path for its movement if any obstacle is detected. Since it is fully automated all these activities will require no supervision.

This will increase the demand of this vehicle in the near future. For the execution of this smart device we have used raspberry pi as microcontroller, IR sensor for detection of obstacles, sanitization box for spraying sanitizer, DC motor for the movement of the robot and buzzer to produce a beep if any obstacle is detected. To avoid the spread of viruses and infections this project is preferred.

III. SYSTEM REQUIREMENT AND ANALYSIS

The system overview is presented in this Section. The various techniques are adapted from the agriculture spraying robot. There are various modifications done for the same. The system uses Raspberry Pi as its main Processor. The robot is designed in such a way that it reduces the man power and also increases the cleanliness efficiency of the region.

Hardware Required & Specifications:

Table 3.1.: Hardware Details

Raspberry Pi 4	Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz,RAM: LPDDR4 2GB
DC motor	5V, 100RPM
H-bridge IC	L298 IC,APM16 Series for LLC and Phase-shifted DC-DC Converter.
Optocouplers	4N25 x8
Resistors and Transistors	2.2K, 1K, 4.7K and Diode & BJT transistor
Water Pump	4ltr/min operated at 6v
IR sensor	EC-0141
Power Supply	6V 4.5A for Pump and DC motor 5V 2A for Raspberry Pi

The system uses the IR sensor to move accordingly when an obstacle is encountered then the DC motors will stop moving and thereby it will initialise the Relay and thus will spray the sanitizer.

Vehicle kinematics i.e. the main robot which is using raspberry pi as its main unit to control the movement of the same which will be connected in an H-bridge format to elaborate it. A H-bridge is a simple circuit that lets you control a DC motor to go backward or forward as shown in Fig. 3.1.

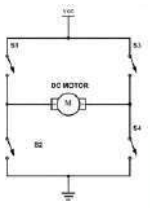


Fig 3.1.: H-Bridge Structure

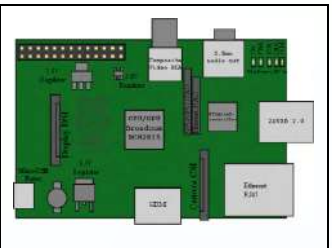


Fig 3.2.: Raspberry Pi

As in fig 3.2, the microcontroller used in this project is Raspberry Pi, which is having a Quad Core Cortex A72 (ARM V8) 64 bit microcontroller clocked at 1.5 GHz having 2 GB of LPDDR4 RAM which runs on LINUX based kernel and thereby the programming is done with the

help of python programming language and it can be considered as the backbone of the whole system.

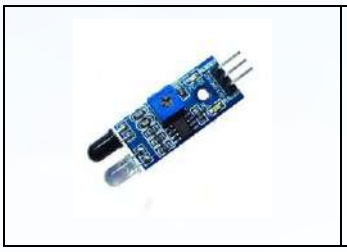


Fig 3.3.: IR Sensor

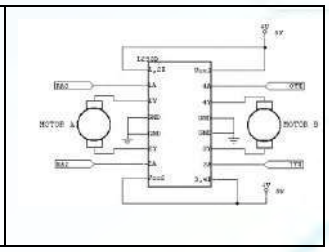


Fig 3.4.: L293D with DC motor Pin Diagram

As in fig 3.3, the IR sensor consists of a SIG pin which is used in order to provide the signal to the microcontroller here Raspberry Pi also the data is in boolean i.e. if an obstacle is detected then the o/p is 1 else 0. Also as in fig 3.4, the L293D is a 16 pin IC out of which four pins are connected to the DC motors i.e. 1Y,2Y,3Y and 4Y whereas 1A,2A,3A & 4A are connected to the optocouplers which in turn is connected to the raspberry.

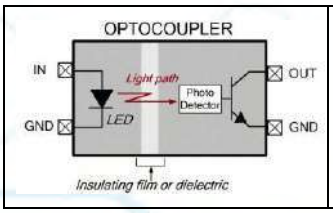


Fig 3.5: Optocoupler

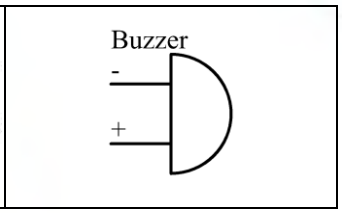


Fig 3.6.: Buzzer

As in fig 3.5, the optocoupler is a device which receives the signal from the IN pin and it converts the electric signal into the photoelectric signal i.e. light with the help of Light Emitting diode and thus the light is received or detected with the help of photodetector, the IN pin in the circuitry is connected to the Raspberry PI whereas the OUT pin is connected to the Driver IC.

As in fig 3.6, buzzer is a device with two pin GND and VCC and it will operate when the signal from the IR sensor is 1.The water pump is used in order to lift the sanitizer from the bottle and thereby spray the pump operates at 6v with a power consumption of 4.2W and max flow rate of 4ltr/min for water.

The Water pump and the 100RPM DC motor is operated (power supply) is provided by 6v 4.5Ah battery whereas Raspberry Pi's power supply is provided by a 5v 2A power supply which in turns provides the power supply to Buzzer, IR, Relay and the remaining circuit.

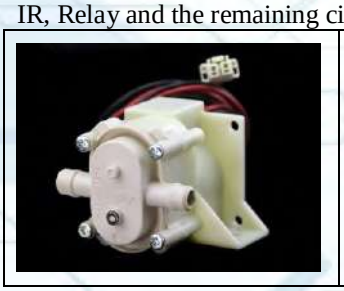


Fig 3.7: Water Pump

Fig 3.8: Power Supply 6v

The path which is to be followed is decided with the help of IR sensor, to elaborate it more IR sensor consists of a transmitter and a receiver when an obstacle is encountered then the dc motor will provide the same data to the microcontroller and from the microcontroller to the relay and L293D which in turn will stop the DC motor and thereby will ask the spraying unit to spray

The whole unit is using Raspberry Pi and data transmission between the relay and the same is done with help of optocouplers.

The Sprayer module uses a water pump and a spraying Node which will help to spray the sanitizer in the respective region.

Table 3.2.: Software Details

Programming Language	Python

Algorithm:

The whole system works on if and else condition the algorithm is as shown in the figure 3.4.

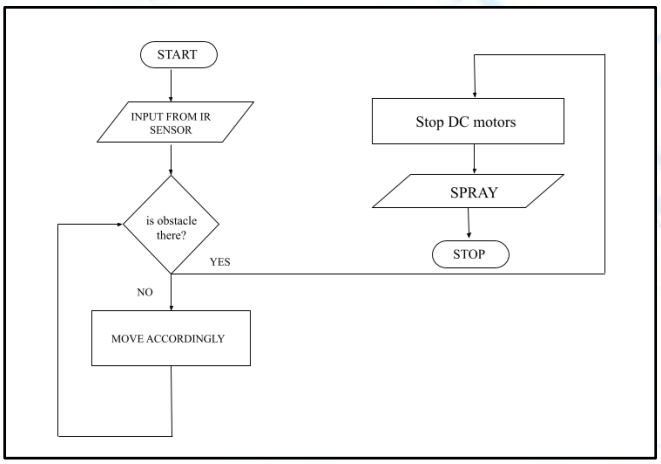


Fig 3.4:Algorithm

IV. METHODOLOGY

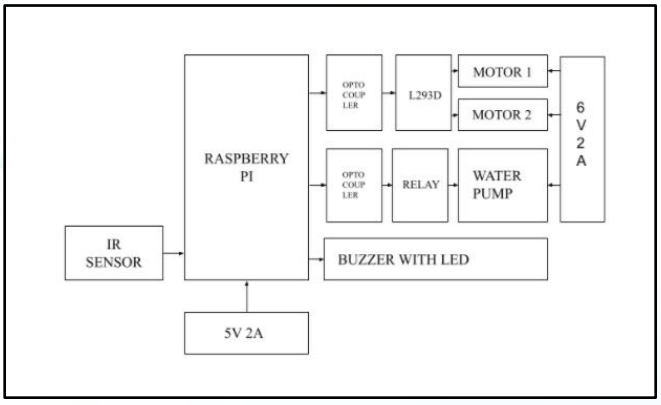


Fig 4.1: Block Diagram of Disinfectant spraying machine

Working

Heart of the project is the raspberry pi. It is a 40 pin controller which has a 64-bit quad-core processor, dual support at resolutions up to 40K which is operated at 5v and thereby providing the power supply to the whole circuit i.e. IR, L293D, RELAY, OPTO, BUZZER.

Coming to the actual connection of the components, the first Optocoupler input i.e. pin number 1 which is the input pin to the photodiode's terminal of the optocoupler is connected to the Raspberry Pi's pin no. 7 i.e. GPIO 4 and the output of which is connected to the L293D's pin 1A which in turn is connected to the DC motor's terminal 1 and Output of the first optocoupler i.e. pin number 4 is connected to the L293D pin number 2, similarly second Optocoupler's input i.e. pin number 1 is connected to the raspberry pi GPIO17 which is pin 11 and Output of the second optocoupler i.e. pin number 4 is connected to the L293D pin number 7 i.e. 2A. Third Optocoupler input i.e. pin number 1 is connected to the raspberry pi GPIO pin13 and Output of the Third optocoupler i.e. pin number 4 is connected to the L293D pin number 10.Fourth Optocoupler input i.e. pin number 1 is connected to the raspberry pi GPIO pin15 and Output of the Third optocoupler i.e. pin number 4 is connected to the L293D pin number 15. Fifth Optocoupler input i.e. pin number 1 is connected to the raspberry pi GPIO pin12 and Output of the optocoupler connected to the Relay which in turn is used to drive the 6v DC Water pump.

Buzzer is directly connected to the SDA pin which is pin 3 of the Raspberry Pi. IR Sensor has three pins i.e. VCC, OUT and GND. OUT pin is directly connected to the GPIO 23 which is pin no. 18 of Raspberry pi. Two DC motors are Directly Connected to the L293D motor driver pin number 3,6, 11, & 14 respectively. Also the VCC and the GND of the raspberry pi are connected to BUZZER,IR, OPTOCOUPLERS, RELAY & the Driver IC.

The boot up for the raspberry pi takes 1.3 min, the time taken is because of the boot up device which is CLASS 4 SD CARD whose read/write speed is 4MB/s and when booted up the program is directed loaded in the system.

The signal is provided to the L293D which in turns controls the motors i.e. the movement of the vehicle. If the input of IR sensor is 1 it means that an obstacle is detected and when it is then the buzzer receives the signal and starts toggling at an interval of 0.5s as programmed, meanwhile the water pump starts pumping the sanitizer that continues for 10s. After which the DC motors starts functioning it takes a left which is as per the signal provided by the Driver IC and if there is obstacle still present then it will move to right by an angle of 30 degrees as in the program which in turns makes the vehicle completely automatic.

The whole programming is done using Python programming language for raspberry pi, the OS used is the lite version.

V. RESULT

Fig 5.1

Fig 5.2

VI. CONCLUSION

The role of unmanned robots for cleaning and sanitization purposes is increasing worldwide. Disinfection and hygiene are two integral parts of any safe environment, and these factors become more critical due to the COVD-19 like pandemic situations. The machine is designed in such a way that it will be 16 hours operational. The robot designed for disinfectant spraying is fully automated. The proposed robot is made using Raspberry Pi 4 as its main processor which is connected to the IR sensor which is used to sense the obstacle and to move accordingly, which is then connected to the relay and thereby is used to spray the obstacle. The main advantage of the robot is that it is eco friendly as it is an unmanned robot, hence the use of personnel protection equipment which protects a person from the harmful chemicals is not required. The unique selling point of this robot is that it can be used anywhere from small-medium scale industries to offices, restaurants and other places. This is a cost effective robot and in turn ensures a safe and clean environment for everyone.

VII. APPLICATION

There are various applications of this Automated Disinfectant Spraying Robot. The application are as listed here:

- *Eco friendly*

The use of the robot relieves personnel from the harmful effects of chemical solutions on the body. That is why, in most cases, manual spraying requires the use of personal protective equipment for the person during the conducting of these works. The robot relieves a person from the risk of harm to health.

- *Unmanned Work*

The disinfection robot is an autonomous robot, which can work autonomously according to a settled disinfection route, setting time, fixed-points, multi-track mobile disinfection and sanitization in a large environment. It reduces manpower input and improved work efficiency and quality.

- *Small – Medium Scale Industries*

A. FOOD PRODUCTION

For obvious reasons, facilities that process, package, or store food have incredibly high standards of cleanliness. The robot will ensure that the place is completely sanitized at all times.

B. Manufacturing

Cleanliness in manufacturing applications improves safety and promotes productivity.

- *Restaurants*

According to the rules of the government, restaurants too need to follow some guidelines, one of which is to place the tables with proper distance from one another. So once a table is used and the people have left, the robot will sanitize the area around the table completely without disturbing the people of the other table.

- *Offices*

Office spaces, including conference rooms can be cleaned every evening after office hours or early in the morning before the rooms are occupied or it can also be sanitized during lunch breaks

- *After Covid-19*

Office spaces, including conference rooms can be cleaned every evening after office hours or early in the morning before the rooms are occupied or it can also be sanitized during lunch breaks

SUMMARY

The role of unmanned robots for cleaning and sanitization purposes is increasing worldwide. Disinfection and hygiene are two integral parts of any safe environment, and these factors become more critical due to the COVD-19 like pandemic situations. The machine is designed in such a way that it will be 16 hours operational. The disinfectant spraying robot is originally based upon an agricultural robot used for spraying the pesticides over acres of farmland, but this robot had to be controlled remotely. The robot designed for disinfectant spraying is fully automated. The proposed robot is made using Raspberry Pi 4 as its main processor which is connected to the IR sensor which is used to sense the obstacle and to move accordingly, which is then connected to the relay and thereby is used to spray the obstacle. The main advantage of the robot is that it is eco friendly as it is an unmanned robot, hence the use of personnel protection equipment which protects a person from the harmful chemicals is not required. The unique selling point of this robot is that it can be used anywhere from small-medium scale industries to offices, restaurants and other places. This is a cost effective robot and in turn ensures a safe and clean environment for everyone.

ACKNOWLEDEMENT

We would like to express my sincere gratitude to several individuals and organizations for supporting me throughout my Graduate study. First, I wish to express my sincere gratitude to my supervisor, Professor Ajit saraf, for his enthusiasm, patience, insightful comments, helpful information, practical advice and unceasing ideas that have helped us tremendously at all times in our research. His immense knowledge, profound experience and professional expertise has enabled us to complete this research successfully. Without his support and guidance, this project would not have been possible. We could not have imagined having a better supervisor in my study.

I would also thank our Principal Sir Dr. Sandeep Joshi and our HOD sir Dr. Avinash R. Vaidya for helping and providing all thesources required for the project.I also wish to express my sincere thanks to the Pillai College of Engineering for accepting us into the graduate program. Also, we are grateful to the Department of Electronics and telecommunications, University of Mumbai for giving us an opportunity to work on our project.

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Automation of Ration Distribution System of GSM and RFID

Vikrant Shelar , Amruta Kulkarni , Sachin Mhatre , Himanshu Maske

***Abstract*—Now a day ration card is very important for every home and used for various field such as family members details, to get gas connection, it act as address proof for various purposes etc. All the people having a ration card to buy the various materials (sugar, rice, oil, kerosene, etc) from the ration shops. But in this system having two draw backs, first one is weight of the material may be inaccurate due to human mistakes and secondly, if not buy the materials at the end of the month, they will sale to others without any intimation to the government and customers. In this paper, proposed an Automatic Ration Materials Distribution Based on GSM (Global System for Mobile) and RFID (Radio Frequency Identification) technology instead of ration cards. To get the materials in ration shops need to show the RFID tag into the RFID reader, then controller check the customer codes and details of amounts in the card. After verification, these systems show the amount details. Then customer need to enter they required materials by using keyboard, after receiving materials controller send the information to government office and customer through GSM technology. In this system provides the materials automatically without help of humans**.

***Index Terms*- Global System for Mobile Communications (GSM), Radio-frequency identification (RFID).**

I. INTRODUCTION

Public Distribution System is one of the widely controversial issues that involve inefficiency in the targeting of beneficiaries and the resulting leakage of subsidies. The Indian ration card is the authority of the Indian people. It is an important livelihood tool for providing proof of personal identity. Public Distribution System is one of the widely controversial issues that involve malpractice. The manual interference in weighing of the materials leads to inaccurate measurement and it may happen, the ration shop owner illegally uses consumer materials without prior knowledge of ration card holders. The proposed automated ration distributed system aids to control Malpractices by replacing manual work with automatic system based on RFID and GSM technology. The most of the people having a ration card to buy the materials from the ration shops. When get the material from the ratio shop, first need to submit the ration

card and they will put the sign in the ratio card depends on the materials. Then they will issue the materials through weighting system with help of human. But in this system having two draw backs, first one is weight of the material may be inaccurate due to human mistakes and secondly, if not buy the materials at the end of the month, they will sale to others without any intimation to the government and customers. In this paper, we have proposed an Automatic Ration Materials Distribution Based on GSM and RFID Technology to avoid the drawbacks. Today we are facing a number of transport related problems.

RFID technology effectively used to solve some of them. RFID is act as ratio card and other purpose such as RC book, insurance details, service details etc. GSM used to communicate the information between the two people or more than two persons to update the information depends on the requirements. Radio-frequency identification (RFID) based access-control system allows only authorized or responsible persons to get the materials from ration shops. An RFID system consists of an antenna or coil, a transceiver (with decoder) and a transponder (RF tag) electronically programmed with unique information. There are many types of RFID systems available in the market. RFID classified based on their frequency ranges. The passive tags are lighter and less expensive than active tags. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. In the current work, SIM300 GSM module is used. The SIM300 module is a Triband GSM/GPRS solution in a compact plug in module featuring an industry-standard interface. It delivers voice, data and fax in a small form factor with low power consumption. GSM and RFID Technology-in this system, only authentic person can be recovered ration materials from ration shops based on the amount available in the RFID.

II. WORKING

The smart ration distribution based on RFID technology. Instead of ration card everyone will be provided with an RFID card. If the customer has to buy any ration material, he has to show the ration RFID tag card to the RFID reader kit. The user will be having a unique number & the reader will recognize it. The recognized RFID number will be given to the microcontroller, which compares the input number with

the database i.e name, address details, date of expiry of card are programmed in the controller will recognize the data coming from RFID by comparing it with the database. Once the user is identified, the microcontroller will check whether the user had already bought the ration item of to that month. If not, then the ration item to be dispensed will be displayed on the LCD screen.

The user has to enter the details of the item he wants to purchase. If the user selects the ration item for purchasing purpose, then the controller will calculate the price of the items & check with the available cash balance in the card. If the person has sufficient balance, then microcontroller will start the solenoid & motor mechanism to dispense the items.

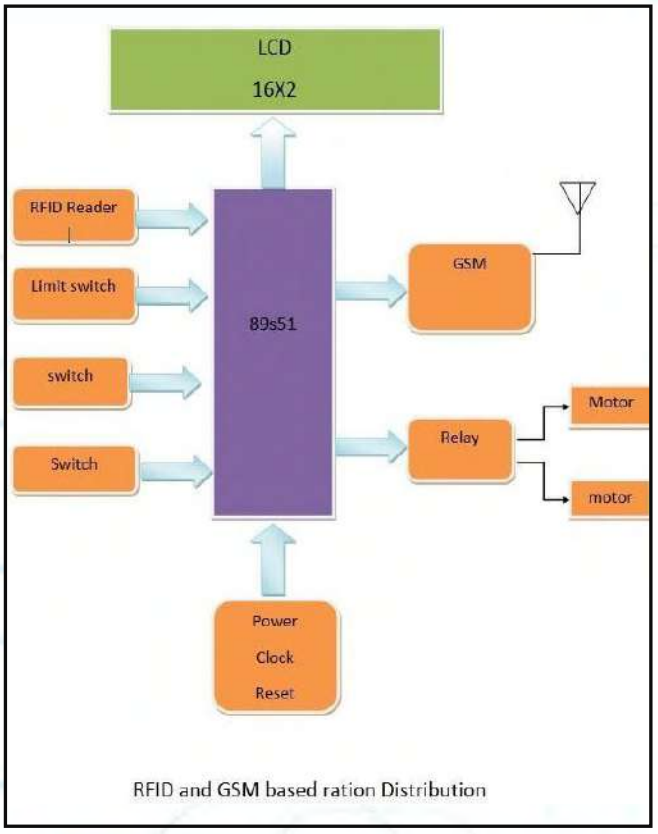

Fig .1

III. RELATED WORKS

Today mobile phone is one of the most important devices for every one that is used in communication purpose and used in embedded system to control the devices. In, the RFID based Bill Generation and Payment through Mobile system is implemented. In this paper, the bill generating in super market using RFID technology and payment through mobile phone. Mobile payments will become one of the most important mobile services. The most essential consideration is the security of the mobile devices and the applications along with the complexity of imbursement process. Advantages of this system, i) Increased consumer confidence, leading to increased sales. ii) Benefit for both consumers and merchants. The RFID (Radio Frequency Identification) emerges as one of the converging technologies and transportation plays a vital role in urbanization. RFID plays major role in auto ID applications like RFID contact fewer smart cards used by bus riders, in Super market, Textiles and logistics chain management. In, the RFID Based Embedded System for Vehicle Tracking and Prevention of Road Accidents system is designed and implemented. This system is may be to reduce the road accident in Indian roads. In, the RFID Based Exam Hall Maintenance System presents an efficient method of examination hall management. This system is possible for a student to identify the particular exam hall from any other hall, when they swipe RFID card in a card reader located there. This helps them to identify the floor or get directions to their respective halls immediately. The card reader is provided at the entrance of the building, if the students enter wrongly a buzzer alarm sets off, otherwise the room number is displayed on the LCD, connected to controller. RFID technology is emergent technology that can be used in wide range of applications. In today's, power saving is very important and difficult. Even though there are many power generation methods available, but it has become very difficult to generate the power due to insufficient resources. Power saving is necessary for our society, this paper discussed about the power saved in the streetlights. The key objective is to control the streetlights using Dual Tone Multi Frequency (DTMF). If any over load occurs, the connection disconnected and the information transferred to EB through Global System for Mobile communication (GSM). If it is any complaint by the consumers, they can send the information to EB through Radio Frequency Identification (RFID) Reader, which is fixed in one of the street light posts and the tag provided to the all consumers. The messages send to EB server through GSM. Advantage of this system, power consumption is very less.

Fig. 2 System Name

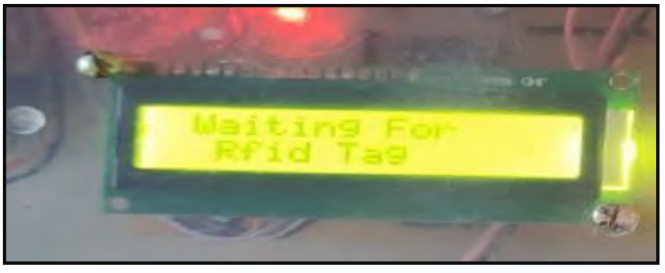

Fig. 3 Initial Display Message

Fig. 4 Guide Name

Fig. 5 PCE

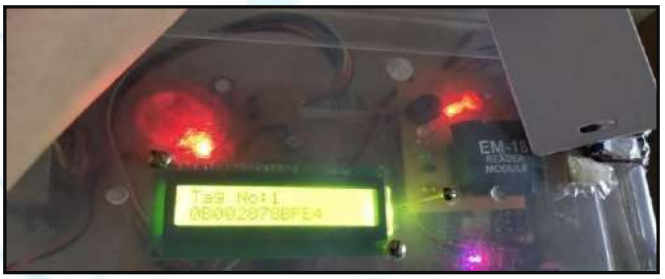

Fig. 6 Tag Information

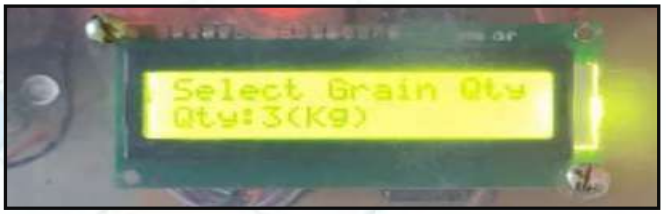

Fig. 7 Amount of weight

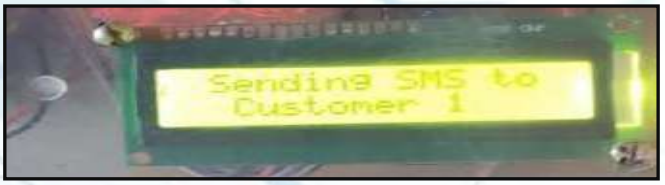

Fig. 8 Sending SMS to customer

IV. APPLICATION

1.Mainly use in ration shop.

2.This system also possible to used in local stores to provides ration for distribution to get customers desired grains such as wheat,oil,rice etc.

V. FUTURE SCOPE

RFID tag replaces the ration cards in this project. We are storing the name and phone number of the customer in the rfid tag. Due to low memory of microcontroller details of only three customers are stored. When the tag is read by the rfid reader name and phone number of the person is displayed on the LCD screen. Then the required product and quantity has to be given through keypad. Immediately a message is sent to the customer through GSM.We can store all the details of the customer like aadhar number, annual income, family details etc in the tags. Because of the memory constraint of microcontroller, we are having only three ration card holders. This memory constraint can be eliminated by using servers having large memory to store customer's information. When there is shortage of groceries at ration shop immediately information can be sent to authorities by short message service. We can also create a website to display the details of customers and the groceries they took. we can change the antenna or antenna element to obtain more gain. We can make this project more advanced by establishing communication between UAV to UAV or by making masterslave UAV communication system. Microstrip antenna have a tremendous application potential. We can design these antennas and used them in Personal Communication System, Mobile Satellite Communication, Direct Broadcast Satellite, Global Positioning System, Wireless Local Area Network, Intelligent Vehicle Highway System etc.

VI. CONCLUSION

In this paper, we have implemented and tested an Automatic Ration Materials Distribution Based on GSM and RFID technology instead of ration cards. But in the existing system having two draw backs, first one is weight of the material may be inaccurate due to human mistakes and secondly, if not buy the materials at end of the month, they will sale to others without any intimation to the government and customers. The above drawbacks rectified by this method. In this system, ration Materials (sugar, rice, oil, kerosene, etc) distributed through automatic mechanism without any help of humans. After receiving the materials, controller sends the information to government office and customer through GSM technology. This system is very accurate, simple and low power consumption, which is used for the real time applications.

ACKNOWLEDGMENT

I would like to express my deep gratitude to Professor Anup Vanage and Professor Dinesh Tiwari research supervisors, for their patient guidance, enthusiastic encouragement and useful critiques of this research work. I would also like to thank Dr. Avinash Vaidya, for his advice and assistance in keeping my progress on schedule. My grateful thanks are also extended to Dr. R.H. Khade for his help and constant support. I would also like to extend my thanks to the entire EXTC staff and technicians of the laboratory of the department for their help in offering me the resources in running the program. Finally, I wish to thank my parents for their support and encouragement throughout my study.

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Implementation of Automatic Door Opening System Using PIR Sensor

Prajakta Pawar, Sneha Pandey, Sharayu Saravade, Shruti Dhole

Abstract: **Automation is a technology by which we can perform the process with minimal human assistance. This paper presents the implementation of automatic door opening system for minimal use of human touch specially when the world is suffering from pandemic situation (Covid19). It can be used not only for automatic door opening but also for handicap people. It consists of entry unit and exit unit. Each unit consists of Arduino Uno, PIR (Passive Infrared) sensor and servo motor.**

***Keywords*: PIR Sensor, Servo Motor, Arduino Uno**

I. INTRODUCTION

Automatic door opening system is used globally everywhere. They are utilized in many places like shopping malls, public buildings, airports, hospitals, theatres, etc. These systems are used to open the door when an individual comes near to the entrance of the door and shut after entered into the door. Sensing process, main controller circuit and motor are the key components of the automatic door opener.

Fig.1. Target environment

There are various sorts of sensors are available within the market to form such sorts of systems like Radar sensors, PIR sensors, Infrared sensors, and Laser sensors, etc. This project uses a PIR sensor to open or close the door automatically which senses the infrared energy produced by the physical body.

II. SYSTEM OVERVIEW

The IR energy sensed by the PIR sensor activates the sensor to operate the door automatically. The signal transmitted to the microcontroller control the door. For the entry door the entry unit is used. The signal which is transmitted to the microcontroller control's the door.The PIR sensor senses the infrared energy produced by the human body from a substantial distance. This sensing signal is fed to a processor to operate the door motor through motor driver.

III. LITERATURE SURVEY

Sr No.	System	Interface	Controller	Merits
1.	Using biometric	Fingerprint orretina GSM Module	Atmega 328P µc	Safe & Secured Effective & Less Vulnerable
2.	Using RFID	Card Reader, CDMA Module, LCD Interface	Arduino µc,LPC 1769	Integrated Security and Less Power Consumption
3.	Using PIR	Heat Detection Module	Arduino	Energy Saving Scalable Safe & Secured Zero Touch

Table No.1. Literature Survey

IV. HARDWARE AND SOFTWARE

Hardware Requirement:

1. Servo Motor
2. PIR Sensor (HC-SR501)
3. L293N Arduino Motor Shield
4. MDF Board
5. Bread Board
6. Connecting Wires
7. Adapter
8. Power Supply for Arduino Uno and Motor Driver

PIR SENSOR:

The PIR sensor stands for Passive Infrared sensor. It is a low-cost sensor which can detect the presence of Human being. It has three output pins i.e. Vcc, Output and Ground as shown within the pin diagram above. Since the output pin is 3.3V TTL logic is often used with any platforms like Arduino, Raspberry, PIC, ARM, 8051 etc.

L293D Based Arduino Motor Shield:

The L293D is a dedicated module to suite in Arduino UNO R3Board, and Arduino MEGA.

It is actually a motor driver shield that has full featured Arduino Shield are often used to drive 2 to 6 DC motor and 4wire Stepper motor and it has 2 set of pins to drive a SERVO.

C++ PROGRAMING LANGUAGE:

C++ was designed with an orientation toward system programming and resource constrained software and large systems, with performance, efficiency, and flexibility of use as.

C++ has also been found useful in many other areas and resource-constrained applications, including desktop applications, video games, servers (e.g. web search, e-commerce websites, or databases) and performance-critical applications.
e.g. space probes or telephone switches.

