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FROM THE PRINCIPAL'S DESK

The need for ongoing exploration and innovation is critical in today's engineering world and it demands the highest level of creativity. So it has become essential for today's generation to find ways to embrace new experimental learning processes to succeed and move towards more concrete goals. As Principal, I stand with the thought of providing students with the right platform for opportunities in an environment that fosters academic and co-curricular learning.

I am happy that the faculty members and students of electronics and telecommunication department with their teamwork succeeded in bringing out such an innovative journal which portrays various technological advances in the field of electronics and telecommunication. The encouragement and support provided a framework for students to showcase their talent. It gives great pleasure to see the creative expression of students who had contributed to this journal. I am extremely delighted with this journal and I wish to the department staff and students success in their future endeavours.

WITH BEST WISHES,

DR SANDEEP JOSHI

PRINCIPAL

PILLAI COLLEGE OF ENGINEERING

FROM THE HEAD OF DEPARTMENT'S DESK

It has been an absolute pleasure seeing the final year students of the EXTC department work on their projects. The innovative ideas thought and implemented by them is quite impressive. Not only have they made sure their projects are efficient, but they also made sure that it is cost-effective, a factor one needs to keep in mind while making a project with actual use. The papers submitted by them to the journal showcase their work to the rest of the college. By the means of the project, it has been made sure that the work done by these students does not go unnoticed. The efforts taken by the journal committee to make sure the whole college sees the talent of our department is much appreciated and applauded. I wish the students good luck for their future and hope the continue taking such innovative approaches in life.

WITH BEST WISHES,

DR AVINASH R. VAIDYA

HEAD OF DEPARTMENT

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

FROM THE TEACHER'S DESK

The annual journal of the EXTC department is a place where the projects formed by the student of the department are showcased in front of the whole college. The papers submitted by the students act as an excellent source of information that can be referred by the other students. The hard work done by the Journal committee has been immense. The committee members not only designed the journal but also lend a hand to the students writing the papers. The punctuality with which the work has been done by them is really commendable. The technical papers submitted this year showcase how innovative the thinking of the students has become and indicates towards a promising future. I wish good luck to the committee and look forward to more wonderful issues of this journal.

PROF. JAYASHRI D. BHOSALE

ASSISTANT PROFESSOR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Project Work is a learning experience which aims to provide students with the opportunity to synthesize knowledge from various areas of learning, and critically and creatively apply it to real-life situations. This year's projects have all been very much fascinating and at the same time productive in their own way. We came across various networking projects, energy management based projects which are the need of present-day scenario and many more such amazing works. All of which was cost-effective as well as creatively executed, showing the capability of the students to think outside the box. The members of the journal committee have worked immensely well in showcasing the potential of our department students. The journal team was swift enough to get things done before the deadlines and made sure that the papers submitted did not have a shred of error. I appreciate the cooperative spirit and the attention to detail that enabled us to streamline the entire process to achieve success and meet our goals.

PROF. SUCHITRA PATIL

ASSISTANT PROFESSOR

ELECTRONICS AND TELECOMMUNICATION ENGINEERING

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IOT BASED SMART PARKING SYSTEM USING RASPBERRY PI

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Department of Electronics and Telecommunication Engineering, New Panvel

***Abstract*- Vehicle parking manager is a concept where technological solutions are designed to overcome the issues that may arise while finding vacant parking slots. It has been observed that a considerable amount of time gets wasted while trying to find a spot for parking vehicles at large public parking lots, and if no slots are available, then the parking has to be done elsewhere, thus resulting in more time being wasted. The cost-effective technology used in this project enables customers to check if parking slots are available at a specific location such as a mall or a movie theatre, using an Android application, and also to book an available slot for a specific period for the vehicle using the same. The customer information and the booking details are stored on a continuously-updating central server, which is then used for payment purposes. The vehicle can be parked at the booked slot after verification, for which hardware is used. This project primarily makes finding parking slots more efficient and less time-consuming, and also eliminates the need of staff to be employed for such purposes at these places, thus increasing the profit margins. The above project has been successfully implemented on a prototype with all the above features included in it.**

***Index Terms*- Hardware, Android application**

I. INTRODUCTION

Variety of occasions turn up when we visit various public places like shopping malls, 5-star hotels, multiplex cinema halls, etc. The difficulty we encounter at these places is finding the availability of parking space. Most of the times we need to traverse through multiple parking slots to find a free space for parking. The problem becomes more tedious if the parking are multistoried. Thus the problem is time consuming. This situation calls for the need for an automated parking system that not only regulates parking in a given area but also keeps the manual intervention to a minimum. India′s urban population is around 30% of its total population. India′s six major metropolises increased by about 1.9 times during 2000 to 2015. In context to the urban transport system, as number of motor vehicles went up, parking is one of the major concerns in terms of space occupation in these places. Making roads more expensive than parking infrastructure. Cars being parked on roads causing traffic congestion and pollution. In traditional car parking systems, the driver has to search for the slot and park the car on his own. This becomes inconvenient especially on weekends and holidays in public places such as malls and multiplexes. The main objective of this project is to design a solution for overcoming the parking issues that exist in public places such as malls multiplexes etc. especially on weekends. The features include unique identification for each vehicle, display of available parking slots on the mobile platform, possibility of making reservations for the very same, maintenance of a database.

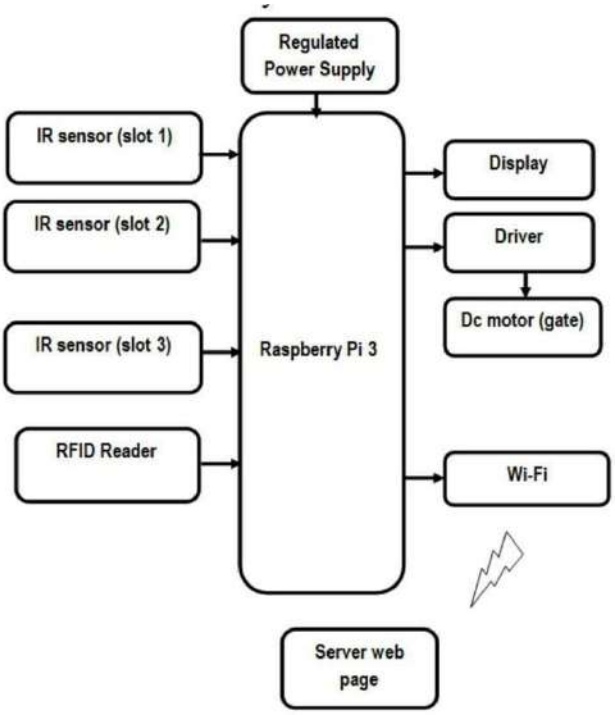
II. LITERATURE SURVEY

Konda Vinod, Mr. K.Raja Sekhar, Mr. T.Saran Kumar, Mr. M.Chinnayya reported one of the intelligent systems for car parking has been proposed by making use of Image processing. In this system, a brown rounded image on the parking slot is captured and processed to detect the free parking slot. The information about the currently available parking slots is displayed on the 7-segment display. Initially, the image of parking slots with brown-rounded image is taken. The image is segmented to create binary images. The noise is removed from this image and the object boundaries are traced. The image detection module determines which objects are round, by estimating each object's area and perimeter. Accordingly, the free parking space is allocated. Smart Parking System using optic Wireless Sensor Network : This system experienced the use of video cameras where they are deployed in the parking slots and are able to capture the license plate of the car and also monitor the parking spaces. Smart Parking System using IR sensors: This proposed system uses feedback mechanism to find the availability of parking spaces. Infrared sensors are used to monitor the parking spaces. Proper utilization of slots is managed properly. This could be implemented in a small budget. Smart Parking System using RFID: This system uses RFID to match the vehicle's unique RFID tag with the value in the database when it is read by the RFID reader in the parking lot entrance. This is a fast method of identification and quite cost efficient.

III. THE PROPOSED SYSTEM

The system will require a Raspberry Pi with various IR sensors attached to it. The IR sensors will determine the parking status. The operating system of the raspberry Pi is Raspbian and to see the status of the parking in the parking lot we use the display unit for monitoring and remote server page. The parking lot setup (Raspberry Pi and IR sensor) will be accessible to the server over Internet of things. The server webpage will be used by users to check the parking status on their cell phones, and hence it will be the User interface of our project. The Raspberry Pi is interfaced with the IR sensors to determine the parking status will be the hardware setup of the project. Hence the raspberry pi becomes the hardware module of the system. This system needs internet webpage with three slot buttons and boxes.

A. BLOCK DIAGRAM



This system will be running in two modes manual and online. In manual when vehicle reads to the parking place then system reads through RFID reader and deduct some amount from the RFID tag of particular vehicle. Then the door is opened using dc motor to park the vehicle. Then the Display is connected at parking area which shows which slot is empty which is detected by using IR sensor. When a vehicle parks at certain slot that information is updated in display as well as in server page. In online, initially when user wants to book a slot which is empty then he/she can simply click on that button to book. Then later he/she can park the vehicle as in manual process. To enable a user to use the smart parking system, user need to register with user ID with vehicle number. User can set up the default payment option in his account settings. The android app is built for booking parking slot and payments. The application is used to find the free slot and user need to specify the estimated time of arrival and parking slot usage start and end time. The IR sensors used to identify the parking slot is free or occupied. Parking slot is empty LED shows slot number N (empty), D (occupied). After booking for free parking slot, if the vehicle enters the entrance gate, it is assumed that each car has built in RFID card and RFID reader verifies the vehicle and is authenticated. The parking slot may be allotted for small vehicle and large vehicle.

B. IMPLEMENTATION DETAILS

☒ Mobile App: Parking App

The mobile app is developed using Android bundle and Android Studio application platform is used. Application Modules - Registration, Login, selecting date and timing or how many days, Parking slot selection, Price calculation and payment. App also supports current booking and advance booking option. If the booked vehicle doesn't enter parking slot within fifteen minutes of threshold booking is automatically canceled.

Identifying Free Parking Slot

Free slot identification is verified using Infra-Red (IR) sensors. The IR sensor used for each parking slot. The infra-red sensor detect the vehicle in infra-red waves reflected and covers short distance. A pulse of IR light is generated by the IR sensor and emitted by emitter. Detected the information will be send via WI-FI module to transfer the information to Raspberry pi board.

Authenticating User Vehicle

It is assumed that each vehicle has built in RFID tag and vehicle is authenticated RFID reader. First time users need to register to avail the facility. Authenticated vehicle would get a pass for entry and slot number would be allocated.

Classifying Parking Slot

The parking slots may accommodate large or small size car. During authentication, user fills the user detail in the type of car.

Navigation to parking Slot

One of the main feature of this application is navigation service allotted to parking slot. Mobile app would start navigating from the gate to the allotted parking slot. Google map is linked with GPS and app to provide path navigation to the parking slot.

Visualization

Owner of the parking center can visualize the booking details, time to time slot availability, bill details periodically. Webpage is created using PHP and parking information At the back end, My SQL database is used to store the information. The web page contains local host and global host connectivity.

C. HARDWARE DESCRIPTION

☒ Raspberry Pi 3

The RPi 3 is a low cost, credit-card sized computer that plugs into a computer monitor TV, and uses a standard keyboard and mouse. It is a capable little device that enables people to explore computing, and to learn how to program in languages like Scratch and Python. It is capable of doing everything one would expect a desktop computer to do, from browsing the internet and playing high- definition video, to making spreadsheets, word- processing, and playing games.

IR Sensor

The IR sensor module consists of mainly of the IR transmitter and receiver, opamp, variable resistor, output LED. It is used as an obstacle detector to transmit an infrared signal, the infrared signal bounces from the surface of an object and is received by receiver.

Ultrasonic Sensor

These sensors work by emitting sound waves at a frequency too high for human to hear. They then wait for the sound to be reflected back, calculating distance based on the time required.

LCD Display

The 16X2 LCD display is a basic module commonly used in circuits. It displays 16 characters per line in 2 such lines.

D. SOFTWARE DESCRIPTION

Python programming

The RPi 3 can be programmed using Python. It is a powerful programming language that's easy to use (easy to read and write) and with RPi enables to connect one's project to the real world. Python syntax is very clean, with an emphasis on readability and uses standard English.

Java/ Xml

These languages are used in android studio software for app coding and layout building purposes.

My SQL

Query language is used to control database which stores data of the user that is parking customer. It stores the data such as name, address , parking spot , payment details etc.

APPLICATION

Shopping mall

Existing system consists of human resource for managing parking in huge parking area of shopping malls. Our idea can be used to reduce human efforts and time and managed more efficiently.

Smart cities

Smart cities contains number of parking plots which are managed differently by different groups of people. Our system integrates all these plots into one app for better efficiency.

Railway station

Railway stations usually has terrible parking system with huge number of users, so our parking system finds best application in this area.

Restaurants

Some 5 star hotels and restaurants do not have valet parking system so customers can use our system to find an empty spot for their vehicle.

IV. CONCLUSION

Smart parking facilities and traffic management systems have always been at the core of constructing smart cities. In this paper, we address the issue of parking and present an IoT based web application smart parking system. The system that we propose provides real time information regarding availability of parking slots in a parking area. Users from any locations could book a parking slot for them by the use of our web application. The efforts made in this report are indented to improve the parking facilities of a city and thereby aiming to enhance the quality of life of its people. In our system user can view the real view of parking slot of nay register buildings, mall, hospitals, colleges and may more public parking areas. Due to this user has a choice that in what transport system he should use to visit that place.

V. FUTURE SCOPE

We infer that our future work would facilitate parking issues and decrease traffic congestion and pollution created by the search for parking. System can be extended to multi-level and multiple parking areas by making potential changes in the hardware setup. SMS sent through Android Application can be made secure by applying encryption algorithms. Also, for security purpose, Login facility can be provided to the users.

VI. ACKNOWLEDGEMENT

We deeply express our sincere thanks to our Principal sir Dr. Sandeep Joshi for encouraging and allowing us to present the project on the topic "IOT based smart parking system using raspberry pi". We sincerely thank to Head of Department Dr. Avinash Vaidya and our project guide Prof. Ajit Saraf for guidance and encouragement in carrying out this project. We take this opportunity to thank all our lecturers who have directly or indirectly helped in our 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.

VII. REFERENCES

[1] Supriya Shinde1, AnkitaM Patial2, pSusmedha Chavan3,Sayali Deshmukh4, and Subodh Ingleshwar5 "IOT Based Parking System Using Google", I - SMAC,2017,pp.634-636.

[2] HemantChaudhary, PrateekBansal., B.Valarmathi," Advanced CAR Parking System using Arduino", ICACCSS, 2017 HemantChaudhary, PrateekBansal., B.Valarmathi," Advanced CAR Parking System using Arduino", ICACCSS, 2017.

[3] PavanKumarJogada and VinayakWarad, "Effective Car Parking Reservation System Based on Internet of things Technologies ".BIJSESC, 2016, Vol. 6, pp.140 - 142.

[4] Prof. Yashomati R. Dhumal1, Harshala A. Waghmare2, Aishwarya S.Tole2, Swati R. Shilimkar2,"Android Based Smart Car Parking System"- IJREEIE, Vol. 5, Issue 3, pp-1371-74,mar-2016.

[5] Prof. Yashomati R. Dhumal1, Harshala A. Waghmare2, Aishwarya S.Tole2, Swati R. Shilimkar2,"Android Based Smart Car Parking System"- IJREEIE, Vol. 5, Issue 3, pp-1371-74,mar-2016.

[6] Faiz Ibrahim Shaikh, Pratik NirnayJadhav, Saideep Pradeep Bandarakar" Smart Parking System based on embedded system and sensor Network" IJCA, vol.140.pp.45-51.Apr-2016.

[7] Tarek Almahdi and chittruriven katratnum, [2016]"Intelligent automated parking System hacking intimation Features,"IEEE computing and engineering.

IOT BASED WEATHER MONITORING SYSTEM USING RASPBERRY PI

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Abstract-Weather is the day-to-day state of atmosphere that is hard to predict which affects the activities of mankind, it also has significance in many different domains. However, the weather station currently in the market is expensive and bulky which causes inconvenience. The paper proposes a system that monitors weather parameters at a particular place and presents this data as per the user's need. The user can then access this data anywhere in the world and at any time through the internet. The aim of this project is to design a weather monitoring station with real time updates, interfacing it to a cloud platform and analyze these parameters. In this project, a weather station has been assembled which uses Raspberry-pi embedded with sensors to collect weather parameters. The data collected is uploaded to the cloud for further access and analysis. Administrators and users can use a website and mobile application that is developed to display the real-time weather conditions in graphical presentations. Users will receive notification regarding the weather conditions at that particular place.

Index Terms- Weather monitoring, Cloud platform, Raspberry-pi, Weather prediction.

