TRAIN PASSENGER MANAGEMENT SYSTEM USING IoT

Project Thesis Submitted in Partial Fulfillment Of

The Requirements for the degree of

BACHELOR OF TECHNOLOGY

In

ELECTRONICS AND COMMUNICATION ENGINEERING

Of

MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY

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Academic Batch: 2018-2022

<u>CERTIFICATE</u>

This is to certify that this project report titled **"TRAIN PASSENGER MANAGEMENT SYSTEM USING IoT"** submitted in partial fulfillment of requirements for award of the degree Bachelor of Technology (B. Tech) in Electronics and Communication Engineering of Maulana Abul Kalam Azad University of Technology in a faithful record of the original work carried out by,

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It is further certified that it contains no material, which to a substantial extent has been submitted for the award of any degree/diploma in any institute or has been published in any form, except the assistances drawn from other sources, for which due acknowledgement has been made.

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DECLARATION

We hereby declare that this project report titled **"TRAIN PASSENGER MANAGEMENT SYSTEM USING IoT"** is our own original work carried out as an undergraduate student in Netaji Subhash Engineering College except to the extent that assistances from other sources are duly acknowledged.

All sources used for this project report have been fully and properly cited. It contains no material which to a substantial extent has been submitted for the award of any degree/diploma in any institute or has been published in any form, except where due acknowledgement is made.

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CERTIFICATE OF APPROVAL

We hereby approve this dissertation titled

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DESIGN AND IMPLEMENTATION

OF A

TRAIN PASSENGER MANAGEMENT SYSTEM USING IoT

Abstract

The objective this work designs a new system to make transport system more comfortable and reliable for our country people. Counting the passenger and store the data by IOT based system by owner of vehicles, saves our time and make profit for vehicle owner because every year the owners do not get their actual investment profit.

We are going to design IOT based information to the vehicles owner to keep a track and run analytics to understand their business better by predicting the number of passengers at a particular time.

This report presents a design and implementation of a bi-directional visitors counter. It helps in determining the number of visitors that enter or leave a confined place. The entire system is based on NodeMCU that makes it to be smarter and easy to modify. The system ranges from the power supply to the logical control unit, the NodeMCU unit, and to the display unit which shows the number of people that has entered or leave the place.

The system was tested repeatedly and it worked perfectly and efficiently. This system helps to be assured of the exact number of visitors in a confined place in case of any emergency. This system can be used in an auditorium, halls, banks, or any other places where counting of visitors is of paramount importance. For further study about counter system, the system can be improved by solving the problem occurred by distance sensor, therefore for long distance sensing laser technology can be employed. calibration for sensor and bright led can be used to increase the accuracy of the distance sensor.

CONTENTS

CHAPTER 1

INTRODUCTION

1.1 PROJECT BACKGROUND

From the basis of technology, we realize that various problem needs to be solved. In our country one of the most problem in vehicle system. There is typical transportation system where include various corruption and added that public do not get their enough good transport system for their comfort.

We also find that the owner of vehicle does not get his proper profit due to some corrupted employee. Again, we found another problem that user is unaware of seat vacancy and thus most of seats remain vacant and thus resulting to loss of the owner. Thus, we are implementing real time cloud monitoring for the benefit of both users and owner.

Many times we need to monitor the person/people visiting some place like Seminar hall, conference room or Shopping mall or temple.

This project can be used to count and display the number of visitors entering inside any conference room or seminar hall. This is a bidirectional counter which means it works in a two-way. That means the counter will be incremented if person enters the room and will be decremented if a person leaves the room. OLED displays this value which is placed outside the room.

Visitor counting is simply a measurement of the visitor traffic entering and exiting conference rooms, malls, sports venues, etc. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life.

Over the years, the usage of Visitor counters has become very positive in terms of monitoring crowd behavior at a particular place. It began with a mechanical tally counter which was

introduced to replace the use of tally stick. A tally (or tally stick) was an ancient memory aid device used to record and document numbers, quantities, or even messages. Historical reference is made by Pliny the Elder (AD 23–79) about the best wood to use for tallies, and by Marco Polo (1254–1324) who mentions the use of the tally in China. Tallies have been used for numerous purposes such as messaging and scheduling, and especially in people counting, financial and legal transactions, to the point of being accuracy.

The substitute of the tally stick was the mechanical tally counter, it is a device used to incrementally count something, typically passing. One of the most common things tally counters are used for is counting people, animals, or things that are quickly entering and existing a location.