Software Requirement:
1. Arduino Integrated Development Environment(IDE)
2. Tinkercad (simulation program)
3. C++Programing language

V. HARDWARE DESIGN

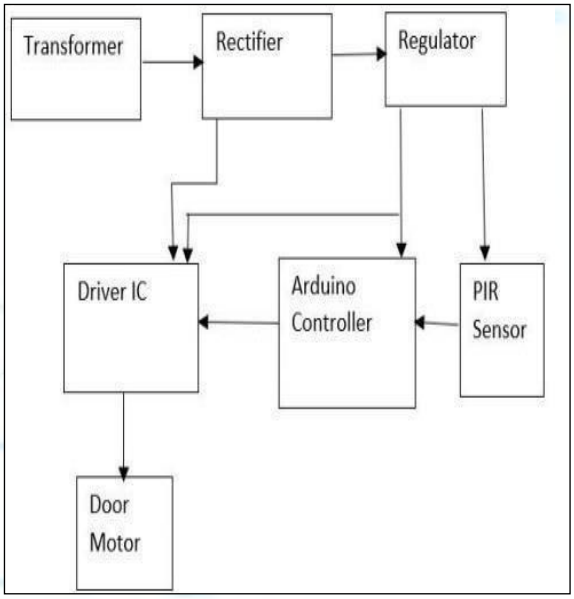

Fig.2. Block Diagram

VI. SYSTEM FLOWCHART

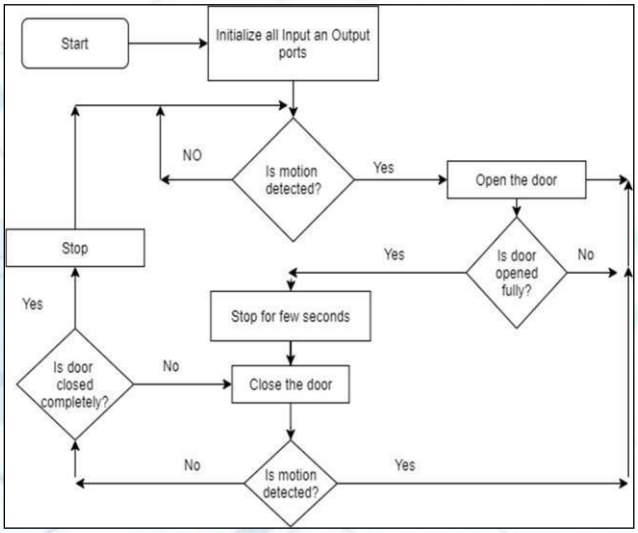

Figure.3. Flowchart of Automatic Door Opening System with Entry Counter

VII. CIRCUIT DIAGRAM

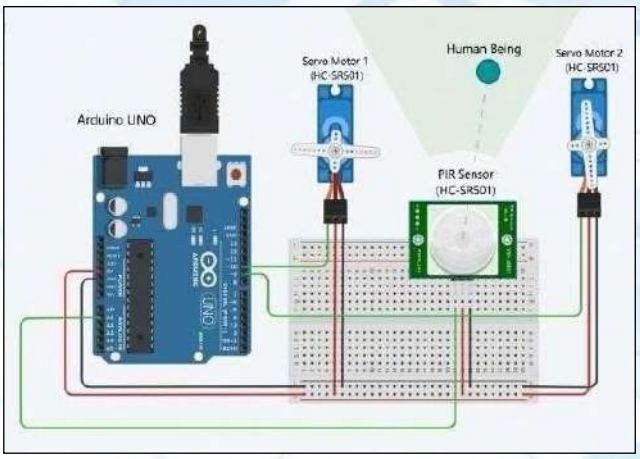

Fig. 4. Circuit Diagram

Circuit Diagram Explanation:

PIR Sensor
1) V+ and GND is connected to respective to +5v Power and ground.
2) Data pin is connected to analog pin A1 of Arduino.

Servo motor
1) V+ and GND is connected to respective to +5v Power andground.
2) Data pin is connected to digital pinout D9 and D10.

Arduino
1) Analog pin A1 is use as input pin for PIR sensor.
2) Digital pin D9 and D10 is use as output pin for Servo motor.

Arduino Motor Shield
1) Arduino pin A1 is connected to pin D1 of Arduino shield.
2) Arduino pin D9 and D10 is connected to Servo1 pin andServo2 pin respectively.
3) Arduino shield pin VIN and GND is connected to +5v Powerand Ground.

VIII. SYSTEM OUTPUT

A. *When door is open*

PIR sensor: At no Detection PIR sensor data pin output signal out is HIGH.

Arduino Processing: As Data pin of PIR sensor is connected to Analog A1 pin, with detection PIR sensor output is High Arduino process with sending control signal to D9 and D10 pin with 90*and 180* Angle signal

Servo Motor: Servo motor1 angle rotated to 90* angle. Servo motor2 angle rotated to 180* angle.

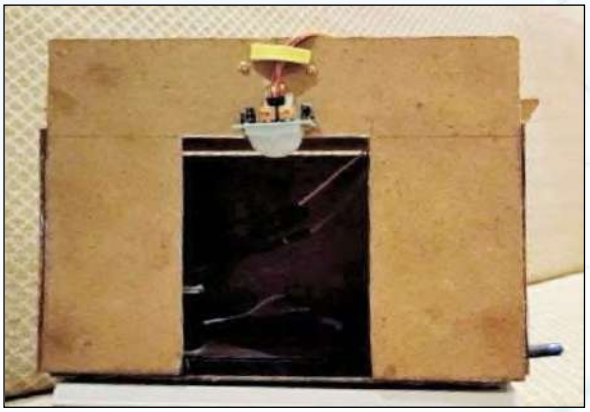

Fig. 5. When door is open

B. When door is closed

PIR sensor: At no Detection PIR sensor data pin output signal out is LOW.

Arduino Processing:
As Data pin of PIR sensor is connected to Analog A1 pin, with NO detection PIR sensor output is Low Arduino process with sending control signal to D9 and D10 pin with 0*and 90* Angle signal.

Servo Motor: Servo motor1 angle rotated to 0*angle. Servo motor2 angle rotated to 90* angle.

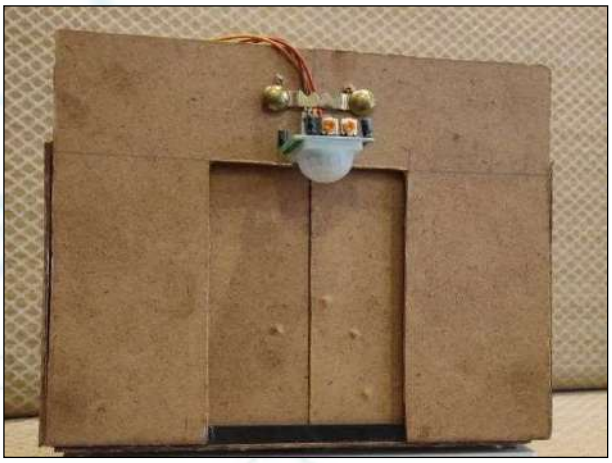

Fig. 6. When door is closed

IX. CONCLUSION

The hands-free door opener automatically door opening system by using passive infrared sensor (PIR sensor). To program the system C++ language was used alone with Arduino IDE and tinkercad is used to simulate the design. Presence of each module has been reasoned out and placed carefully, thus contributing to the best and simplest working of the system. In this way, the system has been successfully implemented.

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Industrial IoT based Gas Leakage Detector

Bhavanaraj Gudiguntla, Manpreet Kaur Bhombra, Aditi Jaiswal, Kannan Nair,

Prof. Suchitra Patil

***Abstract* – Gas transmission and usage play a very important role for cities and industries and thus in growing economies. A gas leak refers to an unintended leak of natural LPG gas or other gaseous product. Gas leaks are hazardous to human health and the environment as well. Even a small leak may gradually build up a large amount of gas. Gas detectors are used to detect such gas leakages. This project aims to minimize such incidents by making an IIoT based gas leakage detecting device that will send a notification with the threshold value to stop further leakage for safety and maintenance.**

***Keywords*– Cloud service, Internet of Things, Web services.**

I INTRODUCTION

Gas leakage detector is a device that detects the presence of gas leaks in an area, often as a part of safety technology. This makes leak detection a part of regular maintenance routines quick and easy. These are preferably used to protect workers and ensure plant safety. This system monitors a variety of parameters, collects and analyses data from the sensor. The output voltage boosts as and when there is an increase in the concentration of the measured gas. Due to the sensor's high sensitivity and fast response time, measurements can be taken as soon as possible. As soon as the gas leak is detected, a notification is sent to the user via various applications such as SMS messaging andTelegram. This type of device is important as many gases exist that can be very harmful to organic life such as humans or animals.

II LITERATURE SURVEY

We have referred to a paper – Wi-Fi Based Gas Pipe Leakage Detector Insect Robot using PI3 written byNyan Phyo Aung, Mo Mo Myint Wai, Lwin Lwin Htay from Department of Electronic Engineering, Technological University, Mandalay, Myanmar. This paper presented LPG leakage detection and alert system. This system is very simple yet reliable. This system is sample model of gas leakage detector insect robot [1].

The other paper referred by us was Gas Leakage Detection Using IOT Tools written by T.H. Feiroz Khan, Disha Dikshita Behera, Riya Sidha, Anisah Manouwar Assistant Professor from Department of CSE, SRMIST, Chennai-India. This paper presented Gas leakage detection using IoT with the help of LCD screen and gas sensor [2]

III SYSTEM ARCHITECTURE

Components- Hardware Components-

1. Gas Sensor: A gas sensor is a device that detects the presence of gas in an area. The MQ135 gas sensor detects the presence of various gases such as nitrogen oxide, alcohols, aromatic compounds, sulphide, smoke, and CO2. Whenever it detects a gas crossing its threshold value, it switches on the buzzer

2. Wi-Fi Module and Microcontroller: Bolt is an IoT platform that helps makers to connect their devices to the internet cloud. Bolt comes with a Wi-Fi/GSM Chip to connect your sensors to the Internet. This system can be configured over the Bolt cloud to receive, store and visualize the data. The Bolt IoT Wi-Fi module contains a microprocessor called ESP 8266 which processes the data.

3. Buzzer: Buzzer switches ON when gas concentration crosses threshold and during that time it requests the Twilio API to send a message to your phone number.

Software Components-

1. Cloud Server: Bolt IoT has its own cloud which helps users to connect to cloud communication software. The record is stored in this cloud.

2. Cloud Communication Software: There are many cloud communication software such as Twilio which can be used to send a message about gas leakage to users. First we have to create Application Bot, which will be

connected to this software. When Buzzer turns ON, during that time it requests the Twilio/IFTTT to send a message to your phone. The bot you created sends a message to a channel.

Twilio: Twilio is a third-party SMS functionality provider. It is a cloud communications Platform as a Service (PaaS) company.

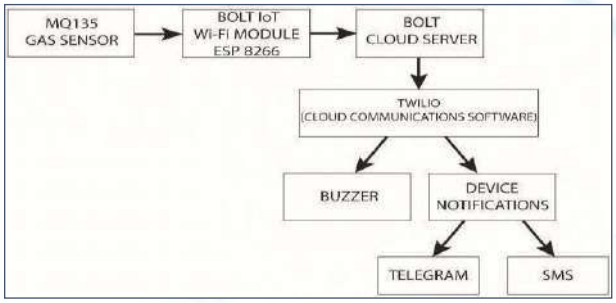

Figure 1 Activity Diagram

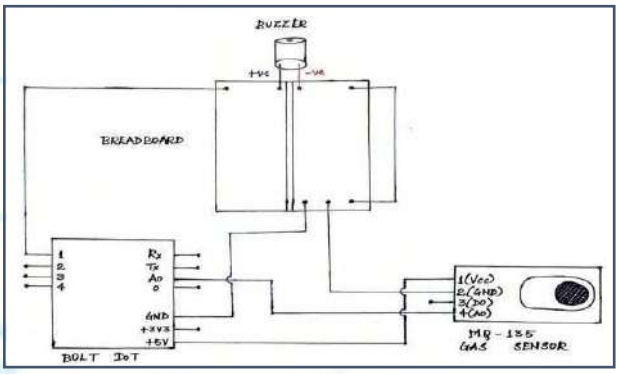

Figure 2 Circuit diagram

Notification is also sent in the telegram channel. The hardware components MQ135 gas sensor, bolt IoT Wi-Fi module, and buzzer are connected. The bolt IoT Wi-Fi module is set up to work with a remote Wi-Fi connection. The MQ 135 gas sensor is used to check Air Quality. It senses a change in air quality and informs the bolt IoT Wi-Fi module to send a signal to software. The software consists of bolt IoT cloud server and cloud communication software. We have connected our Bolt IoT Wi-Fi module to its own cloud server. Using Twilio (cloud communication software) we have done the Python coding required for the project. Once the hardware setup is connected to the power supply, the code is run. The gas sensor then starts measuring air quality every 5 seconds and the threshold value. Once the air quality crosses the given threshold value (E.g.: 300), Twilio is notified and the buzzer starts ringing. Twilio sends notification to the numbers mentioned in the code also mentioning the threshold value

IV RESULTS

The gas sensor detects gas leakage every 10 seconds and this reading is sent to the cloud server. These readings are stored in the cloud server and the cloud communication software, Twilio checks whether it is in the threshold range specified. If the alert reading is outside the range specified, the buzzer rings, and notification is sent to the user's device via SMS and telegram application.

V CONCLUSION

The gas sensor detects gas leakage every 10 seconds and this reading is sent to the cloud server. These readings are stored in the cloud server and the cloud communication software, Twilio checks whether it is in the threshold range specified. If the alert reading is outside the range specified, the buzzer rings, and notification is sent to the user's device via SMS and telegram application.

ACKNOWLEDGMENT

There are many people whose assistance have helped us in this project and we would like to thank them all. Our sincere thanks to everyone at Pillai College of Engineering for supporting us. We would like to thank them for granting us this wonderful opportunity to work on this esteemed project and providing us with valuable resources.

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IoT based gas leakage monitoring system using FPGA

Saksha Poojari, Nidhi Nair, Yashasvi Pawar, and Shruti Phadtare

***Abstract*—Gas leakage is a major downside in industries, residential premises and gas powered vehicles. Undetected leakage may lead to explosion and cause severe damages to life and environment. The leak is usually the result of poorly fitted or faulty appliances like boilers and cookers. As it is estimated that over 20 people every year die due to gas leakage in their residents. Whereas when it comes to industries and commercial areas it can affect a lot of people around the area. Quick action on even a minor leakage of gas is very necessary to avoid any mishaps. Here we are building a IOT based gas leakage monitoring system that will help monitor any leaked gases in the atmosphere within the region.**

***Keywords*— ADC, FPGA, IoT, leakage, Sensor, UART**

I. INTRODUCTION

The agenda of this project is to monitor the gas levels in the atmosphere thereby avoiding any danger. Constant monitoring of various gases used on a daily basis in industries and various appliances would help prevent disasters and injuries that may happen due to leaking of the same. All the huge mishaps and various incidents considered, it is quite evident how much of a serious issue gas leak are and how much important it is to take measures for preventing the same. Some of these measures include timely check-ups of the appliances at both industrial and household levels, making sure certain harmful gases used are properly handled, monitoring of exposure to these gases, and so on. This project mainly focuses on the monitoring of gas levels within the atmosphere. Increasing death rates and serious injuries caused due blasts and inhalation of harmful gases are the key reasons for this project to be implemented. Technology is prospering day by day. New machines, new techniques, all of which demand the use of various risks and use of new gases and their combinations. We must come up with solutions and preventive measures alongside these developments. The system built in this project will be used to monitor the gas level in the atmosphere which would then be displayed on the LCD. Also, a continuous graph of the level would be shown on the device that would be connected through Wi-fi to the system. Proper monitoring from time to time would avoid any serious damage thereby fulfilling the purpose of this project. This project offers a system that would be able to reduce the disasters happening due to undetected gas leaks. Immediate alerts sent to the concerned people or relief teams thereby avoiding any fatal incidents will be the main outcome of this project. This project is concerned with both household as well as industrial level usage. The number of sensors and its range varies according to its implementation. This system is user friendly and hence can be used within houses by layman too. Industrial level implementation is also possible. The type of sensor used and its range will be set taking into consideration the area of the industry or factory within which the system is set up.

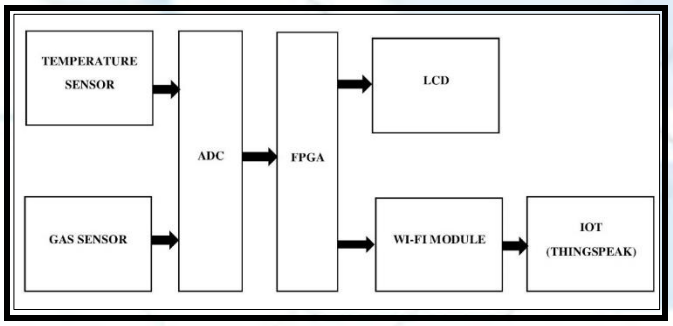

Fig.1 Overview of the gas leakage detection system

II. SYSTEM OVERVIEW

To execute the above concept we are designing a device based on a field programmable gate array (FPGA) which has an inbuilt ADC. The analog to digital converter which is MCP3208 is interfaced with FPGA which works on the communication protocol based on Serial Peripheral Interface which has the working related to master and slave configuration. Here, the FPGA behaves as a master whereas the ADC acts as a slave for the given method. Also, based on the structural and behavioral modeling the FPGA continues to send and receive data signals through which we can read the given gas levels on the 16x2 LCD module. To detect the gas levels and temperature the gas sensor MQ-5 is connected to one of the channels of FPGA along with the temperature sensor LM35 which is displayed on the IOT based application called Thing speak. Through this a Wifi - module is interfaced with FPGA using the UART communication protocol which brings all the modules together to execute the project.

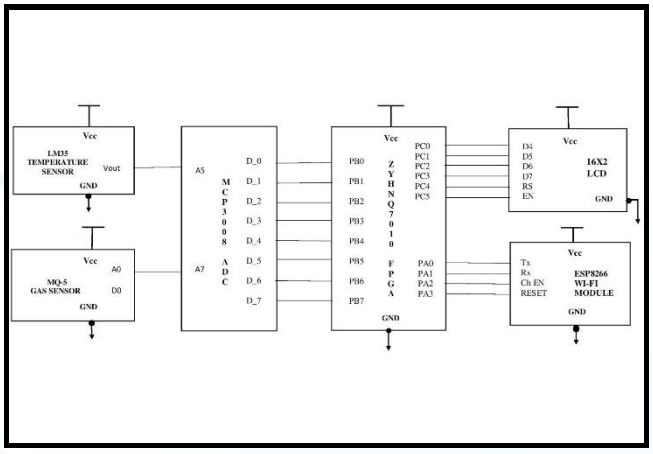

Fig.2 Circuit Diagram

III. WORKING OF SYSTEM

A. *Hardware section of system*

The core element present in the given circuit is a field programmable gate array that uses two communication protocols mainly SPI and UART. Also, the secondary components present are working with FPGA board where some components are already interfaced which reduces the cost and efficiently helps The SPI communication is known as the serial peripheral interface which works on a master and slave configuration. A standard SPI bus consists of 4 signals, Master Out Slave In (MOSI), Master In Slave Out (MISO), the clock (SCK), and Chip Select (SS). Here, the FPGA Spartan 6 board acts as a master which sends commands to the ADC acting as a slave. The SPI transmission is controlled solely by the master here. The master generates the clock and controls the slave select signal. The following means that the slave has no way of sending data to the master on its own. Each SPI transfer is full-duplex; this means that data is sent from the master to the slave and from the slave to the master at the same time. The FPGA device that uses SPI typically will send/receive multiple bytes each time the chip select signal goes low. The ADC, 16x2 LCD, ESP8266 Wi-Fi, Temperature sensor LM35 are interfaced with the FPGA Spartan 6 board. The gas sensor MQ-05 is attached to the core element FPGA which goes through the ADC-MCP3208. It is suitable for detecting H2, LPG, CH4, CO, Alcohol. Also due to its high sensitivity and fast response time, measurements can be taken as soon as possible. The sensitivity of the sensor can be adjusted by using the potentiometer. The four pins consist of VCC, GND, Analog out and Digital out. The Analog pin can detect concentration from 200-10000ppm with VCC taking 5V maximum. Here, the gas sensor senses the gas in the surroundings and sends the analog value to the ADC pin number CH5 or A5 which further converts the value into a digital value and disperse the values through D0-7 to PB0-7. These pins are known for taking the input values given by the interfaced ADC further to the LCD display and Wi-Fi module. Also, the temperature sensor LM35 attached to ADC detects the temperature in analog value through its Analog out pin which has the range of detection up to 10mV/degree celsius. The VCC takes up to 3 to 5V whereas the GND pin is grounded. The analog out pin is connected to CH7 or A7 which transfers the analog value and is converted to a digital value and sent to FPGA. Therefore, the digital value is processed through the FPGA. The processed temperature and gas concentration sensor value is converted into equivalent temperature and gas levels which are sent to the LCD display which is interfaced which makes the circuit less complicated and able to display the values accordingly. The PC0-3 is connected to the D4-7 which are the bus lines. These high-order bi-directional 3 state data bus lines are used for data transfer between FPGA. Further, PC4 is connected to RS which is register select which sets to 1 so that data can be displayed. The data would be in the ASCII value of the character to be displayed on the LCD. The PC5 pin is connected to EN which sends data to data pins when a high to low pulse is given; an Extra voltage push is required to execute the instruction and EN(enable) signal is used for this purpose. The voltage is 5V for VCC and GND is grounded.

B. *Software section of system*

The data can be also displayed using an IoT platform which makes it easier to monitor along with a display nearby which can be done by connecting it to a Wi-Fi module. The Wi-Fi module interfacing with FPGA is connected to four pins namely PA0-3 to Tx, Rx, CH EN, and Reset along with the voltage being in the range of 5-3V. The pin which represents the Rx of the programmer is used to upload the program, whereas the chip enables and reset is used to make changes in the given module with Rx taking the i/p and o/p for the data provided to the Wi-Fi module. Through which the data is sent through the internet and we can see different levels of gas concentrations and temperature which is measured from time to time accordingly. Further, the serial data is sent through the Wi-fi module through the internet and the levels related to temperature and concentration should be displayed. Once the program modules are run on the Xilinx software the IoT platform will display the necessary information. For each person or industry, a unique URL can be created so that they can monitor their gas levels simultaneously while the LCD display nearby will always show the constant temperature and concentration which helps to detect any leakage. The graph displays the concentration and temperature on the Y-axis output sent by the sensors and the X-axis defines the date and time. Each of the dots on the graph which is displayed corresponds to the value and the time in GMT at which the value was posted to the channel. When the gas is brought near the sensors it will be simultaneously displayed on the LCD display for nearby observation whereas the monitoring can also be done through a far place using the IoT counterpart which gives observation in a detailed manner and keeps a track of all the measurements taken via a unique URL given to the user.

IV. EXPERIMENTAL SETUP AND MEASUREMENTS

A. *Testing with LPG*

For testing the system we are using lighter which contain butane gas.MQ-5 gas sensor detects the gas level from 200ppm to 10000ppm.When the sensor senses the gas in the surroundings, it sends the analog value to the ADC which further converts the value into a digital value. FPGA reads the result which will display on the LCD display. This information is sent over the cloud with the help of ESP8266 wi-fi module. The graph will be plotted for monitoring the leakage on the thing speak website.

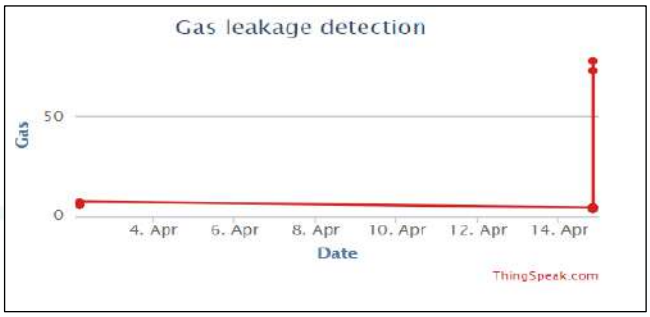

Fig.6 Gas concentration measurements

V. CONCLUSION

The setup is based on a IOT based gas monitoring using a field programmable gate array which helps to monitor the gas concentration along with the temperature which helps to detect any hazards in our surroundings. The platform helps to monitor gas levels with a unique URL assigned to a person. Further, the industry or the house in which the LPG gas or natural gas is used

can be monitored using the website regularly The LCD display present helps to monitor the levels when the person is nearby and is able to check the concentration of gas.

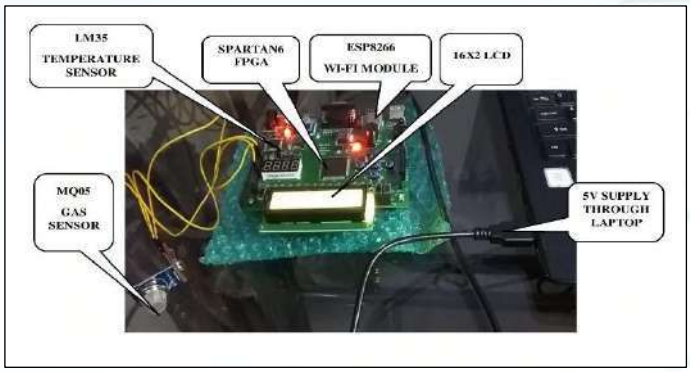

Fig.5. Experimental setup of the gas leakage monitoring system

ACKNOWLEDGEMENT

We express our sincere gratitude to Prof. Suman Wadkar, Head of the department Dr. Avinash Vaidya, Electronics & Telecommunication Department without whom it would not have been possible to successfully accomplish our project. Furthermore, we are indebted to the Principal Dr. Sandeep Joshi whose constant encouragement and motivation inspired us to do our best.

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IOT Based Traffic Signal Automation BySensing And Detecting Traffic Intensity Through IR Sensors

Prachi Baingane, Tejas Patil, Shyam Menon, Shruti Vardhaman

***Abstract*-Congestion of vehicular traffic is a major issue in modern scenario. This results in huge amount of accidents in day to day life and this also increases imminent road violence which is above the average level. This system intends to implement a low-cost model for the users in order to monitor the traffic density level in signals affected in the particular area. This system provides the necessary solution for the above problems and also reduces the negative effects of these problems. This system consists of IR sensors which keeps track of the density of the traffic level at a particular side. Each side IR sensors are fixed at particular ranges and so that we can be able to detect the density of each side simultaneously. This records the values and stores in the Cloud. When with the expansion in road network, motorization and urbanization in the country, the number of road accidents have surged in a drastic manner. The final data from these sensors are given to the cloud storage and then based upon the data updated can be able to track the data via graphical representation The traffic signals are also controlled automatically by using a Radio Frequency module (RF module) and it is also necessary to control the traffic jams near the junction when Ambulance is near to traffic junction, this is done by using RF system. With this system, we can consider the priority of different type of vehicles and also consider the density of traffic on the roads by installing RF receiver on the road intersections. Radio frequency identification is a technique that uses the radio waves to identify the object uniquely. The project presented here is one such idea in automating the movements of important vehicle like Ambulance and Fire Fighting Vehicle etc., here the idea is to ease the movement of vehicles by detecting its proximity to Traffic Signal. Here the project also decodes the approaching vehicles Road code like (1,2,3,4), and based on the information vehicle transmits, Traffic Signal takes decision like and automatically toggle / flip the traffic signals from Red to Blue. This provides the user infotainment display to know about the updated scenario of the traffic density in the signals so that the congestion can be reduced and travelling time gets reduced**.

***Index Terms*- Density of vehicular traffic, IR sensors, RF Transmitter and Receiver, Led lights, Arduino Mega, Cloud storage.**

I. INTRODUCTION

In this system the traffic density can be managed by a traffic signal controller using IOT. The time management required for changing signals adjusts automatically / flip based on the congestion. When the traffic density increases more than a limit at a particular lane, it requires longer green light duration to ease the traffic flow. Our system uses a microcontroller that is interfaced with the IR sensors.

These IR sensors are used for the line of sight object detection using which the system gets the input. And for emergency cases, the priority keys are set within those vehicles which on pressing will provide the best route for it.

II. WORKING

In this paper RF will be used as a source of communication between transmitter and receiver and a microcontroller is used to collect and process the data. At the transmitter end user will be able to detect the density of traffic in a particular lane using IR sensors and then data is sent to the microcontroller which processes the data, then it is the sent to the receiver end which consists of a Wi-fi chip through which data is sent to the IOT platform which keeps record of the traffic control. Two IR sensors are fixed on each lane of which one near to the traffic signal and the another at a certain distance to detect the traffic (no. of vehicles on the lane). An extra traffic light (LED) is fixed for emergency vehicles i.e (an ambulance OR a fire brigade wan) as per the priority.

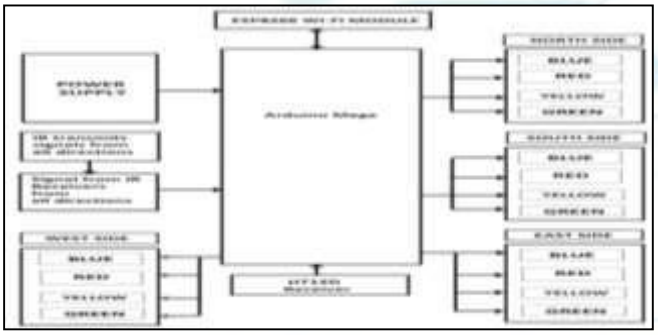

Fig .1: Block diagram of Proposed system

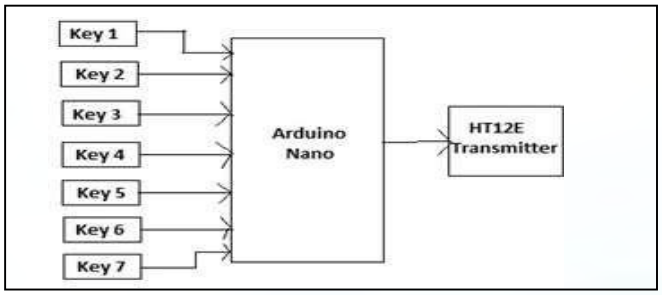

Fig .2: Block Diagram of the Transmitter

III. RF TRANSMITTER AND RECEIVER

The RF module operates at Radio Frequency. It operates on the frequencies between 30KHz to 300GHz. The RF MODULE comprises of RF Transmitter and RF Receiver. So, the RF Tx/Rx operates on the frequency of 434 MHZ.RF transmitter range is approx. 100meters. RF transmitter module is connected to the data encoder HT12E.

3.1 Pin Description of RF Transmitter

a) Ground (GND)
It is a ground pin of transmitter.

a) Serial data input (DATA)
It is an input pin. It is compatible with CMOS to driven with CMOS input level.

b) Supply Voltage (VCC)
It provides +5v supply to the transmitter. Operating for the transmitter. It degrades noise performance as there is noise in the power supply.

c) Antenna Output Pin (ANT)
It is the output pin of the transmitter. It gives 50 ohms' antenna Output. The impedance od antenna affects the output power and harmonic emission. RF Receiver section is connected to the data decoder HT12D. The receiver receives serial data.

3.2 Pin Description of RF Receiver:

a) Ground (GND)
It is connected to the ground pin.

b) Serial data output(DATA)
It is a data output pin.

c) Antenna Input Pin(ANT)
It is the antenna input pin of the receiver to receive the Antenna data.

d) Supply Voltage(VCC)
It provides +5v supply to the receiver. It functions same as in RF transmitter.

IV. IR SENSOR MODULE

The IR sensor module consists mainly of the IR Transmitter and Receiver, Op-Amp, Variable Resistor (Trimmer pot), output LED.

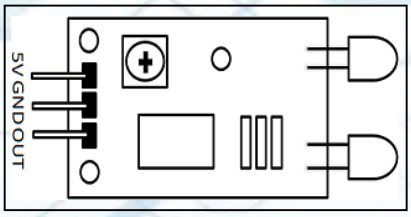

Fig. 3: IR Sensor

a) IR LED Transmitter
IR LED emits light, in the range of Infrared frequency. IR light is invisible to us as its wavelength (700nm – 1mm) is much higher than the visible light range.

b) Photodiode Receiver
Photodiode acts as the IR receiver as its conducts when light falls on it.

c) LM358 Op-Amp
LM358 is an Operational Amplifier (Op-Amp) is used as voltage comparator in the IR sensor.

d) Variable Resistor
The variable resistor used here is a pre-set. It is used to calibrate the distance range at which object should be detected.