INTRODUCTION

Weather conditions play an important role in our daily life as weather and climate are the most ubiquitous factors for home and environment planning. Nowadays it is possible to monitor weather conditions and collect the respective data due to tremendous development of the Internet. The process of Reading the environmental parameters became easier compared to the past days due to the growth in technology. The miniaturized electronic devices called sensors are used to measure the environmental parameters. The results will be accurate and the entire system will be faster and less power consuming by using the sensors for monitoring the weather conditions. The implemented flow of the weather monitoring station is described in the system proposed in this paper.The system includes a raspberry-pi3 for processing the operations of the sensors and other peripherals. After analyzing the requirements of the application, the wireless communication standard for the system was decided. In our application, we have to make the weather condition information available anywhere in the world. Via a communication link, the measured parameters can be stored in a cloud and can be downloaded to a remote location. For further processing, the recorded data must be physically downloaded to a computer. All the sensor devices in the system should act as a client to send the data to the web server. Wi-Fi router controlled by the raspberry-pi was additionally used for establishing a connection between the sensor network and internet. Once the Wi-Fi module is configured with an internet source, it acts as a client and sends the sensor data retrieved by the user device. The criteria of connecting all the sensors to the internet is Internet of Things (IOT). IOT is The concept of connecting the electronic devices, sensors, and automobile equipment together via the internet.

HARDWARE IMPLEMENTATION AND DESIGN.

This IoT based weather monitoring system is developed and implemented using the powerful development platform Raspberry Pi board which helps to minimize the system hardware. So, use of any external microcontroller, ADC and communication module is avoided here in this project. This system uses Temperature and Humidity Sensor (DHT11), Light Intensity Sensor (LDR), Gas sensor (MQ135), Rain Water Level Measuring Sensor. All these sensors are interfaced with GPIO header of the Raspberry Pi board. Ethernet network is used to get real time monitoring of data from sensors.

A. RASPBERRY PI

The Raspberry Pi 3 Model B is the 3rd generation Raspberry Pi .This powerful credit-card-sized single-board computer can be used for many applications and supersedes the initial Raspberry Pi Model B+ and Raspberry Pi 2 Model B. Whilst sustaining the traditional board format the Raspberry Pi 3 Model B brings you a more powerful processor, 10x faster than the 1st generation Raspberry Pi. Additionally, it adds wireless LAN Bluetooth connectivity making it the ideal solution for powerful connected designs.

B. HUMIDITY & TEMPERATURE SENSOR (DHT11):

The DS18B20 digital thermometer provides 9-bit to 12-bit Celsius temperature measurements. It also has an alarm function with nonvolatile user programmable upper and lower trigger points. The sensor communicates over a 1-Wire bus that by definition requires only one data line (and ground) for communication with the Raspberry Pi. It has a range of operating temperature between 55°C to +125°C and is accurate to ±0.5°C, over the range of - 10°C to +85°C.

C. RAIN SENSOR

Rain sensor is a switching device activated by rainfall. There are two main applications for rain sensors. The first is a water conservation device connected to an automatic irrigation system that causes the system to shut down in the event of rainfall Conditions. The second is a device used to protect the interior of an automobile from rain and to support the automatic mode of windscreen wipers.

D. LCD DISPLAY

LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability and programmer friendly. Most of us would have come across these displays in our day to day life. The appearance and the pinouts have already been visualized above now let us get a bit technical.16×2 LCD is named so because; it has 16 Columns and 2 Rows. There are a lot of combinations available like, 8×1, 8×2, 10×2, 16×1, etc. but the most used one is the 16×2 LCD. So, it will have (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots.

E. LDR

An LDR (Light dependent resistor), as its name suggests, offers resistance in response to the ambient light. The resistance decreases as the intensity of incident light increases, and vice versa. The most common type of LDR has a resistance that falls with an increase in the light intensity falling upon the device. It can act as a sensor, since a varying voltage drop can be obtained in accordance with the varying light. In this Project, the function of the LDR is to detect brightness in a particular geographical region. The value of the resistance varies depending upon the intensity of light, which is incident on the Raspberry Pi.

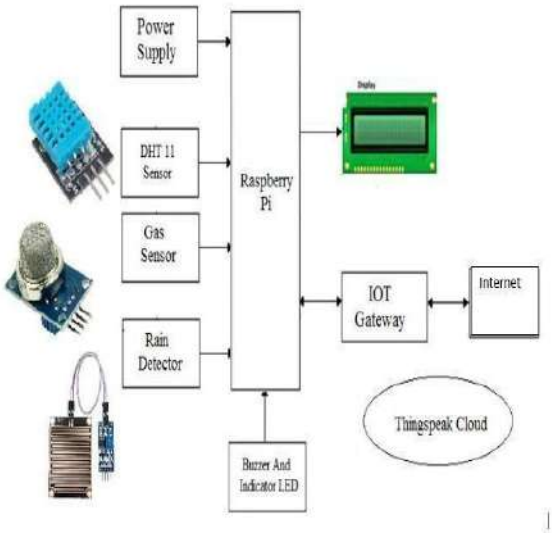
F. GAS SENSOR

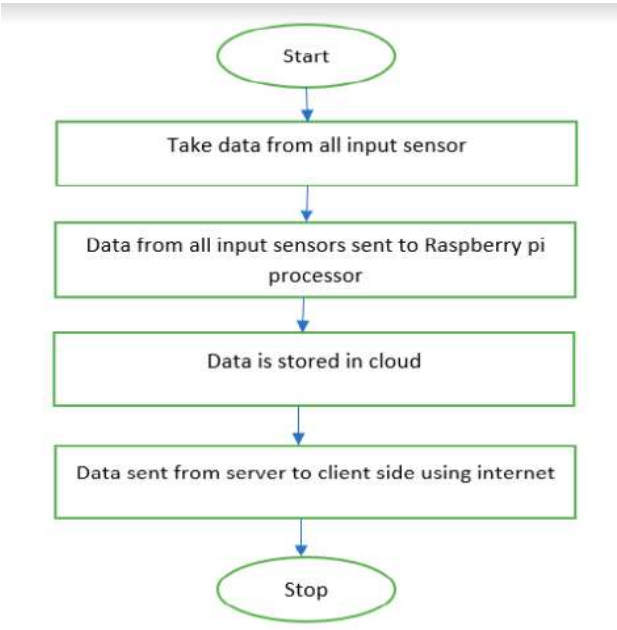
MQ135 gas sensor has high sensitivity to Ammonia and Sulfide steam, also sensitive to smoke and other harmful gases. It is an air quality sensor for detecting a wide range of gases, including NH3, NOx, alcohol, benzene, smoke and CO2. Ideal for use in an office or factory. It is low cost and particularly suitable for Air quality monitoring applications.

SYSTEM DESIGN AND IMPLEMENTATION

According to the circuit, all the sensors required for the particular base station are setup. A python script is written to initialize the GPIO's of the Raspberry Pi for each sensor. An IoT platform facilitates in developing, deploying, and managing IoT and applications. It also automates processes and manages network connections, storing of the data collected from the sensors, connecting and controlling your devices, and analyzing the data.

SYSTEM DESIGN





CONCLUSIONS

Various research operations have been performed in the field of weather monitoring. One such good attempt is this i.e. to monitor the weather parameters in one locality and using cloud, share the data globally. Thus, in future, modifications can be made on this system to make it possible to serve for other applications too. Weather prediction is a very important factor, which forecasts the climate in a region based upon the values of weather parameters. So the calculated results from this system can be made use in forecasting the weather of that locality for a period of time.

ACKNOWLEDGEMENT

We take this opportunity to express our profound gratitude and deep regards to our guide Professor Swati Patil for her exemplary guidance, monitoring and constant encouragement throughout the course of this project. We would also like to thank our H.O.D Dr. Avinash R. Vaidya for providing valuable guidance and encouragement. The blessing, help and guidance given by them from time to time shall carry us a long way in the journey of life on which we are about to embark. We would also like to thank all the laboratory maintenance staff for providing us assistance in various hardware and software problems encountered during the course of our project.

REFERENCES

[1] Modular weather and environment monitoring systems using Raspberry Pi- International Journal of Engineering Research & Technology (IJERT) Vol. 3 Issue 9, September-2014.

[2] Jadhav G, Jadhav K and Nadlamani K, Environment Monitoring System using Raspberry-Pi, IRJET, 03 (04), 2016, 1168-1172.

[3] Iot Based Weather Station Using Raspberry Pi 3 International Journal of Engineering & Technology, 7 (4.30) (2018)145-148.

[4] Raspberry Pi Based Weather Monitoring System, IJARCCE, 5 (10), 2016.Kuruvadi Praveen, & Ankith Bala, Modular weather and environment monitoring systems using Raspberry Pi, International journal of Engineering Research & Technology (IJERT), 2014.

[5] An IoT Based Real-Time Weather Monitoring System Using Raspberry Pi Vol. 6, Issue 6, June 2017.

[6] S.R.N. Reddy, P.V.Y.N Sai Teja, MD. Basit Habibuddin JCHPS Special Issue 10: December 2016.

REMOTE MONITORING AND CONTROLLING SYSTEM USING GSM

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***Abstract*- The technological advancement of the current era has affected the processes of the most of the economic and social related businesses. The aims of this advancement are to serve and make human life more comfortable. However, there are still lots of areas in our daily life where manual processes are used. Taking as an example in the water control and management systems, where many authorities use manual systems for water control and management. Especially nowadays most of the countries are still using manual system for controlling and monitoring the dams. Due to the complicated and time-consuming process in a manual system, a model for Remote Monitoring and Controlling of Dams is proposed that uses remote control technology, linked to the web technology, to attain great success in monitoring and controlling water levels in managing dams. System will allow the user to control and monitor the dams remotely which is saving a lot of efforts, reducing the cost and also increasing the monitoring quality as the users are going to use automated system rather than using of manual system.**

***Keywords*— Hydroelectricity, Microcontroller, GSM, Internal Model Controller (IMC), Internet of Things (IoT)**

I. INTRODUCTION

A dam is a massive barrier built for the protection of an area from water overflows as well as for use for other reasons such as land irrigation and hydroelectricity generation. Inarguably all countries in the world today have dams. However, a very few operate on automated systems, which are more effective and efficient than manual ones (Arch). Hence, it would be useful for all countries to start to use automatic systems for their dams as this will reduce the amount of effort that they're already putting towards dam maintenance. In addition, the same will help spare the many lives that are often taken by overflow and flood waters, while improving the quality of water supply, etc. It is not only complex to manually control a dam, but also time-consuming and excessively risky in times of bad weather. This is the main reason of why most of the governments and water supply companies today continue to face the problems when it comes to the control management of dams. It would advisable for a country such as Sultanate of Oman to implement the automatic system, where the process will be very easy, for example, replace the ineffective manual systems of dam water control and management that it has in place, in favor of an automated one. Given their current use of manual systems, a good number of the countries in the world today continue to face difficulties in terms of:

a. Controlling the levels of water in their dams. The staff is doing the monitoring in manual basis which is too risky, especially in times of bad weather, having led to the loss of lives in some of the countries where it is being practiced. It is suggested to use microcontroller kit with power supply. Microcontroller is a device that read the input, process the operation and writes the output as a matter of programming, it serves to.....

b. Monitoring the levels of water in their Dams. The movement of staff to and from dams comes with logistical technicalities that cannot in some cases, be offset by state and private water agencies. This is quite expensive too, tending to sometimes be limited by financial constraints, hence posing a health risk issue.

c. Receiving danger warning and alerts. Manual systems do not have in place any mechanisms that would allow them to make automatic detections when dams come close to overflowing, and this is a health risk issue. The unavailability of alarm systems means that dams do not have an in-built mechanism for sending out warnings when their waters come to dangerously high levels.

1.1 Background

Most advanced Dam monitoring and controlling systems in existence today require a big and expensive change of infrastructure. This means that it often is not feasible to install a home automation system in an existing building. The monitoring and controlling is a wireless Dam automation system that is supposed to be implemented in existing dam structures, without any changes in the existing infrastructure. Dam monitoring and controlling lets the user to control from any place using his or her mobile.

1.2 Scope

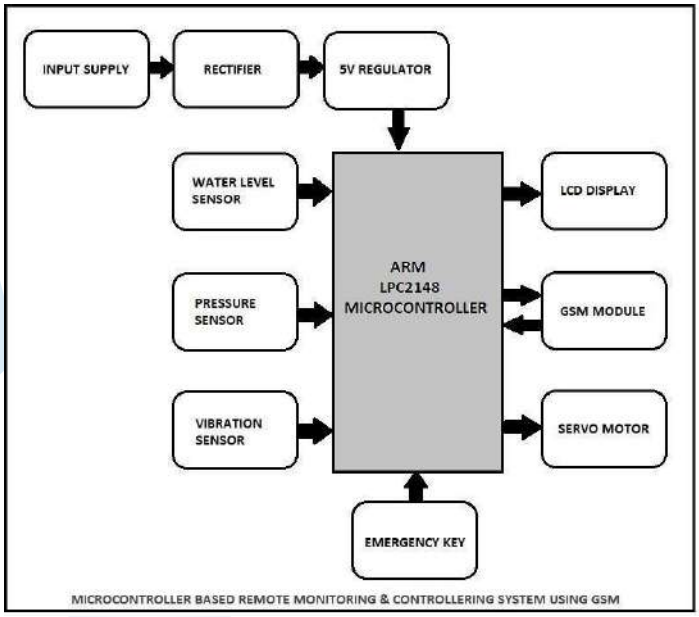
The main objective of this project is to develop a device that controls the Dam through SMS with integrated acknowledgement feature. Unlike the conventional system present in dam structures, where one has to manually open and close the gates of the Dam. The proposed system allows the operator of the dam to control the gates by just sending an SMS to the device and then also receiving the status of the same via return SMS.

1.3 Outline

Use engineering methodologies for establishment and modification of relatively easier Monitoring and Controlling methods for any system. Design and Implementation of a control system by means of microcontroller and Wireless networks. Present the Controlling design of a miniature Manual/Automatic Dam model as an application of this project. GSM integration in the system and Identification of Emergency situations and alerting using buzzer and also via SMS Controlling the dam functions using mobile phone. Reducing the cost and also increasing the monitoring quality.

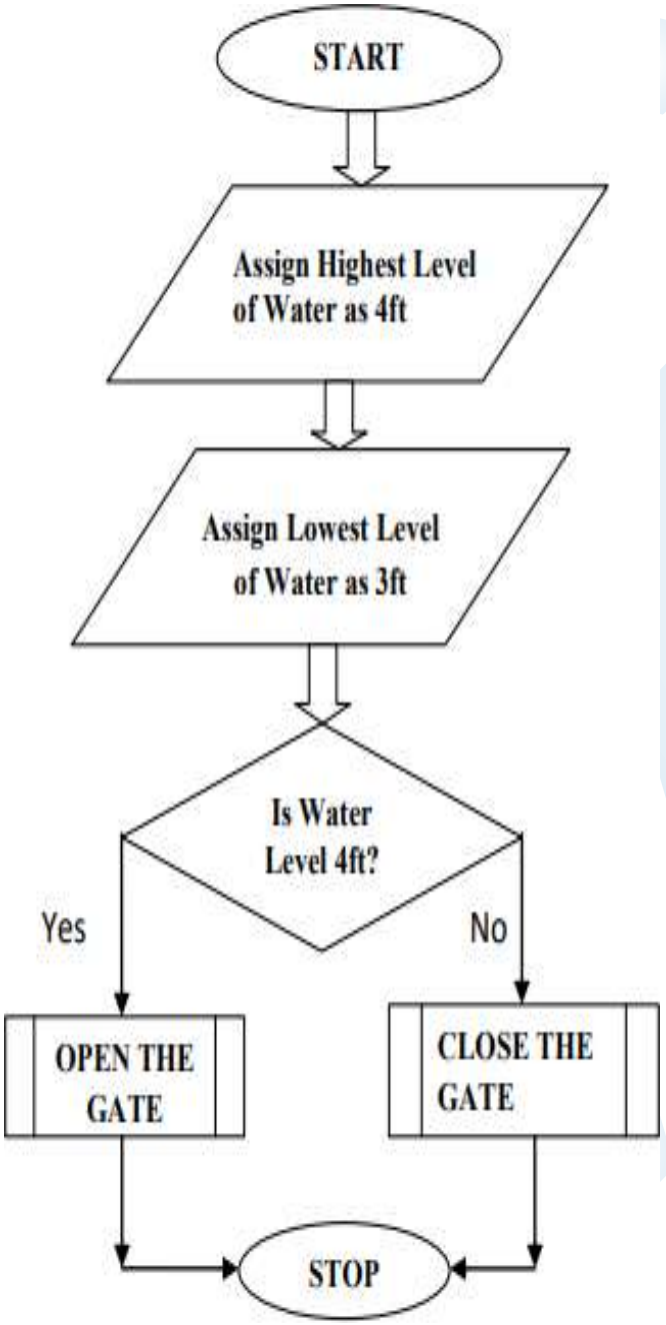
II. EXISTING SYSTEM BLOCK DIAGRAM

In this project, we are focusing on the Monitoring a system and Controlling on the DAM. We will be using various sensors such as water level sensor, Acceleration sensor, Temperature sensors etc. The main unit of the system will the microcontroller which will programmed by embedded C, C programming or Assembly language as per microcontroller requirement. The Monitoring of the project can be done wirelessly via Mobile using GSM module. And the controlling can be done by Messaging by giving command as programmed.