As times went on, an electronic tally counter was introduced which used an LCD screen to display the count, and a push button to advance the count. Some also have a button to decrement the count in case of a miscount. Now, due to technology advancement, various type of people counter has been introduced to automatically count the number of people entering and exiting a building at a particular time. Some of these are laser beam, thermal imaging, video camera and the infra-red sensor. All these sensors play their role respectively as visitor detector. These devices are very reliable and accurate in terms of performance as compared to the mechanical tally counter.

This system is helpful for counting the number of people in an auditorium or halls for seminar to avoid congestion. Moreover, it can also be used to check the number of people who have come to an event or a museum to watch a certain exhibit. Microcontroller is a reliable circuit that takes over the task of counting the number of persons/ visitors in the room very accurately. We will be showing both In count i.e. number of people entering the room and Out count i.e. number of people exiting the room on a 128 x 64 pixel OLED display. An IR sensor is used to monitor the person entering and exiting the room.

NodeMCU does the above job. It receives the signals from the sensors, and this signal is operated under the control of software which is stored in the flash memory of the MCU. It continuously monitor the Infrared Receivers. When any object passes through the IR Receiver's then the IR Rays falling on the receiver are obstructed, this obstruction is sensed by the Microcontroller.

Infra-red sensors are a type of light sensors they function in the infra red part of the frequency spectrum. IR sensors are active sensors that consist of an emitter and a Receiver. When the beam is cut the controller then accordingly comes to know if the person is entering or exiting and then accordingly increments or decrements the count which is then displayed on the OLED.

1.2 OBJECTIVES

This system is designed to count and display the total number of people entering and leaving a particular place. The objectives include:

1. To design a system that will automatically tell the exact number of people that enters or leaves a confined place.
2. To design a system that will not require human intervention in determining the total number of people inside a confined place. (So as to know the number of people to cater for in case of any Emergency).
3. To design a system that can automatically monitors the attendance of a place and also helps in emergency budgeting or planning.

1.3 SCOPE OF WORK

This project is mainly concerned with the design a counter that will count visitors that enters or leaves a particular place where it is installed. It helps in reducing human effort in counting entry and exit, and in deducing the remaining number of people in the room. However, there are a few limitations on this project, this includes:

More than one candidate or person cannot enter or leave the room at the same time. If it happens, it will count them as a single person. This system cannot distinguish between a person and other obstacle interfering the sensor. Also this is a short-range system, since it cannot sense a far object owing to the sensing limitation of the IR sensors used.

CHAPTER 2

BACKGROUND AND LITERATURE REVIEW

2.1 BACKGROUND

Smart vehicle system is almost available in almost every developed country (Canada, USA, etc.). Yet no implementation in India. To avoid the time consumption in roads. To ensure the safety of both passenger and vehicle. In India there is not this kind of vehicle system. So here we come with a new system. Our vehicle system as far as we know that sitting service where no guarantee the system is yet perfect. We observe that first moment when the vehicle is starting everything shows so much clear but after some days the whole system entered a dark corrupting system. Where in vehicle the passenger counting system operated manually. So, people get opportunity to cheat with vehicle owners. So, we come with IOT based smart counting system. Inform any kind of bad occurrence to the vehicle owner using IOT system.

1. Here we use load cell measuring system. Which are used present day as weight sensor machine. Some of basic code is implemented by us which we build as working principle of load measuring system.
2. As far as we searched that there is no related work with our project before. We get some similarity the smart system. Example safety system which we found Canada & USA. Our implementation and effort are totally new for our country's vehicle system.

3. Our project is not yet implemented in India. So that others will not be related their thought with ours project. We are going to develop a prototype. After that others will be know our implementation.

4. We use just measuring concept of weight sensing for design counter. And the fire alarm system included with NodeMcu WIFI module for safety issue.

2.1.1 Typical Transport System

In our country there are various transport system for transporting passenger and other things. For human transport system there are used many types of vehicles. Bus, Mini-Bus, Private vehicle, CNG, Train, Airplane etc. Most of the people are travel by bus. Typically, most of the bus owners are not careful about the system where he is not concern about passenger comfort and vehicle safety. In this system passenger is do not get good service. They are indiscriminate when they travel. People travel with Fed-up mood. Sometimes the vehicle also broken when people get so much annoyed. In typical system the owner doesn't get enough profit due to the cheat of some corrupted employee.