Pin Name	Function
VCC	Power Supply Input
GND	Power Supply Ground
OUT	Active High Output

Table 4.1 IR Sensor

V. ESP8266 WI-FI MODULE

The ESP8266 module works with 3.3V only, anything quite 3.7V would kill the module hence be cautions together with your circuits. The best thanks to program an ESP-01 is by using the FTDI board that supports 3.3V programming. One commonly problem that everyone faces with ESP-01 is the powering up problem. The module may be a bit power hungry while programming and hence you'll power it with a 3.3V pin on Arduino or simply use a possible divider. So it is important to make a small voltage regulator for 3.31v that could supply a minimum of 500mA.

Pin No.	Pin Name	Alternate Name	Normally used for	Alternate purpose
1	**Ground**	-	Connected to the ground of the circuit	-
2	**TX**	GPIO – 1	Connected to Rx pin of programmer/uC to upload program	Can act as a General purpose Input/output pin when not used as TX
3	**GPIO-2**	-	General purpose Input/output pin	-
4	**CH_EN**	-	Chip Enable – Active high	-
5	**GPIO - 0**	Flash	General purpose Input/output pin	Takes module into serial programming when held low during start up
6	**Reset**	-	Resets the module	-
7	**RX**	GPIO - 3	General purpose Input/output pin	Can act as a General purpose Input/output pin when not used as RX
8	**Vcc**	-	Connect to +3.3V only	-

Table 5.1 Pin Description of ESP8266

VI. PROPOSED WORK

The proposed module basically intends to implement a low-cost model for the users in order to monitor the traffic density level in signals. It consists of IR sensors which keeps track of the density of the traffic level at a particular side. This database may also help in finding out the time when the traffic is on the peak and add extra time to the signals accordingly so that the signals work more efficiently thereby avoiding congestion.Also, priority vehicles like ambulance, fire brigades and police vehicles gets the first preference and the signals work accordingly thereby allowing them to move first.

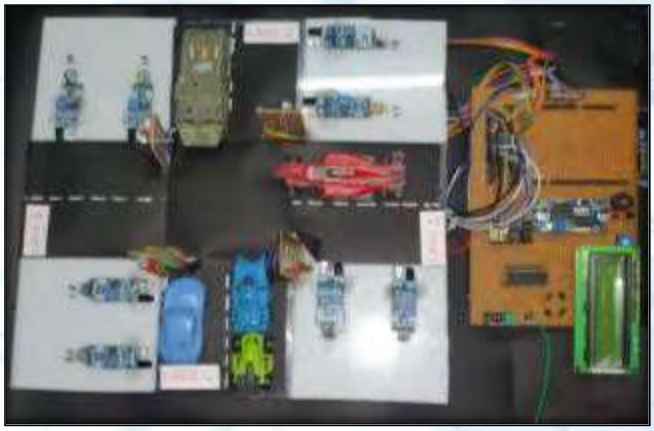

Fig .6 Model of the System

VII. APPLICATIONS

a) Enhance Customer Experience
IoT technologies help to provide customers with more accurate, up-to-date, real-time data.

b) Improved Safety
Using IoT enabled technology the ability to track things such as train speeds, aircraft part conditions, roadway temperatures and the number of vehicles at an intersection is enhanced.

c) Curbing Traffic
IoT technologies are poised to address these pain points in transportation.

d) Environmental Improvements
IoT enabled systems can react quickly to evolving traffic patterns and reduce congestion and energy usage having a positive impact on the environment.

e) Avenue
IoT allows us to take a better look at and analyze the go with the flow of visitors through gadgets in any respect traffic commentary factors.

VIII. FUTURE SCOPE

This project can be used in such a way as to control automatically the signals depending on the traffic density on the roads using sensors like IR detector/receiver module extended with automatic turn off when no vehicles are running on any side of the road which helps in power consumption saving. In health system, the patient's data in the ambulance can be sent to the Hospitals via GSM technology. Thereby providing early and fast treatment of the patient. Traffic lights can be increased to many numbers and traffic lights control can be done for the entire city by sitting on a single place

IX. CONCLUSION

By using multiple features of hardware components in IoT, Smart Traffic Management System has been implemented. Traffic optimization is achieved using IoT platform for efficient utilizing allocating varying time to all trac signal according to available vehicles count in road path. Smart Traffic Management System is implemented to deal efficiently with problem of congestion, perform re-routing at intersections on a road and giving priority vehicles first preference thereby not wasting their time in traffic.

ACKNOWLEDGEMENT

It gives great pleasure to present this project report on “Iot Based Traffic Signal Automation by Sensing and Detecting Traffic Intensity Through IR Sensor”. While working on this project, we found great opportunity to express our sincere regards, deep sense of gratitude and thanks to our project guide Prof. Suchitra Patil for her valuable suggestions, support and timely guidance at every step during course of our project.

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Location tracking system using IoT and GPS

Aadarsh Upadhyay, Nikhil Vig, Piyush Yadav, Sneha Vijay

Abstract **- GPS Navigation and Location tracking system is beneficial in many ways directs us through unfamiliar locations help in asset monitoring, fleet management ,optimizing fuel usage and several others naturally use of tracking system has been increased rapidly .Our work consists of building the GPS based tracking system integrating IOT to make this project more flexible and remotely accessible.**

Index Terms **- Remote sensing , Real time location tracking, IoT, Wi-Fi module.**

I. INTRODUCTION

Today's GPS applications have vastly developed. It is possible to use the Global Positioning Systems to design expense reports, create time sheets, or reduce the costs of fuel consumption. GPS units are great tracking devices that help fleet managers stay in control of their business. The applications in today's GPS units make it possible to take full control of any company. It is clear that the tracking devices offer many benefits to companies, since we can build automated expense reports anytime. GPS units do more than just allow companies to create reports. These devices also help to put an end to thieves. According to recent reports, crime is at a high, which means that car theft is increasing. If we have the right GPS unit, we can put an end to car theft [1].Several types of tracking devices exist. Typically they are classified as "passive" and "active". "Passive" devices store GPS location, speed, heading and sometimes a trigger event such as key on or off, door open or closed (generally used for vehicle tracking). Once the vehicle returns to a predetermined point, the device is removed and the data downloaded to a computer for evaluation. Passive systems include auto download type that transfer data via wireless download. "Active" devices also collect the same information but usually transmit the data in real-time via cellular or satellite networks to a computer or data center for evaluation. Passive trackers do not monitor movement in real-time. When using a passive GPS tracker, you will not be able to follow every last move that a tracked person or object makes. Instead, information that is stored inside of a passive tracker must be downloaded to a computer [2]. In contrast to passive devices, active GPS trackers will allow one to view tracking data in real-time. As soon as we place an active tracker on a vehicle or any object or person (which needs to be tracked), we will be able to view location, stop duration, speed, and other tracking details from the comfort of your home or office. Active GPS trackers are ideal when it comes to monitoring the desired one that need to be tracked at regular time interval. While active tracking devices are more expensive than passive devices (most come with monthly fees), this expensive is usually justified. An active GPS tracker
that comes with a reliable interface (and excellent tracking software), and you will be able to track anything or anyone quickly and efficiently.

II. RELATED WORKS

The GPS (Global Position System) was first introduced by US military, for the purpose of surveillance during the wars with the other countries. In early 80s, the civilians were allowed to use the GPS. It was then used for car racing tournament for the first time to locate each and every car positions during the race which was difficult before [3].

The GPS receiver calculates its own position and time based on data received from multiple GPS satellites. Each satellite carries an accurate record of its position and time, and transmits that data to the receiver. Earth having total of 31 GPS satellites in which 28 satellites are always active for using for the GPS purpose when we are calculating 2-D location using GPS then it uses only 3 satellites to extract the location of GPS module. When we want to get 3-D location of GPS module then it uses minimum of 4 satellites which helps to calculate the latitude, longitude and the elevation of the GPS module.

Nowadays, the growth in the use of devices for the Internet of things is increasing, due to the use in residential and industrial automation projects, providing the execution of tasks Table I Mechanically or automatically, considering artificial intelligence as support for decision making, for the low price and ease it is possible to notice this increase.

When talking about the IoT in different groups of people, other points that stood out during the research were the low cost of assembling a complete project, being able to attend different types of applications and resources, in this way the products became viable for the different types of public, demonstrating capacity of processing and communication.

The last point is about the size and compactness of the device, the Raspberry Pi is very compact and can be used in vast area but the size is bigger as compared to Arduino Uno and ESP8266. The so-called Internet of Things (IoT) is currently revolutionizing logistics and supply chains. Tracking goods, load carriers and crates is a fundamental and influential application for the for the manufacturing and logistics industry. Planners for this type of systems are confronted with a wide variety of technologies, all of which are useful for different use cases. In this second referred research paper [4], which was published by author Andreas Weinzierl, Blik Telecommunications Organization, the author focusses on different IoT devices with their efficiency and lot of functioning of each device also carried out by the author.

In third referred research paper [5], the researcher explaining the change in IoT fields due to Wi-Fi modules. Conversely, using IEEE 802.11 (Wi-Fi) devices can connect to existing Wi-Fi infrastructures directly and access the Internet with shorter communication delays and lower system cost. However, Wi-Fi is energy consuming, impacting autonomy of the end devices. In this work we characterize a recent Wi-Fi-enabled device, namely the ESP8266 module, that is low cost and branded as ultra-low-power, but whose performance for IoT applications is still undocumented.

Tracking technology	Precision	Range	Tracking	Energy consumption
BARCODE	<5cm	<1m	Punctual Tracking	Passive tags
RFID	<10cm	<1m	Punctual Tracking	Passive tags
GPS	<5m	unlimited	Continuous Tracking	High
Bluetooth	<8m	<100m	Continuous Tracking	High
UWB	<30cm	<50m	Continuous Tracking	High
WiFi	<20m	<100m	Continuous Tracking	High
LoRaWAN	>500m	>10km	Continuous Tracking	High

Table: I Comparison of different tracking technologies [4]

In [3], the GPS tracking system was introduced just for the commercial purpose, like for auto racing tournaments. In such racing tournaments, it is difficult to identify the vehicles position in the race, so to identify the vehicles in auto racing, the GPS tracking system was introduced by US researchers in 2004.In that proposed project, a System uses GPS receivers and other Sensors to acquire data about one or more objects at an event. The data acquired by the GPS receivers and the sensors is used to determine various Statistics about the objects and/or enhance a Video presentation of the objects. In one embodiment, the acquired data is used to determine three dimensional positions of the objects determine the positions of images of the objects in a Video and enhance the Video accordingly. One exemplar use of the present invention is with a System for tracking automobiles at a race. The System determines Statistics about the automobiles and enhances a video presentation of the race.

III. PROPOSED SYSTEM

The core function of our project is to develop a tracking system that is cost effective so we have made use of the following components that has effective operation and usage. In order to achieve better domain results, researchers combined GPS module with esp8266, Wi-Fi based module, which seek to inherit advantages and eliminate disadvantages. The researchers and big organization with a lot of employees and owns lots of vehicles have problems with cost management, delay in transmission and reception of data and efficiency of existing tracking systems. To overcome such disadvantages the following Wi-Fi based tracking system is developed. The proposed architecture is shown in Figure a. below.

When the power is supplied through voltage regulator IC 7805, it then converted into constant voltage ranging between 4.8V to 5.2V. As all components needed maximum 5V power supply. Esp8266 Wi-Fi module get connected to available Wi-Fi network to send the extracted data to cloud and with the help of BLYNK application, we can see the outputs. The IR sensor will check the movement of a person to count the steps, DHT11 Sensor will detect the temperature and GPS satellites will find the latitude and longitude of the GPS Module by connecting through the patch antenna of GPS module.

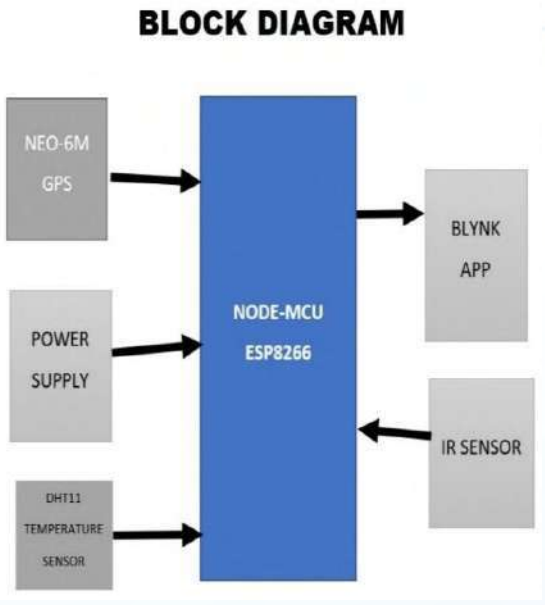

Fig. a Proposed system architecture

The number of satellites connected with GPS module and direction will be shown on BLYNK application. The GPS module receives the location information from the satellites it is processed by the NodeMCU (Advanced development kit within built micro controller) and sends that information to the firebase real time database (cloud). Further the information can be viewed in the android application. The location information is updated for every 10 seconds.

To overcome such disadvantages the following Wi-Fi based tracking system is developed. The proposed architecture is shown in Figure a.

The basic functionality of the project is given by flowchart, by which we can easily summarize the functioning of our project. The outputs can be seen on serial monitor of an Arduino IDE software. When the Arduino based IoT device is powered on, some initial messages are displayed on the character LCD and it starts reading the GPS data from the Neo-6M module. At first the local server IP should be loaded in the web page which will displayed initially in Serial monitor of Arduino or in the LCD display. The GPS starts getting the geographic coordinates of the location, where the GPS module gets the location update every 10 seconds and update to the web server with help of the ESP Wi-Fi module. The device starts searching for a Wi-Fi Access Point. If a Wi-Fi access point is available, the Arduino obtains the IP address if required and connect with the Wi-Fi point. The name and password of the Wi-Fi access point are hardcoded in the Arduino sketch. The initialization of the Wi-Fi connection is done within the setup() function of the Arduino Sketch which runs once the board is powered on.

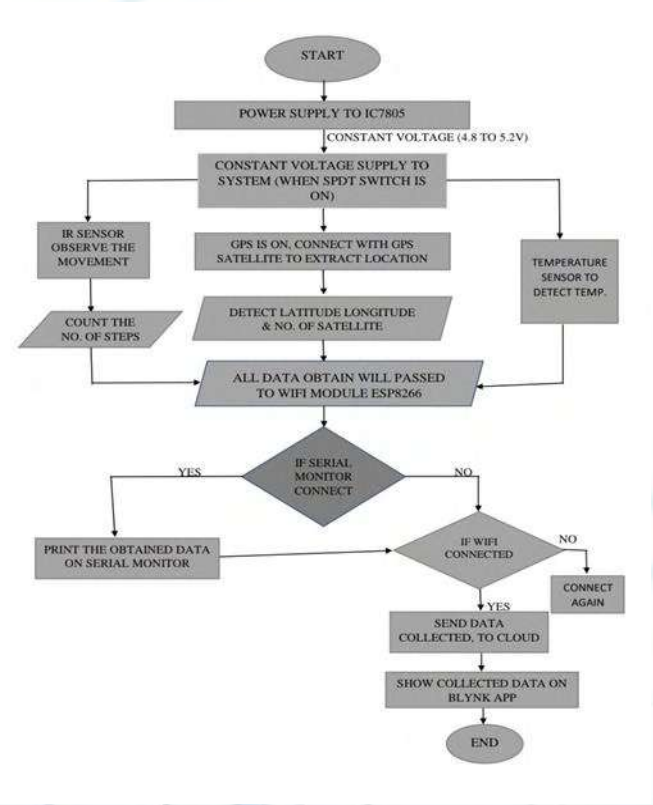

Fig. b Flowchart of working system

IV. Results and Discussion

A. *Designing circuit diagram*

In this stage a circuit diagram of the device was made showing how the different components will be linked to each other. The circuit diagram is very useful in understanding the real working of the project as it shows how each and every component is connected and working. So the circuit diagram of the project was ready at the end of this stage.

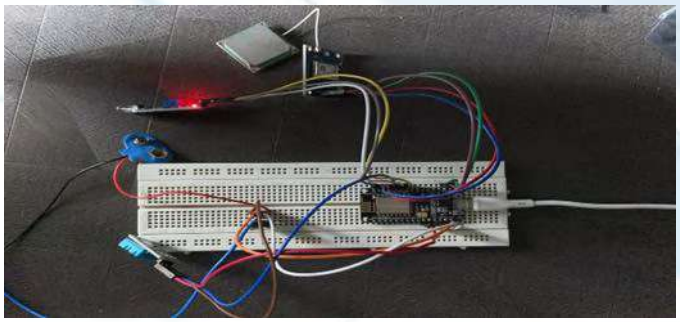

Fig. c Circuit Connection

B. *Developing algorithm for software*

To get the logical flow of the software, the development of algorithm is having a prominent role. So that we have analyzed the complete system and organized the algorithm in such a manner that one can understand the complete working of the software.

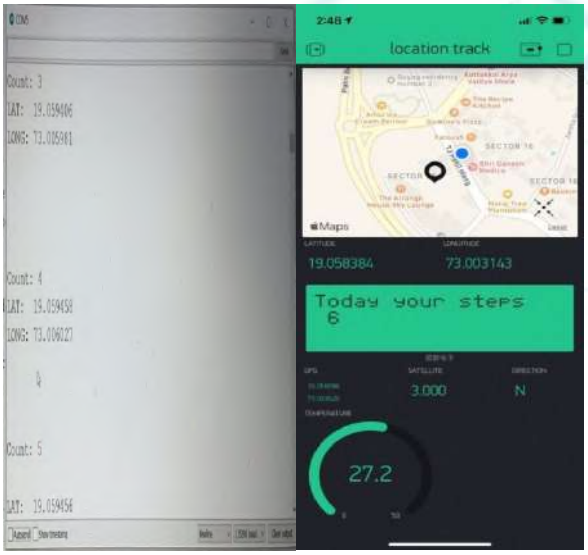

fig. d(1) serial monitor fig. d(2) blynk application

V. Conclusion

Based on the results of analysis of all data obtained by testing the tracking system with the Internet of Things based NodeMCU ESP6288 module, we can say if we are using limited and less number of sensors we can chose ESP8266 Wi-Fi module as the most efficient, reliable and cheaper product. But we have code limit here and only one analog pin available. We can use micro python also instead of C++/C for programming sketch. As IoT is rapidly increasing and emerging technology, so we can expect our technological future in IoT.

VI. FUTURE SCO PE

GPS Tracking To The Rescue : Oxygen Laden Vehicles tagged With GPS Helps Boosts Efficiency, Automatic Toll collection system, Cargo shipment., Wildlife Conservation :Technology for Preservation of endangered species, Increasing market of vehicles tracking system.

ACKNOWLEDGMENTS

We thank the almighty for giving us the courage and perseverance in completing the project. We are greatly indebted to Dr. Suman Wadkar for providing valuable guidance and encouragement throughout the course of our project.

With extreme jubilance and deepest gratitude, we would like to thank HOD of the EXTC Department, Dr. Avinash Vaidya for constant support and encouragement.

Lastly, we would like to thank our principal, Dr. Sandeep Joshi for providing us learning opportunities and for motivating us to enrich ourselves and do better.

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Lora based Smart Water Meter

Sabiha Jahangeer, Sakshi Kadam, Vedant Kandalgaonkar, Ajit Kumar Kannan

Abstract— In many Indian towns, mechanical water metres with AMR capabilities are becoming commonplace.. This old system is unreliable and inefficient since it relies on manual data readings, which is time consuming. By developing a custom read out device with a LoRa trans-receiver for communication in this study, we propose a low-cost, accurate, and dependable solution for reading water in the existing systemWe design a water meter system that combines the uses of LoRa module, Microcontrollers and its various peripherals and other hardware components to reconcile and smoothly carry out the required functions. It is used to build a trans-receiver system with the help of LoRa and IoT, thus eradicating manual readings. It works towards obtaining meter readings with high accuracy. It makes the system cost effective and easy to access as well as use.

***Index Terms*--- Arduino NANO, Flow sensor, NRF24L01 LoraWAN.**

I. INTRODUCTION

The IoT's exciting concept of billions of smart gadgets sensing the actual world (and relaying collected data to Internet repositories) is revolutionising telecommunications research. Moreover, the interaction between the real world and its digital counterpart using secure and real-time technologies may lead to the solution of many issues related to smart cities,and more.

The main focus of this project is to make use of IoT to develop a Smart Water Meter reading system. In order to achieve that we can make use of various devices such as the Arduino, Raspberry-Pi and even the LoRa. Throughout the course of a project our main goal was to study the different functions of these devices and to develop a system that is both cost efficient and not very complex in nature. This was a challenge in itself since the on-going COVID-19 pandemic forced us to make decisions such as: choosing between devices that were already in our possession or going out of the way to make new additions. In the end we believe that we managed to achieve everything keeping in mind our project as the main priority.

II. LITERATURE REVIEW

Making water meter readings available to the consumer requires not only man power but also a long tedious procedure which may also lead to certain kinds of errors.

The main objective of our project was to develop a system that took the water readings at the very source and then sent it to the database and the user in a few steps. As it already suggest, this involves wireless communication over a long distance. Some of the existing techniques suggest that this can be done by using a device that collects the readings from the water meter and then delivers it to the main system. This involves a two-stage transmission that may actually increase the inaccuracies in the readings and even makes the system more complex.

To fix this issue we decided to use sensors that help detect the water levels and make the readings directly available. In order to achieve this we tried to gather exiting literature that gave us some idea about about the existing systems and the functioning of some of the components used in these systems. The following are some of the papers we came across:

- An Integrated IoT Architecture for Smart Metering using Next Generation Sensor for Water Management based on LoraWAN (NRF24L01 Module) Technology: A Pilot Study (Vlastimil Slaný ,Radek Martínek)
- India Smart AMI Water Meter LoraWAN Whitepaper,2018(Ali R. Hosseini, CEO / Director of SenRa Tech Pvt. Ltd.)
- LoRa Technology Based Low Cost Water Meter Reading System (Dinesh Bhoyar, Barkha Katey, Manish Ingle)

TABLE 1

SN	Paper	Advantages and Disadvantages
1.	III. VLASTIMIL SLANÝ, IV. ,RADEK MARTÍNEK	Advantages: 95% Water Detection Rate.. Can be implemented in residential areas. Disadvantages: Highly Expensive
2.	ALI R. HOSSEINI	Advantages: Real time data availability, Automated bill generation Disadvantages:Collaboration between several parties is required for a successful deployment
3.	DINESH BHOYAR, BARKHA KATEY, MANISH INGLE	Advantages: Low power consumption, Real time reading Disadvantages: No leakage detection

III. HARDWARE USED

3.1 Arduino NANO

Based on the ATmega328, the Arduino Nano is a compact, comprehensive, and breadboard-friendly board (Arduino Nano 3.x). It offers a lot of the same features as the Arduino Duemilanove, but it comes in a different packaging. It just has a DC power jack and uses a Mini-B USB cable rather than a conventional one.

3.2 Flow Sensor

The pinwheel sensor in this sensor sits in line with your water line and measures how much liquid has gone through it. With each revolution, an embedded magnetic hall effect sensor generates an electrical pulse. The hall effect sensor is isolated from the water pipe, ensuring that it remains safe and dry.Red (5-24VDC power), black (ground), and yellow wires are included with the sensor (Hall effect pulse output). You may easily calculate water flow by counting the pulses from the sensor's output. It's worth noting that this isn't a precise sensor, and the pulse rate varies based on flow rate, fluid pressure, and sensor orientation. If you need more than 10% precision, you'll need to calibrate it carefully. However, its great for basic measurement tasks

3.3 Relay:

A relay is an electromechanical switch that controls (opens and closes) circuits. The basic function of this gadget is to make or break contact using a signal without the need for human intervention in order to turn it on or off. Its primary function is to regulate a high-powered circuit with a low-power signal.

3.4 Buzzer:

A buzzer or beeper is a mechanical, electromechanical, or piezoelectric audio signalling device (piezo for short). Alarm clocks, timers, and confirmation of human input such as a mouse click or keyboard are all common uses for buzzers and beepers.

3.5 LCD:

A 16*2 LCD display is a relatively basic module that is utilised in a variety of devices and circuits. A 16*2 LCD can display 16 characters per line on each of its two lines.The cost and names of the project's pieces are displayed on an LCD.

3.6 DC Power Socket:

For DC power sources, this is a typical barrel-type power socket. These have a 2.1mm diameter centre pin and are compatible with our DC power supplies.

IV. SOFTWARE DESCRIPTION

The software is designed to process the rate of flow of water at the input end in liters per hour and this value is transmitted to the receiver using the NRF24L01 LoraWAN module. The software includes various measurements of sensors and continues to display the value on the LCDs both at the Transmitter end and the Receiver end.The software is also designed for the micro-controller which in this case is the ArduinoNANO. Furthermore, a threshold value for the flow of water is set. If the water flow exceeds this threshold then the software enables the buzzer. Readings are obtained at a time interval of one second which can be changed in the software as per convenience.

V. METHODOLOGY

The methodology is explained in two parts:

1) Transmitter Side:

The Arduino NANO ATmega328P is the heart of the project. The Arduino Nano is a compact, full, and breadboard-friendly board based on the ATmega328. It has a flash memory of 32 KB, with the bootloader using 2 KB. It has an AVR architecture and 8 analog I/O pins. It is powered through a 12v power supply which passes through a regulator of 5v.The Water Flow sensor YFS201 is a device used to measure the

amount of water flowing through the sensor. It is a Hall Effect sensor and the working voltage is 5-18v DC. Red (5-24VDC power), black (ground), and yellow wires are included with the sensor (Hall effect pulse output). Pin 3 of the flow sensor is connected to VCC whereas pin 2 is connected to GND. Pin 1 of the flow sensor is connected to the pin 8 of Arduino NANO. The flow is measured in Litres/Hour (L/HR) and is displayed on a 16X2 LCD screen display.It is a 16 pin LCD which has two registers the command and the Data Register.

2) Receiver Side:

A 12v supply is given to the Arduino NANO and in between there is a regulator joined so that it can regulate the supply.It has 3 pins. Pin 1 is connected to Vcc, Pin 2 to GND and Pin 3 is output. The data is transmitted to the receiver circuit using NRF24L01 module. It is a wireless long range module. Input pins can tolerate 5V. MISO of the NRF24L01 is connected to D12 of the Arduino NANO. MOSI of the NRF24L01 is connected to D11 of the Arduino NANO.SCK of the NRF24L01 is connected to D13 of the Arduino NANO. CSN of the NRF24L01 is connected to D10 of the Arduino NANO. CE of the NRF24L01 is connected to D9 of the Arduino Nano. Vcc and GND of the module is connected to the vcc and GND pins of arduino nano respectively. The data which is received is displayed on the LCD (16x2) display about the flow rate of the water sensor. It will show the amount of water flown inside the water flow sensor in litres/hour.Pin 1,5 and 16 is connected to the GND of Arduino.Pin 2,15 is connected to the VCC of Arduino NANO.Pin 3 is connected to the Contrast pin of Arduino.Pin 4 is connected to D2 which is RS pin.Pin 11,12,13 and 14 is connected to D4,D5,D6 and D7 respectively. Pin 6 is connected to the enable pin .When the water flows over a certain value (in L/hr), buzzer will make a sound and the LED will glow to notify us.

VI. BLOCK DIAGRAM

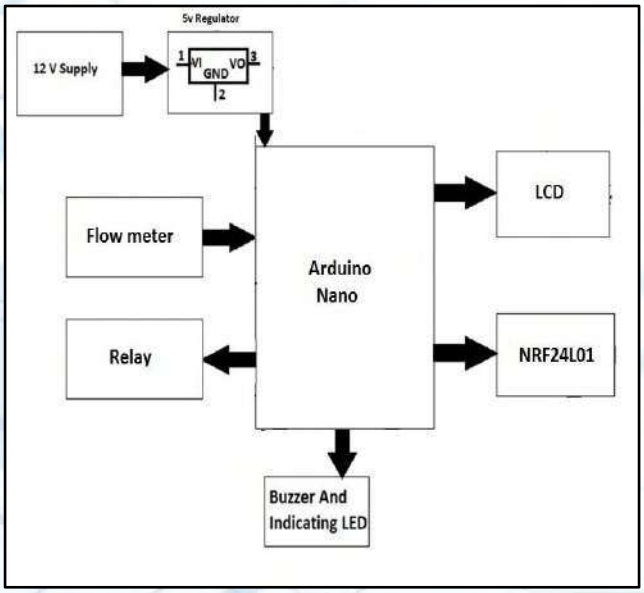

Fig 1: Transmitter Block Diagram

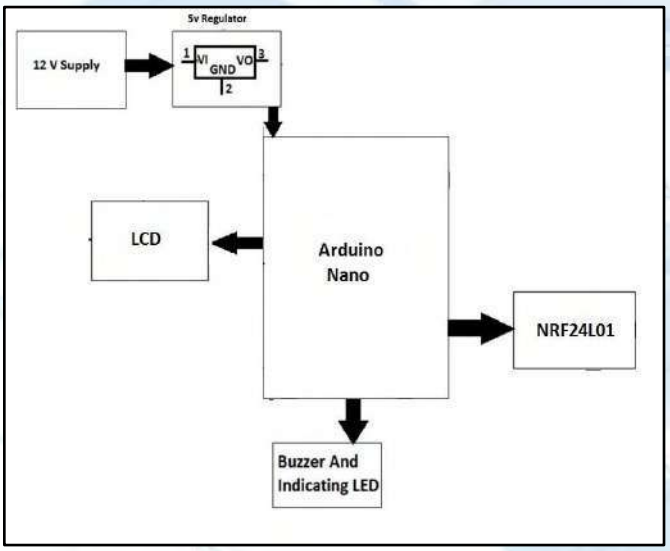

Fig 2: Receiver Block Diagram

VII. IMPLEMENTATION

There is power supply of 230V. It is stepped down to 12V. This main circuit board contains a bridge rectifier circuit which rectifies this 12V ac supply. There is a capacitor for filtering this signal. There is a voltage regulator 7805T. It is followed by another filtering capacitor of 1 microfarad. Then there is a power supply indication led and a current limiting resistor. This makes up the circuit for power supply.

8 bit AVR family microcontroller is provided on the main board. It needs clock. So for that a crystal oscillator is provided. Two 22pf capacitors are connected to the oscillator and are then grounded. This will generate a clock. Pin number 3 is reset and 1 capacitor and 1 resistor is connected and power is given to act as a power reset. As soon as power supply is turned on, controller will reset and program will start from the 0th memory location. There are 4 ports of this microcontroller. At port 0 we are giving connection for the LCD. LCD is 16*2 which can store 16 characters. Preset is given to change the brightness of the lcd. There is a spikes suppressor capacitor which will ground the spikes present in the supply. Port 0 is open collector. There is a pull up resistor network. It pulls up the voltage of all the pins of the controller upto 5V i.e. it provides sufficient voltage for driving the current. At port 1 there are 2 switches which are also pulled up by 2 resistors. 1st switch is given to the bell button and 2nd to the IN/OUT button. Port 1.0 and 1.1 are used for this purpose. Port 2 is the output port. The output from the port 2 is given to the ULN2803 IC. This is a relay driver IC. It amplifies the signal and output of this IC is given to the buzzer to trigger it. The next main and important thing is LoRa module. The LoRa trans-receiver module has an antenna that acts as a resistance to avoid damaging the module.