MICROCONTROLLER BASED REMOTE MONITORING & CONTROLLERING SYSTEM USING GSM

Implementation Details



III. LITERATURE SURVEY

A dam is a barrier that arrests water. Dam serve the purpose of storing water while other structures such as floodgates are to prevent water flow into specific land regions. The dam gate collapse when the water level in the dam exceeds certain level. To avoid this, dam level must be continuously monitored. Water is a scarce resource; it is necessary to preserve and maintain its quality. The water related parameters should be under constant check and evaluation. The main water pollution related parameters such as temperature and pH are to be monitored. In this paper they have used the PIC16F877A Micro Controller which helps in continuously monitoring the water level in dam & also helps in indicating about flood. This paper suggests architecture to control gate by monitoring high density and then communicate in real time. Considering the recent events that took place on June 2013, a destructible situation has taken place due to heavy rainfall and cloud bursting at various places. Many dams were out of knowledge on various parameters about the flow and discharge from the nearer dams which were affected earlier and due to lack of communication among these dams, lead to considerable damage of property and life. The main objective of this paper is to control the water Level in dam which was implemented using IOT (Internet of Things). The design implementation and control of the programmed monitoring system was developed by this project. The cradle of the project is based on methodology of IOT. For best results, the principle operation of the automatic gate control arrangement is subjected to dry running under various possible circumstances, with Proteus as the platform for working. This paper deals with the automatic control of a dam river system. The system is a cascade of single input-single output (SISO) systems, and can be considered as a single input-multiple output (SIMO) system, since there are multiple outputs given by intermediate measurement points distributed along the river. A generic robust design synthesis based on internal model controller (IMC) design is developed for internal model-based controllers. The robustness is estimated with the use of a bound on multiplicative uncertainty taking into account the model errors, due to the nonlinear dynamics of the system. Simulations are carried out on a nonlinear model of the river. This paper presents the design and implementation of a control system by means of microcomputers and data transmission networks. To verify the principle operation of the Controlling design to be presented a miniature Automated Dam model is experimentally tested using a PC-based system.

IV. METHODOLOGY

Using engineering methodologies for establishment and modification of relatively easier Monitoring and Controlling methods for any system. Design and Implementation of a

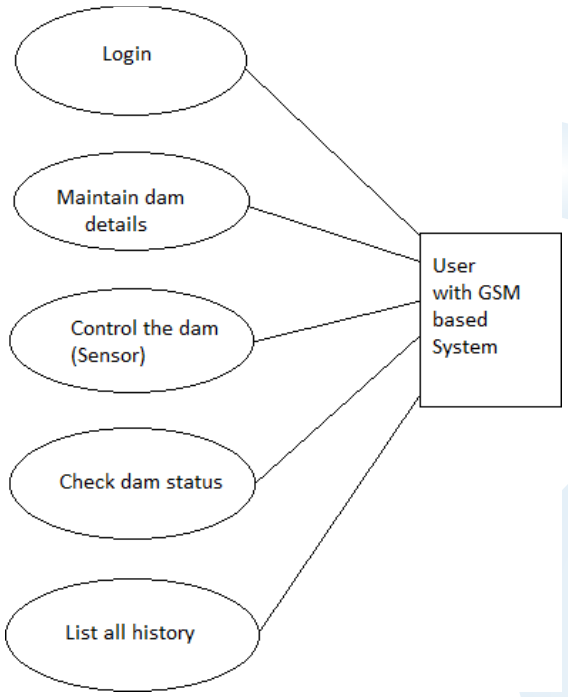


Fig. User Case Diagram

Control system by means of microcontroller and Wireless networks. Present the Controlling design of a miniature Manual/Automatic Dam model as an application of this project. GSM integration in the system and identification of Emergency situation and alerting using buzzer and also via SMS Controlling the dam functions using mobile phone. Reducing the cost and also increasing the monitoring quality. The proposed system allows the operator of the dam to control the gates by just sending an SMS to the device and then also receiving the status of the same via return SMS.

Transmit unit at the most left side are the input devices that will monitor the status of the dam and send information to microcontroller. At the right side there are output devices such as LCD display to display information and servo motor to control dam gates. Transmit unit at the rightest side is GSM module which send information through shot messaging service i.e. SMS to mobile phone. GSM modem sends information and transfer this information to microcontroller through serial communication. Serial communication is type of communication in which data transfer bit by bit to microcontroller.

Software we used here are Keil, PCB wizard, & Proteus lab center. Keil Micro vision is used to develop and debug the program required or this project. PCB Wizard is used for designing the PCB layout for the hardware modules for Microcontroller, LCD display, Relays, & Power supply.

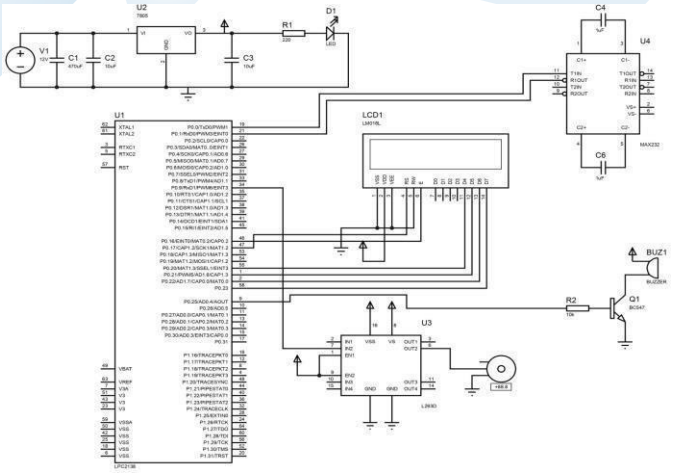


Fig. Proteus Schematic Diagram

The Proteus Design Suite is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly by electronic design engineers and technicians to create schematics and electronic prints for manufacturing printed circuit boards.

V. FUTURE SCOPE

Implementing this control system with IOT.

Hydro Electricity generation can be embedded within this system.

Solar and Hydro Electricity can be used to power the system during power cut.

Using Database Management System, monitored data can be stored for future research.

Centralized control of all dams in a state using GPRS or other wireless technology under central government can be beneficial to the whole country.

VI. CONCLUSION

This system of automated mechanism of water level monitor, control and alerting system using GSM in dams and irrigation system based on season reduces the wastage, ensures efficient use of available water resources and generates more precise and accurate results. There is no requirement of human laborers for monitoring the level, just one operator is sufficient for opening and closing the gate according to sensor output. By increasing the number of level sensors being more, we can open or close the dam gate whenever necessary knowing the accurate level of water. The work was to control effectively the water level in a dam, by automated opening and closing of shutters and to ensure the safety of people through properly designed warning system. Algorithm and prototype were designed and was experimentally verified.

REFERENCES

[1] Prashant Bhardwaj, Yogendra Singh Rajawat, Satya Prakash Rajput, Satyaveer Singh, Narvariya, Laxmi Narayan, (2014) “Automatic Dam Shutter Senses the Water Level and Control the Dam Door Using Servomotor”, Proceedings Of 4th Sarc- Irf International Conference, New Delhi, India, Isbn: 978- 93-84209- 08-7.

[2] Muhammad, Mohani, Syed Ahmed And Mansoor Ebrahim, (2012) “Design for An Irrigation and Monitoring System of An Automated Dam”, Proceedings of The International Conference of Engineers and Computer Scientists Vol Ii, HongKong.

[3] Shen Jin, Song Jingling, Han Qiuyan, Wang Shengde, Yang Yan, "A Remote Measurement and Control System for Greenhouse Based on Gsm-Sms” Iee 8th International Conference on Electronic Measurement and Instrument,2007.

CHARACTERISTICS OF MAGNETIC MATERIAL USING FORCE METHOD

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***Abstract*—The measurement of magnetic moment in magnetic materials is a widespread area of research in both academic and industrial frontier. The Vibrating Sample Magnetometer (VSM) is a sensitive and versatile instrument for study of magnetic moments in different magnetic materials as a function of magnetic field and temperature. A sample of magnetic material is placed inside a uniform magnetic to magnetize the sample. The sample is then physically vibrated sinusoidally. The Vibrating Sample Magnetometer (VSM) measures the magnetization of a small sample of magnetic material placed in an external magnetizing field by converting the dipole field of the sample into an AC electrical signal.**

***Index Terms*— Faraday's Law, Magnetometer, Vibrating Sample Magnetometer (VSM)**

I. INTRODUCTION

The oldest technology and a magical science is Magnetism. It was first recorded around 600 BC by the Greeks studying ferrite rocks (lodestone). The earliest mention of a magnetic compass used for navigation is from a Chinese text dated 1040–1044 A.D., but it may have been invented there much earlier. Magnetism is a sub-atomic phenomenon and is mainly caused due to the polarization of electric clouds, or magnetic dipoles of certain materials with unpaired electrons. The Vibrating Sample Magnetometer is a sensitive and versatile instrument for study of magnetic moments in different magnetic materials as a function of magnetic field and temperature. It's used to measure magnetization and is based on the Faraday's laws of electromagnetic induction. The Vibrating sample Magnetometer was first designed by Simon Foner, in 1959 at the Lincoln laboratories. All the VSM work, involves the measurement of voltage induced in a stationary coil, otherwise called as detection coils, due to the harmonic vibration of the sample in a uniform magnetic field.

II. CLASSES OF MATERIALS

1. Ferromagnetic

These materials show a large positive χ. Once magnetization is induced, even after the external field is removed some of it persists.

2. Ferrimagnetic

These materials are similar to ferromagnetic substances however they have two sub lattices which are magnetized in opposite directions. One of the sub lattices has a stronger magnetization and hence we are able to see a net magnetization in the material sample.

3. Anti-Ferromagnetic

They are similar to ferrimagnetic materials. However, the magnetization of the two opposite sub lattices is equal in magnitude. As a result, the magnetization of one cancel out that of the other and there in no net magnetization in the material.

4. Paramagnetic

The atoms or molecules of these materials have a net magnetic moment because the spin and orbital angular moment of their electrons do not cancel out completely. In the absence of external field, they are oriented in random directions. On application of external field, they tend to align along it, however due to thermal energy some still stay in random orientation. This partial alignment produces a small magnetization giving the material a positive χ. The susceptibility of these materials is temperature dependent. The induced magnetization vanishes when external field is removed.

5. Diamagnetic

These materials have completely filled electron shells as a result they do not have any dipoles. They tend to cancel the applied magnetic field which gives them a negative χ. However, this effect is minute.

III. METHODS FOR MEASURING MAGNETIZATION

a. Force Methods

These methods observe the force on a magnetic dipole or a material sample to find the magnetic properties of that material. Examples include torque magnetometers, in which the torque on a magnetic dipole by an external field is measure to find the magnetic moment of the dipole. In a similar method we introduce the material sample in a field with constant gradient and measure the force exerted on the sample using an analytic balance. This can be used to find the magnetization of the sample. Alternating gradient force magnetometer is another important implementation of force method.

b. Alternating (Field) Gradient Magnetometer

In this technique the sample is mounted at the end of a fiber and then subject to a fixed (dc) field plus an alternating field gradient, produced by an appropriate coil pair. The field gradient produces an alternating force on sample, which causes it to oscillate, flexing the fiber. If frequency of vibration is tuned to a resonant frequency of the system, the amplitude of vibration increases by a factor equal to quality factor Q of the vibrating system, which can be of the order of 100. To measure the amplitude of vibration of the fiber an optical microscope can be used. A piezoelectric material can also be utilized for measuring vibrational amplitude. It generates an electrical voltage which is proportional to the amplitude of vibration which in turn is proportional to the magnetic moment and the magnetization of the sample. However, there are a few complications involved. This method is very sensitive to the mass of the sample. Furthermore, the presence of a necessary gradient field means that the sample is never in a uniform magnetic field which can be problematic for large samples as induced magnetization will not be uniform.

c. Vibrating Sample Magnetometer

The vibrating sample magnetometer (VSM) is one of the most successful implementations of a magnetometer. The VSM is indifferent to mass and size of sample up to a considerable range in comparison with alternating gradient magnetometer. In this scheme the sample is introduced in a constant uniform external magnetic field which induces a magnetization in the sample. As the magnetized sample is then vibrated, it introduces perturbations in the external magnetic field. A set of coils or some magnetic field sensors can be arranged around the sample to measure these perturbations. For example, in the case of coils, magnetic flux piercing the coils will change resulting in generation of an emf (electro motive force) in coils. For a particular coil geometry, the emf generated in coils will depend on

1. Amplitude and frequency of vibration
2. External magnetic field and
3. Magnetization of sample

We can reduce the value for magnetization from emf with proper manipulation. The project aims at analyzing and developing a VSM that can measure the magnetic susceptibility, at room temperature, of magnetic samples. For this scheme the first crucial step is construction of a vibrating mechanism which can vibrate the sample with measurable and controllable amplitude. Then we need an electromagnet to provide the magnetic field required to magnetize the sample. Finally, detection coils are required to detect the magnetic field perturbations produced by vibrating the magnetized sample in the applied magnetic field.

IV. WORKING PRINCIPLE

A vibrating sample magnetometer (VSM) operates on Faraday's Law of Induction, which informs that a changing magnetic field will produce an electric field. This electric field can be measured and provide us information about the changing magnetic field. A VSM is used to measure the magnetic behavior of magnetic materials. The sample to be studied is kept in a constant magnetic field. If the sample is magnetic, this constant magnetic field will magnetize the sample by aligning the magnetic domains, or the individual magnetic spins, with the field. The stronger the constant field, the larger the magnetization will be. The magnetic dipole moment of the sample will create a magnetic field around the sample, sometimes called the magnetic stray field. As the sample is moved up and down, this magnetic stray field is changing as a function of time and can be sensed by a set of picks- up coils. The alternating magnetic field will cause an electric current in the pick-up coils according to Faraday's Law of Induction. This current will be proportional to the magnetization of the sample. The greater the magnetization, the greater is the induced current. By a phase lock-in amplifier (PLA) The induction current is amplified. The various components are hooked up to a computer interface. Using controlling and monitoring software, the system can tell us how much the sample is magnetized and how its magnetization depends on the strength of the constant magnetic field. The output is a hysteresis curve, which shows the relationship between the induced magnetic flux density and the magnetizing force and gives important information about the magnetic saturation
, the remanence, the coercivity and the level of residual magnetism left in the material. The vibrating sample magnetometer

operates on the principle that when a sample material is placed in a uniform magnetic field, a dipole moment proportional to the product of the sample susceptibility times the applied field is induced in the sample. A sample also undergoing sinusoidal motion induces an electrical signal in a set of stationary pick-up coils. This signal is proportional to the magnetic moment, vibration amplitude, and vibration frequency. The material under study is contained in a sample holder, which is centered in the region between the pole pieces of an electromagnet. A vertical sample rod connects the sample holder with a transducer assembly located above the magnet, which supports the transducer assembly with sturdy, adjustable support rods. The transducer then converts a sinusoidal AC drive signal, provided by a circuit located in the console, into a sinusoidal vertical vibration of the sample rod, and the sample thus undergoes a sinusoidal motion in a uniform magnetic field. Coils mounted on the pole pieces of the magnet pick up the signal resulting from the sample motion. This AC signal at the vibration frequency is proportional to the magnitude of the moment induced in the sample, vibration amplitude and frequency. A servo system maintains constancy in the drive amplitude and frequency so that the output accurately tracks the moment level without degradation due to variations in the amplitude and frequency of vibration.