2.1.2 Smart transport System

Smart can be made by various way. In smart transport system means that passenger will not face any kind of hassle when they travel, the owner of vehicle is concern about the transport system where his passenger and his vehicle is safe. Passenger travel with comfort. In smart system the owner will get his profit properly. And the owner served people with their joyous mood.

2.1.3 Counting passenger

We know that typical system which is already running in our county where passenger counting system is manually operated by handwritten. Paper and pen are used to save the passenger number how much passenger are travel. In this method there are some errors occur where the vehicle owner has to count some loss profit. But our smart system the passenger counting system is automatic. And then the number of counted values will send as a message to the owner from counter to counter. We can also assure that there will be no error in counting the passenger. So, the owner will get his real profit. Also, there will no need of counter man in every checking point.

2.2 LITERATURE REVIEW

Implementation of Automatic Room Light Controller with Visitor Counter Design is the visitor counter that is bidirectional in feature which can read both the incoming and outgoing traffic and agents at same time securely. In this system, up to 999 incoming or outgoing visitors can be counted using a microcontroller. Microcontroller is used here to make a secure count over a large number of visitors. The audacity of this project will not only give account of the person entering the room but will also light up the room according to the number of persons that entered, This system is basically required in many places where count for the visitors is needed by the administrator of that system **(Shilpa, 2017).** This cited project was implemented using homemade IR sensors, three single digit seven segment displays. My work takes after this cited project with some modifications such as: using four single digit seven segment displays for an increase in count capacity to be achieved, usage of industry-made IR sensors.

Automated Room Light Controller with Visitor Counter is a reliable circuit that takes over the task of controlling the room lights as well us counting the number of persons / visitors in the

room very accurately. When somebody enters into the room then the counter is incremented by one and the light in the room will be switched ON and when any one leaves the room then the counter is decremented by one. The light will be only switched OFF until all the persons in the room go out. The total number of persons inside the room is also displayed on the seven segment displays. The microcontroller does the above job. It receives the signals from the sensors, and this signal is operated under the control of software which is stored in ROM. Microcontroller AT89S52 continuously monitor the Infrared Receivers, When any object pass through the IR Receiver's line of rays, the IR Rays falling on the receivers are obstructed. This obstruction is sensed by the Microcontrolier. The work cited here designed the system using two DIY IR sensors, an 8052 microcontroller unit and two single seven segment displays **(Sarath Pradeep, 2011) (Waradkar),** In my work, I increased the seven segment display to four thereby increasing the count capacity and also industry-made IR sensors were used,

Bidirectional Visitor Counter with Automatic Room Light Controller with Arduino as master controller is a system to count the visitors of an auditorium, hall, offices, malls, sports venue, etc. The system counts both the entering and exiting visitor of the auditorium or hall or other place, where it is placed. Depending upon the sensors interruption, the system identifies the entry and exit of the visitor. On the successful implementation of the system, it displays the number of visitor present in the auditorium or hall. This is an economical cost reducing system when implemented in places where the visitors have to be counted and controlled. Counting the visitors can be time consuming so it helps to maximize the efficiency and effectiveness of employees, time saving and sales potential of an organization, etc. The cited work was implemented using an Arduino kit and LCD **(Chattoraj, 2016), (Archana D, 2018).** I used an 8051 microcontoller that is very much smaller than an Arduino Development Board and also I used segment displays in place of LCD which has small display outputs.

Automatic Room Light and Fan Controller with Bi-directional Visitor Counter has an automatic light and fan control for room to achieve these two objectives, which are, the design of a system wherein the number ofpersons entering or leaving a room is kept track of and displayed on a LCD

and to turn on and turn off light and fan according to human presence in room with respect to light intensity & room temperature **(Nikose, 2018), (R.R. Yuganandhine, 2017).** I used segment displays in place of LCD which has small display outputs.

An author modeled and designed an automatic sliding door with a room light control system. This system works on the principle of breaking an infrared beam of light, sensed by a photodiode. It consists of two transmitting infrared diodes and two receiving photodiodes. The first one is for someone coming in and the second one is for someone going out of the room. The photodiodes are connected to comparators, which give a lower output when the beam is broken and high output when transmitting normally. The general operation of the work and performance is dependent on the presence of an intruder entering through the door and how close he/she is in closer to the door. The door is meant to open automatically but in a case where there is no power supply trying to force the door open would damage the mechanical control system of the unit (Adamu MurtalaZungeru). In place of the two segment displays used by the cited authors, used four segment displays to increase the count capacity.