The NS pin on the LoRa module is a chip select pin, which is set to low or high depending on the number of LoRa modules are use. Since we are using two modules for our application, we set it to high. The VCC and GND of the LoRa module are

connected to the VCC and GND of the microcontroller respectively. Clock(SCK) to provided to the LoRa module using pin D13 of the microcontroller. The EN pin of the LoRa module is connected to D10 of arduino to enable the module. The LoRa module is reset using pin D9 of the microcontroller. MISO and MOSI are connected to pins D12 and D11 respectively.

Fig 3: Transmitter Side

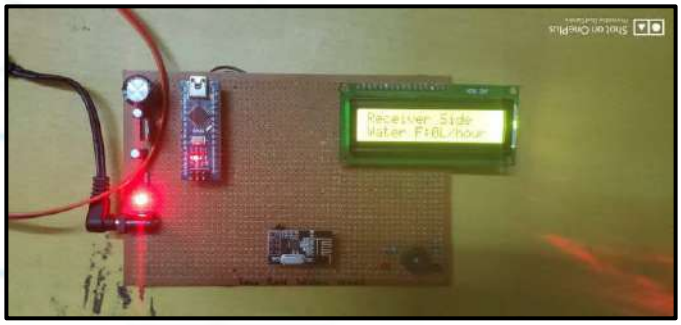

Fig 4: Receiver Side

VIII. CONCLUSION

The input traced by the sensors is collected and sent back via the Arduino NANO, and the data, using the LoRaWAN trans-receiver, is transmitted to the base station where this data is stored or analysed. The received data is confirmed and displayed on an LCD Display. This precise data is then stored for future reference or to make desired changes to the system. We expect the system to provide accurate readings and to be implemented globally. If a system like this is ideally executed, it can eradicate many problems, making the process of collecting data less painstaking while also making sure it stays under budget. The design concept is microcontroller based so the security for the system is maintained. This project is implemented To work towards obtaining meter readings with high accuracy. To make the system cost effective and easy to access as well as use.

REFERENCE

[1] An Integrated IoT Architecture for Smart Metering using Next Generation Sensor for Water Management based on LoRaWAN Technology: A Pilot Study (Vlastimil Slaný , Radek Martínek)

[2] India Smart AMI Water Meter LoRaWAN™ White paper, 2018(Ali R. Hosseini, CEO / Director of SenRa Tech Pvt. Ltd.)

[3] Low-cost water metre reading system based on LoRa technology (Dinesh Bhoyar , Barkha Katey, Manish Ingle)"

LPG Gas Monitoring,leakage and alert system

Menon Namita Vishwanathan , Nambiar Surabhi Saji , Fheba Mariam Varghese , Biswal Kajol Niman

***Abstract*- Booking an LPG gas cylinder has always been a boring task for many. Also keeping reminders of gas bookings and talking to booking personnel is tedious and time consuming. So, in our project we are planning to tackle two big problems which can be solved with the help of Electronics and embedded software technology using GSM/GPRS technology. Our system consists of a 10Kg Load cell which will be continuously measuring the weight of the cylinder. Over time, the weight of cylinder refill will get low as LPG gas is consumed. Once weight is below a certain limit Our Microcontroller will send commands to GSM modem in order to send SMS of a particular format to the GAS booking agency and orders the new refill of LPG gas. Another problem which ls of gas leakage hazard is also solved by using the LPG GAS leakage sensor MQ-4.** If **a gas leak is detected by a microcontroller, then an Alert message will be sent to the user and an emergency message will be sent to fire services. So, the overall project will help to solve ultimate problems related to LPG Gas cylinder booking and its leakage hazards.**

I. INTRODUCTION

The main objective of this project is to implement a system where it checks the level of gas in the cylinder along with a leakage detection system plugged in the system to notify via SMS to the user or owner of the system. This project also provides the ease to avoid checking in timely durations and automatically books the cylinder needed in the household orany other industrial area within its limitations. The main aim of our project is to solve our problems through developing a system which continuously monitors the leakage of LPG gas and alerts users regarding leakage to avoid major accidents. If temperature goes above threshold, then it detects fire and takes necessary actions like opening the window, turning on the exhaust fan. In addition to leakage detection, a feature of sending SMS to the user for the booking of cylinders is added. System continuously measures the weight of the cylinder and sends SMS if weight is below threshold.

II. LITERATURE REVIEW

1. "SMART LPG MONITORING & AUTOMATIC GAS BOOKING SYSTEM" by Shashi Kumar, Pranita Padole, Shweta Salve, Aditya Sachdev and Prof, M.P. Wankhede. International Research Journal of Engineering and Technology (IRJET). ISSN:2395-00 72, Volume-5, Issue-04, April 2018. Arduino AT328 is the microcontroller used for developing the prototype . The system detects the leakage of the LPG using MQ-2 gas sensor and alerts the consumer about the gas leakage by sending SMS. The proposed system uses the Text Local API to alert the person about the gas leakage via SMS and status of the cylinder.
2. "AUTOMATIC LPG GAS MONITORING AND BOOKING THROUGH ANDROID APPLICATION" by S.Abirani, T.Pr iya, L.Rohinilswarya, M.Thaila, S.Priyanka. International Journal of Innovative Technology and exploring Engineering (IJITEE). ISSN:2278-3075, Volume-8, Issue- 6S4, April 2019. Android application is used to alert the user for LPG spillage and execution of security against gas spills. When spillage is distinguished by sensor at that point promptly fumes fan will be turned on and, in the meantime, it educates the client about the gas spillage by sending the alarm message.
3. "A SURVEY ON LPG LEVEL MONITORING, BOOKING & GAS LEAKAGE DETECTOR" by Madura Ghule, Koma! Hole, Sayali Pathak, Nishigandha Patil, Prof. Santosh A. Darade. International Journal of Innovative Research in Computer and Communication Engineering (TJIRCCE). ISSN:2320-9801, Volume-5, Issue 11, November 2017. The system detects the leakage of the LPG using gas sensor MQ-6 and alerts the consumer about the gas leakage by sending SMS (Short message service) to user on android application using IoT and at the same time cautions the client utilizing a GSM module, while initiating the alert and fumes fan. The extra preferred standpoint of the framework is that it ceaselessly screens the level of the LPG introduced in the chamber utilizi ng weight sensor and naturally books the barrel utilizing a GSM module. The proposed system uses the GSM Modem to alert the person about the gas leakage via SMS and status of automatic cylinder booking.

III. BLOCK DIAGRAM

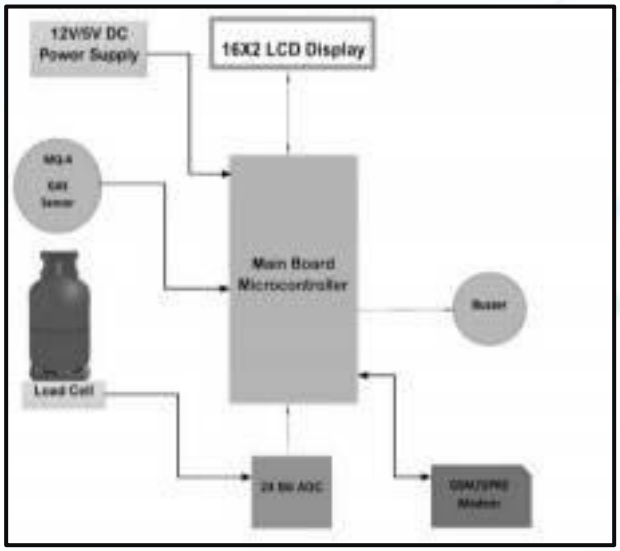

Fig. 1 Block Diagram

IV. HARDWARE COMPONENTS

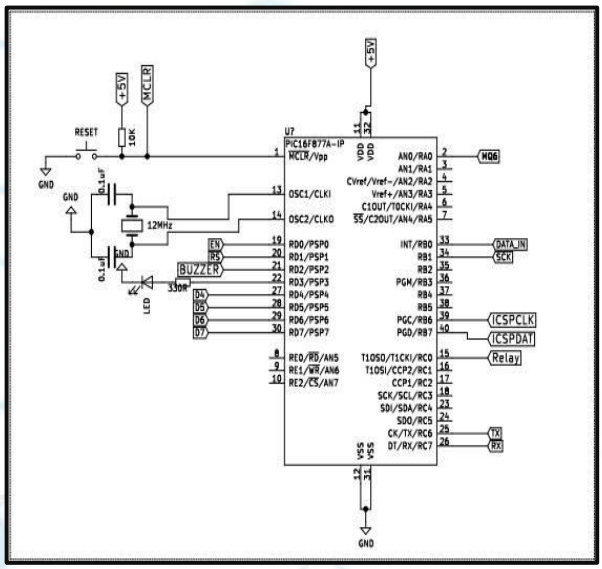

Fig. 2 PIC16F887A microcontroller

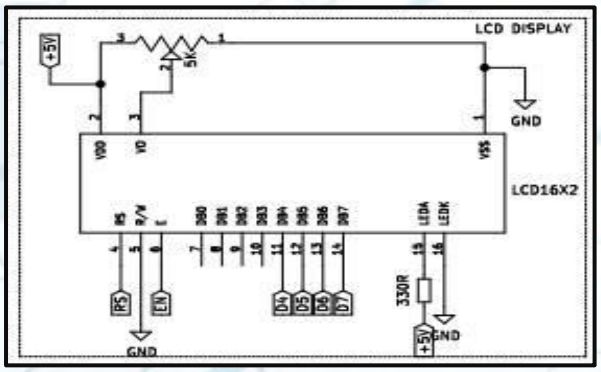

Fig. 3 LCD display

3. Wheatstone bridge

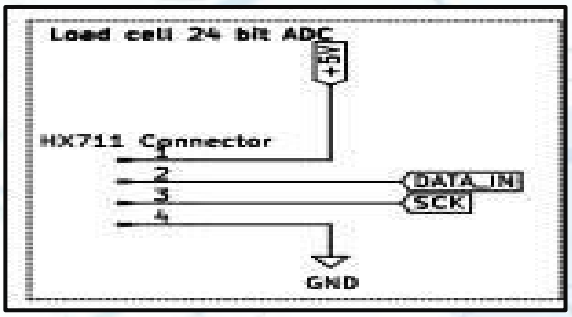

Fig. 3 24-bit load cell amplifier ADC HX-710

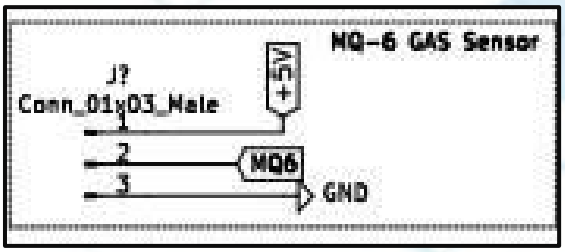

Fig. 4 MQ-6 LPG gas leakage sensor

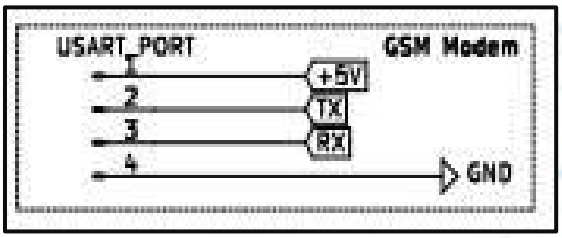

Fig. 5 SIM800 GSM Modem

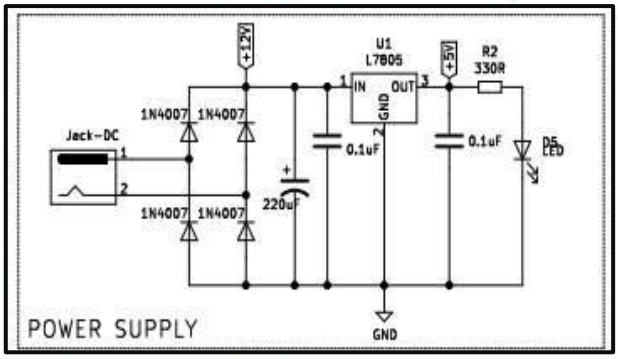

Fig. 6 Power supply of 12v

V. SOFTWARE COMPONENTS

1. MPLAB-X IDE for Embedded C programming
2. Proteus for Simulation
3. Putty software for debugging the serial data fromGSM/GPRS Modem
4. CAD soft eagle for PCB designing

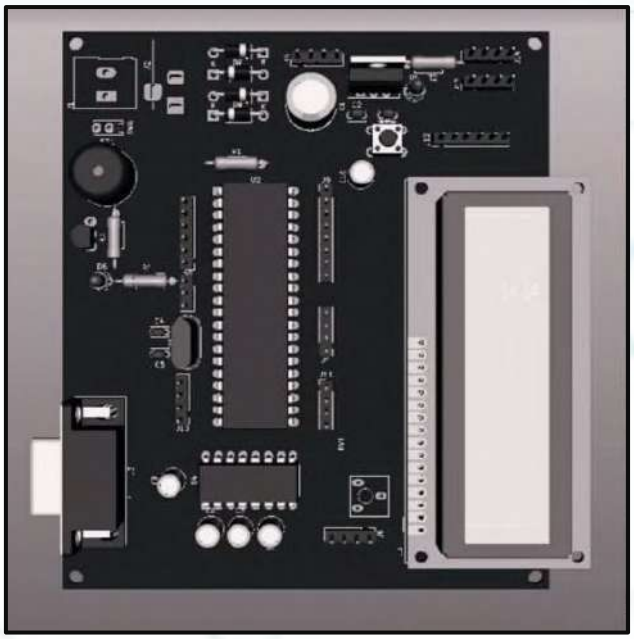

Fig. 7

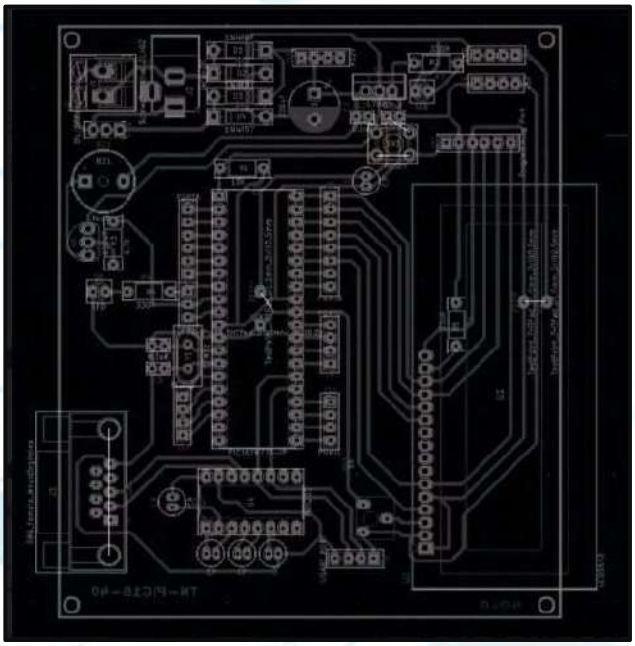

Fig. 8

VI. RESULTS

As a precautionary alert system device this electronic system actually provides the weight of the cylinder which is the main input of the system. The alterations in this weight actually triggers the buzzer alert system and sends an SMS to the user's mobile phone. Also the gas sensor, when reading the amount of gas more than the limit set in the system, sends an alert message to the user's mobile phone. This is also customized in a way that the decrement of the gas cylinder under the standard amount will automatically send the user's primary details to the gas booking agency.

VII. CONCLUSION

In developing countries like India where there have been instances regarding huge gas tragedies, a safety system should be economically befitting and suffice the emergency actions in critical conditions to actually avoid mishaps. This product actually extrapolates our idea and stimulating planning regarding- Safety should never be an option. Our economic product makes it easy for the buyers to invest for life long safety.

ACKNOWLEDGMENT

We are humbly obliged to many people who se though t provoking inputs and assistance has cultivated into this project. Firstly, we would like to thank Dr. Sandeep Joshi, our Principal for granting us this opportunity to work on this particular project and for providing us with all the valuable resources.We would like to thank Dr. Avinash R. Vaidya, our Head of the department for his affirmative support and guidance during the course of this project.We would like to thank our Guide Prof. Rubina A. Shaikh for her expertise, instructions and suggestions that have served as the major contribution towards the completion of our project.Special thanks to our co- guide Mr. lshmeet Singh Riat for his helpful guidance that helped us to complete this project and make it successful.

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Medicine & Food Delivery Robot Using RFID

Suraj Kumar B. Maiti, Sachin Brahmadev Mahato, Chetan Balu Gaikwad, Dhiraj Devaram Kathra

***Abstract*- In this paper we used line follower technique along with RFID tag to create Food & medicine delivery robot. Line follower is being used because it can move automatically once the system is installed in the robot. It is affordable, easy to build and can also be used for long distance. RFID was added in the system to give instruction to robot to stop at a particular location.**

***Keyword* – DIY Arduino, RFID, IR sensor.**

I. INTRODUCTION

The goal of this project was to build a affordable robot which can successfully deliver medicine and food to the patients. So that small size clinics and hospitals can afford them and reduce the risk for their staff members in this pandemic.

The use of robots in healthcare represents an exciting opportunity to help a large number of people. Robots can be used to enable people with cognitive, sensory, and motor impairments, help people who are ill or injured, support caregivers, and aid the clinical workforce.

Today the entire world is facing a major epidemic with a wide spread of coronavirus originated from Wuhan, China. The majority of countries are under the lockdown facing a severe disaster of losing economy and people on a large scale. In order to reduce the severity of virus spread, there is huge need of deploying Robots as they stand in the front line saving the human labor to get infected from the coronavirus as these are highly immune to corona virus. In this view, different types of research and innovation works are to be carried out to safeguard the people and serve the corona affected patients. Delivering food and medicine to covid 19 patients or other highly infectious disease pose some level of risk. In various hospitals nurses became covid positive due to this task. To reduce this risk various companies and organizations started making robots to complete this simple but very important task. More and more advance robot are launched with variety of features

II. WORKING

The Microcontroller ATMEGA 328 works as CPU of the project. When switch is used to start the robot the microcontroller sends output to the LCD to display options to select rooms. Rooms can be selected using 3 input switches. It tells the microcontroller which room it needs to deliver medicine. Once the robot starts it uses line following technique to follow the black line.

Line following technique uses a feedback mechanism to follow the black line. For this the robot has 2 IR sensors.

IR sensors keep radiating light which is absorbed by the black line. As long as any one of the sensor comes in contact with white surface the light is reflected back and is detected by photodiode which in turn sends input to microcontroller. When the left IR sensor detects white surface it sends input to microcontroller. Microcontroller sends output to motor driver which stops the right wheel causing the robot to take a right turn. Similarly, when the right IR sensor detects white surface it sends input to microcontroller. Microcontroller sends output to motor driver which stops the left wheel causing the robot to take a left turn. When both the sensor detects white surface the robot stops.

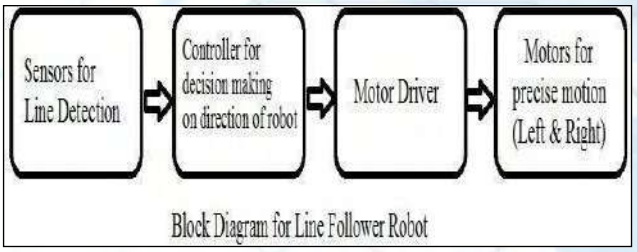

Figure 1 Block Diagram for line follower robot

In our project while effectively following black linea RFID reader is used to detect RFID cards to identify the rooms at which medicines need to be delivered. The RFID cards information is stored using the microcontroller along with its room number. When the RFID reader detects as RFID card it reads its information and matches it with the information stored in microcontrollers memory to see if itis the selected room or not.

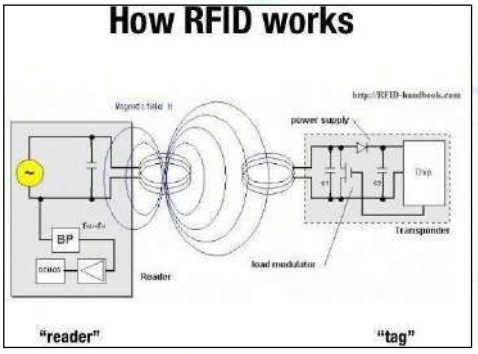

Figure 2 Working of RFID

The robot effectively avoids stopping in unselected rooms. When the robot detects selected room it stops for 5 seconds and buzzer beeps to let the patient know that his medicines have arrived. After delay of 5 sec the robots start moving towards next room.

III. RELATED WORKS

Research into autonomous driving using smaller robots typically follows one of two approaches. In the first approach a mathematical model of the vehicle and its surroundings is generated, tested in simulation, and then applied to a robot built specifically for the purpose. In the second approach a

combination of a visual serving system and a kinematic model is used, again the robot is typically designed around the solution technique. Due to the size of these robots, the processing resources available are quite limited so simpler models and techniques, such as visual serving, are used to reduce the processing load.

During the Ebola outbreak that began in 2014, the White house office of science and technology
policy and National Science foundation, organized workshops to identify various ways in which robots
could make a difference. Guang-zhong yang, dean of the institute of medical robotics at Shanghai Jiao
Tong University, said during the epidemic, we really need to ensure that we have a global orchestrated sustainable approach to robotics research. Robots could occupy the place of health workers in certain circumstances, like administering tests who are infected with coronavirus and silent infection is the biggest problem. It helps that robots don't get sick and unless they run out of power, they do not sleep-Yang said. Russel Taylor, a roboticist at johns Hopkins University said sending a remotely operated robot to interact with the patient instead could dramatically reduce the risk. After all, robots are immune to biological pathogens and can be efficiently disinfected with harsh chemicals. Bill Smart, a roboticist at Oregon State University, explained, "You're not directly interacting with the patients where it could go really wrong if the robots breaks, and you're also not denying the patient human contact. He also said robots could still help minimize the risk for front line medical staffers, use of drones by IOT to transport medicine within the hospitals or using robots to deliver meals.

Sawai Man Singh (SMS) Government Hospital, Jaipur, tested locally-manufactured humanoid 'Sona 2.5' to deliver food and medicines to Coronavirus patients. Tiruchi Software Company, unveiled its Zafi and Zafi Medic robots on March 29 at the city's Mahatma Gandhi Memorial Government Hospital, equipped to deliver food and medicines to COVID- 19 patients under quarantine. While Zafi has a payload of eight kilograms and can act as a medical assistant for contact- less consultations, Zafi Medic is an all-terrain robot that can carry meals and supplies of up to 20 kilograms, and can be controlled from a range of one kilometer with live Zafi robot gives key features such as:

April 3, Kochi-based Asimov Robotics debuted its KARMI-Bot, an autonomous robot that performs functions similar to those of Zafi, but with the added feature of being able to disinfect the premises using ultra- violet radiation. The Karmi Bot will help in serving food and medicines to the COVID- 19 patients in the hospital. The autonomous robot will also be able to collect trash generated by the patients, perform disinfection functions (UV based and targeted disinfectant spraying) and even enable video calls with the doctors. It can carry a payload of 25kg and reach maximum speeds of 1 m per second.
Bengaluru based Invento Robotics launched a food and medicine delivery robot. As per a company release, the autonomous robot can navigate the topography of a hospital once programmed. The TUG autonomous robot works in hospital 24/7 moving materials and clinical supplies. It keeps hospital staff focused on patient care, provides surge capacity during peak demand and improves the overall efficiency of logistics. TUG brings ease to work.

IV. APPLICATION

Medicines are delivered with a higher accountability via an integrated chain of custody systems Automated delivery enables pharmacy technicians to focus on performing high-value tasks such as mixing IVs without committing any mistake.
Delivery of medicines can be more frequent and nurses can concentrate on caring for patients rather than worry about missing medicines and supplies.
Automated delivery brings down costs and improves on-time reliability

V. FUTURE SCOPE

This project includes designing and fabrication of food & medicine delivery robot to create safer environment for people taking of covid patients, affordable robots for common populace and making the robot easy to use so that even common people could operate.
With new applications and features, healthcare robots are expected to increase the quality, operational efficiencies, accuracy, and safety in healthcare service delivery. The advancement in AI will provide a new dimension to robotics. As expected the combination of artificial intelligence and robotics will make the operation faster and much safer. Apart from this, data analytics, improvement in hardware and software systems will diversify robots' scope in other healthcare fields. The investment and the collaboration between the robotic companies and healthcare providers will further boost the Healthcare robots market. However, the robots' cost and the affordability by the common person will remain the key challenges to address.

VI. CONCLUSION

The results of these Robotic applications have proven that there is a huge need and demand in emergency epidemics than human labor, which can assist along with the integration of technical personal. Due to the smart technologies like sensors, transducers, actuators, and microprocessors used in robots, drones, scanners etc., they proved in various medical, societal, shopping malls, public places, schools and colleges working effectively as they are highly immune to bacteria, coronaviruses and super bugs.

In this project different techniques were studied. After studying different techniques, the most suitable techniques were chosen to implement the project. Line follower technique with combinations of RFID tags and reader was selected to perform the required task. The medicine/food delivery robot will greatly reduce the chances of contacting highly infectious disease especially covid 19.

Multiple hospitals are already using their own medicine/food delivery robot which also have lots of additional features installed in it. Unfortunately, they costa lot.

Several new works are being done to reduce the cost. This project makes an attempt to make the robot affordable.

ACKNOWLEDGEMENT

It gives us great pleasure and immense satisfaction to present this report on our project “Medicine & Food Delivery Robot using RFID” which became possible under the guidance of our project guide Prof. Rajendra Kumar H. Khade and our project co- guide Prof. Ishmeet Singh Riar. We would like to thank our Head of Department, Dr. Avinash R. Vaidya to give us this chance to work on such a great project and improve our technical skills. We would like to thank out principal for all the support all college provided while completing the project

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Monitor and Control of Greenhouse Environment

Abhilasha Shinde, Sandhya Yadav, Mitali Shinde, Prajakta Shinde

***Abstract*— Greenhouse Environment, aims to grow plants under controlled climate for efficient production, forms a crucial a part of the agriculture and horticulture sector. In this project, we have proposed a framework that can gather the data identified with the greenhouse environment and yield status, control the system automatically according to the gathered data. The framework is simple to set up, micro-controller-based circuit that observes and records the amount of humidity, soil moisture, temperature, and light intensity of the greenhouse environment using temperature sensor, moisture sensor, humidity sensor and light sensors and the parameters are incessantly altered and managed to optimize them in order to attain maximum seed growth and hence productivity. All the data gathered is sent to the user interface/web application to analyze and represent the data graphically making it easier to understand. It is a closed-loop system which will execute control action to regulate temperature, humidity, candlepower and soil moisture if any unwanted errors (high/low) occur.**

I. INTRODUCTION

The primary idea of the system is to automate the plant cultivation process inside the greenhouse to attain maximum production. Monitoring and controlling the greenhouse environment play a vital role in production of crops in the greenhouse. To effectively control & monitor the greenhouse parameters it is essential to design a monitoring and controlling system. The main idea of the system is to design a simple NodeMCU based circuit to continuously watch & readthe values of temperature, humidity, soil moisture and sunlight of the normal environment that are constantly changed and controlled in order to get maximum development of plant.The proposed system in this project is a cost-effective method and delivers high quality crop production, the system offers a path towards sustainable and more efficient plant cultivation by advancements of technologies, productionsystems, and software. Every year, automation technology becomes additional subtle, and what was latest simply a number of years ago can become commonplace and cost-efficient soon. The human part will invariably be a basic side of managing a farm, however absolutely autonomous vehicles and farm instrumentation are returning.

II. LITERATURE SURVEY

In India greenhouse technology was employed only during 1980's and it had been mainly utilized for research activities. In India, greenhouse cultivation takes place especially in Maharashtra, Uttarakhand, Karnataka and Jammu and Kashmir. Greenhouses are being constructed in the Ladakh region for extending the season of vegetables from 3 to eight months. In the NorthEast, greenhouses are being builtessentially as rain shelters to permit off-season vegetable production.

Use of technology within the field of agriculture plays a vital role in increasing the production as well as in reducing the manual work. Research for increasing agricultural production by making use of completely different controllers like PIC microcontroller,8051 controller, ARM 7 etc or additional observance done by different communication technology like Zigbee, Wireless sensor network (WSN), even using GSM.

A simple Raspberry Pi 3 based circuit is designed to continuously observe & read the values of Soil moisture, Humidity, Temperature and light. The system does this with the help of wireless sensor nodes[1].

A WSN was implemented by deploying wireless sensor nodesin a greenhouse with temperature, humidity, moisture light, and CO_2 sensors[2]. To control the environmental factors, the used microcontroller is programmed to regulate the parameters according to pre-set values, or manually through a user interface panel.

A ZigBee based energy effective environmental monitoring alerting and controlling system centered on ZigBee and ARM7 processor, various sensors and ZigBee communication module. Sensors gather various physical data from the sector in real time and send it to the processor and to the end user via ZigBee communication[3]. Then necessary actions are undertaken to perform action on behalf of people to reduce or eliminate the need of human labour.

III. PROPOSED SYSTEM

To enhance the growth of plants, the main requirement is to monitor various environmental parameters like temperature, humidity, light intensity and soil moisture and providing the adequate amount of these parameters by automatically controlling the components like exhaust fan, bulb and water pump. The monitoring and controlling of these components is done by the main controller NodeMCU. The user will be able to view the changes with time of the greenhouse parameters graphical representation and can also control the components manually with the help of force mode on web application. The proposed architecture is shown in Figure 3.1.

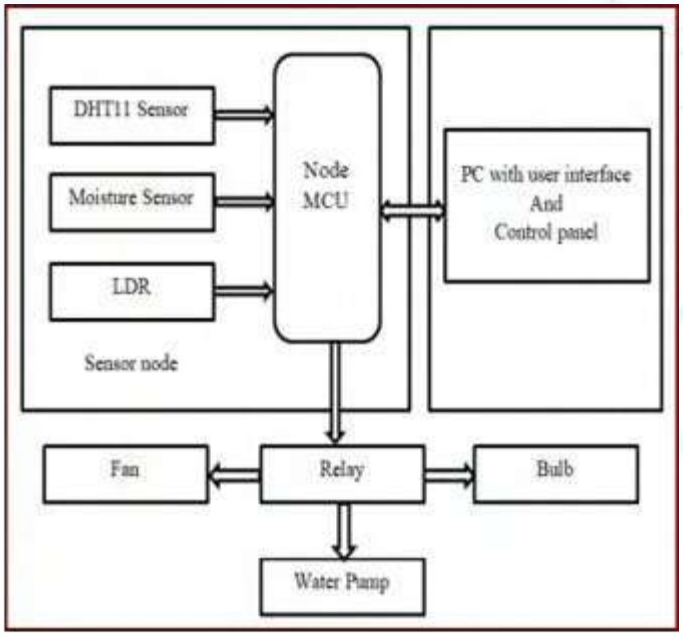


Fig 3.1

Following is the description of different components used in the system :

A. Node MCU

Node MCU is an open source software and improvement package that runs on the ESP8266 Wi-Fi SoC from Espressif Systems and hardware which is based on the ESP-12. From the NodeMCU, the data will be sent to the database and user can view the information on the users interface.

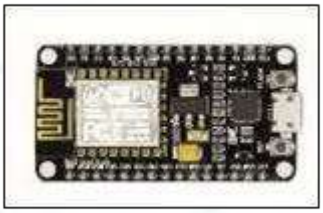


Fig 3.2

B. Soil Moisture sensor

The Soil Moisture Sensor (Figure 3.3) utilizes capacitance to check the dielectric permittivity of the joining medium. The sensor makes a voltage concerning the dielectric permittivity, and everything considered the water substance of the soil.

Fig 3.3

C. LDR

LDR (Figure 3.4) measures illumination level of the greenhouse. The resistivity of LDR is directly proportional to the amount of light absorbed. When light intensity is lower than a specified level, the system turns on the artificial light. When the light intensity comes to the acceptable range, the system turns off the artificial light.