V. DIAGRAM

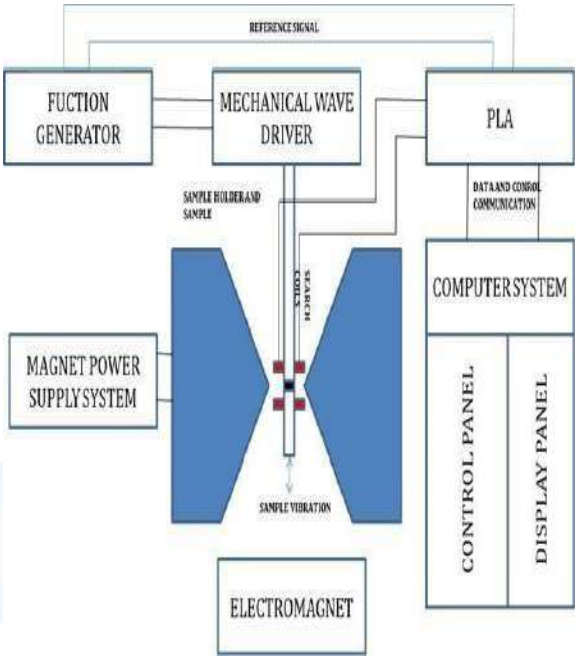

Fig 1. *Vibrating sample magnetometer*

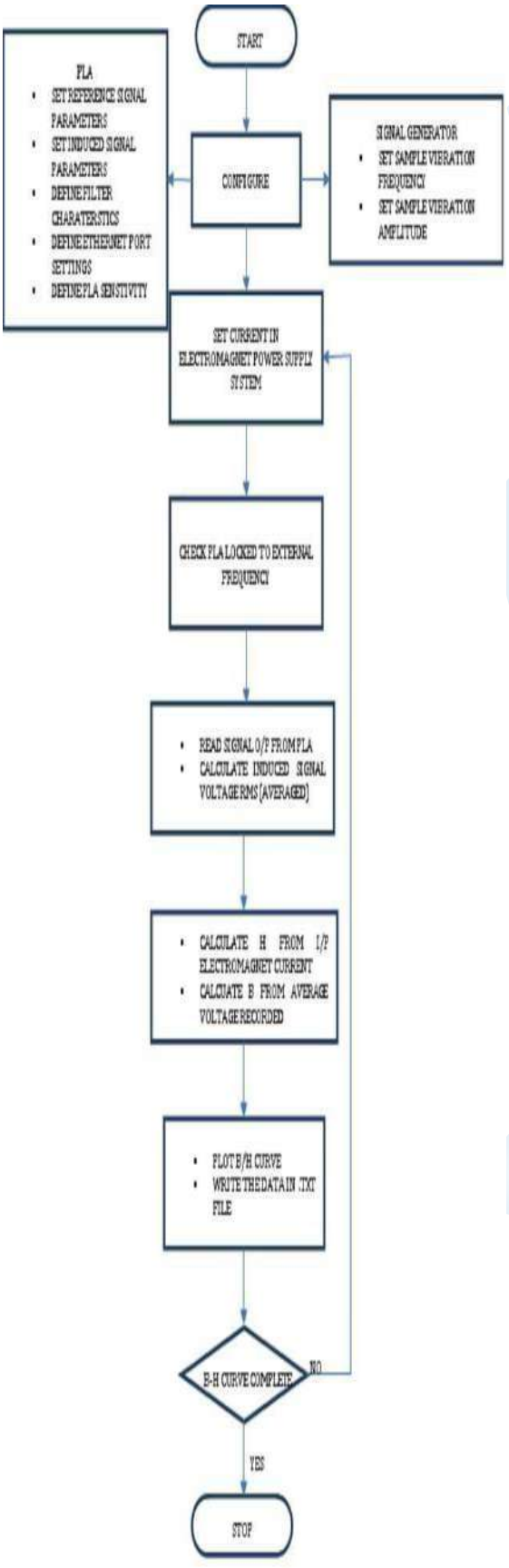

Fig 2. *Flow chart*

VI. RESULT

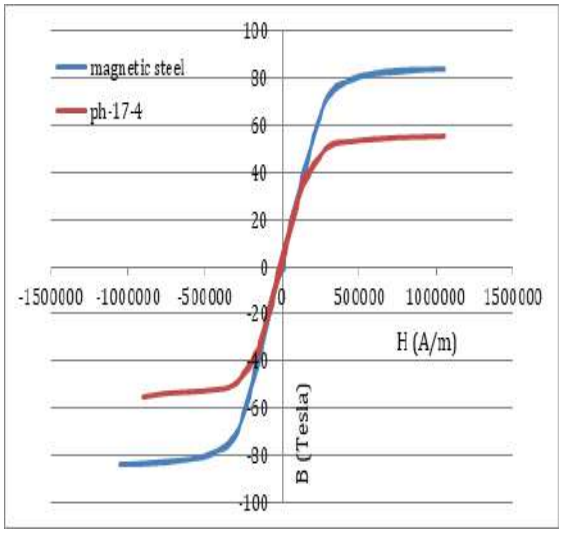

Fig 3. B-H Curve Obtained After Test

Magnetic steel being more magnetic exhibit higher values B. Also, the hysteresis loop for Ph-17-4 is broader suggesting its hard-magnetic behavior as compared to magnetic steel.

VII. REFERNCES

[1] Vibrating Sample Magnetometery: Analysis and Construction - Syed Alamdar Hussain Shah, 2013.

[2] Essays, UK. (November 2018). Vibrating Sample Magnetometer (VSM). Retrieved from https://www.ukessays.com/essays/physics/vibrating-sample-magnetometer-vsm6963.php?vref=1.

[3] Rev. Sci. Instrum. 67 (11), November 1996 *0034-6748/96/67(11)/3914/10*.

[4] A simple vibrating sample magnetometer for use in a material, 2003 American Association of Physics Teachers. *DOI: 10.1119/1.1572149*.

[5] Vibrating Sample Magnetometer for LargePermanent MagnetsA. Lopes Ribeiro, Member, IEEE.

[6] A precision, low-cost vibrating sample magnetometer Niazi, P. Poddar and A. K. Rastogi* July2000.

[7] The vibrating sample magnetometer: Experiences of a volunteer (invited), S. FonerFrancis Bitter National Magnet Laboratory and Department of Physics, MIT, Cambridge, Massachusetts *02139 © 1996 American Institute of Physics. @S0021-8979~96!505*

VOICE OPERATED INTELLIGENT FIRE EXTINGUISHER VEHICLE

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***Abstract*— With the advent of technology, humans are replaced with robots in life-threatening situations. We aim to design a robot capable of detecting and suppressing fires. By designing and implementing a robot capable of detecting and extinguishing flames, disasters can be avoided with minimal risk to human life. The need for a device that can detect and extinguish a fire on its own is long past due. This paper demonstrates the voice controlled intelligent fire extinguisher robot which is used to extinguish the fire disaster area where the human being cannot reach. This is designed under the low cost where the robot can be used as fire protection system in buildings and various places. The Robotic vehicle's direction is controlled using voice commands. The proposed vehicle has a water pump which is capable of spraying the water to extinguish fire. The fire sensors are used in the robot for sensing fire and sends the information to the microcontroller, after that the microcontroller pass the signal to the control circuitry for moving the robot in that particular fire zone for extinguishing the fire by using water pump. New economical solution of robot control systems is described in this project.**

***Keywords*— Microcontroller, Speech recognition, Flame sensor, Buzzer, Water Pump, IR sensor.**

I. INTRODUCTION

It is an inevitable part of being a fire fighter as the fire fighters face risky situations when extinguishing fires and rescuing victims. The vehicle avoids static objects in environment. It tracks the character of an object in an unknown environment. This robot provides fire protection which reduces the human work and the fire can be easily extinguished. By giving the voice command the robot moves according to the command given by the user.

II. METHODOLOGY

2.1 Construction

The framework consist of microcontroller(PIC 16F876A) as base unit, IR sensor for automatically sensing the upcoming obstacles, fire/flame sensor module, motor driver IC(L293D), micro buzzer to indicate the presence of fire, DC motors, water pump(DC40-1245) as the main element of extinguishing the fire, Relay driver to initiate the relays, Load relay to make sure the motor is protected against excessive load, Bluetooth module(HC 05) to give commands through an easily available software application in smart phones. Further improvising can be made by mounting camera and using CO2 as the extinguishing agent.

2.2 Block Diagram

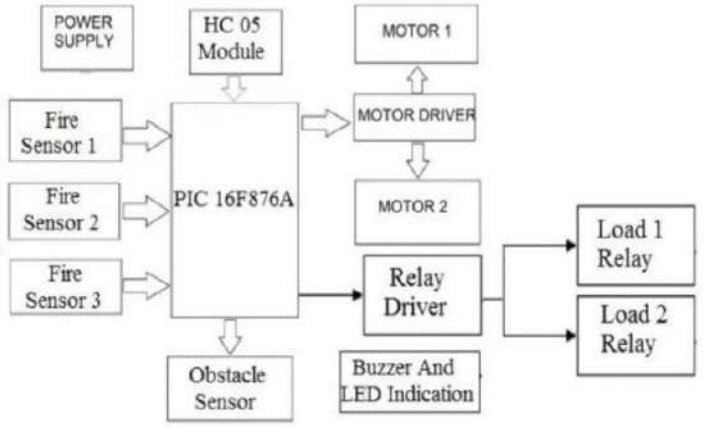

Fig. 1 Block diagram

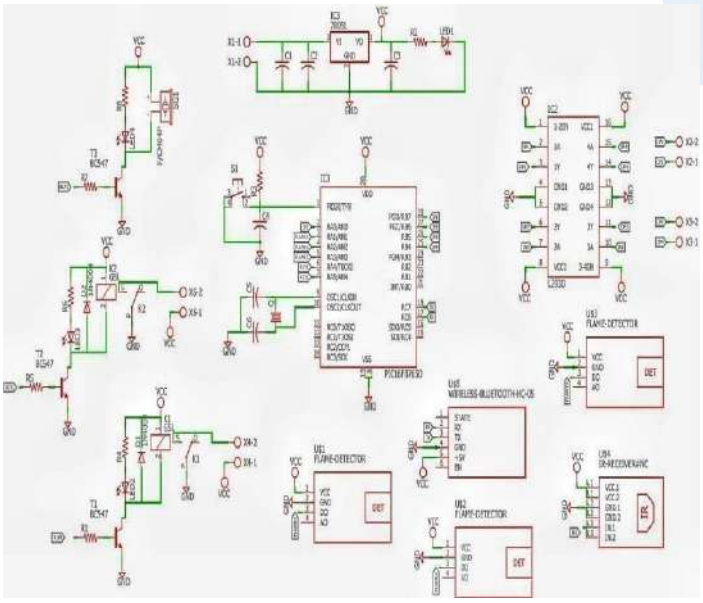

Fig. 2 Circuit Description

III. PROJECT DESCRIPTON

After receiving the sufficient power supply i.e. 2V to 5.5V for microcontroller to enable, the robotic vehicle will detect the occurrence of fire using fire/flame sensors and will alert others with the help of buzzer. If it detects the fire, the vehicle will automatically start its DC motors and move in its direction by crossing any obstacles on its way by using IR sensors.

These obstacles and direction of the vehicle could also be controlled externally using a software present in a smart phone as the vehicle have Bluetooth module mounted. Once the vehicle reaches close to area of fire it'll enable the water pump that'll further extinguish the fire.

3.1 Microcontroller

This powerful (200 nanosecond instruction execution) yet easy-to- program (only 35 single word instructions) CMOS FLASH-based 8- bit microcontroller packs Microchip's powerful PIC® architecture into a 28-pin package and is upwards compatible with the PIC16C5X, PIC12CXXX and PIC16C7X devices. The PIC16F876A features 256 bytes of EPROM data memory, 368 data memory, 14 interrupts, 5 input channels operating at DC 20 MHz All of these features make it ideal for more advanced level A/D applications in automotive, industrial, appliances and consumer applications.

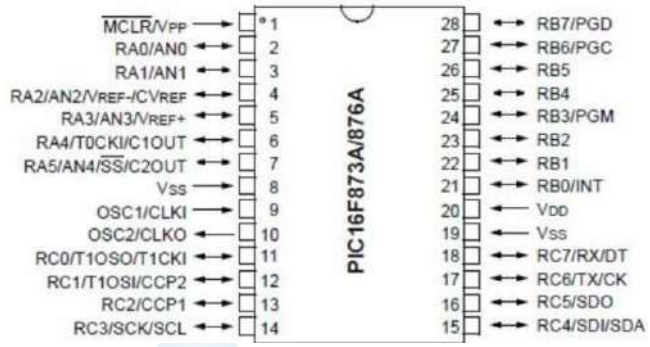

Fig. 3 Pin Description

3.2FireSensor

This module can detect flame or wavelength in 760 nm to 1100 nm range of light source. Flame detectors are actuated when they receive electromagnetic radiation from one or more defined wave lengths are received according to their design in the ultra-violet or infrared spectrum. This sends the signal to the microcontroller and alerts the user about the fire. The sensor and flame should keep a certain distance to avoid high temperature damage to the sensor. The detection angle is 60 degrees so the flame spectrum is especially sensitive.

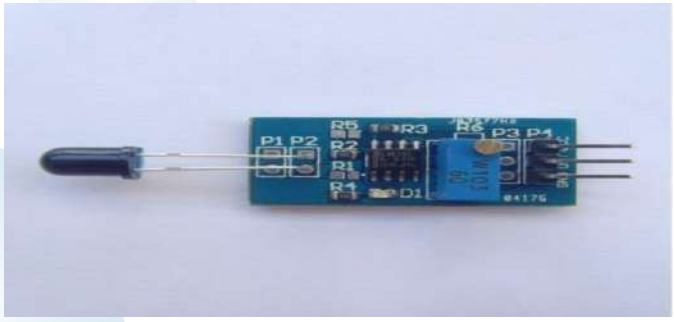

Fig. 4 Fire Sensor

3.3 IR Sensor

The IR Sensor-Single is a general-purpose proximity sensor. Here we use it for collision detection. The module consists of an IR emitter and IR receiver pair. The module consists of 358 comparator IC. The output of sensor is high whenever its IR frequency and low otherwise. The on-board LED indicator helps user to check status of the sensor without using any additional hardware. The energy emitted by the infrared source is reflected by an object and falls on the infrared detector.

If an object falls in the line of site communication, it obstructs the radiation from reaching the receiver either by reflecting the radiation or absorbing the radiation.

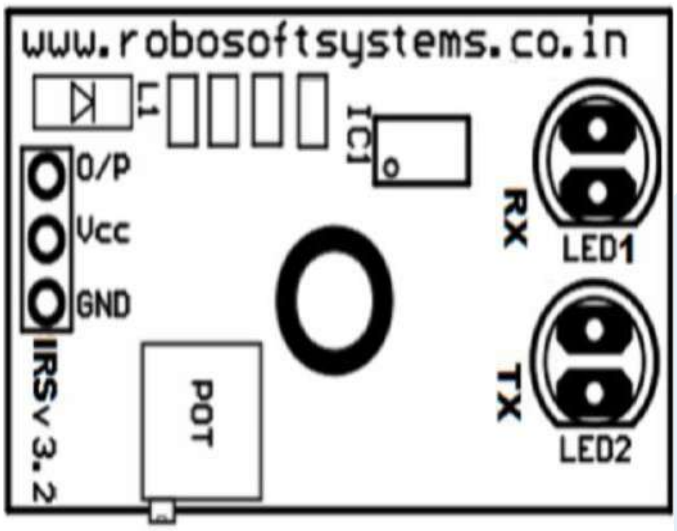

Fig. 5 IR Sensor

3.4 Motor Driver

The two wheels are driven by the pair of dc motors which are interfaced to the microcontroller through L-293D dual H-bridge. L293D can drive two dc motors which can be controlled in both clockwise and anticlockwise direction. It has output current of 600mA and peak output current of 1.2A per channel. The in-build diodes protect the circuit from back EMF at the outputs. Supply voltage range vary from 4.5V to 36V.

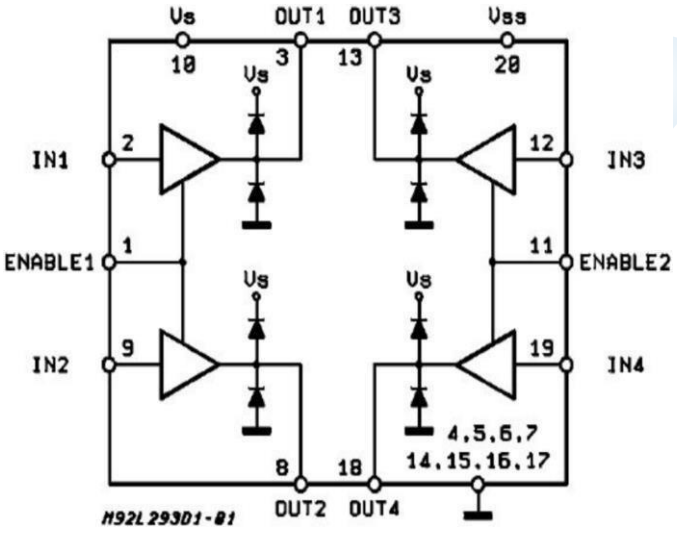

Fig. 6 Motor Driver

3.5 Water Pump

In this system, a water pump (DC 40-1245) is connected to microcontroller through relay and a water pipe is attached to servo motor. Relay is an electrically operated switch. Relays are used when it is necessary to control a circuit by low power signal. Water pump is used to extract water from the container and provide it to the nozzle which sprays water to extinguish fire.

This product is operated at 12V with 950mA current maintaining a minimum liquid temperature at 60°C, 172F and hence can be used in many fields, such as computer cooling system, Garden fountain, Aquarium, car cooling system, humidifier, air conditioner, and many other cooling and circulation systems.

Fig. 7 Pump (DC 40-1245)

3.6 Bluetooth Module- HC-05

HC-05 module is an easy to use Bluetooth module, designed for transparent wireless serial connection setup. Serial port Bluetooth module has a complete 2.4GHz radio transceiver and baseband. The module operates on low power i.e. 1.8 – 3.6V.

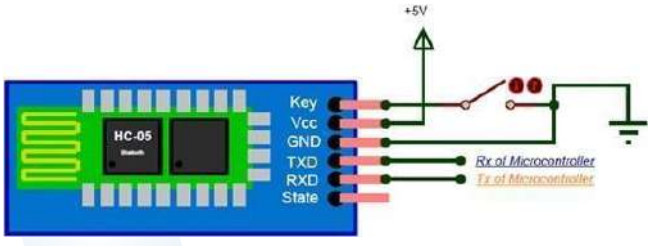

Fig. 8 Bluetooth Module HC-05

IV. APPLICATIONS

1. It is used in hazardous places.
2. The IR sensor in the robot will sense the obstacles and it will make decisions according to the obstacles it encounters.
3. It can be used in server rooms for immediate action in case of fire.
4. It can be used in record maintaining room.