Arduino based Smart Light Control System is an advanced light control system that is capable of replacing the old generation light control system. The system is implemented on an embedded platform & is equipped with a photo sensitive detector (LDR) which gives the required input for operation. The working of our light control system is based on the amount of luminous energy in the environment at that moment of time. Depending upon the light intensity at that instant the lighting of the lighting system is adjusted. The embedded main board including the Microcontroller chip, memory (flash), and communication port are used as a processing module for the input that we get from peripheral devices (LDR) (Rath, 2016). The cited work was implemented using an Arduino Development Board which is quite costly. I used an 8051 microcontoller that is very much cheap than an Arduino Development Board.

Automatic Classroom Lighting Controller and Energy Saved based on a Microcontroller unit is a project based on the Campus Card System and automatic gadget control system respectively, which is mature and has been

widely used, in combination with Ethernet, RF wireless communications technology, as well as the development of campus card to achieve a complete classroom energy saving system. System controls the master classroom power on and off by detecting the presence of the card, and effectively solve this problem. This system is characterized by simple-use and low-cost renovation **(Jabeen, 2016), (AyyubKhan, 2018)** .This cited work does not have a visitor counter unlike mine that merges both visitor counters and gadget controller together.

Some authors presented an Automatic Room Light Controller with Visitor Counter and GSM Messaging and room appliances controller based. on Wi-Fi respectively. It automatically counts the number of persons that enter or exit the room and depend on counter value it automatically turns on or off the lights of room. To show the Count value, they use the 7-Segment display and the GSM is used to transmit the count value on allowed mobile number as a message "count=__" **(Ghotre, 2018), (Adetiba,2011),(Nangare, 2014).** The striking difference between the cited work and mine isin the cost, the incorporation of a GSM and Wi-Fi module is cost effective.

An author presented a Congestion Control Bi-directional Digital visitor counter which is a consistent circuit mainly designed to monitor the room appliances as well as count number of people entering in the arena very accurately and also avoids congestions in the different areas of usage. When a person enters into the arena, a counter is maintained for presenting the number of people and is updated by one and the appliances in the arenawill be turned ON and when a person leaves the arena, counter is maintained for presenting the number of people and is decreased by one. The appliances will be turned OFF when all the persons in the arena go out. The overall count of people inside the arena will be presented on Liquid crystal display. When a particle passed through the Infrared Receiver's rays then the Infrared Rays falling on the receivers are obstructed. This obstruction is sensed by the Ardunio Microcontroller. It also can manage fans based on relay provided, if the room reaches the maximum capacity, then, by using wifi module, message is sent to authorities to limit the person entering the room. Thereby congestion is avoided **(S.LAKSHMIL, 2016).** The cited work here used cost-effective modules like Wi-FI and Arduino boards unlike my cheap Work.

An author presented the design and construction of a digital bidirectional visitor counter (DBVC). The DBVC is a reliable circuit that takes over the task of counting number of persons / visitors in the room very accurately and beeps a warning alarm when the number of visitors exceeds the capacity limit of the auditorium/hall. When somebody enters the room then the counter is incremented by one (+1) and when any one leaves the room then the counter is decremented by one (-1), The total number of persons inside the room is also displayed on the LCD (Liquid Crystal Display). The microcontroller is used for detecting an entry or exit action and computing the figures (addition and subtraction) to acquire accurate results. It receives the signals from the sensors, and this signal is operated under the control of embedded programming code which is stored in ROM of the microcontroller. The microcontroller continuously monitors the Infrared Receivers. When any object pass through the IR Receiver's line of rays, and then the IR Rays falling on the receivers are obstructed. The obstruction occurs under two circumstances, either you obstruct sensor 1 (i.e. outside the building) before sensor 2 (i.e. which is inside the building) this shows that you are entering the building or you do it the other way round, which is obstructing sensor 2 before sensor | to indicates an exit movement. This obstruction is sensed by the Microcontroller, computed and displayed on a 16x2 LCD screen **(Adjardjah, 2016).** Instead of the homemade sensors used in the cited work, I used industry-made sensors.

An author presents the design of an occupancy detector circuit that automatically switch ON and OFF the light in a room based on room occupancy and display the number of persons in a room on LCD, design of Light dependent Resistor (LDR) based circuit that controls the light in a room depending upon the lighting condition (intensity of ambient light), design of Temperature indicator, design of smoke detector and design of capturing an image using webcam/canon camera (Bhushan, 2009). In place of LCD used in the cited report, I used seven segment displays for better display outputs.