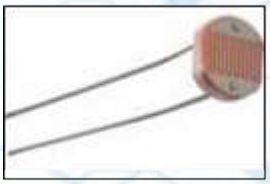


Fig 3.4

D. DHT11 Temperature and humidity sensor

Air temperature and humidity is essential factor to analyze the growth of plant. It has capacitive humidity sensing element for measuring humidity. The change in capacitive and resistive values are detected and the IC changes these values in digital form.

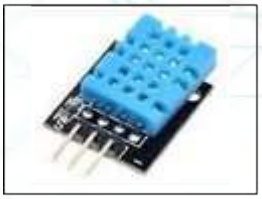


Fig 3.5

E. Relay Module

Relay module is used to control appliances. When the signalport is on low level, the signal lights up and transforms the electrical signals by light and can isolate input and output electrical signals.

Fig 3.6

F. Mini Water Pump

A submersible mini water pump is utilized to provide waterto the greenhouse. When the moisture level reaches below the required value of moisture in the soil, the pump is kept on until the moisture level reaches the threshold value of moisture.

G. Bulb

Artificial light i.e. bulb is used to provide optimum illumination for the plants.

H. Exhaust Fan

Exhaust fans can move a substantial volume of the hot plant outlet and pull outside air in through the back vent.

IV. WORKING

The proposed framework with the intention to almost display and manage the small-scale climatic parameters of a greenhouse on a typical premise.

At the factor whilst any above – stated climatic parameters move a safety restrict which has to be stored as much as stable the yields, the sensors feel the extrude and the node MCU reads this from the facts at its information ports, being through the gateway PC with person interface.

When the temperature reaches below the lower limit of desired temperature range, the coil is turned on. When the temperature goes beyond the upper limit of temperature, the cooling fan is turned till the temperature is reached the desiredvalue.
For light sensing, the circuit uses a 10kohm resistor tied with +5V and LDR. When the light intensity falls below optimum value i.e. 500 lumen, the relay module is turned ON andartificial light is used.

Soil moisture sensing circuit with a grove moisture sensor is used to check soil condition. The voltage value is 0V for dry soil and above 3.5V for slurry soil. The optimum value will be preset using a microcontroller. The microcontroller will check the value and the motor is controlled accordingly for irrigation. Water supply is stopped after reaching desired value.

All the sensor data is sent to the user interface/gateway through Node MCU where the data is analyzed. If the readings are undesired then it allows the user to manipulate (ON/OFF) the fans/light/water pump manually or automatically with the help of toggle buttons on web page.

Fig 4.1

V. SOFTWARE IMPLEMENTATION

To host the website pythonanywhere.com is used which is an online IDE which is based on python programming language and is very helpful in deploying of web applications written in python. All the sensor data is sent to database and is represented in form of graph for easy analysis. Python anywhere.com has inbuilt MySQL database. MySQL is a suite of interrelated computer programs designed to manage message processing and database update in a tightly controlled manner which is used to store data. All the web pages are fundamentally designed using HTML and styled using CSS. The server is programmed using python (flask frame work).To program NodeMCU we have used Arduino IDE, as it is open source and user friendly.

VI. RESULTS AND DISCUSSION

A. User Interface

Fig 6.1

B. Parameter Graphs

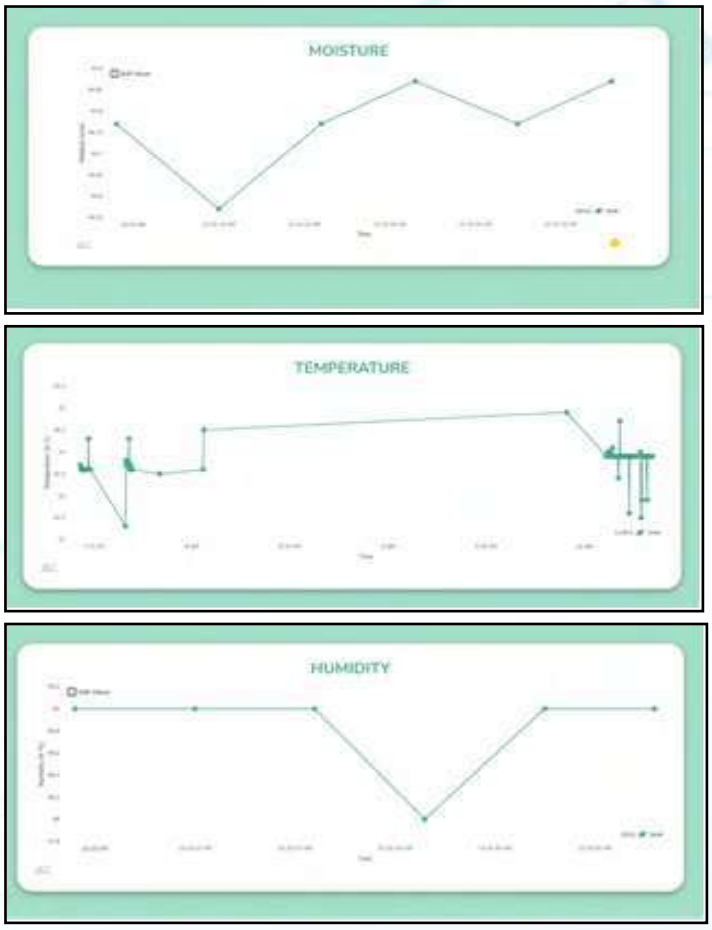
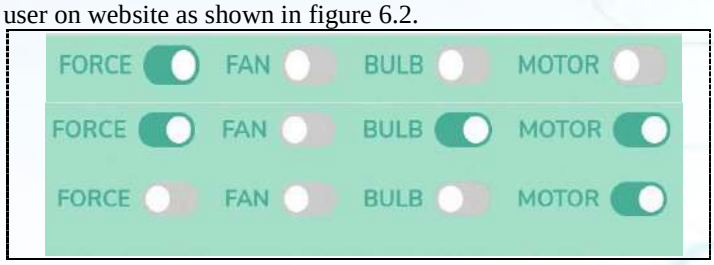
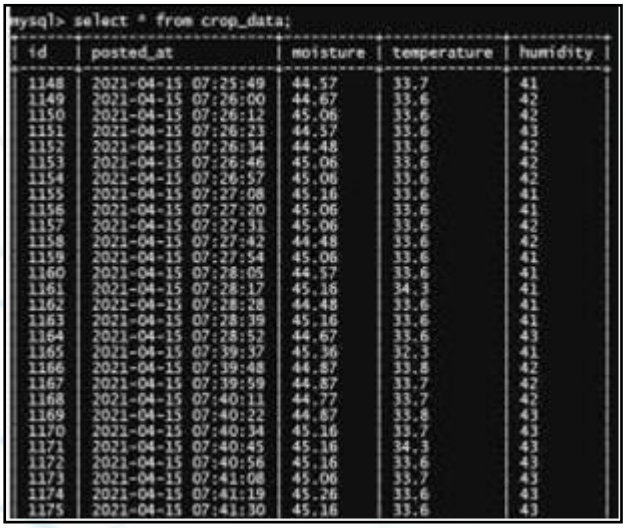


Fig 6.2

The changes in various parameters is continuously recorded and the graphical representation of the same can be observed by the user on website as shown in figure 6.2.



Instructions can be sent by the user for controlling the components with the help of toggle buttons available on the website, as shown in figure 6.3. If the user enables the force mode they can directly control the devices without worrying about the sensor values .When the force mode is off the system runs automatically.



```
mysql> select * from crop_data;
+------+---------------------+----------+-------------+----------+
| id   | posted_at           | moisture | temperature | humidity |
+------+---------------------+----------+-------------+----------+
| 1148 | 2021-04-15 07:25:49 | 44.57    | 33.7        | 41       |
| 1149 | 2021-04-15 07:26:00 | 44.67    | 33.6        | 42       |
| 1150 | 2021-04-15 07:26:12 | 45.06    | 33.6        | 42       |
| 1151 | 2021-04-15 07:26:23 | 44.57    | 33.8        | 43       |
| 1152 | 2021-04-15 07:26:34 | 44.48    | 33.8        | 42       |
| 1153 | 2021-04-15 07:26:46 | 45.06    | 33.6        | 42       |
| 1154 | 2021-04-15 07:26:57 | 45.06    | 33.6        | 42       |
| 1155 | 2021-04-15 07:27:08 | 45.16    | 33.6        | 41       |
| 1156 | 2021-04-15 07:27:20 | 45.06    | 33.6        | 41       |
| 1157 | 2021-04-15 07:27:31 | 45.06    | 33.6        | 42       |
| 1158 | 2021-04-15 07:27:42 | 44.48    | 33.6        | 42       |
| 1159 | 2021-04-15 07:27:54 | 45.06    | 33.8        | 41       |
| 1160 | 2021-04-15 07:28:05 | 44.57    | 33.6        | 41       |
| 1161 | 2021-04-15 07:28:17 | 45.16    | 34.3        | 41       |
| 1162 | 2021-04-15 07:28:28 | 44.48    | 33.6        | 41       |
| 1163 | 2021-04-15 07:28:39 | 45.16    | 33.6        | 41       |
| 1164 | 2021-04-15 07:28:52 | 44.67    | 33.6        | 43       |
| 1165 | 2021-04-15 07:39:37 | 45.36    | 32.3        | 41       |
| 1166 | 2021-04-15 07:39:48 | 44.87    | 33.8        | 42       |
| 1167 | 2021-04-15 07:39:59 | 44.87    | 33.7        | 42       |
| 1168 | 2021-04-15 07:40:11 | 44.77    | 33.7        | 42       |
| 1169 | 2021-04-15 07:40:22 | 44.87    | 33.8        | 43       |
| 1170 | 2021-04-15 07:40:34 | 45.16    | 33.7        | 43       |
| 1171 | 2021-04-15 07:40:45 | 45.16    | 34.3        | 43       |
| 1172 | 2021-04-15 07:40:56 | 45.16    | 33.6        | 43       |
| 1173 | 2021-04-15 07:41:08 | 45.06    | 33.7        | 43       |
| 1174 | 2021-04-15 07:41:19 | 45.26    | 33.6        | 43       |
| 1175 | 2021-04-15 07:41:30 | 45.16    | 33.8        | 43       |
+------+---------------------+----------+-------------+----------+
```

Fig 6.4

All the sensor data is saved on the MySQL data base. The database has values of moisture temperature humidity pertaining to particular time stamp.

VII. FUTURE WORK

The performance of the system is often further improved in terms of the operating speed, memory capacity, and instruction cycle period of the micro controller by using other controllers. The amount of channels are often increased to interface more number of sensors which is feasible by using advanced versionsof micro-controllers.

VIII. CONCLUSION

The framework is the simple controlling and observing ecological parameters in greenhouse by Node MCU esp8266. The data is recorded and can be observed by user remotely. Recorded data can be very useful for future references.

An emerging agricultural system industry in several areas of agricultural production will end in reliable control systems which will address several aspects of quality and quantity of production. Thus, implementation in future may end in not only higher yield but lower crop prices. it'll also enable production of crops easily in artificial conditions allowing growth of seasonal crops without using an excessive amount of chemicals and fertilizers. This controlled greenhouse environment has immense potential offering a good field of study and research enabling improved crop production facilities especially in developing and undeveloped countries.

ACKNOWLEDGEMENT

We would like to express heartfelt thanks to our Project Guide Prof. Swati Patil, Department of Electronics Engineering and Dr. Avinash Vaidya, Head of Department of Electronics and Telecommunications Engineering, for providing us with needful assistance and guidance wherever required. We are thankful to Dr. Sandeep Joshi, the Principal, for his support and co-operation and for allowing us to use the library and the Knowledge Centre of the Institute. We want to thank our parents for their support at various stages and assistance.

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RFID Canteen Management System

Shruti Ashok Bhosale, Prajakta Maruti Gadage, Saurabh Dharma Patil, Snehal Dharmendra Bhoir
Prof.Sweta Waghmare(Guide)

***Abstract*-- We are currently in the information and technology revolution, it will greatly change our lives and possibly redefine its meaning to humans. Automation can reduce errors and help improve accuracy and efficiency. At the same time, it turns out that it is more correct and makes life easier. The aim of the canteen management system is to automate the traditional manual system for better use in the organization. Nowadays, people have very little time to go to the canteen and wait to order and receive food. Thus, with the help of computer equipment and webbased software, valuable data can be stored for longer periods of time with easy access, retrieval, update and handling as a whole. The canteen management system uses web-based software and a Radio Frequency Identification (RFID) system accessible from anywhere on the Internet. It allows an error-free calculation, a low development cost, a secure, reliable and faster service for the management of the system. It also provides easy data sharing, collaboration, easy installation and maintenance. Web-based software has more centralized security capabilities than cloud-based systems. User valuable time is reduced by facilitating cashless payments. The main advantage of wireless and contactless RFID tag systems is that they are organically inefficient. So that person in the canteen focuses on their other activities rather than record keeping.Since most payments are made online via virtual currency, it provides a reliable way to store records and ensure the safety of funds. Is is very Benefited for canteen owners. We accomplish this automated process by using Radio frequency identification (RFID) cards, RFID readers, smartphones and application hosting.**

Index terms: Hardware Design,RFID,System Analysis, Software Design.

I. INTRODUCTION

Every day, modern people await the arrival of new devices and technologies to simplify their daily lives. In College campuses, a canteen facility is provided. Students, academic staff or employees use this facility. In previous systems, cash payments were the only method of payment. The main disadvantage of the cash payment system is that the user must always carry cash.During lunch break there is a huge crowd in the canteen.These system saves the students time the didn't have to wait in the queues for longer time.The canteen owner have to keep the details of the orders every day. This method has limitations and the disadvantage of keeping paperwork, but in this cafeteria, students or staff use passive RFID tags to pay bills. Provides efficient and accurate College canteen management functions. It also manages dayto-day activities and simplifies student and Employees accounts. Each employee's and students can use RFID tags in this system. The system provides a Login Credentials for Students and the employees to purchases food, adds and deletes orders, and generates invoices.User will be notified when the accont balance is insufficient. Everyone has their own unique card and identification. The administrator does not need to enter an entry in the registry. This problem can be avoided on this system. General order information will be saved in Google Sheets.

1.1.Objective of Project:

The implementation of RFID technology in Campus canteens will be faster than the entire canteen management process. Manual processes in the canteen and food ordering and payment will be completely eliminated, thus saving time and providing a very realistic output.Man Power requirements is also reduced. Compared with the timeconsuming data input in a manual process, RFID technology saves a lot of time and improves operational efficiency and avoid input errors due to manual operation. Reduce labour costs to achieve value-added functions.

1.2 Existing System

The existing system uses the traditional canteen management system. It is not an automated system. Traditional canteens use cash for payment. This situation only applies to small restaurants. Users should always carry cash. The system also wastes a lot of time for users and people in the dining room. Canteen staff is responsible for manual book keeping, paper work, data entry and customer service delivery. This increases the crowd in the cafeteria. In many restaurants, restaurants also use biometric restaurant automation systems to help. However,the system is more Complex, requires more time, has less response time and cannot work efficiently.

1.3 Proposed System

In order to effectively solve the problems faced by the existing manual system problems, we implemented a project called "RFID Canteen Management System". The RFID card system can provide the digital coupon invoice with complete information about costs and types of meals. Authorized users can only receive digital coupons. The CMS system has a postpaid method. All users must have an RFID card to obtain the service. The card is registered with the account, and the total invoice amount is deducted from the user account. User details are stored on each RFID card so that the card uniquely identifies the customer. If the card is lost or damaged, it can be blocked by asking the administrator. The Canteen will provides visitors with RFID visitor cards. The administrator can only log in to the system software.The Administrator can accept food orders, assist, replenish, block and issue cards to people and provides employees with a secure login name.

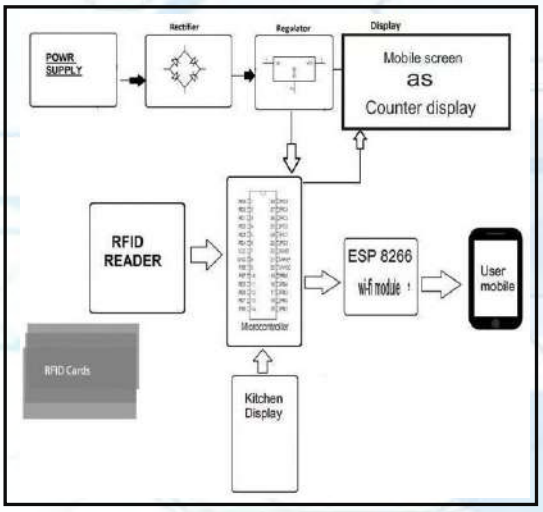


Fig 1: Block diagram of propose method

II. FEATURE OF PROPOSED SYSTEM

1. The CMS system reduces paperwork.
2. Recharging the e-wallet is very simple.
3. The system saves time.
4. The total storage time of user information is longer.
5. The calculation is correct.
6. The service is delivered quickly.
7. Authorized users can only get one service.
8. Post-payment method for canteen.
9. Time-based automatic menu.
10. Provide menus in Digital Format.

III. PROPOSED METHOD

The Block representation of project is shown in below figure. It contains several blocks such as RFID reader, RFID card, Power supply,ATMEGA328P Microcontroller,User Kitchen and Counter Display and ESP8266.

1. Canteen Management System is Designed Using ATMEGA328P Microcontroller.

2. The RFID system plays an important role in this project. RFID stands for Radio Frequency Identification. It has two components: an RFID tag (tag) and a reader. RFID tags have a unique identifier for identification. RFID readers work on the principle of radio waves. When the user scans the RFID tag to the reader, it sends an RF signal. The tag receives RF signals from the reader and is activated within the tag's frequency range. Electronic data is stored on the electronic chip of the card. Electronic data is the unique identification of each person's card. The tag has an antenna that returns a spurious signal to the reader. It encodes and amplifies the data, then sends it to the reader.

3. Thus, CMS system checks the received data is authorized or not and give the message as Card Declined if the received data from the card is Invalid and Card Accepted if the Received dada is Valid on GUI Application.

4. Google Speardsheet is Used to Store the Login,Registeration and Order Details of the User

The Flow Chart of the proposed System

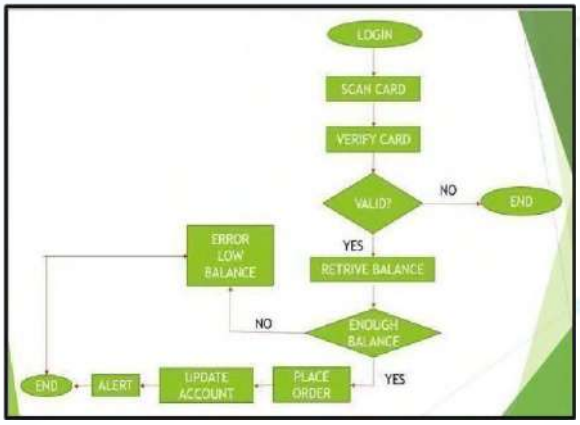


Fig 2: Flow Chart Of Proposed System

IV. SYSTEM DEVELOPMENT

4.1 RFID based CMS system

Hardware Requirement

a. Atmega328p Microcontroller

b. ESP8266 Wifi Module

c. Diodes(IN 4007)

d. Resistance(1k ohm)

e. Voltage Regulator(7805 5v)

f. Capacitor(470uf/63V)

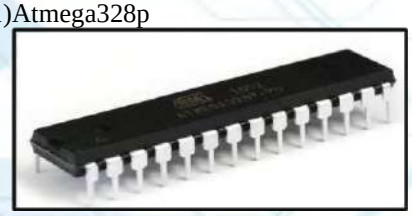
g. Capacitor

h.RFID Readter and Cards

i.Transformer Software Requirement

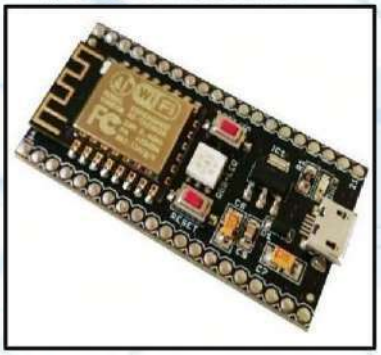
a. MIT App Inventor *4.2.Hardware Implementation*

1)Atmega328p



- Non Programable Data and Program memory
- High Performance
- Low Power Consumption.

2) ESP8266 Wifi Module



- The ESP8266 is a user friendly and cost effective device.
- Fully Static Operation

3) EM18 RFID Reader

- RFID Reader used to read unique ID from RFID tags.
- It is used to provide Internet connectivity to our Project.
- Whenever RFID tags comes in range, RFID reader reads its unique

4.3.RESULT

The Project is Implemented Successfully and Gives the Expected Output.The diagram below shows the complete prototype implementation of the proposed system.

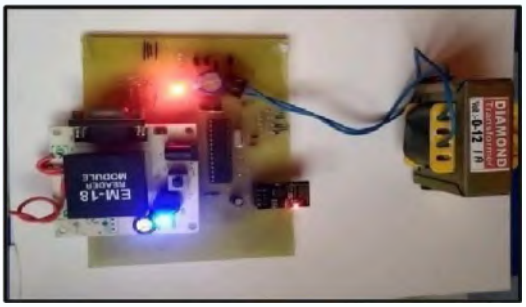


Fig 3 shows the Assembled Hardware model

When User Scans the RFID Card on the Scanner the received data will be send the GUI Application and If the Card is Invalid the Card Decliend message will be Show on the Screen.

4.3.1. GUI Application:

1. Home Page:

Fig 4: Home Page of the Application

Fig 4 shows the Home Page of the Application. User has to Enter The UserID and password given to them by the Canteen Administrator during the Registeration Process,If User enters the Incoreect UserID and Password He/She will not be able to go to the Next Page. If the User Is New,First he has to Register Himself By clicking the Register Button.All the login and the registeration details will be automatically saved in the google spreadsheet.

The Screenshot Below shows the Order and the Registeration Details Which are automatically updated in the Google spreadsheet.

	A	B	C	D	E	F	G
1	Tea	Coffee	Vada Pav	samosa	Veg Fried Rice	Chicken Fried Rice	TotalAmount
2	1	1	0	0	0	0	30
3							
4							
5							

Fig 5: Order Details

	A	B	C
1	Name	Email	Username
2	Shruti Bhosale	shruti170799@gmail.com	shruti
3			
4			
5			
6			

Fig 6: Registeration Details

Fig 7: Registeration Form

By Clicking on RegisterButton the New user will be successfully register and details will be automaticallysaved in the google spreadsheet as shown in Fig 6

2. Menu page

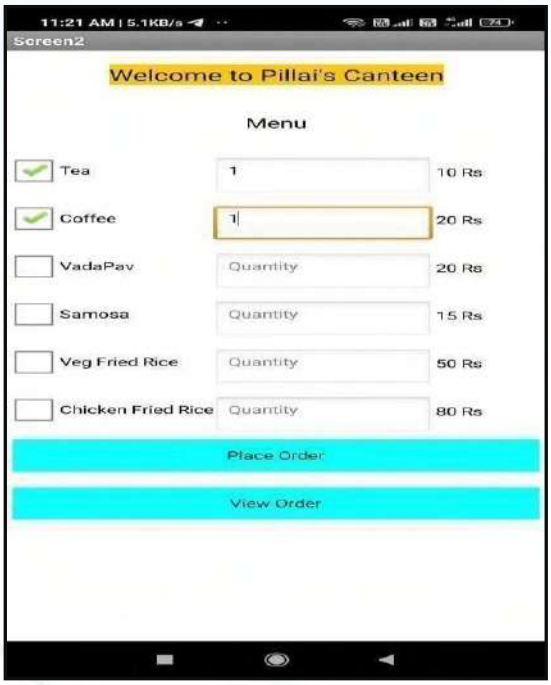


Fig 8: Menu Card

Authorized user will go to menu page where user has to select the menu and has to Enter the Quantity.After that User has to click on the 'place order' button to place the order successfully.By Clicking view order button the payment page will open and User has to make the payment for his order.

3.Payment Page

Fig 9: Payment Page

Fig 9 shows the Payment Page.User has to First Click on the 'Add and Pay Bill' Button and after by Swiping the Card on the RFID Reader user has to click on paybill button.Then If the Card is Valid the Payment will be done successfully and

If the card is Invalid it will show the message as 'Card Declined'.

Fig 10:Invalid Card Result

If the card is Valid ,Card Accepted message will be shown.

Fig 11:Valid card Result

After that By clicking on Pay Bill Button the Payment will be Done and the ‘Payment Done’ Message will be shown and the Amount will be Deducted from the A\C Balance.

Fig 12: Successful Payment Result

And Suppose if the Balance is Unsufficient Then the ‘Insufficient Balance’ message will Display.

Fig 13: Insufficient Balance Result

V. CONCLUSION

It is an important step towards smart college canteen so it’s necessary to install this high quality of Cafeteria using RFID everywhere in the country. This project aims at developing a stable, most reliable and efficient system for the people The system uses radio frequency identification to differentiate between valid and invalid users .It will overcome the problem associate with traditional canteen management system and provides scalable and reliable canteen control.By this we can change the entire canteen system. RFID technology promises an increased effectiveness and improved efficiency for business processes.

ACKNOWLEDGEMENT

We deeply express our sincere thanks to our Principal Dr. Sandeep Joshi for encouraging and allowing us to present the project on the topic “RFID Canteen Management System". We sincerely thank Head of Department Dr. Avinas Vaidya for his guidance and encouragement in carrying out this project.We would like to take this opportunity to render our heartiest thanks to our guide Mrs. Sweta Waghmare who offered us all kinds of support and helped us throughout the preparation of this project. We pay our respects and love to our parents and all other family members and friends for their love and encouragement throughout our career.Last but not the least we express our thanks to our friends for their cooperation and support.

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Smart Helmet

Sanidha Hadkar, Aditya Shetty, Siddhant Nivilkar, Ishwaree Padalkar

Abstract **- In today's era, especially in the young generation, the rate of usage of bikes (or two wheelers) is increasing. Therefore, the road mishaps are also increasing, due to which many deaths occur. Most of the deaths occur since the injured person is not given immediate medical attention or due to drinking and driving. In order to overcome these problems, "Smart Helmet" an Intelligent System based on RF Communication and IoT is developed. It ensures the safety of bike riders by implementing features like Accident Detection, Alcohol Detection, Emergency Detection, Engine Control System and Location Alert.**

Keywords **- Accident Detection, Alcohol Detection, Blynk App, Emergency Detection, Engine Control System, IoT, Location Alert, RF communication.**

I. INTRODUCTION

As per the WHO report 2018, 1.35 million people die due to road accidents every year across the world. According to the latest 2021 report of the World Bank, in India it accounts for 11% of global death in road accidents which is the highest in the world. Also, it states that approximately 4.5 lakhs of road crashes are reported per annum out of which 1.5 lakhs are death cases. Major accidents are faced by two-wheelers and the causes of such accidental death cases are drinking and driving, injured persons not provided immediate medical attention and negligence in wearing helmets. Hence, the main objective of developing a Smart Helmet is to implement features like Accident Detection, Alcohol Detection, Emergency Detection, Engine Control System and Location Alert which can ultimately help in providing safety to the bike rider and reduce road accidents.

The Accident Detection feature will send an email with the location of the rider to the registered email address, if in case any accident is detected. The Alcohol Detection feature will check whether the rider has consumed alcohol or not. If yes, it will send an email along with the location of the rider to the registered email address and will also turn OFF the engine's relay. The Emergency Detection feature will enable the rider to send his/her location to the registered email address, if in case he/she gets trapped in any emergency situation like brake failure or sudden tyre puncture. The Engine Control System will ensure that the bike is not involved in any theft activities. Hence, it will enable the rider to control the engine's relay with the help of IoT based Blynk Application.

The Location Alert feature is an additional feature through which the rider can send his/her location to the registered email address through the IoT based Blynk Application. Hence, the key technologies used in this project are Radio Frequency (RF) Communication and Internet of Things (IoT).

II. LITERATURE REVIEW

The analysis of the effects, causes and rate of road accidents is taken from [2] and [8]. In order to overcome these issues, we have developed an Intelligently Smart Helmet. The basic idea of developing this project is taken from [1] and [3].

In [6], the authors have used an accelerometer which will be activated if there is any sudden change in accelerometer readings and the system will beep continuously and will wait for 20 seconds. If the driver pushes the button on the helmet to tell it's a false case, then no SMS will be sent. But if the driver doesn't do so, that is if it is a serious accident the GPS location will be retrieved. And the information and location will be sent to the emergency contact number using the GSM module. Hence, we have referred to this concept to build the Accident Detection System.

In [4], the authors have developed a project that features alcohol detection as well as helmet detection. To check whether the rider has worn the helmet or not they have used a PIR(Passive infra-red) sensor. And for alcohol detection they have used a MQ3 gas sensor which is fitted on the inner front side of the helmet. If any alcohol is detected in the rider's breath, a message will be sent to the registered number using the GSM module. Hence, the concept of implementing Alcohol Detection System is taken from this reference.

If any input such as impact, alcohol or emergency is detected, then the location of the bike rider is sent to a predefined email address. This concept of using email as a medium of communication for better and efficient domain results is taken from [11] .

From [5] and [9], we have referred to the concept of configuring IoT based Blynk App with Microcontroller. For implementing RF communication, some functionalities and principles have been referred from [10]. We have used the Arduino Integrated Development Environment for the microcontroller coding. Some of the basic functioning of this IDE is referred from [7]

III. PROPOSED SYSTEM

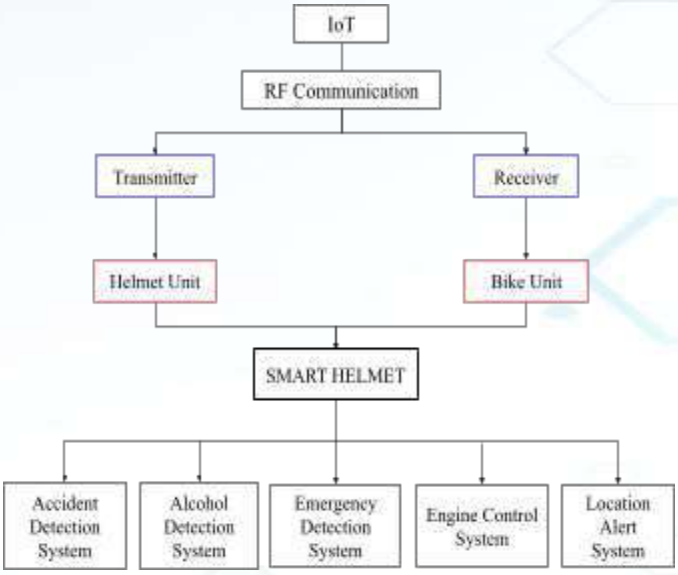

Fig 3.1

In order to achieve better domain results and build a system which eliminates disadvantages of the existing systems, this project has used some key technologies like Radio Frequency (RF) Communication and Internet of Things (IoT). It consists of two sections. One is the transmitter section which is mounted on the Helmet and the other is the receiver section which is to be mounted on the bike.