V. RESULT AND CONCLUSION

The fire extinguisher vehicle senses the fire through the flame sensor (LM393) and it covers around 60cm to 80cm distance. For maneuvering the vehicle, we use the android app and we give Bluetooth voice command through the app to the motor driver (L- 293D). The water pump (DC 40-1245) which we are using it has output range 10 to 15ltrs per minute. It can cover the distance around 10m. Practically, the total range of our fire extinguishing vehicle is about 10m (miniature pump + Bluetooth module HC-05 which about 10m range practically).

In this project, we are finally able to Implement our fire extinguisher vehicle using the technology PIC16F876A microcontroller. The fire extinguishing vehicle detects the fire using the flame sensor and it also detects obstacles using IR sensor. Avoiding the obstacles, it further moves and extinguish the fire using water pump. It reduces human intervention and saves the human lives.

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VI. ACKNOWLEGEMENT

We would like to offer our gratitude to our project guide Mrs. Deepti Nair for the support and the guidance provided for our project.
We express our sincere gratitude to HOD of EXTC department Dr. Avinash Vaidya for providing us with required technical support and excellent faculty.
Furthermore, we are indebted to the Principal sir Dr. Sandeep M. Joshi whose constant encouragement and motivation inspired us to do our best.
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REFERENCES

[1] E.V.Sivakumar, P.Manoj , S.Punithadevi , S.Sherlin Sylvia , M.Thangaraj, "Voice Controlled Intelligent Fire Extinguisher Robot", IJSART - Volume 2 Issue 2 – FEBRUARY 2016, ISSN [ONLINE]: 2395-1052.

[2] Akib Islam, P.Sathya, "Intelligent Wireless Fire Extinguishing Robot", International Journal of Control Systems and Robotics http://www.iaras.org/iaras/journals/ijcsr.

ACCURATE ELECTRICITY MONITORING OF THE HOUSEHOLD APPLIANCES

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***Abstract*- It represents new design of a smart energy meter integrated with a monitoring and control system to monitor the quality of electrical power supplied to consumers and to protect them upon abnormal situations with the capability of storing all the events in real date and time as a history. This system provides several advantages for utility companies such as consumed energy, issuing the bills remotely and use multiple tariffs for billing electricity at different times during the day. Also, the system offers a capability to disconnect/resume the supply for a client if the bill has not been paid after a specific time or other clients caught in electricity theft.**

INTRODUCTION

The main goal of our project "Smart home energy monitoring and management system" is to develop a system such that it will be capable to keep a track of each and every appliance in the home and the user will be able to acquire all appliance energy consumption parameters. Along with this, the energy consumption parameters of each individual appliance will be sent to gateway where an intelligent algorithm will be running to manage all the appliances as per user requirements. The user can monitor the energy parameters of each individual load using an android smart phone which will also work as a data setter to set various user programmable parameters like high/low cut-off voltage, etc. By automatically turning off loads when not in use, the system can provide energy savings in homes and offices. Applications for this system include workstations, open cubicles, home offices, and home entertainment systems.

1.1 Objectives

A Smart Meter System is required which can analyze multiple appliances in a household getting readings such as voltage, current, active power, apparent power, reactive power, power factor and frequency. With the help of a wired / wireless connection, the device can connect to a central gateway and the gathered information can be uploaded and processed by the gateway management system. The data can then be displayed on the platform's graphical android-based user interface. The platform allows users to access the data from any android enabled device. To reduce cost the system requires energy metering nodes that can communicate with the gateway wireless or in wired way in such a way that only one Wi-Fi access point is needed for a household containing many monitored appliances.

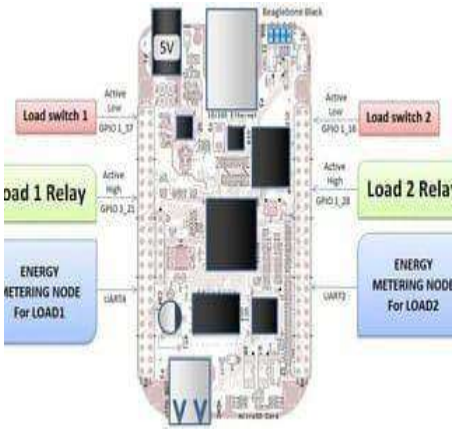
1.2 Scope

The main improvement for the future is going to make energy monitoring, tampering identification techniques, and connection and disconnection and also the pre information providing to the users all is going to happen on Wi-Fi internet. Where we are going to develop some Wi-Fi hotspots in each area through which all the energy meters are get connected and set 4 to 5 parameters which is also going to be monitored.

1.3 Outline

The use of technology has become an essential part of improving lifestyle, work efficiency, and a catalyst for economic growth. The benefit of the Internet of Things (IoT) and connected nodes has been on a step incline in recent years. This project aims to research, build, test and implement a low-cost energy monitoring and control system using IOT devices. Electrical appliances (e.g., air conditioning units and overhead lighting) can be controlled and monitored using IOT technology from any place in the Firstly we have to switch on the mains. Current sensor senses the power utilized by the load. Which gives output in analog form. The output of the sensor is supplied as input to the analog input part in the Node MCU Board. Node MCU board has inbuilt analog to digital convertor which converts analog input of power to digital output. This digital output is displayed on LCD display in form of Watts. There is a set point value; when the power utilized by the load exceeds the set point value LCD displays "Theft detected".

BLOCK DIAGRAM.



- In this project we have use Node MCU for internet connectivity And Controlling.
- We are measuring Current using ACS712 Current Sensor. There are 3 loads connected to 3 different relays, Supply Voltage 230V AC connected to every load through Current sensor ACS712 and relay.
- Whenever we turn on any load by turning ON specific relay allocated to that Load it will turn on LOAD simultaneously Current sensor start calculating Current consumption of load. We can turn ON and turn OFF any load any time using BLYNK App.
- Total watts are then converted to no UNITS used by the calculation,
- 1000 watts == 1 kilowatts==1units.
- So, we are calculating watts per second and adding new watts every second, for demo purpose and whenever it reaches 1000wattts it will consider as 1UNIT and it will show on App.
- We have also limited the watts consumption to 250watts to all load. So that if watts consumption is more than 250watts per second by all load it will turn off all LOADS.

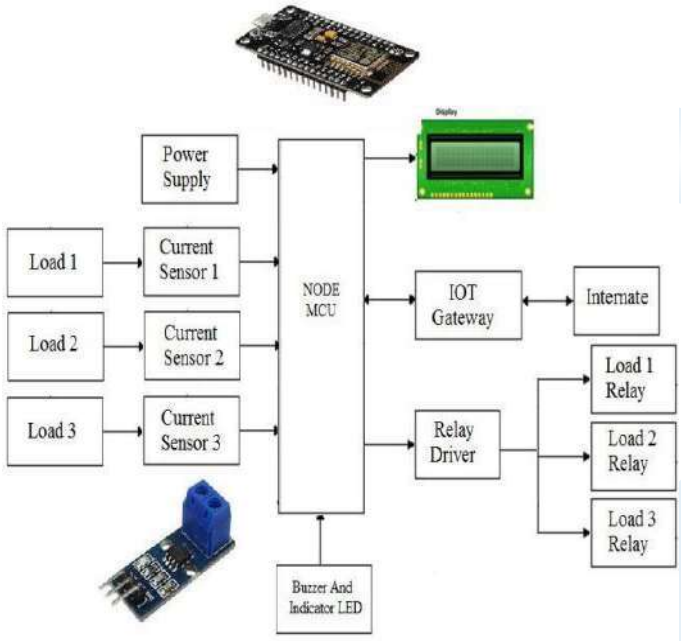
IMPLEMENTATION DETAILS

The implementation detail is given in this section.

The connections of other parts of the circuit like switches, relays and metering node to the gateway is shown in figure

2 LITERATURE SURVEY

The rise in use of commercial appliances in large scale also results in large amount of power draw and hence huge amount of electricity bills to be paid. This results in a large difference between their power draw from the mains and the actual utilization as some amount of this energy is bound to be wasted in some form of energy. In this paper, various techniques that have been implemented previously for measuring the difference between the actual power draw and the utilized power draw, the steps to reduce the amount of power draw and hence saving the energy costs are mentioned.[1] In this paper they described such as a low cost real-time ARM-based energy management system is proposed. It is conceived as part of a distributed system that measures the main power system quantities and give the possibility to manage the whole power plant. An integrated Web Server allow to collect the statistics of power consumption, power quality and is able to interface devices for load displacement. The device is characterized by easy access to the information and the combination of a smart meter and data communication capability allow local and remote access. In this way it is possible to manage the power consumption of the power system leading to an overall reduction in consumption and costs.[2] this paper they described such as the growing demand of energy, the capacity limitations of energy



management, one-way communication, the need of an interoperability of the different standards, the security of the communication and the greenhouse gas emissions, leads to emerge new infrastructure grid: Smart Grid. Smart Meters are one of the proposed solutions for the Smart Grid. In this paper, an AMR solution which provides enhanced end-to-end application. It is based on an energy meter low-power micro controller MSP430FE423A and the Power Line Communication standards a real time pricing thanks to the proposed communication infrastructure. This solution is with great interest in economical and low carbon society point of view. [3] this paper they described such as Presently electronics energy measurement is continuously replacing existing technology of elector-mechanical meters especially in China and India. By the year 2004, digital meter has start replacing elector-mechanical meters in Singapore. A wireless digital energy meter would definitely offer greater convenience to the meter reading task. Bluetooth technology is chosen as a possible wireless solution to this issue. In this paper, we present the design and implementation issues of a Bluetooth-enabled energy meter. The energy reader can collect the energy consumption reading from the energy meter wireless based on Bluetooth.[4]

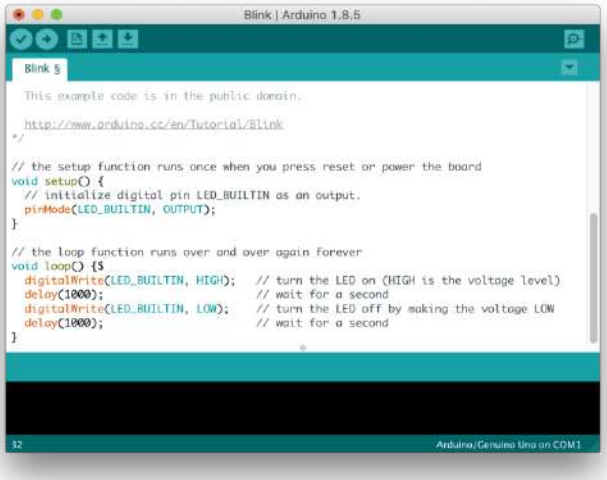
3. METHODOLOGY

Use of Simulation software:

ARDUINO SOFTWARE (IDE):

It is open source software that is used to write codes and upload it to the Arduino board. The Arduino IDE contains a text editor for writing codes, a message area, a text console, a series of menus along with toolbar with buttons. The programming codes are known as sketch. The sketches are saved with the file extension. ion. It runs on Windows, MAC

and LINUX. Thus, through this software we can code for the robotic movements and also for the sensors interfaced with the Arduino board.



CONCLUSION

The study of different domain techniques is presented. Increasing the energy consumption awareness in every household is an important step to make the user able to manages his energy consumption. We have brought this concept even one step further by allowing users to observe not only the overall house hold consumption but also each device's consumption. Thus, users are able to learn the energy profile of each device and to identify the devices that consume most power at home. Based on this knowledge, users have the possibility to develop better strategies for saving energy costs.

REFERENCE

[1] "Landi, C.; Dipt. di Ing. dell"Inf., Seconda Univ. di Napoli, Aversa, Italy ; Merola, P.; Ianniello, G", "ARM-based management system using smart meter and Web server",2011.

[2] "Garrab, A.; Bouallegue, A.; Ben Abdallah" , "A new AMR approach for energy saving in Smart Grids using Smart Meter and partial Power Line Communication" , 2012.

[3] "B. S. Koay, S. S. Cheah, Y. H. Sng, P. H. Chong, P. Shum, Y. C. Tong, X. Y.Wang, Y. X. Zuo and H. W. Kuek" , "Design and implementation of Bluetooth energy meter", 2012.

[4] "Darshan Iyer N, Dr. KA Radhakrishna Rao M Tech. student, Dept. of ECE, PES College of Engineering, Mandya, Karnataka, India", "IoT Based Energy Meter Reading, Theft Detection and Disconnection using PLC modem and Power optimization", Vol. 4, Issue 7, July 2015.

[5] Zanella A, 2014, Internet of Things for Smart Cities, IEEE IOT-J, Vol 1, Issue 1, ISSN: 2327-4662.

PATIENT MONITORING SYSTEM USING GSM MODULE

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***Abstract*—In this fast pace life, it is difficult for people to be constantly available at every beck and call, to be physically support their loved ones who are going through a disease or physical disorder. This increases the difficulty of monitoring the patient's body parameters such as temperature, pulse rate etc. Our project is therefore designed to ease this burden on doctors and nurses and remove human error in terms of watching and testing of some parameters such as body temperature and transmitting wirelessly using GSM module interfaced with PIC microcontroller to a doctor's, nurse's or relative's phone and also displaying the same information on a LCD. This project will specifically be designed to test heart rate and body temperature using appropriate sensors.**

Keywords—GSM, PIC microcontroller, LCD, heart rate monitoring, body temperature.

I. INTRODUCTION

Recently, the health care sensors are playing a vital role in hospitals. The patient monitoring systems (PMS) is one of the major improvements because of its advanced technology. So by connecting the temperature and heart rate sensor, we can simultaneously monitor the patient's condition and hence ruling out the use of thermometer and other devices to check the condition of the patient [1]. PMS monitors the physiological parameters and informs the surgeon about the present status of the patient's condition [2].

Among many diagnostic devices, patient care monitors are extremely important, especially in the critical care units (CCUs) of hospitals, providing continuous display and interpretation of the patient's vital functions. The rapid evolution of electronics and information technology has resulted in powerful patient monitors. These machines are capable of complex bio-signal processing and interpretation.

II. THEORITICAL BACKGROUND

A. Patient monitoring system (PMS):

Patient monitoring system (PMS) is primarily implemented to have a quantitative evaluation of the crucial physiological parameters of patients during critical periods of biological functions. This system is used for measuring continuously and automatically the values of the patient's important physiological parameters such as body temperature, ECG and heart rate. This system detects the various parameters of the patient using suitable sensors [4]. The main objective of patient monitoring system is to standardize everything from medical terminology to networking protocols so that medical records can be stored electronically and can be instantly sent to the doctor.

B. Use of PMS:

Patients with a suspected life-threatening condition. It may provide warnings when stress levels signs are rising before human can notice it and provide alerts and suggestions Example: a patient who has findings indicating an acute myocardial infarction (heart attack).

Patients at high risk of developing a life-threatening condition. Example: patients immediately post open-heart surgery, or a premature infant whose heart and lungs are not fully developed.

III. DESIGN OF PATIENT MONITORING SYSTEM

A. System Architecture:

The overall system consists of PIC Microcontroller, GSM Module, Temperature Sensor, Heart Rate Sensor, Power Supply, LCD Display and a Smart Phone. The system architecture at patient's end is shown in figure 1.

1. PIC Microcontroller:

In 1989, Microchip Technology Corporation introduced an 8-bit microcontroller called the PIC. PIC stands for Peripherals Interface Controller [5]. A microcontroller is a microcomputer on a single integrated circuit containing a processor, memory, and programmable input/output peripherals. PIC is one of the most advanced microcontrollers. This controller is widely used for experimental and modern applications because of its low price, high quality, and ease of availability. The PIC Microcontroller features almost all the components which modern microcontrollers normally have.

Table 1: Specifications of PIC.

Program Memory Size	7KB
Pin Count	40
Operating Voltage Range	2 to 5 V
Program memory type	Flash

2. GSM Module:

GSM stands for global system for mobile. The communication between GSM modem and mobile device is established using a GSM. For communication purpose GSM modem requires 12V power supply, communication interface such as RS232, and SIM (Subscriber Identity Module) Card same as mobile phones to activate communication with the network.

In GSM modem communication takes place with the help of AT-Commands.

Table 2: Specifications of GSM.

Quad-Band	850/ 900/ 1800/ 1900 MHz
Dual-Band	900/ 1900 MHz
Control via	AT commands
Power consumption	Low
Operation temperature	-40°C to +85 °C

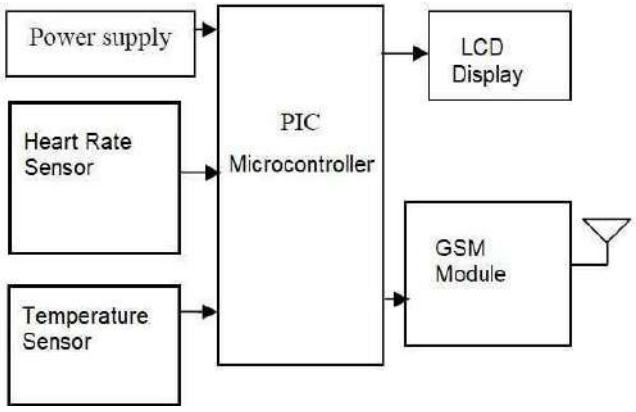

Fig. 1 System Architecture at the patient end.

3. Temperature Sensor:

LM35 used as a temperature sensor. Its output voltage is linearly proportional to Celsius temperature. ML35 does not require external calibrations. It provides low input impedance output and works between 4 to 30V.