A paper presents the design and development of PICL6F877A microcontroller based intelligent conference hall automation system, which is useful to control and integrate all

electrical devices in a room automatically. The proposed system consists of an Infra-Red sensor, which acts as a bidirectional person counter to count the number of people inside the conference hall, Based on this count, the microcontroller automatically controls the electrical devices inside the hall. The system also provides a user interactive menu to set the required count value to turn on the devices, to meet the needs of the user **(Hariprasath, 2016).** The work cited here controls quite a number of appliances thus increasing the system's complexity and cost, whereas, my work controls few appliances making it considerably inexpensive in comparison to the cited work's cost.

Another paper contains the development of an ARM based controller or ARM 7 TDMI microcontroller i.e. LPC 2148 micro controller with automatic functioning of home appliances using IR sensors. This paper reports on a system which will save electricity, over and over whenever we have left the room and hall without switching/turn off lights and fans or any electrical appliance, therefore electricity is wasted. In this work we've
developed a system during which energy are saved based on range of individuals coming in or going out of the area, If there's nobody within the area or in that particular room, then automatically the lights and fans are switched OFF. On the opposite hand, as a person enters the room, lights used in that room and fan are switched ON. On the idea of the intensity of daylight we will turn off lights in day time **(Renuka, 2017).** I substituted an
8051 microcontroller for the large ARM microcontroller used in the cited work.

In a paper, a system was designed to analyse the power usage in a Gathering Hall/Auditorium by deploying a visitor counter and automatic fan control system **(Bagali, 2016).** The system cited is expensive, whereas, my less expensive system achieves the basic purposes intended to be achieved by the cited work.

One paper has in it the design of a system in which every room will be monitored by a single CPLD that will keep the record of the number of persons in every room and when it finds the no of persons in a room to be zero then it automatically cut the power line for that room. We can also use a SEVEN SEGMENT, which will display the status of every room. The project can be subdivided into three main parts. First: - The one that will detect the entry or exit of a

person in the room, this module will be applied at the door of each room. Second: ~ Which will further differentiate between entry and exit, and then accordingly increase or decrease the count of each room and display the count of each room on the timesharing bases on the seven segments which will be installed at a single central room. Third: - will be used to control the power line of each room which will work jointly with the second module to control the switching of power of each room **(Ahmad,2017).** The complexity of the system proposed in the cited work is relatively high compared to my low cost system.

CHAPTER 3

DESIGN AND IMPLEMENTATION

3.1 DESIGN

General Flowchart of the system
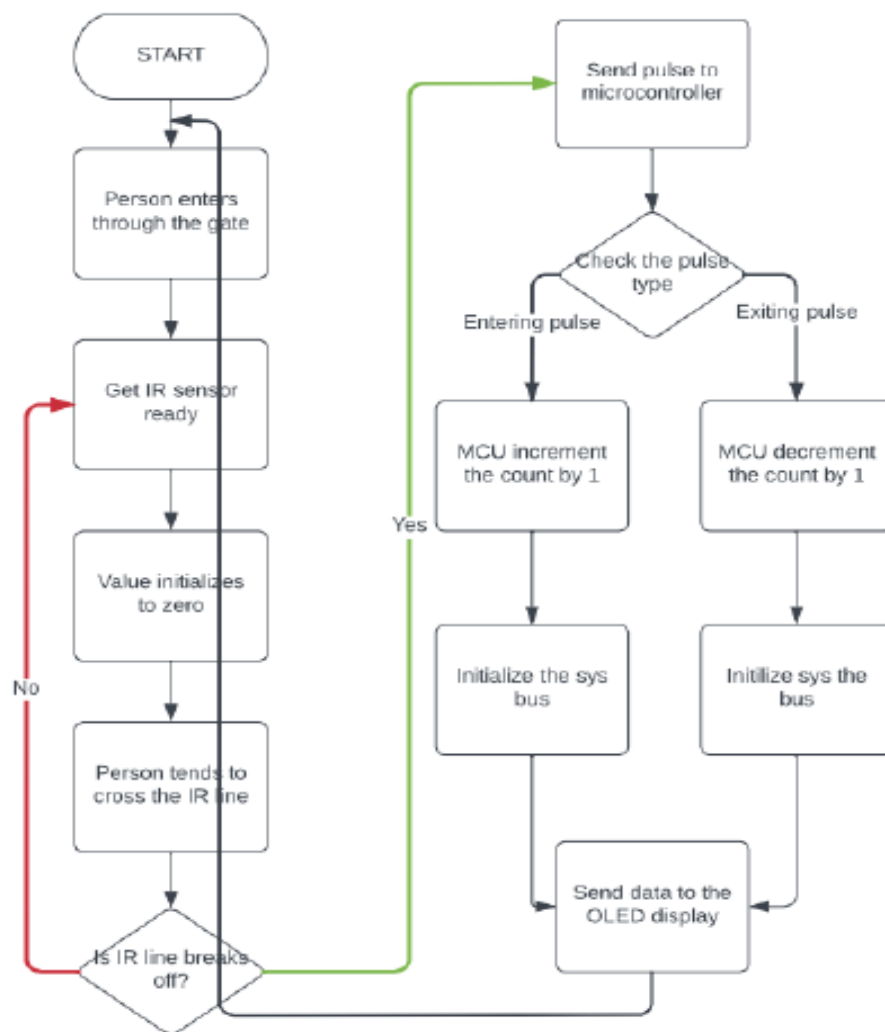
Figure-3.1