IV. BLOCK DIAGRAM

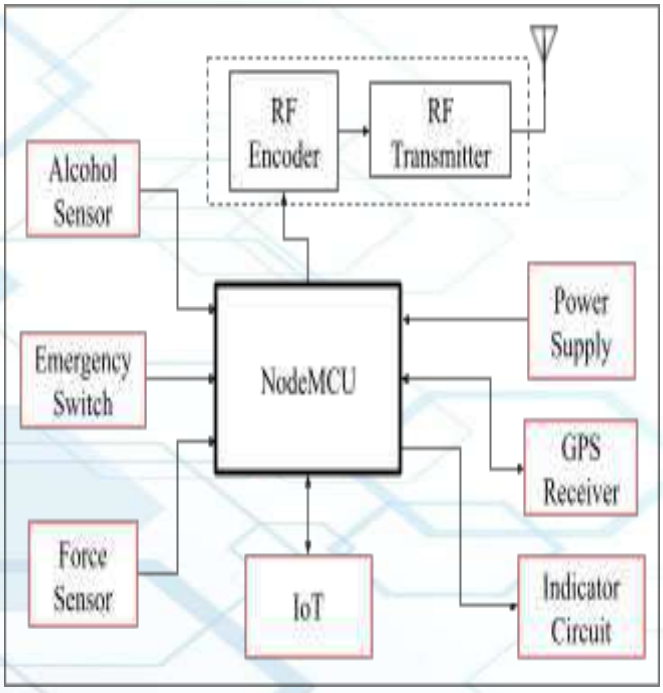

Fig 4.1 - Transmitter / Helmet Unit

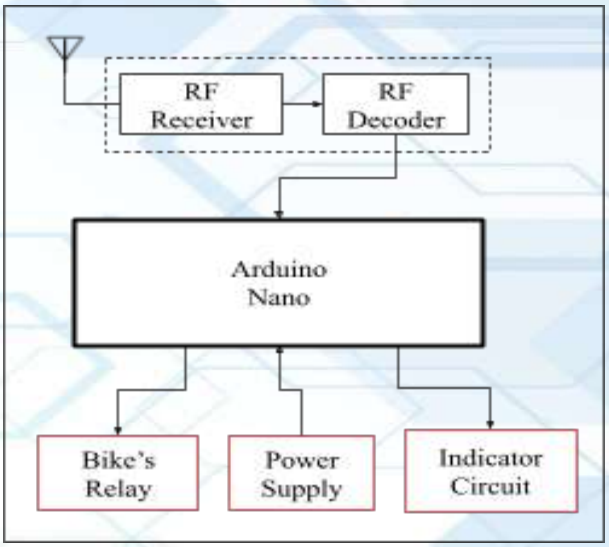

Fig 4.2 - Receiver / Bike Unit

V. WORKING

1. Accident Detection System :

In most of the cases, the situation becomes critical, because the injured person is not given proper medical treatment. This feature is used for detecting accidents. A FlexiForce A502 Force sensor is fixed on the helmet that is the transmitter unit using NodeMCU as its microcontroller. Whenever a bike rider collides with a hard object, impact will be generated. If the impact generated is greater than the threshold value (threshold value is set as 1000), then the force sensor will be activated and the indicator circuit will beep continuously for 5 secs. If the rider long presses the emergency switch button to tell it's a false case, then there will be no further communication. But if the rider doesn't do so, that means if it is a serious accident, then the Gauge named "Force / Accident Detection" virtually pinned to V1 in the IoT based Blynk App is activated displaying the impact reading. Also, the microcontroller uses the NEO-6MV2 GPS Receiver to send the location to a predefined email address (Family member's email address) stating "Accident Detected Location of the vehicle".

2. Alcohol Detection System :

One of the major causes of road accidents is drinking and driving. This feature checks whether the rider has consumed alcohol or not. A MQ-3 gas sensor is fixed on the front side of the helmet that is the transmitter unit using NodeMCU as its microcontroller. If the alcohol concentration consumed by the rider exceeds the threshold value of the alcohol sensor, then the Led named "Alcohol Detection Led" virtually pinned to V0 in the IoT based Blynk App is activated indicating that alcohol has been detected. Also, the microcontroller uses the NEO-6MV2 GPS Receiver to send the location to a predefined email address (Family member's email address) stating "Alcohol Consumption Detected Location of the vehicle". Along with this, if alcohol is detected, this data is also sent to the HT12E encoder IC and is further delivered to the FS1000A 433MHz RF Transmitter Module. This module then transmits the data

to the XY-MK-5V 433MHz RF Receiver Module through the antenna pin which is mounted on the receiver unit using Arduino Nano as its microcontroller. Hence, RF communication takes place. The receiver module delivers this data to the HT12D decoder IC. After decoding the data, the decoder IC sends this data signal to the Arduino Nano. Finally, the Nano analyzes that the alcohol is detected and deactivates the Transistor Relay Driver Circuit.

3. Emergency Detection System :

Sometimes there might be situations where the bike's brake fails or suddenly a tyre punctures which raises the possibility of an accident. Hence, this feature detects such emergencies. A switch button is connected on the transmitter unit using NodeMCU as its microcontroller. In case of any emergency, if the rider presses the switch button, then the Led named "Emergency Alert Led" virtually pinned to V3 in the IoT based Blynk App is activated indicating that an emergency has been detected. Also, the microcontroller uses the NEO-6MV2 GPS Receiver to send the location to a predefined email address (Family member's email address) stating "Emergency Detected Location of the vehicle".

4. Engine Control System :

Engine Control Mechanism in a bike can reduce theft activities. This feature enables the rider to switch ON and OFF the bike engine's relay according to his/her's requirement. If the Button named "Engine Lock Button" virtually pinned to V5 in the IoT based Blynk App is turned ON, then the microcontroller NodeMCU in the transmitter section receives this data through Wi-Fi. Hence, this data is forwarded to the HT12E encoder IC and is further delivered to the FS1000A 433MHz RF Transmitter Module. This module then transmits the data to the XY-MK-5V 433MHz RF Receiver Module through the antenna pin which is mounted on the receiver unit using Arduino Nano as its microcontroller. Hence, RF communication takes place. The receiver module delivers this data to the HT12D decoder IC. After decoding the data, the decoder IC sends this data signal to the Arduino Nano. Finally, the Nano turns ON the Transistor Relay Driver Circuit.This indicates that the Bike engine's relay is turned ON. Similarly, it can be turned OFF using the same "Engine Lock Button" virtually pinned to V5 in the Blynk App. Hence, this feature provides the rider a hands on control over the Engine's Relay.

5. Location Alert System :

The Location Alert feature is an additional feature through which the rider can send his/her location to the registered email address through the IoT based Blynk Application. If the Button named "Location Alert Button" virtually pinned to V14 in the IoT based Blynk App is turned ON, then the microcontroller NodeMCU in the transmitter section receives this data through Wi-Fi. Then the microcontroller uses the NEO-6MV2 GPS Receiver to send the location to a predefined email address (Family member's email address) stating "Location of the vehicle".

VI. SOFTWARE IMPLEMENTATION

1. Coding for the Microcontroller

Microcontroller Used :	NodeMCU, Arduino Nano
Software :	Arduino Integrated Development Environment
Programming Language :	C
Libraries used :	Blynk-master, Arduino-master, BlynkSimpleEsp8266, SimpleTimer, TinyGPSPlus, ESP8266WiFi
Operating System :	Windows

Table 6.1

2. IoT based Blynk Application

Blynk App is an IoT based platform that allows the creation of amazing interfaces for projects using various widgets.

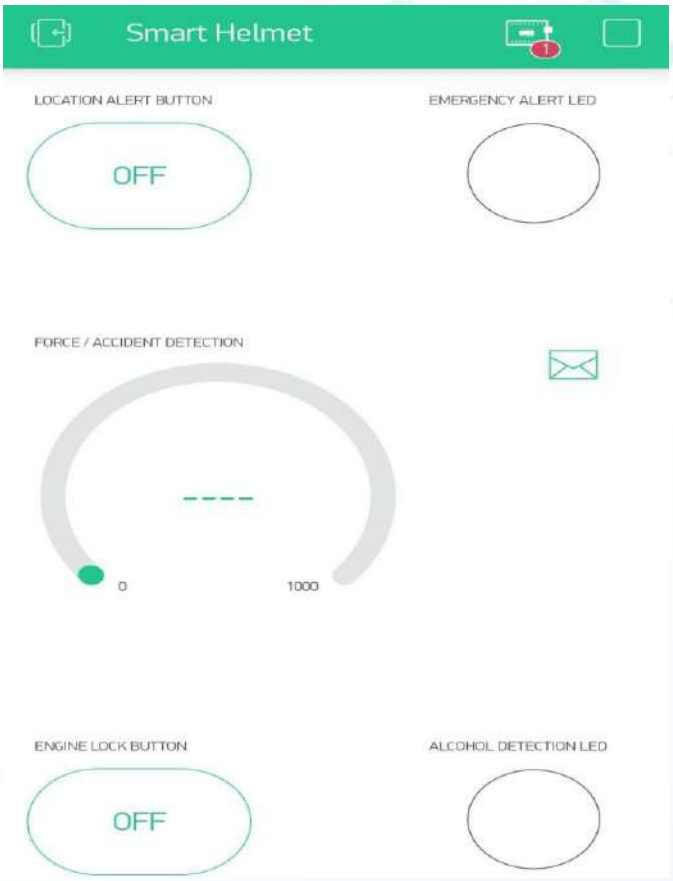

Fig 6.1 -

Widgets selected in implementing Smart Helmet IoT based Blynk Application are as follows :

Widget	Widget Name	PIN TYPE	PIN No.	To
Button	Location Alert Button	Virtual	V14	-
Button	Engine Lock Button	Virtual	V5	-
Gauge	Force / Accident Detection	Virtual	V1	-
Led	Emergency Alert Led	Virtual	V3	-
Led	Alcohol Detection Led	Virtual	V0	-
Email	-	-	-	ishwareepadalkar@gmail.com

Table 6.2

3. Configuring the Blynk Application with themicrocontroller code.

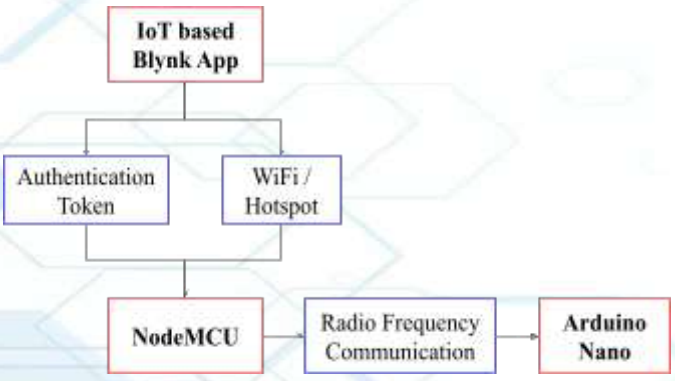

Fig 6.2

The id and password of the Wi-Fi hotspot connected with the Blynk App is used in the code which is uploaded in the NodeMCU. And the Authentication token of the blynk project is also included in the NodeMCU code. Hence, IoT based Blynk App gets interfaced with the transmitter section microcontroller NodeMCU.

VII. RESULTS

a) Transmitter Board

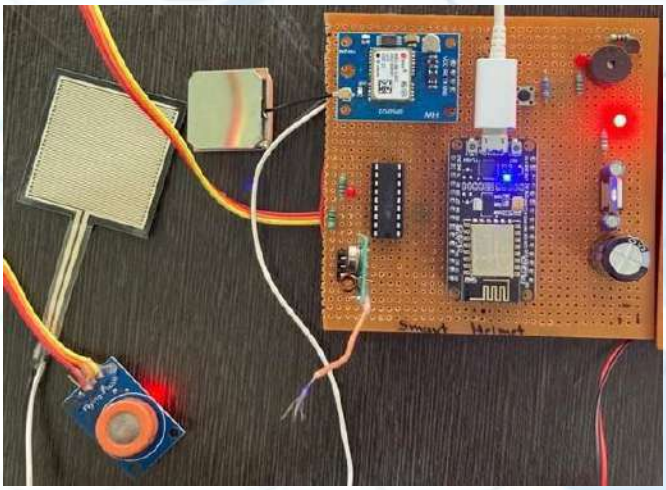

Fig 7.1

b) Receiver Board

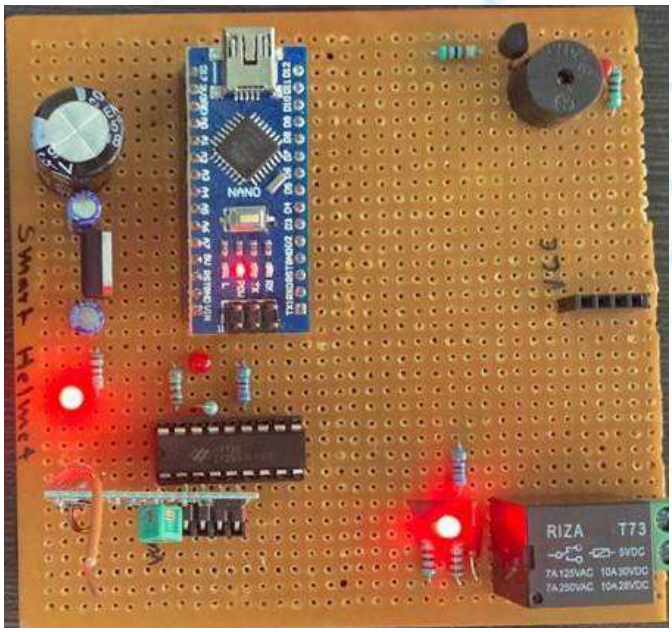

Fig 7.2

c) The screenshots of email received when a specific inputis detected are :

Fig 7.3

Fig 7.4

Fig 7.5

Fig 7.6

VIII. CONCLUSION

In this era of immense usage of vehicles leading to road mishaps, "Smart Helmet" is an essential development which should be proposed on a larger scale. This project has effectively implemented features like Accident Detection System, Alcohol Detection System, Emergency Detection, Engine Control System and Location Alert System which ensures the bike rider's safety and reduces the causes of road accidents. The key technologies RF communication and IoT used in this project makes it a "Intelligently Smart Helmet".

IX. FUTURE WORK

This system can be made theft free by asking a voice password. This can be implemented using a speech recognition module EasyVR. Also, a drowsy driver detection system can be implemented by using an eye blink sensor that will detect the eye blink rate and alert the driver when the driver is sleepy or drowsy.

ACKNOWLEDGMENT

We have immense pleasure in expressing our thanks and deep sense of gratitude to our guide Prof. Swati Patil, Departmentof Electronics for her guidance throughout this project. We also express our sincere thanks to Dr. Avinash Vaidya, Head of the Department, Electronics and Communication for extending his help. We wish to express our profound sense of gratitude to Dr. Sandeep Joshi, Principal of Pillai College of Engineering, New Panvel for encouraging us.

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Temperature and Pulse Oximeter

Jinisha Jain, Janhavi Kharmale, Nevedita Kale, Harshal Desai

***Abstract*—A monitoring device for a person to check his/her oxygen level at any time can reduce the fatality effect of the heart problem. General pulse oximeter connected with the Internet of things (IoT) technology enables a family member to remotely monitor the patient. It may be used to monitor the health of individuals with any type of condition that can affect blood oxygen levels, especially while they're in the hospital. The system uses a pulse oximeter sensor, a Bluetooth module to connect the device and the data could be displayed on an Android application. The android app is made with the help of MIT App Inventor which is a free and open-source software. It uses a graphical user interface (GUI) which allows users to drag and drop visual objects to create an application that can run on android devices. The Key feature of this system is contactless easy diagnosis through Wireless Pulse Oximeter. Without contact, readings can be taken and database can be provided to doctor. Along with oxygen levels, the Oximeter will also measure the temperature of the user. A pulse oximeter for self- diagnosis would be possible which can help reduce the spread of Covid-19.**

***Index terms*—wireless pulse oximeter, Bluetooth, MIT App Inventor.**

I. INTRODUCTION

Due to increase in Corona Virus cases worldwide many people including doctors themselves are risking their life. This virus is spread primarily through droplets generated when a person sneezes, coughs or speaks. One can also become infected by touching an infected surface. The conventional pulse oximeter measures the oxygen saturation level in blood and displays it on the screen of the device. If a person who is infected by the virus uses the pulse oximeter device and wants to show the readings to a doctor, he/she can't show the readings without any contact. The more the contact, more is the spread of virus. To avoid contact a smart pulse oximeter is designed. By referring to the research paper is 'A wireless monitoring system for pulse oximetry sensors' which focuses on transmitting the pulse-oximetry signals of several monitored patients without using any wired infrastructure, the proposed system is designed. Bluetooth archives enough bit rate to transit any vital signals. In this research paper a pulse oximeter device which can display the readings on an android app is designed. The readings of the pulse oximeter are transmitted wirelessly to the android app through Bluetooth. Bluetooth archives enough bit rate to transit any vital signals. The key feature of this system that will make it stand out from already existing devices available in market is its compatibility with software and the temperature measurement. The software part will thus make this device contactless and self-diagnosis would be possible which can help reduce the spread of Covid- 19.Unlike other smartwatches it is possible to connect this pulse Oximeter via Bluetooth/wi-fi. It is cheaper compared to other smart watches which only shows specific data. This can also be used on a largescale basis like hospitals, covid centers etc. and keep check of all the patients at a time. All of this can be done without any physical interference between patient and authorities. Pulse Oximeter is also very user friendly. A person of any age can operate without any hassle.

The proposed system will take readings displayed on the hardware and will send the readings through Bluetooth to an app which will compare the readings with normal range and suggest if the vitals are stable or not. In addition to that the Pulse Oximeter will also showcase the temperature. In the future generations of smart Pulse Oximetry, a much compact and everyday wear friendly devise can be created with the addition of many more sensors like Glucometer. Many more features to the proposed app can be added by frequent updates. A virtual link between patients and doctors or family members by live tracking daily health reports, recording monthly progress etc. by account creation and management can be created.In section 2 the methodology of proposed system is explained. It explains the block diagram and the components used in the block diagram. Section 3 tells us about the working of the pulse oximeter, how the sensors are connected and the data is transferred. Section 4 shows the results of the proposed system.

II. METHODOLOGY

This proposed work is about the design of a temperature and pulse oximeter using Arduino nano. When a person places his/her finger on the pulse oximeter sensor, it calculates the blood oxygen concentration and pulse rate. This calculated reading is shown on the OLED display. The pulse oximeter is integrated with HC-05 Module which transmits the vital to the app which displays the readings on the user's mobile screen. Along with pulse oximeter sensor we have added a temperature sensor. When a person places his/her finger on the sensor, it calculates the person's body temperature and displays it on the OLED display and Smartphone app via Bluetooth.

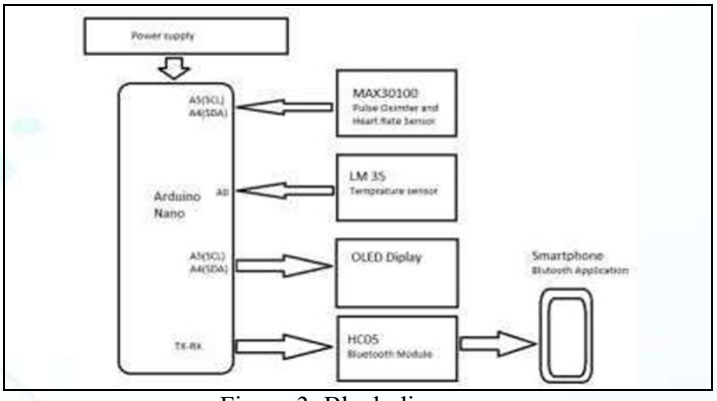

Figure 3: Block diagram

Power Supply is a 12V extra battery supply to furnish each segment with their force supply. IC 7805 is a Voltage Regulator that restricts the output voltage to 5V output for various ranges of input voltage. It breakdowns the power supply for the whole circuit so that the power is utilized efficiently.

Arduino Nano is one type of microcontroller board, which interlinks all the components in the circuit and helps transmitting data back and forth with Bluetooth module and the temperature sensor and pulse oximeter.

The MAX30100 is an integrated pulse oximetry and heart- rate monitor sensor solution. It has been utilized to gauge Oxygen Saturation of the blood and pulse. It comprises of upgraded optics, a photodetector, two LEDs and a low clamor simple sign preparing unit.

LM35 is a temperature sensor that outputs an analog signal which is proportional to the instantaneous temperature. Its estimates the internal heat level in centigrade. It ingests encompassing temperature alongside internal heat level.

HC-05 is a Bluetooth module, used to send information through sequential correspondence pins to gadget we need to be associated. It makes our errand simple by straightforwardly sending information to gadget client needs.

OLED Display helps in displaying out the pulse rate, SpO2 and body temperature.

The data is also displayed on the smartphone screen via Bluetooth application.

III. FUNCTIONALITY

3.1 Hardware

When vitals are displayed on the pulse oximeter and in case you need to show it to someone, then you need to manually note it down. This becomes a long procedure to get guidance for your health. What if there is an application which will directly show an individual's vitals on their phone, so that there is no need of writing it down. The main component is Arduino nano which bind all components together. It is brain of the hardware which provides a way to execute the assigned task of individual component. The main sensors used are Max30100 pulse oximeter & Temperature sensor the LM37. Serial communication between Hardware and the software is done using the help of HC-05 Bluetooth module.

The pulse sensor module includes a light that aids in the measurement of pulse rate. The light reflected from the pulse sensor changes depending on the amount of blood within the capillary blood vessels as we put a finger on it. The volume within the capillary blood vessels would be high during a heartbeat. This affects light reflection, and light reflected during a heartbeat will be less than light reflected during a period of time when there is no heartbeat (the volume within the capillary vessels will be less during the period of time when there is no heartbeat or the period in between heartbeats).

This will result in increased light reflection. From the output of a pulse sensor, this difference in light propagation and reflection is obtained as a pulse. This pulse can then be programmed to read as a heartbeat count after being conditioned to calculate heartbeat.

A temperature sensor is a system that detects the degree of warmth or coolness in an object. The voltage around the diode determines how well a temperature meter works. The resistance of the diode is directly proportional to the temperature rise. The resistance decreases as the temperature drops, and vice versa. The resistance across the diode is measured and converted into readable temperature units, which are then displayed numerically over the readout units.

The HC-05 has a red LED that shows whether the Bluetooth is attached or not. This red LED blinks continuously in a periodic pattern before connecting to the HC-05 module. Its blinking slows down to two seconds when it connects to another Bluetooth system. This module operates at 3.3 volts. Display used is 4 pin Oled which shows the reading of hardware on its display itself. IC7805 is used in the circuit to provide voltages to each component by dividing the upcoming voltage into required voltage. Complete readings were not flashing on OLED display that's why a switch is attached.

When it is pressed the temperature, value is shown and when it is not pressed the heart rate and spo2 readings are shown. By collecting all data from every sensor Arduino nano pass all data through serial communication to HC-05 module using Rx and Tx pins. HC-05 module is connected to the android application through Bluetooth. So, data fetched by HC-05 module is transferred via Bluetooth to android application.

3.2 Software

The Pulse Rate and Blood Oxygen concentration that is displayed on OLED Display can be transferred wirelessly to Android device using Android App over a Bluetooth Connection. This app has been designed using MIT App Inventor. MIT App Inventor is a web application integrated development environment which allows newcomers to computer programming to create application software(apps) for two operating systems (OS): Android and iOS. It is a free and open-source software. In this proposed system the layout of the app is made by the designer which allows users to select the components they will be using in the mobile app and adjust the layout of the app. To provide functionality to the app, the blocks editor allows users to simply select, drag and drop functional blocks onto the web-browser based platform to create their own Android mobile applications.

This research focuses on developing a BluetoothLE Component to provide IoT connectivity since BLE technology plays a significant role in the IoT ecosystem. Once the connection has been established, the smartphone and the peripheral device will start exchanging data according to the Generic Attribute Profile (GATT). This is a specification for sending and receiving short pieces of data to help developers develop their own specific applications. In the proposed system, the smartphone containing the app with the BluetoothLE Component is the GATT client.

The process of enabling a mobile app to communicate with a BLE device is broken down into several main stages, which are reflected in the development of the BluetoothLE Component. First, a GATT client is established on the phone to act as the main communication backbone interfacing a mobile app with BLE devices. Once that step is complete, the app will start to conduct a scan to find possible BLE devices to interface with by requesting information on each device in the vicinity. Only the BLE-enabled devices nearby will be able to respond to this request. Based on the information provided by the BLE devices, the app on the phone will choose a specific device and start to initiate the connection to the GATT server hosted on the discovered BLE device.

From here, data transfer can take place once the connection is established between the phone and a BLE device. This is shown by the text 'connected' which appears after the connection in successful. After this the readings of the vitals appear on the app and it updates continuously as soon as the readings change. The app shows the oxygen level, heartrate and temperature of the user.

3.3 Software Flowchart

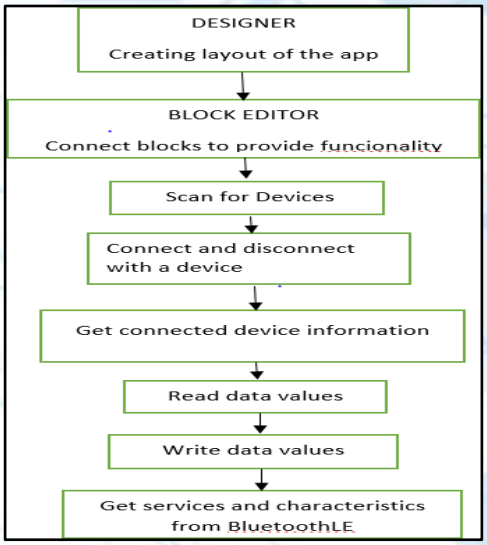

Figure2

IV. RESULT

Heart Rate and spo2 vitals value are shown on app successfully. Temperature values are also readily seen on app. The sensor also detected correct temperature. It also monitored oxygen saturation over time. In case of low levels of oxygen alert system has been added. Arduino nano works very efficiently and accurately. BluetoothLE Component is functional and can be used with a variety of BLE devices. When a human body is connected, vital readings including SpO2, heart rate and temperature are clearly display on the OLED panel.

Figure3: vitals value on app

IV. CONCLUSION

This paper presented working of Wireless Pulse Oximeter. The hardware was developed and the sensors were connected to measure the vital parameters of human body. The prototype image shows the developed hardware system of the human monitoring system with the integrated sensors. Along with oxygen levels, it will also detect the temperature. The key feature of this work that will make it stand out from already existing devices available in market is its compatibility with software. It will showcase the readings on the display as well as on the app designed through Bluetooth and the app will show vitals directly in user's phone so that they can take screenshot of it and send it to their Doctor. The software part will thus make this device contactless and self-diagnosable which can help reduce the spread of Covid-19. The objectives of this paper would be to measure proportion of oxygenated Hemoglobin in the blood and temperature. Some of the advantages are to study and compare the readings with normal range, to avoid human contact and to help to every person to self-diagnose. Pulse oximeter can be used in continuously monitoring arterial blood oxygenation under a variety of conditions and circumstances to fight the corona virus at an early stage, for patients with chronic obstructive pulmonary disease (COPD).

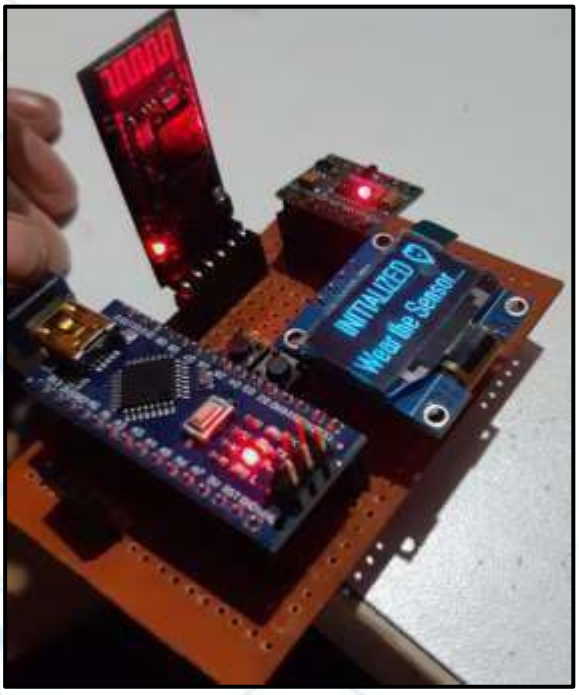

Figure4: Prototype

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to several individuals and organizations for supporting us throughout our project work. Firstly, to our supervisor, Dr. Monika Bhagwat, for her enthusiasm, patience, insightful comments, helpful information, practical advice, and unceasing ideas that have helped us tremendously at all times in our research. Due to the ma'am's constant supervision and guidance in all situations, we were able to complete our project paper successfully. Lastly, we are grateful to the Department of Electronics and telecommunications, the University of Mumbai for allowing us to work on our project.

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The Impact of Covid-19 on the Internet of Things

Raj Mahamunkar, Sagar Dedhia, Adarsh Jaiswal, Deepak Chaudhari

***Abstract*—In the COVID-19 situation, because of the absence of labor, roads were loaded up with residue and trash, as there could have been no legitimate administration for the waste. A legitimate waste administration framework is important to try not to spread some destructive sicknesses in this already existing situation. The essential venture thought is to plan a shrewd waste recognition framework that would naturally advise the authorities about the current status of different trash canisters around there and would have continuous checking capacities. In the proposed paper, the data is sent and observed by the GSM module. The Microcontroller 8051 is utilized to speak with sensors and GSM module. The Ultrasonic sensor recognizes the level of the residue in the dustbin and conveys the messages to the microcontroller, which would be distantly controlled utilizing GSM technology.**

***Keywords*—GSM module, Ultrasonic sensor, Covid-19.**

I. INTRODUCTION

The Smart residue receptacles are associated with the wireless communication technology to get ongoing data about the smart dustbins. Lately, there was a fast development in the spread of Covid-19 virus which affected garbage removal process. An appropriate waste framework is important to try not to spread dangerous infections in the already existing condition which could worsen the situation. Dealing with the keen containers by observing the status and scheduling the time to collect waste when necessary, can solve this problem. The essential venture thought is to plan a keen waste level discovery framework that would tell the authorities about the current status of trash level in the bin around there on its own, would have continuous checking abilities. In the proposed paper, the data is sent and checked by GSM framework. The microcontroller 8051 is utilized as bridge between sensors and a GSM module. The Ultrasonic sensor recognizes the level of the residue in the dustbin and conveys the messages to the microcontroller, which would be distantly controlled utilizing IoT (Internet of Things) methods which includes GSM module for communication interfaced with microcontroller 8051 operating as the brain of the whole setup.

II. METHODOLOGY

The data will be sent via GSM module to the municipal office and driver. When the dustbin level exceeds its limit, it is intimated and will be collected by following GPS location of the module on the system. There is one more sensor that is used for automation for opening and closing of doors.

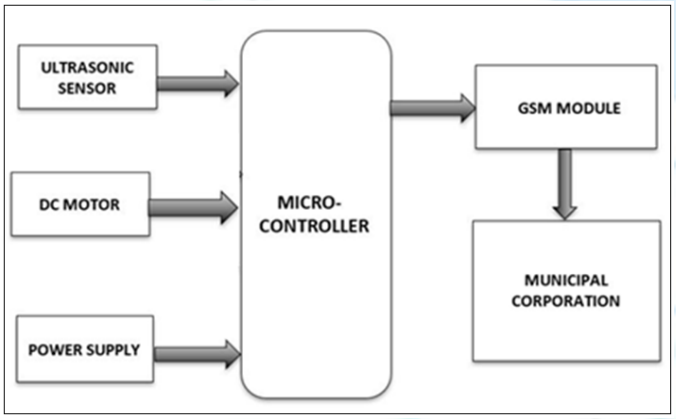

Fig1. Block diagram

In this proposed paper, different sensors assume a significant part in the execution of the entire model. The proposed paper will utilize 8051 as microcontroller on the grounds that when contrasted with Arduino, 8051 can store enormous amount of information, alongside the microcontroller other remote sensors are likewise central point for the entire execution of the model to happen. The proposed paper utilizes an extremely modest however successful item distance estimating sensor named Ultrasonic sensor which will assist with tracking down the level of trash in the container.