Table 3 : Specifications of LM35. [6]

Temperature range	55°C to 150°C
Supply voltage	5V
Temperature cost	Low
Calibrated in	Celsius

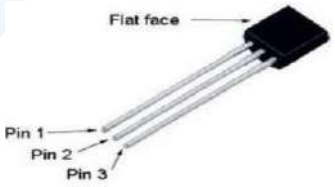

Fig 2 Temperature Sensor.

4. Heart Rate Sensor:

The sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the maximum light must pass spread in finger and detected by detector. Now, when the heart pumps a pulse of blood through the blood vessels, the finger becomes slightly more opaque and so less light reached the detector. With each heart pulse the detector signal varies. This variation is converted to electrical pulse. This signal is amplified through an amplifier which outputs analog voltage between 0 to +5V logic level signal. It works on the principle of light modulation by blood flow through finger at each pulse.

Fig. 3 Heart Beat Sensor.

Table 4 : Specifications of SEN-11574.

Operating voltage	5V
Operating current	100 mA
Light source	660nm Super Red LED[7]
Output Data Level	5V TTL level

1. LCD Display:

LCD is a liquid crystal display. The market has 14-pin and 16-pin displays. In this project we use 16 pin16*2 LCD display. 16*2 means 16 characters per line and there are 2 such lines & LCD each character is displayed in 5*7 matrix.

B. Equations:

When switch is turned ON, the hardware circuit is initialized. After pressing reset switch, calculation of heart rate and temperature takes place. The heart rate sensor counts for 30sec. and then it converts into beats per minute by using the following formula:

CountRead=heart rate time *4

The heart rate sensor simultaneously measures the body temperature and PIC convert it in °C (Celsius). Finally measured readings of temperature and heart rate is sent to the concerned medical advisor by GSM modem using AT+CMGS command and this information is displayed on LCD display.

IV. SOFTWARE DEVELOPMENT

The software design involves writing and debugging the program and simulation. The software program was written in C programming language using MPLABX IDE for

PIC software. The system is simulated by using Proteus software. The system can successfully read the data from the BP module and display on the LCD using microcontroller.

A. Hardware setup:

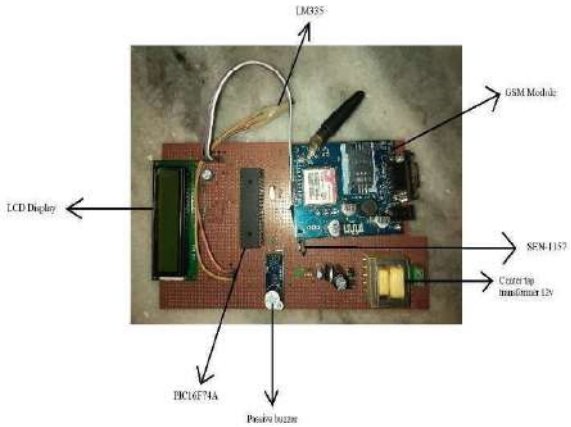

Fig. 4 working setup of developed system.

RESULT AND ANALYSIS

The operation of the system will result by following the following procedures:

1. At first, the system will measure the heart rate and body temperature. The output is then visible on the LCD.

Fig.5 LCD Display [8]

2. Then, the system sends an SMS to the doctor's mobile phone via GSM modem.

The system will be enormously unique one to the consumers as this is the only system of its class and it concentrates on those people who want to keep themselves fit and healthy. The system is not a complicated one which will take a lot of time to manufacture it.

SCOPE

Remote monitoring system has made possible a new generation of non-invasive, unobtrusive, personal medical monitors applicable during abnormal activities. The devices are going to relay the information to the doctor and the doctor can prescribe medication, if needed. There are many ongoing researches on remote patient monitoring system using GSM and the main purpose behind these researchers is to make this system more compact, easily available at affordable price and to include as many parameters as possible required for heart rate monitoring.

ACKNOWLEDGMENT

We would like to use this opportunity to express our gratitude to everyone who supported us during the course of this project. We are grateful for their guidance and invaluably advice. We are sincerely grateful to them for sharing their truthful and illuminating views on a number of issues related to this paper.

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CONCLUSION

Microcontroller based fully-automatic temperature and heart beat monitor with GSM communication will be implemented. The key objective of developing this module is to alert medical advisory about present health condition of patient via SMS. This module is advantageous where continuous monitoring of patient is required under critical condition and is applicable in hospitals, homes and also in ambulances.

The system allows health personnel to monitor a patient's temperature and heart rate from a remote location without requiring the physician to be physically present to take the measurements. Therefore, this proposed system can be practically used for remote monitoring of the patient.

REFERNENCES

[1] Jaiee Sitaram Adivarekar , Amisha Dilip Chordia , Harshada Hari Baviskar , Pooja Vijay Aher, Shraddha Gupta, Patient Monitoring System Using GSM Technology, International Journal Of Mathematics And Computer Research, Volume 1 issue 2, Page No.73-78 ISSN :2320-7167, March 2013.

[2] Mrs. M. V. Patil, Mrs. M. S. Chavan, Gsm Based Remote Patient Monitoring System, Department of Electronics Bharati Vidyapeeth University College of Engg. Pune.

[3] Peter Varady, Zoltan Benyo, and Balazs Benyo, An Open Architecture Patient Monitoring System Using Standard Technologies, March 2002.

[4] Rifat Shahriyar, Md. Faizul Bari, Gourab Kundu, Sheikh Iqbal Ahamed, and Md. Mostofa Akbar, Intelligent Mobile Health Monitoring System , International Journal of Control and Automation Vol.2, No.3, September 2009.

[5] Muhammad Ali Mazidi Rolind D. Mckinlay Danny causay, "PIC microcontroller and Embedded System", Edition second, Pearson publication.

[6] Mr. Aniket V. Kale, Miss. Supriya D. Gawade, Miss. Sayali Y. Jadhav and Mr. Samrat A. Patil, GSM Based Heart Rate and Temperature Monitoring System, International Journal of Engineering Research & Technology (IJERT), Vol. 4 Issue 04, ISSN: 2278-0181,April-2015.

[7] Sudhindra.F, Annarao.S.J, Vani.R.M, P.V. Hunagund, "A GSM Enabled Real Time Simulated Heart Rate Monitoring & Control System", International Journal of Research in Engineering and Technology, Page No. 6-10 Volume: 03, special Issue: 0 May 2014.

[8] Shahin Mahmud, Md Morshed Alam, Joynal Abedin, Saikat Roy, A GSM Based Intelligent Wireless Mobile Patient Monitoring Syatem, International Journal of Engineering Research & Technology (IJERT), Vol. 4 Issue 04, eISSN: 2319-1163, pISSN: 2321-7308, April-2015.

DEVELOPMENT OF KITS FOR SELF DRIVING CARS

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Abstract – We have developed a driving simulator which will receive instructions from a human operator through a wired system and will rotate a steering wheel in accordance with steering angle desired, along with actuation of throttle and brake pedals according to the given instructions. The simulator will also be capable of taking physical inputs in addition to computerized ones. Prime importance is given to the precision of the steering and pedal system simulation. Simulation at higher speed condition along with taking input from a virtual environment is our secondary concern and a part of our future scope.

I. INTRODUCTION

In recent years driving simulators are being widely used by automotive manufactures and researchers especially related in Human-In-The Loop (HIL) experiments. Simulators help researchers reduce prototyping time and cost. Simulators provide unlimited parameterization, more safety and enhanced repeatability. They play an important role in studies of the driver's behavior in unstable vehicle conditions and maneuvers. Driving simulator is widely considered within the automotive manufacturing to increase the safety of vehicle in emergency situations. Driving simulations is preferred to real cars of experiments in unstable condition, because it provides safety, repeatability experiments, various parameterizations of vehicle dynamics for vehicle and the environment conditions.

The validity of the acquired measurement data depends on the reality of the simulator. Therefore, improving the driving simulators reality is considered by researcher to increase the driving feel of driver in experiments. Driving simulator reality is usually described by the quality of its motion cueing and visual components. So, the control properties and hardware function of the simulator must be taking into account to increase the reliability of the experiments.

A driving simulator is a useful tool for conducting driving experiments. They are mainly used for research purposes in the area of human factors as they provide a safe and cheap way for repeatability and unlimited parameterization testing of new technologies to be implemented in vehicles. A driving simulator consists of 3 main parts: Computing component, Software for the simulator, motion hardware.

II. PROPOSED SYSTEM

We have developed a driving simulator which will receive instructions from a human operator through a wired system and will rotate a steering wheel in accordance with steering angle desired, along with actuation of throttle and brake pedals according to the given instructions.

The simulator will also be capable of taking physical inputs in addition to computerized ones. Prime importance is given to the precision of the steering and pedal system simulation. Simulation at higher speed condition along with taking input from a virtual environment is our secondary concern and a part of our future scope. "To Develop a self-driving car simulator which is able to actuate the under fixed working environments by taking inputs from the human operator"Self-driving cars are expensive, and buying a new car leads to older cars being obsolete. This constricts the people who want to take advantage of this technology as the costs of such are sky-high. Our project is to develop a system which will overcome this issue and hence will be able to install these actuation kits in a conventional human driven car to make itself driven. The simulator is used here to test this system before it is implemented on an actual car and check if the actuation is to point with what is required in real world driving environments.

III. THE PROPOSED SYSTEM

A. STEERING MODULE

This module consists of a belt pulley drive system to actuate the steering wheel.

Fig 1: Entire Project Setup

B. Wiper Motor

It was a dual geared wiper motor originally. We removed the worm gears as they don't allow the steering wheel to be rotated manually due to the worm gear configuration. This made it possible to rotate the steering manually in case of motor failure. This motor is used in windscreen wipers also known as Ferrite magnet type motors as permanent magnets are used in them.

These motors contain gears to control the speed of the wiper and three brushes to be used according to the speed of the wiper and the motor itself. These three brushes include a high- speed brush, a low speed brush and a common brush for the ground. The gear section of the wiper motor also contains a cam switch to stop the wiper every time at the same position.

Fig: Steering Actuation System

C. Power transmission mechanism (Pulley and Belt):

A belt is a loop of flexible material used to link two or more rotating shafts mechanically, most often parallel. Belts may be used as a source of motion, to transmit power efficiently or to track relative movement. Belts are looped over pulleys and may have a twist between the pulleys, and the shafts need not be parallel. In a two-pulley system, depending upon the direction the belt drives the pulley, the belt drives are divided into two types.

They are open belt rive and crossed belt drive. We have used open belt drive as it is used to rotate the driven pulley in the same direction of driving pulley. In the motion of belt drive, power transmission results make one side of pulley more tightened compared to the other side. In horizontal drives, tightened side is always kept on the lower side of two pulleys because the sag of the upper side slightly increases the angle of folding of the belt on the two pulleys.

Fig: Belt and Pulley.

D. Raspberry Pi 3B+

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It now is widely used even in research projects, such as for weather monitoring, because of its low-cost and portability. It does not include peripherals (such as keyboards and mouse) or cases. However, some accessories have been included in several official and unofficial bundles. The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting a 64- bit quad core processor running at 1.4GHz, dual-band 2.4GHz and 5GHz wireless LAN, Bluetooth 4.2/BLE, faster Ethernet, and PoE capability via a separate PoE HAT. The dual-band wireless LAN comes with modular compliance certification, allowing the board to be designed into end products with significantly reduced, wireless LAN compliance testing, improving both cost and time to market.

E. 2-Channel Relay Module:

A relay is defined as an electrically operated switch; their main use is controlling circuits by a low-power signal or when several circuits must be controlled by one signal. This module incorporates 2 relays. The following forms the relay system.

Input: Vcc, connected to the 5V current on the Arduino Board, GND, connected to the ground and 2 digital inputs. (In1 & In2).

Output: The 2-channel relay module could be considered like a series switches: 2 normally Open (NO), 2 normally closed (NC) and 2 common Pins (COM).

NC- Normally Closed, in which case NC is connected with COM when INT1 is set low and disconnected when INT 1 is high.

NO- Normally Open, in which case NO is disconnected with COM when INT1 is set low and connected when INT 1 is high.

IV. APPLICATION

There are various applications of this domain system. The application is listed here.
Many companies (i.e. Otto, Starsky Robotics, ...) have focused on autonomous trucks. Automation of trucks is important, not only due to the improved safety aspects of these very heavy vehicles, but also due to the ability of fuel savings (through platooning). Autonomous vans are being used byonline grocers such as Ocado. In Europe, cities in Belgium, France, Italy and the UK are planning to operate transport systems or automated cars, and Germany, the Netherlands, and Spain have allowed public testing in traffic.

In 2015, the UK launched public trials of the LUTZ Pathfinder automated pod in Milton Keynes. Beginning in summer 2015, the French government allowed PSA Peugeot-Citroen to make trials in real conditions in the Paris area. The experiments were planned to be extended to other cities such as Bordeaux and Strasbourg by 2016. The alliance between French
companies THALES and Valeo (provider of the first self-parking car system that equips Audi and Mercedes prime) is testing its own system. New Zealand is planning to use automated vehicles for public transport in Tauranga and Christchurch. In China, Baidu and King Long produce automated minibus, a vehicle with 14 seats, but without driving seat. With 100 vehicles produced, 2018 will be the first year with commercial automated service in China. Those minibuses should be at level 4, that is driverless in closed roads.

V. FUTURE SCOPE

The scope of this project is to develop a closer to real steering, brake and acceleration simulator used in self driving cars. Increasing the reality of the steering enhance the driving experience on simulator. The work is divided into two parts; the first part is development of a steering wheel with its associated system and the second part is development of acceleration and braking system along with its driving mechanism. This simulator can be used to evaluate the proposed kit for self-driving car and driver's need to interferewith the system. Driving simulators are being increasingly used by automotive manufactures for investigation of vehicle systems and driver's behavior in different situations. A simulator allows us to investigate e.g. how the driver reacts to new active safety technologies such as lane keeping assist, stability control system, etc. The goal is to mimic a real vehicle's steering feeling, and also to investigate how steering support systems can be developed and evaluated. For this reason, the model is combined of 3 essential components for driving a vehicle: steering, accelerator and brake.

VI. CONCLUSION

Driving simulator is widely considered within the automotive manufacturing to increase the safety of vehicle in emergency situations. Driving simulations is preferred to real cars of experiments in unstable condition, because it provides safety, repeatability experiments, various parameterizations of vehicle dynamics for vehicle and the environment conditions. The validity of the acquired measurement data depends on the reality of the simulator. Therefore, improving the driving simulators reality is considered by researcher to increase the driving feel of driver I experiments. Driving simulator reality is usually described by the quality of its motion cueing. So, the control properties and hardware function of the simulator must be taking into account to increase the reliability of the experiments. A driving simulator is a useful tool for conducting driving experiments. They are mainly used for research purposes in the area of human factors as they provide a safe and cheap way for repeatability and unlimited parameterization testing of new technologies to be implemented in vehicles. A driving simulator consists of 3 main parts: Computing component, Software for the simulator, motion hardware.

VII. RESULT

Driving simulator is widely considered within the automotive manufacturing to increase the safety of vehicle in emergency situations. Driving simulations is preferred to real cars of experiments in unstable condition, because it provides safety and various parameterizations of vehicle dynamics for vehicle and the environment conditions. Driving simulator reality is usually described by the quality of its motion cueing and visual components. So the control properties and hardware function of the simulator must be taken into account to increase the reliability of the experiment.

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REFERENCES

[1] 2-Channel Relay Module Summer Fuel Robotic.

[2] Development of Steering Control System for Autonomous Vehicle Using Geometry-Based Path Tracking Algorithm-Myungwook Park, Sangwoo Lee, and Wooyong Han

SAFETY MEASURES FOR DROWSY DRIVING

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***Abtract*- On road, driver's fatigue and drowsiness is contributing more than 30% of reported road accidents. Driver drowsiness can be estimated by monitoring biomedical signals, visual assessment of driver's bio-behavior from face images, by monitoring drivers performance or by combing all above techniques. The project uses the algorithm based on live monitoring of EAR (Eye aspect Ratio) by application of Image processing. HD live video is decomposed in continues frames and facial landmarks has been detected using pre trained Neural Network based Dlib functions. Dlib functions are trained using HAAR Cascade algorithm. Intel's Open source Image processing libraries (OPEN CV) is used as primary Image processing tool. Python Language is used as main coding language. EAR is calculated by calculating Euclidean distance between measured eye coordinates. Blink and microsleep detection mechanism is implemented by monitoring EAR against a threshold value. Blinks and drowsiness level are displayed on monitor screen with microsleep detection audio warning.**

***Keywords*- EAR, Microsleep, Drowsiness, OPENCV, Dlib, Python.**

I. INTRODUCTION

Driver fatigue is a significant factor in a large number of vehicle accidents. Fatalities have occurred as a result of car accidents related to driver inattention, such as distraction, fatigue, and lack of sleep. Studies and experiments have substantiated the fact that driving performance deteriorates with increased drowsiness. One of the case studies shows that one out of five road accidents are caused by drowsy driving which is approximately around 21% of road accidents, and this percentage is increasing every year as per global status report on road safety 2015, based on the data from 180 different countries. Real time drowsy driving detection is one of the best possible major that can be implemented to assist drivers to make them aware of drowsy driving conditions. The US National Highway Traffic Safety Administration has estimated approximately 100,000 crashes each year caused mainly due to driver fatigue or lack of sleep. Accidents due to lack of sleep can be prevented by using autonomous systems designed to analyze driver exhaustion. Detecting driver drowsiness can be an integral part of the future smart vehicles. A variety of techniques have been employed for vehicle driver fatigue and exhaustion detection. Driver's operation can be implemented by capturing the emotions of the driver by using computer vision and deep learning algorithms. These are non-intrusive ways of driver drowsiness detection. In this application, we will detect how long a given person's eyes have been closed. If their eyes have been closed for a certain amount of time, we'll assume that they are starting to doze off and play an alarm to wake them up and grab their attention.