General Block Diagram
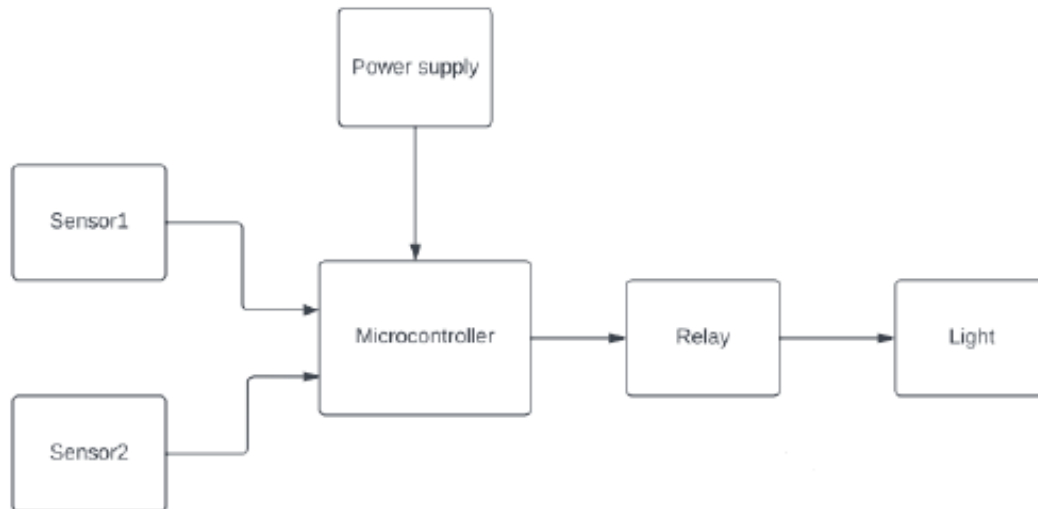
Figure-3.2

3.2 IMPLEMENTATION

The implementation of this project was done on the breadboard. Stage by stage testing was done according to the block representation on the breadboard. The data which is being transmitted to cloud is also tested for any anomalies.

The cloud interface and frontend is being designed to view the data in graphical format which is easier to read to human eyes rather than raw sensor datas.

3.2.1 Project Component List

S.No	Components Name	Description	Quantity
1	NodeMCU	NodeMCU ESP8266-12E Board	1
2	Infrared Sensor	IR Infrared Sensor Module	2
3	OLED Display	0.96" I2C OLED Display	1
4	Relay Module	5V 1 Channel Relay Module	1
5	Power Supply	5V 1 Supply	1