The ultrasonic sensor will be associated with the microcontroller which will send the information straight forwardly to the control unit from which the degree of trash bin be checked straight forwardly. The other significant sensor is the humidity sensor which will distinguish whether the trash is wet or dry waste. The purpose of utilizing this model is that it will help in the ongoing observing of waste jars and furthermore help in keeping up the cleanliness of the encompassing spot.

The microcontroller will be coded in such a way that it will send the directive for the assortment of trash each third day if the trash doesn't pass the boundary mark. Assuming the trash passes the boundary mark before the third day, the trash ought

to likewise be gathered right away. In the event that any of the given conditions are fulfilled a content will naturally be shipped off the district.

This framework is financially and very nature agreeable and the main factor is that it offers continuous observing.

III. FUNCTIONALITY

Microcontroller 8051 is used as the brain of the proposed system in this paper. It is programmed using embedded C language. For executing, compilation of program, Keil Microvision software is used.

Trigger pin is set high for 10 microseconds. this activity will trigger an ultrasonic wave at the recurrence of 40hz from the transmitter and the beneficiary will trust that the wave will return. when the wave is returned after it getting reflected by any item the echo pin goes high for a specific measure of time which will be equivalent to the duration taken for the wave to return back to the sensor. Duration during which the echo pin remains high is observed by the MCU/MPU as it gives the data about the duration taken for the wave to return back to the sensor. using this data, the distance is estimated as clarified in the above heading.

The data from ultrasonic sensor is given to microcontroller 8051. The data is in the analog form, GSM module does not work with analog form. To counter this problem arduino UNO is used by interfacing it with 8051 microcontrollers. Arduino UNO uses 5V for its operation which is provided by down conversion of voltage using regulator IC 7805

Arduino UNO is capable of ADC conversion. Arduino Uno has 6 0n-board ADC channels which can be utilized to peruse simple signs in the reach 0-5V. It has a 10-bit ADC implies it will give computerized esteem in the scope of 0 – 1023 (2^10). This is known as a goal that shows the number of discrete qualities it can create over the scope of simple qualities.

The converted digital data is fed to GSM module. The GSM module has a sim card and is programmed with a registered sim number on which the signal describing level of bin is sent

The registered number is inserted in a phone which will receive the level of bin which can be either “Dustbin Full” or the current level of bin if not full.

IV. RESULT & CONCLUSION

When the system is turned ON and the garbage bin is full i.e., the maximum garbage level is reached it alerts by delivering the message “Dustbin Full” to the receiver number fed on the system. When the municipality wants to check the status of the bin, it can now be easily checked by sending a message to the smart system “/status/”. The feature enabled is working properly with providing the desired output. An ultrasonic sensor is used to send a signal to the GSM module to send a text message to respected authorities. The text message also consists of bin id and location.

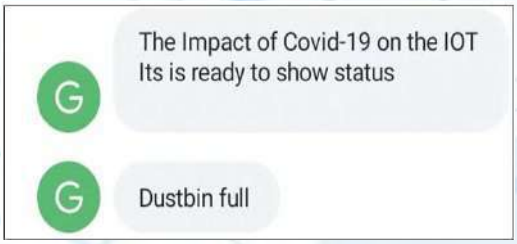

Fig 2. – When the dustbin is full

Fig 3. Authority checking the status of the dustbin via the command “/status/”

This paper shows continuous waste administration framework by utilizing shrewd dustbins to check the fill level of savvy dustbins if the dustbins are full. In this framework, the data of all shrewd dustbins can be gotten to from any place and whenever by the concerned individual and he/she can take a choice appropriately. By executing this proposed framework, the expense decrease, asset advancement, viable use of savvy dustbins should be possible. This framework in a roundabout way lessens traffic around there. Insignificant urban communities, the trash assortment vehicle visits the territories consistently twice or threefold relying upon the number of inhabitants in the specific region and now and again these dustbins may not be full. Our System will illuminate the status regarding every single residue container progressively so the concerned authority can send the trash assortment vehicle just when the dustbin is full.

Along these lines, the shrewd trash framework makes trash assortment more proficient. Progressively, this arrangement can be carried out in the domestic climate. This arrangement can likewise be carried out in Industry based territories.

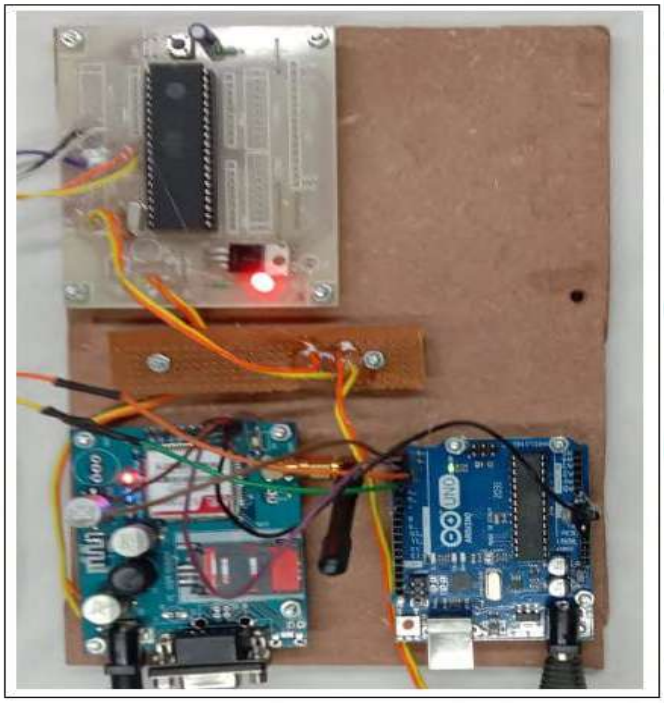

Fig 4. Microcontroller 8051 Interfaced with Arduino UNO + GSM module

Fig 5. Framework implemented on a dustbin prototype

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Upgradation of existing Refrigerator into Smart Refrigerator

Vinayak Guntuka , Harish Gowda , Rohit Jagtap , Rohan Darji.

***Abstract*--- It is essential in today's busy lifestyle to have the best devices in terms of upgraded features that are very easily accessible and highly time efficient where minimum inputs from users are needed so that lives are simplified for better mental as well as physical being . Such devices should make the best utilization of time and should have operational simplicity from the user's end. This paper aims to upgrade the existing refrigerator into a smart refrigerator. Various sensors like Touch sensor, temperature sensor and ultrasonic sensor are interfaced with Raspberry Pi 4 model, having Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC operational at 1.5GHz, using Python language at an input voltage of 5Volts (V) and power requirement of 10 Watt (W) to 15 Watt (W). The paper will describe the upgraded Smart Refrigerator intended to be an operational model which can monitor all the items (fruits, vegetables, milk, cheese, etc) through camera interface with the "Amazon Rekognition servers" (AWS) which will give information of the items inside the refrigerator in real time, displaying he information of the same on an android phone using Telegram application through Wi-Fi and python programming. It will keep a track on specific items, and would notify the user if the door is kept open. Also, the temperature malfunctioning will be notified to the user through an android application. The user's ease of implementation of Smart Refrigerator for finished goods athome, malfunctioning of Fridge can be seen in this paper.**

***Index terms*- AWS rekognition, Raspberry pi, Telegram application, python, operational model, malfunctioning.**

I. INTRODUCTION

A smart refrigerator, also known as an internet refrigerator, is a refrigerator which is able to communicate with the internet. This kind of refrigerator is often equipped to determine itself whenever a food item needs to be replenished. Kitchen is one of the most important places for a Smart home as it consists of many Appliances which provides better services to the household. The focus of our paper is on the smart refrigerator model. Many efforts in the development of the smartrefrigerator have been made, none of which has been energy efficient or cost effective. Suppose if a person is busy going to office and working daily, then he/she will have limited time or mostly no time to check what all are the items that should be bought while coming back home, that are to be refilled. So, this problem can be solved by using this smart refrigerator device/model. By the late 1990s and the early 2000s, the idea of connecting home appliances to the internet (Internet of Things) had been popularized and was seen as the next big thing. In June 2000, LG launched the world's first internet refrigerator, the Internet Digital DIOS. This refrigerator was an unsuccessful product because the consumers had seen it as an unnecessary and expensive product as it was costing more than 20,000 dollars. These smart refrigerators were able to create grocery lists and link to smartphone apps, allowing users to control the temperature remotely, be alerted if the door was left open, and access online recipes based on their fridge contents. However, up until recently, smart fridges have not been a common place in the everyday household. This is partly due to the existing smart fridges being expensive and underwhelming in terms of functionality. The smart refrigerator or the internet refrigerator as it is called, is used to monitor the items inside it and notify about scarce products. The idea of connecting home appliances to the internet or the smart home environment has been seen as the future and is highly regarded as the next big thing.

Section II talks about literature review, Section III consists of problem definition , that contains hardware and software issues faced during implementation. In Section IV the objective has been defined. Section V and VI contains components and implementation of the smart refrigerator model. Section VII is all about the detailed working of the paper. Section VIII and IX shows the input and output the entire paper. And section X determines the future work. And Finally Conclusions are presented in Section XI of the paper respectively.

In the next section, the research papers of some popular journals are being listed that have been referred to.

II. LITERATURE REVIEW

Some research papers similar to smart refrigerators have been referred to help in creating a better, efficient and low cost smart refrigerator model for the user. Has proposed a work on the designing of a smart refrigerator which is able to sense the quantity as well as quality of the food items kept inside it and also simultaneously sends the following data to the user on the android application. Has Proposed a system to have an

operational model which monitors the contents inside the refrigerator in real time and generates a notification to the user in case of any product which is low on quantity as per the threshold set by the user. Has Proposed a smart refrigerator system which can detect the freshness of specific items using gas sensors and also designed the circuit using pi camera and interfaced it to the android device using wifi so that the user can check the contents present inside the refrigerator. Has Proposed the designing of a smart refrigerator that sends a normal text message to an android mobile and also lets us know about the weights of the particular food items using arduino, gsm module and few sensors. It also notifies the user whether the door is kept open or is closed. Modified the existing refrigerator into asmart refrigerator by using arduino and a camera module that keeps a track of the food spoiling data through image processing of the image taken by the camera. This data is then displayed on a "16x2 inch" lcd display. They also stated that thesystem will display the message prior to the day the food is going to get spoiled. Has Proposed a RFID based smart refrigerator using an arduino ,lcd display, buzzer and some basic sensors in which the refrigerator itself can be turned off and on using an android application. It gives indication if the ice is ready, detects volume of liquid in bottles, gives alert when hot items are placed inside the refrigerator, Indicates when the main door or freezer door is opened for a long time, and sends SMS for items to be ordered.

As we discussed various research papers in the previous section, The next section includes the difficulties that will be faced during the implementation process.

III. PROBLEM DEFINITION

The name of the paper is "Upgradation of existing refrigerator into smart refrigerator". This paper consists of a system which allows the users to determine the items (fruits, vegetables,etc) in the refrigerator and simultaneously notifying the user regarding the items available in the refrigerator remotely via an android application called telegram. It will also show the recipe whenever the user types the command in the telegram application. We actually want to create a user-friendly environment between the user and the refrigerator so that the user can save some time from day-to-day hectic schedule and invest it wisely in some other important work.

So to implement such a system, connections of the temperature sensor, ultrasonic sensor and touch sensor will be done to the GPIO pins of the raspberry pi while making the use of resistors where ever needed, and connecting the web camera to the female USB port.

So during the interfacing of various sensors following problems may arise:

Hardware Interface: As each and every item kept inside the refrigerator will be monitored using various sensors, the difficult job will be to manage the connections of those sensors on to the raspberry pi because each and every sensor works on different voltage levels. Some work on 3.3v whereas some work on 5v. Some require resistors as they work on 1-wire bus technology while some work normally. So by taking care of all those hardware difficulties the smart refrigerator system will be implemented.

Software Interface: The amazon image rekognition software will be used along with the camera to detect the contents of the refrigerator. But here the problem factor would be the inaccurate results given by the servers. So the solution here would be to send the raw data i.e actual image to the user as well as the detected/recognized data i.e the names of the contents present in the image which is detected by the amazon rekognition servers.

The interfacing of various sensors and a web camera will be done using "python language" in the raspberry pi graphic user interface itself, and then the program of the whole software and hardware setup will be then interfaced to the telegram application using the access token of telegram bot.

As the problem definition was discussed in the previous section, Now in the next section, the objective of smart refrigerator will be defined.

IV. OBJECTIVE

Rapid improvement in technology tends to use smarter devices in day to day life, one such device is Refrigerator. Kitchen is one of the places where such intelligent appliances have been used. In the modular kitchen and shops, refrigerators play a major role in preserving food items. The products currently available are expensive as the user has to purchase the whole refrigerator. This Smart Refrigerator module is designed to convert any existing refrigerator into an intelligent cost effective appliance using sensors and camera. The smart refrigerator is capable of sensing and monitoring the contents present inside it. The Internet of Things (IoT) system detects the shortage of food items, by transmitting the quantity of available food items to the users through mobile application. Additional functionality includes the notification sent to the user if the door is kept open. The core functionality of the smart fridge is maintenance, with minimum effort, an inventory list of food items which might be needed to be purchased as soon as they run out and will indirectly stop wastage of food items while also giving the temperature and open door warnings respectively.

Now after defining the objective in the previous section, In the next section the components used in this paper will be discussed.

V. COMPONENTS

While building the system, it's important to set up the components properly to avoid any mishap during the experimentation process. Most of the components mentioned below will only be used during the setup stage.

A. Hardware Components:

1. Raspberry Pi 4 Model B: We use the version 4 of the raspberry pi system.

2. Web Camera Module: The Camera Module can be used to take photographs.

3. HDMI cable: HDMI cable is used to connect the raspberry pi system to the monitor so as to run andexecute the code.

4. Ultrasonic Sensor: It is an instrument that measures the distance to an object using ultrasonic sound waves.

5. Temperature Sensor: A temperature sensor is a device, typically, a thermocouple or resistance temperature detector, that provides temperature measurement in a readable form through an electrical signal.

6. Touch Sensor: A touch sensor is an electronic sensor used in detecting and recording physical touch.

7. Resistor: A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element.

B. Software Components:

1. Amazon Web Services (AWS) Rekognition: Amazon Rekognition makes it easy to add images to any applications using proven, scalable, deep learning technology that requires no machine learning expertise to use.

2. Telegram Application: Telegram is a freeware, cross-platform, cloud-based instant messaging (IM) software and application service. The service also provides end-to-end encrypted video calling VoIP, file sharing and several other features.

C. Programming Language: Python

VI. IMPLEMENTATION

After defining the function of the components used in this paper in the previous section, the hardware and software implementation will be discussed in detail in this section.

A. Hardware Implementation

Temperature Sensor

Here we have used one temperature sensor. The Temperature sensor will be used to measure the temperature. The Data pin of the temperature sensor is connected to GPIO 4 and 3v to vcc. The temp sensor will be placed inside the refrigerator which will monitor the temperature If the temperature goes above set threshold value then the temperature sensor will send Signal 1 to raspberry GPIO 4 (pin no.7). Then we have connected a pullup resistor in between VCC pin and the data pin as we need it either to 'pull up' the power pin voltage near the voltage of the data line (when you want to avoid running a 'power' wire), or to pull up the data bus to logic 1 when it is idle if you decide to use a power wire, but don't want to use the internal pull-up resistor in the Raspberry Pi.

Touch sensors

Works similar to a switch. Here we have used two touch sensors as we are making a small prototype model of smart refrigerator. The SIG (signal) pin of Touch sensor is connected to GPIO 26 (pin no.37) and 16 (pin no.36) and 3.3V to Vcc.
Touch sensor is placed in the egg tray so as to monitor the egg quantity. When touch sensors are subjected to touch, pressure or force they get activated and act as a closed switch .In closed switch condition the sensor will send signal 1 to raspberry pi . But When the pressure or contact is removed they act as an open switch. In Open switch condition the sensor will send signal 0 to raspberry pi . Thus the user will know the status of the number of eggs placed in the egg tray.

Ultrasonic Sensor

We have placed the Ultrasonic sensor on the refrigerator door so as to get accurate reading of the door in case. The Trigger pin is connected to GPIO 23 (pin np.16) , Echo pin to GPIO 24(pin 1no.18) and 5v to vcc. Now here we have programmed this ultrasonic sensor in such a way that if the door of the refrigerator is open for more than 2 minutes then the ultrasonic sensor will send signal 0 to GPIO 24 i.e pin no.18 of raspberry pi. Then raspberry pi will send Notification using telegram Application to the user using the access token of telegram bot.

Web camera

The web camera is connected to the female USB port of the raspberry pi which is used to capture the image whenever the command is entered in the telegram application. As soon as the command “contents” is entered in the telegram app the clicked image will be sent to the user.

B. Software Implementation

Telegram Bot

First of all we have created a telegram bot as we are supposed to show all the information of the refrigerator on a telegram application. We have then used the access token of the telegram bot in the python code to build the connection between raspberry pi. We call the telegram bot using the telebot library.

Amazon rekognition

Here we have created an IAM user, because for amazon rekognition IAM user is required. Then after creating the IAM user we used the access key and secret key to build connection with AWS. We call the AWS using the boto3 library. AWS performs the conversion process i.e it takes the image and recognizes the contents in it.

After the hardware and software implementation section, the working of the whole smart refrigerator model will be explained in the next section.

VII. WORKING

The Smart Refrigerator proposed is composed of software and hardware subsystems combined together to form the main system. The subsystems included in our Smart Refrigerator are: Raspberry Pi, web camera, sensors (ultrasonic, touch and temperature sensor) , Telegram application , Amazon Rekognition system as shown in above figure. Each subsystem has its own functions, As explained below:

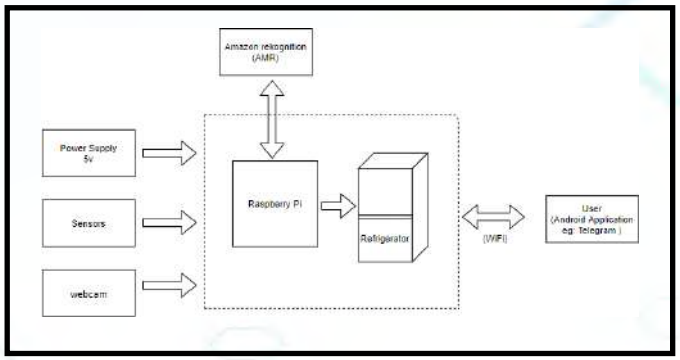

Fig1.. Design of proposed system

As shown in the above fig.1, 5v power supply is applied to Raspberry Pi which will make the raspberry operational to run 3 sensors and a web Camera which are connected to it. The interfacing between the raspberry pi and telegram application is done through wifi with the help of programming. So all the commands or instructions will be given by this application only to get the desired results. Now the next block in the diagram is sensors block, The user will have to click on the chat bot created by us in the telegram application and then will have to type the following commands for respective functions of the sensors to work:

1) If a user wants to know the egg content in the refrigerator, Then he/she will have to type the command “eggs” in the application after which the raspberry will give command to the Touch sensor. The touch sensor will then read the data through its data pin and send the sensed data to the raspberry pi. Then this data will be forwarded to the telegram application using bot access token by the raspberry pi, indicating the count of the eggs as shown in fig.2.
2) The user will receive a warning notification, if the temperature goes above threshold value, indicating the increase in temperature along with the number like “temperature is high 15 degree Celsius” or else the user can directly check the temperature by typing the command “temperature”. This works as follows:
3) Raspberry pi will send a signal to the data pin of the temperature sensor connected to pin no.7. As soon it receives the 3.3V vcc and data pin as 1, it will sense the temperature and send it to the user. Similarly if the door is kept open, the ultrasonic sensor will send signal 1 to the raspberry pi , then this data will be sent to a telegram application indicating the door status as shown in fig.3 below.

Fig2.. Count of eggs shown in telegram app

Fig3. Warning message shown in telegram app

Now the web camera block is divided into two parts:

1) As soon as the user types the command “Contents” in the app, Raspberry pi will send command to the webcam to click the image, then the webcam will click the image of the contents inside the refrigerator and send it to raspberry pi which will be forwarded to the application and the user will be able to that image directly.

2) Now if a user only wants to see the contents name so show up in the chat bot, they will have to type a command “items” in the chat. As soon as this command is entered by the user, the raspberry pi will do the same thing as above mentioned command, but it will do one additional step i.e it sends the clicked image to the amazon rekognition site which is interfaced by using access key and secret key in the program. As soon as the image is recognized by the AWS servers, following data will be sent to raspberry pi which will further send it to the telegram application. As shown in fig.4 below.

Fig4.. Contents of refrigerator displayed in telegram app

After the working of the smart refrigerator system, the input and output of the entire paper will be shown in the next section.

VIII. INPUT

In our case, the input will be items in the refrigerator. The system should be properly placed to capture the image without any background hindrance. We need the Raspberry pi, Web camera, and the power cable to be placed in the fridge. The entire connection to be placed in the fridge is as shown above in Fig. 5 that shows the input and the system setup.


Fig5.. Refrigerator model for input

IX. OUTPUT

Fig6.. Output image received on telegram application

Fig.6 shown above, is the image we received on the telegram application as soon as we have given the command “Contents” in the telegram application. The user will also receive a message indicating only the contents name if the command named “Items” has been typed by the user in the telegram application as shown in fig.4. All other outputs like temperature warning, open door warning and egg contents have been already covered in the working section of this paper and can be seen in fig.2 and fig.3 respectively.

X. FUTURE SCOPE

This paper gives the implementation plan of a smart refrigerator which involves use of a web camera that sends the actual image of the contents present inside the refrigerator on the telegram application and also uses sensors like temperature sensor, touch sensor and ultrasonic sensor to detect particularly the temperature , numbers of eggs and door opening status of the refrigerator respectively. The actual implementation and interface of the shown implemented plan can be one valuable scope of this paper. And the rest of the upgradable future scope is as follows:

1. *More features for all the aspects of food*

While developing the smart refrigerator we have only focused on the perishable items which are mainly vegetables, fruits, eggs, etc. This makes our smart refrigerator recognize fruits and vegetables accurately and efficiently. Therefore, because of the lack of time we couldn’t focus on different aspects of food like milk carts, meat, fish, grains, bread and many more. This paper can proceed with advancements in the range of items to be recognized by the system for the users accurately. So we can make this system more advanced in the future by adding more features like liquid level measurement of cold drinks, milk

bottles, etc. RFID scanning technology which will scan each and every items that goes in and out of the refrigerator and generates a count of it respectively to order it automatically as soon as the items go low on count. Then we can use gas sensors that will sense the quality of food items.

2. High resolution camera for high quality photos

While using raspberry pi to recognize the fruits and vegetables we have used a web camera which have very less resolution. This reduces the sharpness in the quality of the image as well as the accuracy of reading the image efficiently. Therefore, by using a Pi camera module, we can increase the sharpness and the accuracy of the images which will do better recognition of the items in the refrigerator.

3. Automatic door closing system

We can also add this feature like an "automatic door closing system" in the coming future by using some stepper motors that will be interfaced with the raspberry pi to close the door automatically after a few seconds as soon as the user leaves it open.

XI. CONCLUSION

The conversion of an Ordinary refrigerator to a smart and intelligent refrigerator is done with the use of Raspberry Pi, some sensors and a Web camera. This has been shown in the paper. This smart refrigerator module helps the user to keep a watch on all the items placed inside the refrigerator on an android application called telegram, by just typing simple commands that are assigned. With the help of which the user receives the image of the entire refrigerator contents, will receive notification for egg contents, temperature warnings and open door warnings. It uses Amazon web service named Amazon rekognition software to detect what's inside the refrigerator with the help of a camera and using image processing algorithms which returns the user the names of the items along with the actual image of the contents present inside the refrigerator. This system is cost-effective and can be used in any ordinary refrigerator by just consuming some space in it.

ACKNOWLEDGEMENT

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Voice Controlled ROV/UAV

Shivendra Sharma, Ankit Soni, Sahil Shetye, Rohan Yadav

***Abstract* - This work helps in understanding anddiscovering the spectrum of possibilities of an unmanned vehicle. The task undertaken is to develop an early model of a remotely operated vehicle (ROV) using hardware and software integration. The software consists of a mobile application that requires to be connected wirelessly to the microcontroller on the vehicle. This application is an upgraded version of a more simplistic application. The application is developed using Google's toolkit named 'flutter', it is broadly capable of connecting and transmitting data to the vehicle via speech or text. The hardware fabricated is around an ESP8266 NodeMCU controller interfaced along with dc gear motors. The gear motors are guided by motor drivers L298n which is in turn controlled by the microcontroller. The vehicle effectively reacts to the data transmitted by the app. The purpose of this project is to provide a seamless ROV solution capable of solving the impediment to traditional vehicles and provide a breakthrough in reducing traffic. The idea of voice control can further simplify the travel experience on the roads.**

I. INTRODUCTION

Speech is the most important way of communication for people. Every individual mostly communicates with each other via speech throughout lives. Looking at the developments done in communication technologies, in previous few decades the speech recognition has become an emerging technical aspect of many systems. Recognizing human voice commands has become major part of artificial intelligent systems, even we can see this technology uprooting in automobile industry too. In this project, it is aimed to control ROV/UAV using voice commands. The voice commands are used to move vehicle correctly. To direct vehicle in a particular direction, first the voice command is given to an android based application which recognizes the spoken command and processes it to text and forwards it to the controller mounted on the vehicle which makes the motor movement and moves the vehicle according to the received commands.

II. LITERATURE SURVEY

Remote-controlled robots were developed in the 1940s and were used by trained experts. A new class of remotely controlled robots is now accessible on the internet, the online robots. These allow users from all over the world to look over museums, tend gardens, navigate undersea or handle protein crystals. The first generation of online robots came into existence in 1994.

There is much advancement in the field of engineering, robotics in particular.Many robotic systems have been developed for various purposes. There is a certain system which is used for the automatic motion of vehicles in roadand wheel chairs which can help disabled. Wireless controlled vehicles have been extensively used in a lot of areas like unmanned rescue missions, military, and many others.

[1]. An Arduino Uno based voice-controlled vehicle was designed to make motors move. The system does this withthe help of Bluetooth module.

[2]. Using web-app and Bluetooth robot was controlled and flexibility of using via Bluetooth or Web application was given to user. To control robot using IoT was the mainaim of system.

[3].Using an android app to control the vehicle using voice. Also, used an ultrasonic sensor to detect any obstacles. Arduino Mega is the controller. The app transmit data through Bluetooth connectivity implemented by using HC-05 module. Advantages are easy installation, repair and maintenance and quite cheaper as compared to the AI counterparts

III. PROPOSED SYSTEM

To achieve voice control in ROV the main requirement is to recognize voice commands efficiently and transmit it to controller to perform respective task. To attain these requirements android based application is developed for speech recognition and send it to NodeMCU. Application will process the recognized commands and convert them into machine code for controller. Then after receiving commands controller will perform appropriate movements using motors. The user is given two flexibilities to make ROV autonomous or controlled mode and to send command by text or voice command. Basic set of commands are preloaded in controller but, if user wants can add delete commands according to his/her convenience. The proposed architecture is shown in Figure 3.1

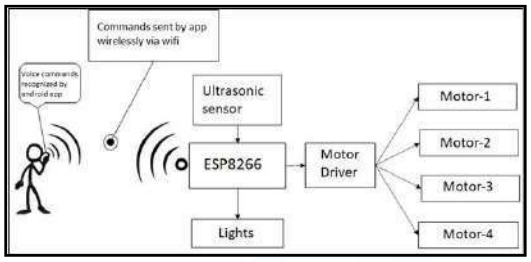


Figure 3.1

Following is the description of different components used in the system:

A. Node MCU:

The NodeMCU ESP8266 development board comeswith the ESP-12E module containing ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency. NodeMCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with in-built Wi-Fi / Bluetooth and Deep Sleep Operating features make it ideal for IoT projects.

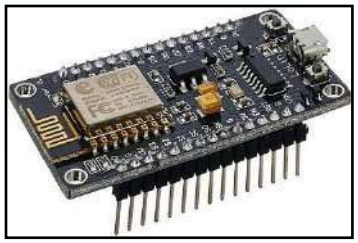


Figure 3.2

B. MOTOR DRIVER L298N

L298N motor driver IC has many applications in the embedded field, especially on the robotics side. Most of the microcontrollers operate on very low voltage (5v) and current while the motors require higher voltages and current So, the microcontrollers cannot provide them such higher current. For this purpose, we use motor driver ICs.

The motor driver is a little current amplifier. It takes a low current signal and gives out a high current signal which can drive a motor. It can also control the direction of the motor. Motor drives are of many kinds depending upon the maximum supply voltage, maximum output current, rated power dissipation, load voltage, and number outputs, etc. We have used motor driver L298N. L298N is an integrated circuit multi watt 15 package and capable of giving high voltage. It is a high current dual full-bridge driver that is designed to accept standard TTL logic levels. It can drive inductive loads e.g., relays, solenoids, motors (DC and stepping motor), etc.

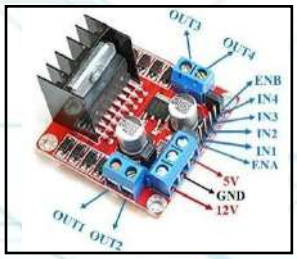


Figure 3.3

C. ULTRASONIC SENSOR

The HC-SR04 Ultrasonic Distance Sensor is a sensorused for detecting the distance to an object using sonar. The HC-SR04 uses non-contact ultrasound sonar to measure the distance to an object, and consists of two ultrasonic transmitters (basically speakers), a receiver, and a control circuit.