II. THE PROPOSED SYSTEM

Fig. 1. Proposed System Architecture

Fig 1. showcases the various important blocks in the proposed system and their interaction. It can be seen that the system consists of distinct modules like video acquisition, Face/eye detection and drowsiness detection. In addition to these there are external hardware components namely, Camera mounted on the dash board of a car to capture the images of the driver for video acquisition, Raspberry Pi is a credit card sized single-board computer for implementation and an audio alarm system for drowsiness detection and correction. The flow chart of the proposed system shows in Figure 2, describes the overall methodology that was used. In the proposed system, first video acquisition is achieved by camera placed in front of the driver. The acquired video is then converted into a series of frames/images. The next step is to detect the driver's face, in each and every frame extracted from the video. Next, we make use of cascade haar transform for eye detection, and detect the eyes by processing only the region of interest.

Once the eyes have been detected, the next step is to determine whether the eyes are in open/closed state. Monitoring each frame for pupil detection if the eyes are detected to be open, no action is taken. But if eyes are detected to be closed continuously and it is above threshold value then it means that the automobile driver is feeling drowsy and a sound alarm is triggered.

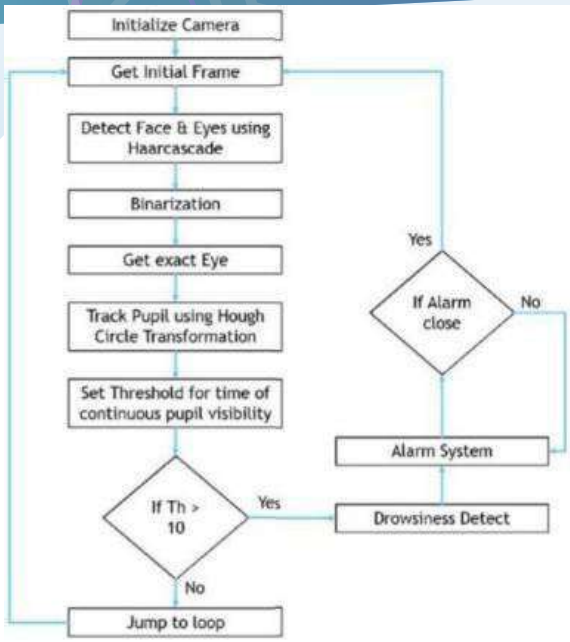


Fig 2. Methodology Flowchart

III. METHODOLOGY:

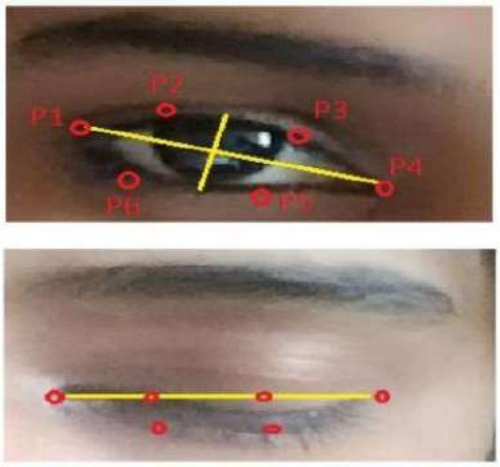
The main aim is to detect drowsiness of driver, it can be done in different ways like detecting facial expression of the driver and measuring Eye Aspect Ratio (EAR). Blinking pattern is different for each and every individual. The pattern gets varied in terms of squeezing degree of eye, blink duration and speed of closing and opening the eye [16]. The proposed method involved with the following methodologies such as Haar Cascade Classifiers, Shape Predictor_68_facial landmark detection, Eye Aspect Ratio (EAR), Ubidots cloud service and Twilio API.

3.1 Haar Cascade Classifiers

In Haar Cascade Classifiers, a lot of similar and dissimilar images are trained in order to detect fatigue of the driver. OpenCV is a learning-based method, packed with a detector as well as a trainer. For training, a separate database is maintained for face and eye with several positive and negative images having eye closed and opened conditions and different set facial images. In 2013, Patil et all suggested a vision-based drowsiness is carried out using Support Vector Machine and Haar Cascade Classifiers.

3.2 Shape predictor_68_Facial Landmark detection and Eye Aspect Ratio (EAR)

In order to predict the face and eye region in the live video stream, shape predictor is used. Fig.1 shows the sleepiness which is between the eyes are calculated), the arguments are passed to the predefined dataset and facial landmark detection is carried out. For every video sequence, the eye landmarks are located. The aspect ratio between width and height of the eye is calibrated.



The EAR is calculated for several frames of a video. A single blink is represented.

$$EAR = \frac{\|p2-p6\| + \|p3-p5\|}{2\|p1-p4\|}$$

Where p1,…,p6 are the two-dimensional landmark location, represented in Fig.2. The EAR is mostly stable when an eye is open and is getting close to zero while the eye is not in open state. If the person viewing the camera continuously, the Eye Aspect Ratio (EAR) is found to be normal and it reaches low value when he/she closing the eye for a longer time. When the lower value is reached, then drowsiness is detected. In 2012, Ubidots elaborated on connected software and hardware solutions to remotely control, automate processes for healthcare clients and monitor. Twilio is a cloud communication platform as a service (PaaS), it allows a software developer to programmatically send and receive text message using its web service APIs, make and receive phone calls. The paper introduces alerting process when the driver feels sleepy using cloud server and mobile API to send a message and at the same time providing an alarm signal to the driver.

IV. RESULT AND DISCUSSION:

The driver drowsiness can be measured using Eye Aspect Ratio (EAR). The ratio of the eye can vary for each and every person. Fig.4. The following case is tested for ten different set of people with two conditions. One is calculated for eye-opening condition and another one for eye closing condition. Fig.3. Eye closing rate is measured after every 0.5 seconds and if the value crosses already existed threshold value, then the raspberry pi 3 receives the alert signal from alarm connected to the GPIO pins of Pi 3 board. Fig 5. When the person closing his eyes for more than fixed threshold range then the alert signal is generated to wake up the driver from sleepy

state and also through the cloud service the alert message is sent to the owner of the car along with the car plate number.

Fig. 3: Drowsiness detection for open and closed eyes with drowsiness count and message send to mobile after 10 continuous blinks from the cloud server.

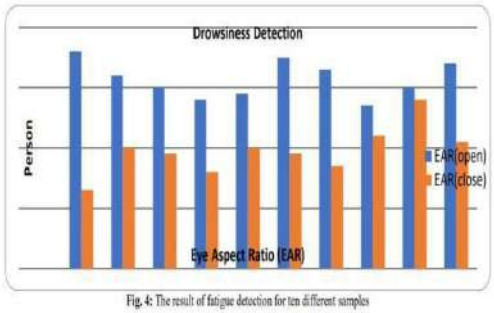


Fig. 4: The result of fatigue detection for ten different samples

V. CONCLUSION

The elaborated monitoring system developed is capable of detecting drowsiness, drunken and reckless behaviour of driver in a short time. The Drowsiness Detection System developed based on eye closure of the driver can differentiate normal eye blink and drowsiness and detect the drowsiness while driving. The proposed system can prevent the accidents due to the sleepiness while driving. The system works well even in case of drivers wearing spectacles. The system delivers output even in low light conditions. Information about the head and eyes position is obtained through various self-developed image processing algorithms. During the monitoring, the system is able to decide if the eyes are opened or closed. When the eyes have been closed for too long, a warning signal is issued. Processing judges the driver's alertness level on the basis of continuous eye closures.

VI. ACKNOWLEDGMENT

We deeply express our sincere thanks to our Principal sir Dr. Sandeep Joshi for encouraging and allowing us to present the project on the topic "Safety Measures for Drowsy Driving". We sincerely thank to Head of Department Dr. Avinash Vaidya and our project guide Prof. Sneha Chikodi for guidance and encouragement in carrying out this project. We take this opportunity to thank all our lecturers who have directly or indirectly helped in our 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.

REFERENCES

[1] Association for Safe International Road Travel (ASIRT), Road Crash Statistics.http://asirt.org/initiatives/informingroaduser s/road-safety-facts/road- crash-statistics, 2016

[2] Journal of VLSI Signal Processing 23, 497–511 (1999) c °1999 Kluwer Academic Publishers. Manufactured in The Netherlands.

[3] Eye Detection Using Morphological and Color Image Processing Tanmay Rajpathaka, Ratnesh Kumar and Eric Schwartzb

[4] A Robust Algorithm for Eye Detection on Grey Intensity Face without Spectacles- JCS&T Vol. 5

[5] Froba Kebbuck: Audio- and Video-Based Biometric Person Authentication, 3rd International Conference, AVBPA 2001, Halmstad, Sweden, June 2001. Proceedings, Springer. ISBN 3-540-42216-1.

SMART WATER DISTRIBUTION

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***Abstract*— A greenhouse provides an environment to grow plants all year round, even on cold and cloudy days. However, extreme environmental factors inside the greenhouse such as high temperatures and a high humidity can negatively impact the plants. Consequently, controlling this environment is essential in order for the plants to grow strong and healthy. The aim of this project is to design and build a greenhouse controller that can maintain the environment, by acting upon live sensor readings and be able to display the status of the system to the owner. Sensors measure the physical parameters and transmit them either by wireless medium called as node. To control and monitor the environmental factors, sensors and actuators are necessary. It communicates with the various sensor modules in real-time in order to control the temperature, soil moisture, humidity and day light inside a greenhouse by actuating a cooler, water pump, sprayer and lights respectively according to the necessary condition of the crop. All that information will be recorded by the sensors in Raspberry Pi and will be send to the cloud so that we can monitor the system anytime being anywhere. The proposed IoT system provides the ability for specific people to monitor and manage their systems remotely, using a web application with cloud technology.**

I. INTRODUCTION

A greenhouse is a framed structure with walls and roof made with transparent material such as glass or translucent plastic roof, in which plants will grow in a regulated climatic condition. The greenhouse materials like glass or plastic are designed to hold heat inside. It may be a cold weather, but the green house will provide a nice warm environment through which plants can grow and flourish. It is noticed that the yield of greenhouse is considerably high due to the controlled environment. An added advantage of greenhouse is protection of plants from environmental pollution because of its closed structure. In this project, we look at the need of IoT in smart water system. In the first step, a basic architecture is selected and applied in WDS by analyzing and comparing different technologies, equipment, cost and methods to build a smart water system. It reveals the need for an IoT architecture with technologies combined for water distribution system. It also takes into account of its advantages and disadvantages based on the literature review. The selection of the best choice can be identified for smart water system at the end of this step. The next step involves selection of the parameters required using IoT for water distribution. At this step, the current issues during the selection of parameters and some suitable suggestions are provided. Finally, an overview of the benefits which is necessary to implement IoT in smart water system is discussed.

II. LITERATURE REVIEW

[1] Teemu Ahonen, Reino Virrankoski and Mohammed Elmusrati University of Vaasa Department of Computer Science (2008). In this work, they integrated three commercial sensors with Sensi node's sensor platform to measure four environmental key variables in greenhouse control. They achieved up to 10-meter communication range with tolerable 5% packet loss. Because of the high humidity and dense tomato growth, the reliable communication range was reduced to one third of the respective communication range in open space.

[2] Muhammad et al (2010); A simple approach to Irrigation control problem using Artificial Neural Network Controller. The proposed system is compared with ON/OFF controller and itis shown that Escs are an essential component of modern quadcopter that provides features like high power, high frequency, high resolution three phase AC power to the motors in an tremendously small package. These crafts totally rely on the changeable speed of the motors driving the propellers. This large difference and fine RPM control motor speed is necessary for a quadcopter to take off. ON/OFF Controller based System fails miserably because of its limitations. On the other hand, ANN based

Project By	Application	Sensor used	Technology Used	Web Based/ App Based	Limitation/Future Research Direction
TomoPopvic, Et al., (2017)	Agriculture/ Outdoor	Temperature, Humidity, Leaf wetness	Aurdino, Raspberry Pi and IoT	Web Based	Data analysis has beer proposed as future work.
Mustafa Alper Akkasa, et al., (2017)	Agriculture/ Outdoor	Temperature, Light, Pressure & Humidity	Mica2, ZigBee Tiny OS, Nese, Ado.Net	Both	Future work to collect data from actuators.
YuthikaShekhaer, Et al., (2017)	Agriculture/ Outdoor	Soil Moisture & Temperature	Aurdino, Raspberry Pi 3 and IoT	Both	Spraying Appropriate chemical, water level of tank for irrigating.
Revathy. S, et al. (2017)	Green house /Indoor	Temperature, Humidity, Fan, Fogger unit	Arduino, Fuzzy logic, MATLAB	Web Based	Crop growth is reliable degree of success has been increased in greenhouse.

III. HARDWARE USED

Raspberry Pi 3B:

The Raspberry Pi 3B is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.

Dht11:

The DHT11 is a basic, ultra-low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data. Sticks like super glue, is moldable and waterproof.

LDR sensor:

An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.

Soil Moisture Sensor:

A soil moisture sensor measures the quantity of water contained in a material, such as soil on a volumetric or gravimetric basis. To obtain an accurate measurement, a soil temperature sensor is also required for calibration

Relay:

Relay is a switch which controls (open and close) circuits electromechanically. The main operation of this device is to make or break contact with the help of a signal without any human involvement in order to switch it ON or OFF. It is mainly used to control a high-powered circuit using a low power signal

Micro Buzzer 20mA:

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

LCD:

A 16*2 LCD display is a very basic module and is very commonly used in various devices and circuits. A 16*2 LCD means it can display 16 characters per line and there are 2 such lines. LCD is used to display the cost and names of the items in the project.

Water Pump:

The water pump can be defined as a pump which uses the principles like mechanical as well as hydraulic throughout a piping system and to make sufficient force for its future use. At present these pumps are utilized within a wide range of housing, farming, municipal, and manufacturing applications.

IV. SOFTWARE DESCRIPTION

The software is designed to process the humidity, temperature, moisture and light values, monitoring and controlling the green house. The software includes various measurements of sensors and continues to display the value in application may be at Android computers or other monitoring devices, control the so-called microcontroller i.e. Raspberry Pi 3 from the application in Android and update to user by sending the values of sensors for monitoring the greenhouse. The Android platform application is developed as most of the phones and handy devices support Android OS. Python programming language using the Android Software Kit (JDK, SDK) has been used for the development and implementation of this system

V. METHODOLOGY

Step # 1: Identify measurable variables important to production.

It is very important to correctly identify the parameters that are going to be measured by the controller's data acquisition interface, and how they are to be measured. The set of variables typically used in greenhouse control is shown below: An electronic sensor for measuring a variable must readily available, accurate, reliable and low in cost. If a sensor is not available, the variable cannot be incorporated into the control system, even if it is very important. Many times, variables that cannot be directly or continuously measured can be controlled in a limited way by the system. For example, fertility levels in nutrient solutions for greenhouse production are difficult to measure continuously

Step# 2: Investigate the control strategies.

An important element in considering a control system is the control strategy that is to be followed. The simplest strategy is to use threshold sensors that directly affect actuation of devices. For example, the temperature inside a greenhouse can be affected by controlling heaters, fans, or window openings once it exceeds the maximum allowable limit. The light intensity can be controlled using four threshold levels. As the light intensity decreases one light may be turned on. With a further decrease in its intensity a second light would be powered, and so on; thus, ensuring that the plants are not deprived of adequate sunlight even during the winter season or a cloudy day. More complex control strategies are those based not only on the current values of the controlled variables, but also on the previous history of the system, including the rates at which the system variables are changing.

Step #3: Identify the software and the hardware to be used.

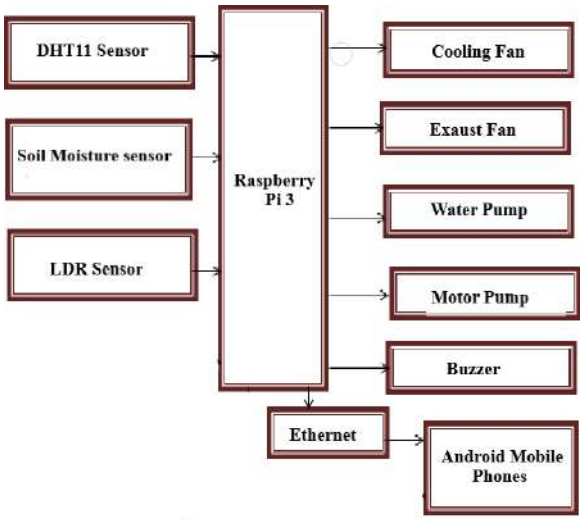
It is very important that control system functions are specified before deciding what software and hardware system to purchase. The model chosen must have the ability to:

1. Expand the number of measured variables (input subsystem) and controlled
2. Devices (output subsystem) so that growth and changing needs of the

3. Production operation can be satisfied in the future.
4. Provide a flexible and easy to use interface.
5. It must ensure high precision measurement and must have the ability resist
6. Noise.