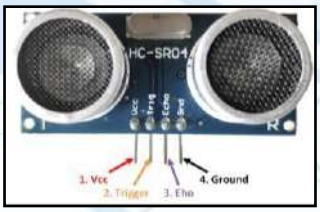


Figure 3.4

IV. WORKING

The proposed system uses Wi-Fi as wireless mode of communication so, first step is to establish a connection between the android application and controller. For this connection to be made controller hosts a web server and initiate a Wi-Fi hotspot to which user have to connect before sending commands or opening application. After a successful connection, user can send commands using applications either by text or by voice. The commands to be used are listed in the application also, user can modify these commands as per his/her own convenience. After typing or saying as soon as user hits send button these commands are then converted and parsed as a set of five different variables such as f_b (forward-backward), l_r (left-right), d (distance), li (headlights), and m (mode), for example, if a user sends a command forward then it is converted to the value "1,0,5,0,0", where "1" means forward and "5" means default distance, detailed list of commands is cited in *Table 5.1*. These commands, which are converted to the set of variables, then are sent to the controller. The controller receives the set of variables as a single string, from which the values for different variables are extracted. These variables are then tested for the operation of every aspect of the rover, such as the "li" variable is used to turn on and turn off the headlights of the rover if its value is "1" and "0" respectively, once turned on the headlights will remain in the same state until said to turn off. The rover is fitted with an ultrasonic sensor to avoid obstacle collision. To avoid an obstacle, the controller constantly commands the sensor to send a trigger pulse at certain time intervals through the TRIG pin which is connected to one of the GPIO pins of the controller, and then receive the echo pulse from which bounce back from the obstacle in front through ECHO pin which is also connected to one of the GPIO pins of the controller. After calculating the time taken by the echo pulse to bounce off the obstacle and come back to the sensor, the distance is calculated by formula

$$distance = \frac{(time\ taken * speed\ of\ sound)}{2} \text{ or}$$

$$\frac{(duration * 0.034)}{2}$$

The L298n motor driver is used to control all four DC motors of the rover for all possible movement. It is connected to the controller via 6 GPIO pins which decide the direction rotation and speed of rotations of the motor. When commanded by the user to move forward all four motors rotates clockwise for a certain period. As for the case of turning left or right, the two motors on the left side of the rover turn clockwise and the two motors on the right side turn anti-clockwise, and vice versa for the right side making an angle of 30° on either side. But, when

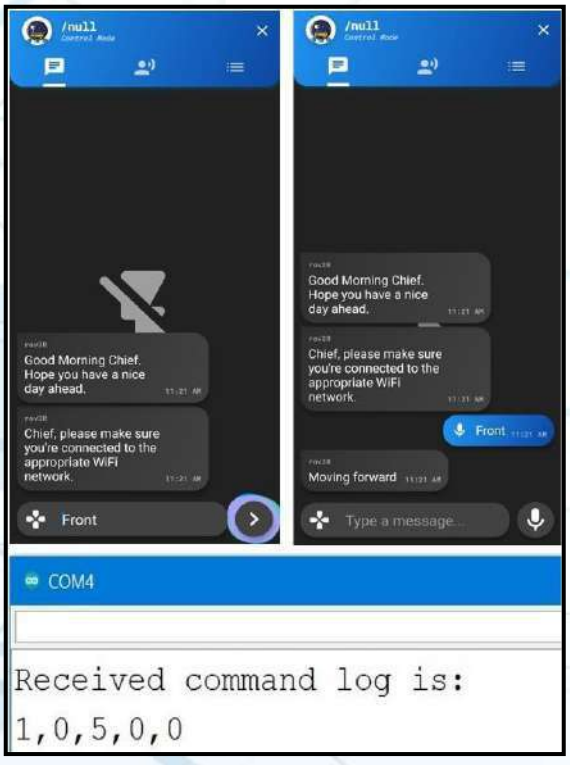
instructed to move backward, the rover will first make a U-turn and then move ahead either by default distance or as instructed by used. The motor driver is powered by the batterywhich in turn is powering the microcontroller through a 5v output pin by short-circuiting the 5v enable pins. A switch is connected between the battery and the motor driver which is used to disconnect the power supply entirely.

This system has two modes of operation i.e., control mode and autonomous mode. By default, the ROV is in control mode in which the user can control the rover entirely with obstacle avoidance. The rover will always move with a default distance of 1 foot upon being instructed. The working of obstacle avoidance is such that if encountered by an obstacle the rover will first stop moving and then move left by 30° take a reading of empty distance and then move back to its mean position and then move right by 30° and take a reading of empty distance in front of it. And will start moving in the direction where is more empty space available. If a situation arrives where the rover is stuck in a narrow place it has to come back the same path, the rover will first stop, move left by 30° and right by 30°, and then compare the distance, if it cannot go in either direction it will again move left and right by 30° from the same position as earlier until it finds enough space ahead to move forward. The rover will remain in autonomous mode until instructed to switch to control mode or switched off completely.

V. SOFTWARE IMPLEMENTATION

To make software framework for this project software implementation is divided into 2 section i.e., User Side software and Controller Side software.

In User side software using android studio and flutter package application is designed for communication and in Controller side software what happens after receiving commands is been programmed using Arduino IDE software. Following table shows the detailed list of commands sent and what controller receives.



Fi gu re 5. 1

Sr. No.	Command	Description	String *(f_b, l_r, d, li, m)*
1.	Forward	Moves forward	1,0,5,X,X
2.	Forward with distance (say 50)	Moves forward 50 feet	1,0,50,X,X
3.	Backward	Moves backward	-1,0,5,X,X
4.	Backward with distance (say 50)	Moves backward 50 feet	-1,0,50,X,X
5.	Left	Turns left by 30º	0,-1,X,X,X
6.	Right	Turns right by 30º	0,1,X, X, X
7.	Stop	Stops instantly	0,0,X,X,X
8.	Headlights on	Switches on the headlights	-2,-2,5,1,X
9.	Headlights off	Switches off the headlights	-2,-2,5,0,X
10.	Auto Mode	ROV is independent and finds an obstacle free path automatically	-2,-2,5,X,1
11.	Control Mode	User need to control the ROV indefinitely	-2,-2,5,X,0
12.	Recall	This will send all the stacked movements in inverted format	*,*,X,X,X
13.	Reset	This will clear the Movement Stack and set all the variables to 0.	0,0,0,0,0

** = Inverted Value (1 <-> -1); X = Don't care*

Table 5.1

VI. RESULTS

A. *User Interface*

Following is the user interface of application designed using android studio.

Figure 6.1

B. *Hardware Images*

Following are the images of ROV fabricated:

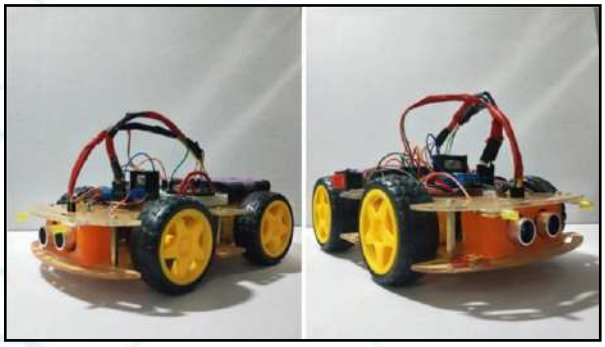


Figure 6.2

The complete development of the project was discussed and this system was divided into the following stages:

1. *Problem definition stage:*

It is the very first step of the project. It precisely defines the aim and the and target of the project. The aim is to design an ROV which can be controlled from mobile by voice commands. The vehicle can detect obstacles and follow the path as commanded by the user.

2. *Designing block diagram:*

At this stage, we have broken down the project into broad categories (Blocks).

This provides a basic overview. It helps us in identifying the direction in which we must move.

3. *Designing circuit diagram:*

The circuit diagram is very helpful in showing how the different components will be linked to each other. It supplements understanding the real working of each component.

4. *Purchasing components from the market:*

After the circuit diagram, it became very easy to identify which components are needed. The required components were then purchased from the market.

5. *Testing individual components:*

It is very important to test the individual components before assembling them. This helps in identifying compatibility and faults in the very early stage. This greatly helps in reducing the load on the troubleshooting stage.

6. *Assembling the hardware:*

Assembling the hardware is the early stage of project implementation. All the components are checked for compatibility with each other. The hardware is then assembled.

7. *Writing the code for the hardware:*

All the individual components are controlled by the ESP8266 microcontroller.

A set of instructions need to be written in the form of code for the microcontroller.

These codes are written according to set goals and then loaded on the microcontroller.

8. *Testing the code:*

After loading the code, the hardware is tested to see if it is working as expected. When certain expectations are not met then code is modified and testing is repeated.

9. *Writing algorithm for the android software:*

In this preliminary stage, the logic of the software is defined. This gives the basic flow and the code gives an overall idea.

10. *Writing and compiling the code:*

The code is written referring to the algorithm and then compiled to check for errors.

Various errors like syntactical and logical errors are encountered. The compiling part helps get rid of the issues.

11. *Testing and running the software with hardware:*

The android app controller is connected with the vehicle. Certain commands are given to check if the output matches the expectation. The vehicle failed to respond to certain commands which were then rectified by changing the code

VII. CONCLUSION

In this project, we have successfully controlled rover using voice commands through an android mobile application. The connection built between the application and microcontroller was using android WIFI. A rover can process real-time transmitted instructions and can act accordingly.

In this project, the rover is build using an ESP8266 microcontroller with limited interfacing pins available. The android application developed is to communicate with the microcontroller on the vehicle. Additionally, it is intended to provide an easy user experience.

Autonomous vehicles have gained significant momentum in recent years, along with the potential of self-driving cars.
These types of rovers can also provide surveillance in a specific region. It can also drive on rough and dangerous terrain autonomously without endangering the life of the driver

VIII. FUTURE SCOPE

The performance of this system can be enhanced by using more advanced controllers with various peripheral devices connected. Using camera and other sensors, live camera feed inspection class vehicle can be made. Also, using cutting edge technologies human follower rover can also be fabricated.

ACKNOWLEDGEMENT

It gives us great pleasure and immense satisfaction to present this report on our project "Voice controlled ROV/UAV", which became possible due to the unstinted guidance and focused direction of, Dr. Sanjeevkumar Srivastava, Electronics & Telecommunication Department.
We express our sincere gratitude to Dr. Avinash Vaidya, HOD, Electronics & Telecommunication Department without whom it would not have been possible to successfully accomplish our project.
We also thank to our senior faculty members of Electronics department, Prof. Ajit Saraf, Prof. Sonali Kathare, Prof. Salim Jafri for their time-to-time suggestions to develop the project. Furthermore, we are indebted to the Principal Dr. Sandeep Joshi whose constant encouragement and motivation inspired us to do our best.
Last, but not the least, we sincerely thank our family members, colleagues and all the others who directly or indirectly contributed in making our task easier.

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Voice Operated Elevator

Aishwarya Pokharkar, Niriksha Poojari, Harish Pawar, Amey Patil

***Abstract*— This project presents the look and construction of voice operated elevator with an emergency indicator. This device acts as a human-machine communication system. Speech recognition is that the method of recognizing the spoken words to require the mandatory actions in line with the commands. Speech Recognition could be a system that functions to convert auditory communication into a computer file. The system input is human speech. The main purpose of coming up with this method is to control the Elevator by mistreatment voice commands by the user. It aims at serving unfit, short-height folks and physically challenged persons. This projected system is incredibly abundant convenient throughout the COVID-19 pandemic.**

***Index Terms*— Speech recognition, Arduino, IR sensor, AMR_voice**

I. INTRODUCTION

Elevators are taken into account Associate in Nursing inescapable a part of our society. But Elevators until currently are all switched primarily based that it needs humans physical interaction for its movement. So considering completely different aspects of automatic technology tend to come up with a concept of planning the elevator that may be automatic which can perform all the task mistreatment voice commands of users as input rather than physical input with simply giving a voice command the user can reach the destined floor. This project better fits for blind, paralyzed and physically challenged individuals, as well as regular individuals to move from one floor to other without the use of switches. Manual work might give ease to the user to achieve their destined floor throughout peak hours and can conjointly provides ease to physically challenged individuals. Elevators are controller devices that use a switch mechanisms for operation. Either the person wishes to travel in down or upward direction, uses the computer keyboard or perhaps for Associate in emergency stop or to open & shut the elevator door. In today's life, we will notice a colossal kind of housing complexes packed in a procurable locations with multi storage building capability. This project higher fits for blind, unfit and physically challenged people. Trying towards the current scenario of COVID- 19. Manually operated elevate encompasses a high rate of spreading the virus. The essential explanation for planning this method is to perform elevator operations via voice directions. Speech recognition systems are a crucial part of the project. The speech recognition of the elevator system permits the communication mechanism between the user and also the Arduino primarily based mechanism.

II. PROPOSED SYSTEM

The main goal of the proposed system is to design and implement a speech operated elevator system. To reduce physical requirements and increase safety measures during the COVID-19 pandemic. The voice operated system is the main part of this project. Voice-to-text converter software is a communication mechanism between the user and the Microcontroller. Speech is the best and ideal method to control the elevator. The system input is human speech. The system will identify spoken words to input data for control equipment. The project makes use of a DC geared motor for the moving of lift. The Microcontroller is programmed, with the help of embedded C programming. The microcontroller is capable of communicating with all input and output modules of an elevator. The

Bluetooth module is used for the wireless connection between the user and controller.

III. BLOCK DIAGRAM

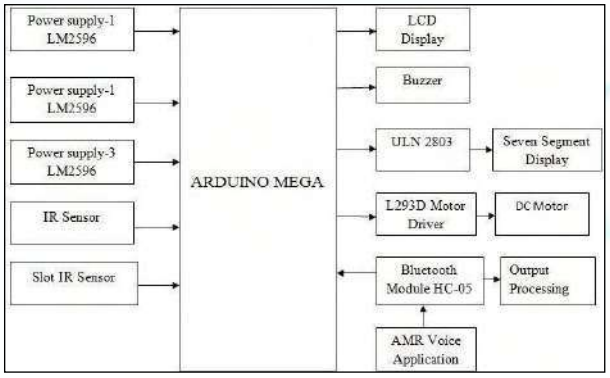

Fig: Proposed block diagram

IV. WORKING PRINCIPLE

In this project, we use Arduino Mega as the main Controller. Two LM2596 DC to DC converter is used to give supply to all circuitry. One LM2596 is used to give supply to Arduino Mega, Wireless Bluetooth Module, Seven segment display ULN2803, LCD display and to the three Slot IR sensor. Second LM2596 is used to give supply to the DC motor driver L293D, to the buzzer & three IR sensors. Now we see the working of this project. Here we make one elevator module with two floors. On each floor, we connect one IR sensor and seven-segment display. Here IR sensor is used to detect the person who comes in front of the elevator and seven segment display is used to display the actual location of the elevator i.e. it displays the current floor of the elevator. So to get the elevator's current position i.e. which floor the elevator is, this work is done by the slot IR sensor. When the elevator goes up & down then one side edge of the elevator passes through the Slot IR sensor so arduino mega gets the signal that where the elevator is currently located. When someone wants to use the elevator then they will come in front of the lift. Then the IR sensor mounted on that particular floor gets detected and gives a signal to the controller, so the controller checks by using a slot sensor that the elevator is on which floor and displays on seven segment display. When actually elevator comes where the IR sensor is detected then the person has to tell the required floor number through the app. So this value is getting controlled through the Bluetooth Module. After this, the DC motor gets ON and the elevator will reach the required floor and also display the floor number on a seven-segment display.

V. HARDWARE DESCRIPTION

A. Microcontroller ATmega2560

The Arduino Mega relies on the ATmega2560 Microcontroller. The ATmega2560 is an associate degree 8-bit microcontroller. We'd like an easy USB cable to attach to the pc and therefore the AC to DC adapter or battery to urge started with it. The Arduino Mega is organized victimization the Arduino (IDE), which may run on numerous platforms. Here, IDE stands for Integrated Development atmosphere. The functioning of the Arduino Mega is comparable to alternative Arduino Boards. We'd like not to need additional parts for its operating. The ATmega2560 Microcontroller is per most of the shields of Arduino UNO. The advantage of victimization the Arduino Mega board over alternative boards is that it provides the advantage of operating with additional memory areas. It's higher process power, which may facilitate the North American nation to figure with the number of sensors at a time.

B. HC-05 Bluetooth module

HC-05 Bluetooth Module provides change mode between master and slave mode which implies it's ready to use neither receiving nor transmission information. Examination it to the HC-06 module, which may solely be set as a Slave, the HC-05 are often set as Master moreover that allows creating communication between 2 separate Arduino Boards. You'll use the Bluetooth module merely for an interface replacement to ascertain the association between MCU, laptop to your embedded project, etc.

C. L293D Motor Driver

The L293D could be a sixteen-pin motor driver IC consisting of quadruple high-current half-H drivers. it's designed to supply biface drive currents of up to 600-mA at voltages from four.5 V to thirty six V. each device is designed to drive inductive hundreds like relays, solenoids, dc and bipolar stepping motors, moreover as alternative high-current/high-voltage hundreds in positive-supply applications. All inputs are TTL compatible. Every output could be a complete totem-pole drive circuit, with a Darlington semiconductor sink and a pseudo-Darlington supply. Drivers are enabled in pairs, with drivers one and a couple of enabled by one, 2EN and drivers three and four enabled by three, 4EN. Once associate degree modify input is high, the associated drivers are enabled, and their outputs are active and in part with their inputs. Once the modifed input is low, those drivers are disabled, and their outputs are off and within the high-impedance state. With the correct information inputs, every combination of drivers forms a full-H (or bridge) reversible drive appropriate for magnet or motor applications.

D. LM2596 DC-DC Converter

A DC-to-DC converter is an associate degree electronic circuit or mechanical device that converts a supply of electricity (DC) from one voltage level to a different one. It's a sort of electrical power converter. Power levels vary from terribly low (small batteries) to terribly high (high-voltage power transmission). This is an associate degree LM2596 DC-DC buck converter diminution module with high-precision potentiometer, capable of driving a fill up to 3A with high potency, which may work with Arduino UNO, alternative mainboards and basic modules. Once the output current keeps bigger than two.5A (or output power bigger than 10W), please add a sink on that.

VI. CONCLUSION

The voice-controlled elevator is of great use. It works effortlessly. This project tries to throw light on the voice recognition system which can be used to modify the conventional elevator and make it more efficient and usable for physically challenged 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. It will provide ease to the user for using the elevator service and would also provide great benefit to physically impaired people thereby resolving their dependencies on others for using the elevator. It resolves the issue of pressing the switches all the time for moving up or down which becomes quite difficult in crowded hours.

VII. FUTURE SCOPE

This device is extremely useful for dysfunctional, short height folks and physically challenged persons. The speech recognition system provides the communication mechanism between the user and therefore the arduino based mostly elevate management mechanism. This system acts as a human-machine communication system. Speech recognition model is that the methodology by that the elevator will be controlled. Speech recognition is that the method of recognizing the spoken words to require mandatory actions consequently. The voice directions are given by the user as input and therefore the controller judges whether or not the instruction is to elevate upwards or downward, and per the user’s voice the switch mechanism controls the elevate. Throughout the covid-19 pandemic it’s higher to require safety measures, our projected system will overcome most the drawbacks of the manual system.

ACKNOWLEDGEMENT

We have immense pleasure in expressing our thanks and a deep sense of gratitude to our guide Prof. Deepti Nair and our co-guide Prof. Dinesh Tiwari, for their guidance throughout this project. We also express our sincere thanks to Dr. Avinash Vaidya, Head of the Department, Electronics and Telecommunication for extending his help. We wish to express our profound sense of gratitude to Dr. Sandeep Joshi, Principal of Pillai College of Engineering, New Panvel for encouraging us.

Finally, we express our sincere gratitude to all the members of faculty who contributed their valuable advice and helped to build the idea of this project.

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Patient Health Monitoring System using Internet of Things (IoT)

Suraj Krishnamurthy, Divya Wairkar, Govind Rao, Shivashish Sanyal

***Abstract*- One main area of research that has seen the adoption of the technology in the healthcare sector. The increased use of technologies and smart devices in the health zone has brought an extraordinary effect on the world's critical health care. The current pandemic situation of "COVID - 19" is demanding the people take good care of their health and monitor them properly on a regular basis. As social distancing has become one of the most important aspects nowadays, we wanted to implement and design a system that could monitor the health parameters of the people by obeying social distancing norms using the latest and newly prevalent IoT technology. In this project, by keeping in mind the mentioned points, we have decided to make a system that will monitor the health parameters like body temperature, heartbeat, and oxygen level. The data will get saved automatically and will be sent to the online open-source IoT platform "Thingspeak" so that data analysis is performed by the doctor. There will also be an option for virtual online communication with the help of a camera. This type of system will be very useful, especially at hospitals. If a nurse is unable to physically attend to the patient, then she can make the patient come virtually online and monitor the parameters at a distance. It is also possible for the patient to make an emergency call using an SOS button in case of any urgency or if any assistance is needed by the nurse.**

***Index Terms*- Healthcare systems, Raspberry Pi, WIFI, Online Communication**.

I. INTRODUCTION

HE technology provides ease in life by providing facilities. To measure the health parameter for every patient every time is not possible manually. So, to keep the health sound and maintained, different technologies are used which provides facilities. To overcome such type of delay the fundamental agenda of this device is to measure the basic and important health parameters such as body temperature, oxygen level, and pulse (beats per minute) of a patient thus generating the data over a particular source platform. It also creates a virtual environment for the patient, doctors, and nurses for a routine check-up thus leading to less time consumption and quick response.

In this project, by keeping in mind the mentioned points, we have decided to make a system that will monitor the health parameters like body temperature, Heartbeat, and oxygen level. The data will get saved automatically and will be sent to the online open-source IoT platform "Thingspeak" so that data analysis is performed by the doctor. There will also be an option for virtual online communication with the help of a camera. This type of system will be very useful, especially at hospitals. If a nurse is unable to physically attend to the patient, then she can make the patient come virtually online and monitor the parameters at a distance.

II. SYSTEM OVERVIEW

Fig 1. Shows the block diagram for the health monitoring system. The system is designed to read the body temperature, heartbeat and rate of oxygen of the patient at run time. To measure all these healthcare parameters our system uses high frequency sensors to avoid any error in the results. The system mainly focused on collecting the physical parameter and then that information is made available from multiple users.

The detected values should be available for every doctor who is appointed for that patient, for this the detected values should be made local by uploading them on ThingSpeak. ThingSpeak which is an open source IoT application which refresh in every second which shows detected values at runtime.

It will contain the basic information of the patient and the determined values of body temperature and pulse rate (which are refreshed at every second). ThinkSpeak with the help of data analytics helps us view the data in real time in a graphical format, which helps in understanding the data effectively. This data will get stored in a folder of the patient's name which will include his details along with date and time. In case if a patient requires a nurse's assistance for any sort of query so he will press the button and make a call to the nurse's chamber and the available nurse will receive the notification leading to virtual online communication.

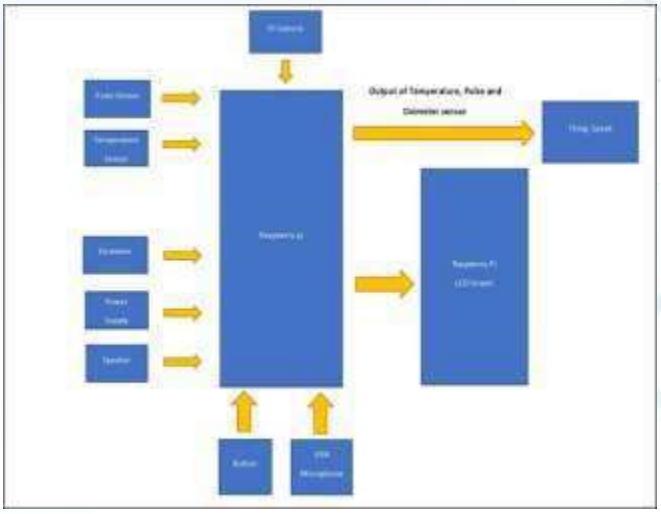

Fig. 1: Health Monitoring System

A. *Introduction to Raspberry Pi*

Fig. 2: Raspberry Pi 8+ Model [31

The Raspberry Pi is a mini computer (consist of processor, graphics card, and memory in a single package). These models were developed in UK, it is about the size of a credit card. The board is developed for the users who wanted to use the system without using the computers and any other operating device. Using this board, the whole system can be operated only the power source is required for Raspberry Pi board. The Raspberry Pi has a Broadcom BCM2835 system on a chip (SoC), which includes an ARMI176JZF-S 700 MHz processor, Video Core IV GPU, and onboard the 256 megabytes of RAM is available. This model is later upgraded (Model B & Model B+) to 512 MB. It does not contain a built-in hard disk but it uses an SD card for booting and storage. The Model B+ uses a Micro SD which is the advance feature of this era. The SD card must contain the operating system (Linux), programs and the data needed to run the Raspberry Pi. Raspberry Pi has the functioning according to the operating system.

This device uses the ARM processor. The health care system consists of Raspberry Pi B+ model which can interface with different parameters measuring units. The Raspberry Pi works only on digital values. In this paper, basic health parameters are considered and monitored.

B. *Pulse Oximeter (MAX30100)*

It acts as a pulse and oxygen level detection sensor. It combines 2 LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse and oxygen level. Operating voltage – 1.8V to 5.5V.

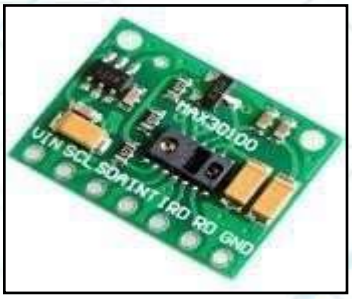

Fig.3:Pulse Oximeter

C. *Pulse sensor*

It is used to measure the pulse of a person. Monitoring is done easily just by placing one's finger on the front side of the pulse sensor. Operating voltage - +5V or +3.3V.

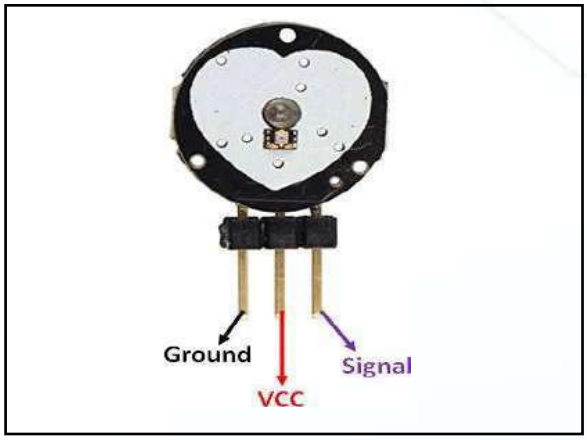

Fig. 4: Pulse sensor

D. 5MP Raspberry pi 3 Camera

The camera is used in this project to establish virtual online communication with the doctor in case of any emergency.

Specifications:
• Resolution – 5MP
• Lens Focus – Fixed focus

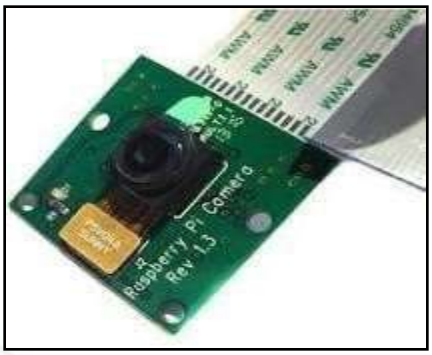

Fig. 5: Raspberry pi 3 Camera

E. ADS 1115 (ANALOG TO DIGITAL CONVERTER)

The main purpose of the ADS1115 16-Bit 4-Channel ADC is to serve as a low-consumption, powerful and accurate analogue-to-digital converter that can be adapted to perform different conversions. The supply ranges between 2 and 5.5 V and allows you to adapt your chosen microcontroller, for example an Arduino or Raspberry Pi. Regarding the transmission channels, these can be used as single-ended input channels (4) or differential channels (2). In our project, ADS 1115 is used for accepting input from pulse sensors. This will prove useful to all those not processing a microcontroller with an analogue to digital converter.

Specifications:
Precision :- 16 bits
Operating voltage :- 2 – 5.5V
I2C interface :- upto 4 pin selectable addresses
Consumption :- 150 µA in continuous mode

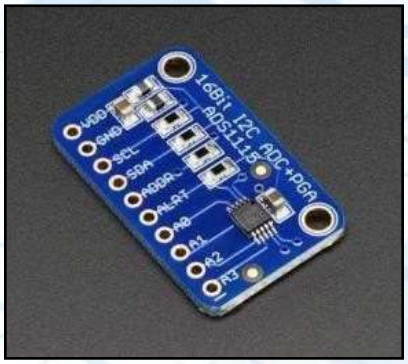

fig .6: ads 1115 (analog to digital converter)

F. Temperature Sensor probe (DS18B20)

This is a 1-wire programmable Temperature sensor from maxim integrated. It is widely used to measure body temperature as well as detect temperature in hard environments like in chemical solutions. Each sensor has a unique address and requires only one pin of the MCU to transfer data so it a very good choice for measuring temperature at multiple points without compromising much of your digital pins on the microcontroller.

Specifications:
Programmable digital temperature sensor
Temperature Range :- -55°C to +125°C
Communicates using 1 – wire method
Output Resolution :- 9-bit to 12-bit multiplexing

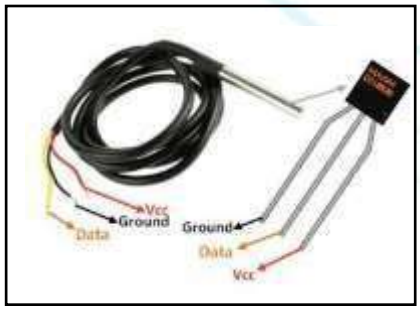

Fig. 7: Temperature Sensor probe (DS18B20)

III. SOFTWARE REQUIREMENTS

Python programming: It is the language which can be interpreted very easily i.e. Can be read and write. As it is platform independent, has vast libraries and supported by the Raspberry Pi, thus making it suitable for our project.
ThingsSpeak: It allows you to aggregate, visualize, and analyze live data streams. Once you send data to ThingSpeak from your devices, you can create instant visualizations of live data without having to write any code.

IV. RESULT

Fig 8 Shows the webpage showing health parameters with patients' information through the IoT platform open-source application 'ThinkSpeak'. Our system uses different types of sensors to measure healthcare parameters of the patient and send that information to ThinkSpeak. ThinkSpeak with the help of data analytics helps us view the data in real time in a graphical format, which helps in understanding the data effectively. Further our system also provides an online video communication platform, where the doctor can consult the patient virtually which will save the time of both doctor and patient.

Fig. 8: Output in ThinkSpeak IoT platform

V. CONCLUSION

IoT has proved to be one of the key technologies for solving difficult problems in the healthcare industry. Here, IoT(Internet Of Things) conducts crucial health information through high-frequency sensors that could effortlessly be shared with the physicians to guide the patient to their wellbeing. IoT has become so strong that it has the potential to reach each and every human on the planet at some point or the other in their lifetimes. Gone are the days when a patient had to wait for a significant amount of time to get the reports for their check-up.

Using our system will not only provide the patients with instantaneous results of the measured healthcare parameters, but also help them to consult with the doctors using the online video communication platform.

So, by working on this system our group is attempting to provide smarter solutions to the challenges that one faces when they measure various healthcare parameters which are also made by using limited & non bulky equipment using IoT.

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EVOLUTION OF TELECOMMUNICATION

1876

MARCH 10

Alexander Graham Bell conducted a successful experiment with the telephone.

1935-1943

FIRST AUTOMATIC ANSWERING MACHINE

Willy Müller invented the first automatic answering machine.

THEORY OF COMMUNICATION

Dr. Claude Shannon first theorised his Mathematical Theory of Communication, which introduced the concept of using binary code (0 and 1).

1968

THE INTERNET

Initially developed by the US Defence Department in 1968 for military reasons. The internet is basically a global network of computers.

1973-1984

FIRST MOBILE PHONE CALL

Martin Cooper made the first mobile phone call

FIRST MOBILE PHONE SOLD

The Motorola DynaTAC 8000X is the first mobile phone that was available commercially.

1995

SMS (SHORT MESSAGE SERVICE)

The 'Special' Nokia tone for receiving SMS text messages is Morse code for 'SMS'

FIRST INTERNET PHONE SERVICE

The first Internet Phone Service was created by the Israeli company VocalTec.

2000 AND BEYOND

INFORMATION APPLIANCES

'Information Appliances' make Internet mobile, wireless "Web to Go", voice activated dialling, phone numbers for life, phone calls and Internet on your TV, TV via wireless phones, and much more.

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B.M.S.
B.Sc. (I.T.)
B.Sc. (Computer Science)
B. Com. (Accounting & Finance)
B.M.M.
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B. E. in Electronics Engineering
B. E. in Mechanical Engineering
B. E. in Electronics & Tele- communication Engineering
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M. E. in Computer Engineering
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B.E. in Information Technology
B.E. in Computer Engineering
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