Hardware must always follow the selection of software, with the hardware required being supported by the software selected. In addition to functional capabilities, the selection of the control hardware should include factors such as reliability, support, previous experiences with the equipment (successes and failures), and cost.

V. BLOCK DIAGRAM



VI. CONCLUSION

In this work, we presented a design of greenhouse automation system based on WSN technology. The system has the ability for real-time monitoring and control of the necessary environmental conditions (temperature, humidity and soil moisture). The system depends on advanced technology, high accuracy and short time response sensors to collect climate information. This option support greenhouse size extension and increase automation system efficiency. Raspberry Pi network is used for greenhouse technology produced low cost in both installation and maintenance, removed limitation of wire and low power consumption efficiency. To user to modify inside conditions of greenhouse as he/she needs. System diagnostic functions include sensing error, error correction and send feedback alarm. The proposed design used to control and monitor the different environmental parameters of greenhouses in real time systems using Raspberry Pi, parameters include concentration of gas, temperature, light and humidity. This design has many advantages to apply a new technology to the greenhouse for protecting agriculture and avoid using of wire connection systems and give efficient in the manpower saving. The system is going to be monitored by sending SMS messages to coordinator.

The data received at the server node was analyzed and updated to the database periodically.

The data entered into the database can be used for report generation.

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 “Smart water distribution system.” We express our sincere gratitude to Prof Dr. Avinash Vaidya, H.O.D of Electronics and Telecommunication Engineering, for his guidelines and support which he has given us as well as giving us such a golden opportunity to embark on this project. We sincerely thank to our project guide Prof. Ravi Biradar for proper guidance, help and encouragement in carrying out this project. We take this opportunity to thank all our lecturers who have directly or indirectly helped our 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.

REFERENCE

[1] Eldhose. K.A, Rosily Antony, Min i.P.K, Krishnapriya.M.N, Neenu.M.S, “Automated Greenhouse Monitoring System”, International Journal of Engineering and Innovative Technology (IJEIT) Volume 3, Issue 10, April 2014.

[2] Greenhousem Structures (University of Arizona, 2001) http://ag.arizona.edu/ceac/sites/ag.arizona. edu.ceac/files/Greenhouse%20Structures.pdf

[3] PIC16F877A Datasheets

[4] Technology Student, Light Dependant Resistors, Viewed 30August 2010.

[5] 7805 Datasheets B. Vidyasagar,” Green House Monitoring and Automation using GSM”, in International journal of Scientific and Research Publications, Volume 2, Issue 5, May 2012.

[6] TomoPopovic, Nedeljko Latinovic, Ana Pesic, ZakroZecevic, BazoKrstajic, Slobodan Djukanovic “Architecting an IoT enabled platform for precision agriculture and ecological monitoring: A case study, “Computers and Electronics in Agriculture, (June 2017) pp.255-265

[7] Mustafa Alper Akkaşa, Radosveta Sokullub , “An IoT-based green-house monitoring system with Mica2 motes,” IMH 2017 Procedia Computer Science, (2017) pp.603–608

[8] Ami J. Shukla, VirajPanchal, Sahil Patel, “Intelligent Greenhouse based on Internet of Things (IoT), “IJETEE- Vol 11, Issue. 2 June 2015.

[9] Vaibhav Sherkar, Akshay Surwase, Prasad Kalekar, Bha-gyashree Gavhane, “Smart Poly-House Surveillance Using IOE” IRJET Vol: 04 Issue :03 Mar 2017.

SMART SHOPPING TROLLEY

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***Abstract*— One of the important aspects of modern electronic technology is embedded systems based on micro controllers. The main aim of science has always been to make our lives easier. We observed that the main cause for long queues at the billing counter is not the crowd, but the time spent in scanning each item using the Bar code Technology. The RFID reader scans all the items as and when they are put in the trolley. The record of the items bought is stored in the micro controller memory along with their individual costs as well as the total expenditure. This information will be displayed on an LCD screen which will also be placed on the trolley for the customer to verify the item bought and to keep a track on the amount spent on each item. At the billing side, the employee can get an itemized bill from every trolley just by giving the trolley number as the input to a software which would then print the itemized bill. Data can be erased from the micro controller memory after the bill is printed to make that trolley reusable.**

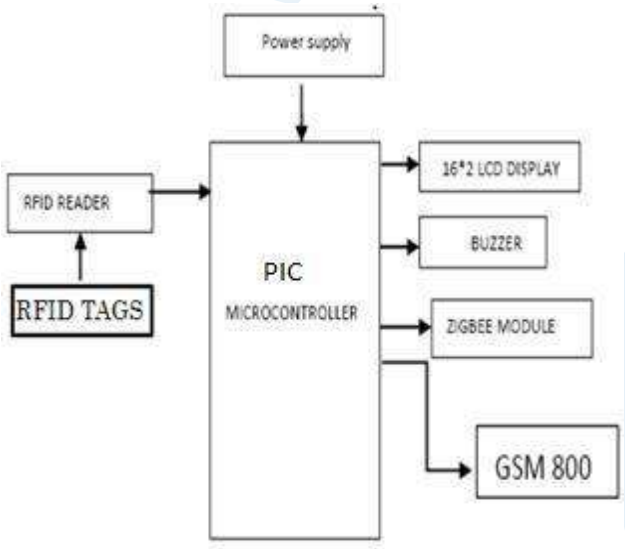
***Keywords*— Radio Frequency Identification (RFID), PIC Microcontroller, Wireless ZigBee Module transmitter and receiver, RFID tags, Server database, GSM Module.**

I. INTRODUCTION

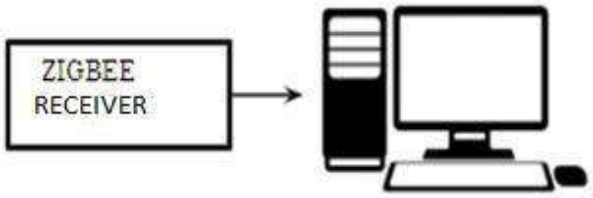
The recent evolution in technology and people's understanding towards the technical advancements have made it possible to develop comfort in the grocery industry. Also, consumer perceptions of privacy, security and trust in present commerce mentioned that the proliferation of electronic commerce technologies has utterly transformed the way business is conducted. Products are lined up in stores; customers check their price and may be their nutrition value too. Put all the stuff in a cart and push it around to fill until its bloating. Standing in a queue for billing wastes an ample amount of time and customers realize they have stuff in their cart more than they can afford to buy. The recent couple of years have witnessed explosive interest in RFID and supporting technologies due to rapid expanding use to track products. Similar technology can be used for unique identification of each product in the supermarket. The RFID readers are non-contact sensors that can read over a considerable distance. The items are added just by hovering the item over the reader once only. Deleting the item from the cart is just as simple, which can be done by hovering the item over the reader a second time. Supermarket is the place where customers come to purchase their daily using products and pay for that. So, there is need to calculate how many products are sold and to generate the bill for the customer. Cashier's desks are placed in a position to promote circulation. At present, many supermarket chains are attempting to further reduce labor costs by shifting to self-service check-out machines, where a single employee can oversee a group of four.

II. BLOCK DIAGRAM

1. Trolley Unit:



2. Control Unit:



III. HARDWARE USED

Trolley Unit:

In this unit the PIC 16F877A processor is attached to a RFID reader and bar code reader. As the user puts the items in the trolley the reader on the trolley reads the tag and sends a signal to the PIC processor. The PIC processor then stores it in the memory and compares it with the look up table. If it matches, then it shows the name of item on LCD & also the total amount of items purchased.

Billing Unit:

As soon as the shopping is over the user comes near the billing section. The total bill will display on the billing computer.

Power Supply:

The AC supply is applied to 12V adapter. The

adapter output is the 12V AC which is rectified using a diode bridge. The output of Diode Bridge of 5V DC is filtered by capacitors.

RFID Tags:

The RFID tags are used to tag the bar code of the items. Which gives the information of the items. The RFID consists of two types of tags that are active tag and passive tag. We are using the active tag which have battery life. The RFID has either fixed or programmable logic data which sense the sensor.

RFID Reader:

RFID reader is used to read the information which is stored in RFID tag. When the object is taken close to the line of field reader it detects the card and gets the information.

LCD:

A 16*2 LCD display is a very basic module and is very commonly used in various devices and circuits. A 16*2 LCD means it can display 16 characters per line and there are 2 such lines. LCD is used to display the cost and names of the items in the project.

Zigbee:

The RFID tag number is compared with database if it is present in the database then Product details like Cost, manufacturing Year and Name of the Product is displayed and at the end Total Bill information is displayed that is Number of Products purchased and Total cost etc. The web portal is maintained at the server and being accessed from the cart. Customer can pay the bill amount and there after leaving the counter without waiting in big queue for scanning each product during payment like what it was happening in the existing techniques.

GSM Module:

GSM is an architecture used for mobile communication in most of the country. We are using GSM to send message of entire bill of the purchase on customer mobile phone.

IV. SOFTWARE DESCRIPTION

1. MPLAB X IDE is used for the programming the microcontroller. Embedded C language is used for PIC microcontroller.
2. VB is used on the front end to display the final Billed amount to the customer on both the display Each trolley is associated with a RFID reader and tags. So, this way all the functioning of the smart trolley used by the customers is going to happen.

V. DETAIL DESCRIPTION OF SYSTEM

The functioning of the system is explaining below:

- When the customer purchases a product, she/he first scans the RF tag of the product using the RFID reader and then places it into the trolley. While the customers scanning the RF tag of the product, a price of the product is taken and stored in the system's memory.
- Information stored in system's memory is compared with the look up table. If matches are found then cost, name of respective product gets displayed on the LCD.
- Double entry of product deletes the product name with respective to cost of product.
- The Product Identification device is made up of a PIC microcontroller, an RFID reader, LCD, ZigBee module [1]. RFID Tag carries the price information of the tag, RFID Reader reads product information, Liquid Crystal Display displays product information, then allows the RFID reader to either add or remove price and a PIC microcontroller conducts the activities of the whole system [2], [7].
- Each product Identification device is assigned a tag number for easy identification. While shoppers' shop, details of products shopped for is transferred to the main system via the ZigBee module. The Product Identification device can also be monitored while shopping is in progress from the main system though the ZigBee module.
- After completion of shopping, a key is pressed indicating final billing of all the products. Thus, the final information of all products is transmitted to a computer with the help of serial communication & the final billing is done by VB software on computer.
- After shopping the entire bill can be send on customer cell phone through GSM Module.

VI. ALGORITHM

Step1: Start

Step2: Initialize System

Step3: Search for RFID

Step4: Check RFID tag

Step5: Read related data from memory

Step6: Display data on LCD

Step7: Add item cost as items are added

Step8: Reduce item cost as item is subtracted

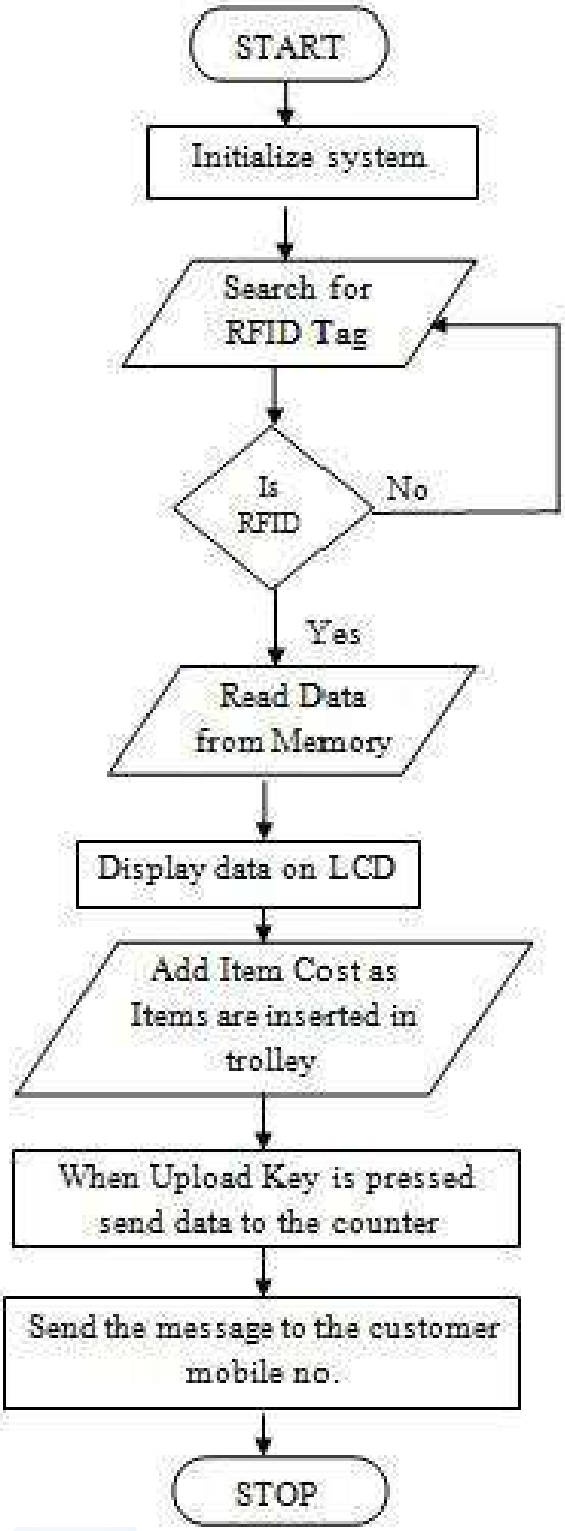
Step9: If system of trolley is hack then buzzer will on & the system will be initialized

Step10: In case tag is not present to product then we are using load cell to calculate weight

Step11: when upload key is pressed send data to the counter

Step12: Print the bill & send message to customer

Step13: Stop



VII. CONCLUSION

We will create an automated central bill system for supermarkets and mall. Using RFID and Zigbee by which customers do no need to wait near cash counters for their bill payment. Since their purchased product information is transferred to central billing system. The system proposed is highly dependable, authentic, trustworthy and time-effective. There will be reduction in salary amount given to employees, reduction in theft. Also, the system is time efficient. In future we can used a card swiping system in the trolley for payment purpose. Many more scopes for anti-theft can be added in the future.

VIII. ACKNOWLEDGEMENT

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REFERENCE

[1] D. Hahnel, W. Burgard, D. Fox, K. Fishkin and M. Philipose "Mapping and localization with RFID technology", *Proc. IEEE Int. Conf Robot,* 2004, pp.1015 -1020.

[2] Dr. Suryaprasad J, Praveen Kumar B O, Roopa D Arjun A K, A Novel Low-Cost Intelligent Shopping Cart, Proceedings of the 2nd ed., *IEEE International Conference on Networked Embedded Systems for Enterprise Applications*, NESEA 2011, Perth, Australia, December 8-9, 2011.

[3] Ankit Anil Agarwal, Saurabh Kumar Sultania, Gourav Jaiswal and Prateek Jain on *"RFID Based Automatic Shopping Cart in Control Theory and Infrmatics"*; ISSN 2224-5774 (print) ISSN 2225- 0492 (online), 2011, Vol. 1.

[4] J.Awati and S.Awati, (ISSN 2250-2459, Volume 2, Issue 3, March 2012) *"Smart Trolley in Mega Mall"* in International Journal of Emerging Technology and Advanced Engineering. Website: www.ijetae.com

[5] Zeeshan Ali, Reena Sonkusare, "RFID Based Smart Shopping and Billing", *International Journal of Advanced Research in Computer and Communication Engineering*, Vol. 2, Issue 12, December 12.

[6] Raju Kumar, K. Gopalakrishna, K. Ramesha on "Intelligent Shopping Cart" *in International Journal of Engineering Science and Innovative Technology (IJESIT)*, Volume 2, Issue 4, July 2013.

[7] Akshata J Bilgi, Aishwarya, "RFID and Zigbee based smart shopping cart system", *International Journal of Engineering, Basic Sciences, Management and Social Studies*. Volume1, issue 1, May 2017 P59-62.

[8] DR. Mary Cherian, Disha D.H, Chaitra K.B, Ankita, Aishwarya, "Billsmart - A Smart billing system using raspberry pi RFID" *International Journal of Innovative research in Computer and Communication Engineering*. Volume 5, issue 5, May 2017, pp. 9586-9591.

[9] Popoola, S.I, Popoola, O.A, Oluwaranti, A., Atayero, A.A, Badejo, J.A, Misra, S. "A cloud-based intelligent toll collection system for smart cities" *3rd International Conference on Next Generation Computing Technologies, NGCT 2017*; Volume 827, 2018.

[10] Popoola, S.I, Popoola, O.A, Oluwaranti, A., Atayero, A.A, Badejo, J.A, Misra, S. *"A cloud-based intelligent toll collection system for smart cities"* NGCT 2017; Volume 827, 2018.

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

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'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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