3.2.2 Description of each Component

1. IR LED Transmitter

The main element of this IoT project is the IR Sensor which works as an Obstacle Detector. Whenever the IR sensor detects an interrupt, it counts the person and adds it to the previous value.
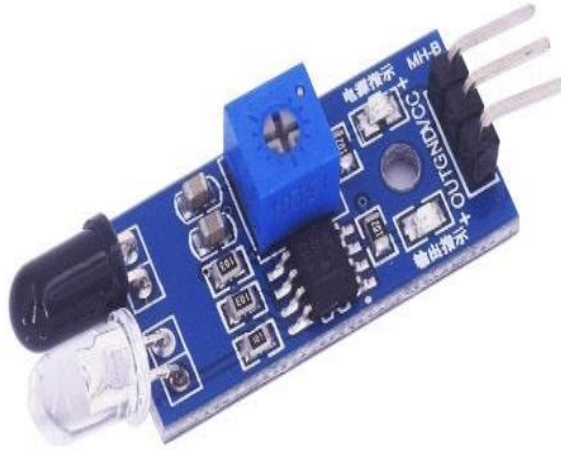
Figure-3.3

IR Sensor module has the great adaptive capability of the ambient light. It has an infrared transmitter and a receiver. The infrared emitting tube emits a certain frequency which when encounters an obstacle reflect to the signal. The reflected signal is then received by the receiver tube. The other components in the circuit are Opamp, Variable Resistor & output LED.

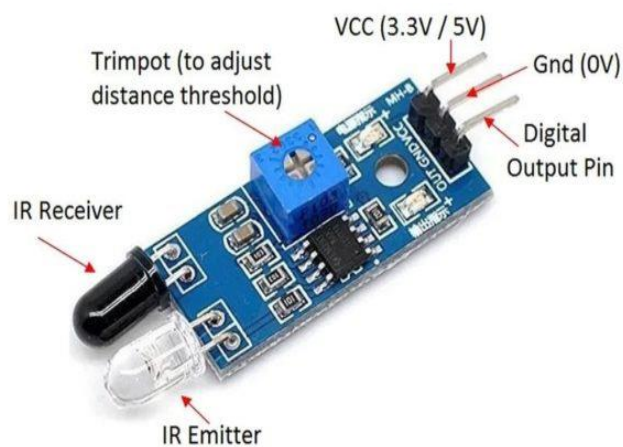The Sensor consists of the following electronics components.

Figure-3.4

IR LED emits light, in the range of Infrared frequency with a wavelength of 700nm – 1mm. IR LEDs have a light-emitting angle of approx. 20-60 degrees and has a range up to 5-10cm.

2. Photodiode Receiver

Photodiode acts as the IR receiver as its conducts when light falls on it. Photodiode looks like a LED, with a black color coating on its outer side.

3. Node MCU

NodeMCU IOT based open source platform which include ESP 8266 firmware on it based on ESP-12 module. By this it can connect a wi-fi network, creat a server and pass data to serve. It support arduino ide for coding.
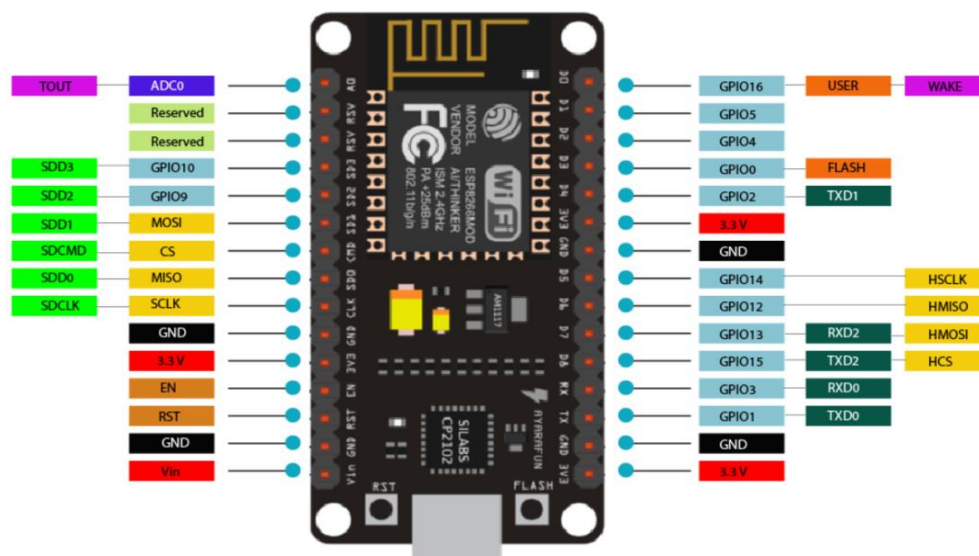
Figure-3.5

4.OLED Display

This 0.96" I2C OLED Display is an OLED monochrome 128×64 dot matrix display module with I2C Interface. It is perfect when you need an ultra-small display. Comparing to LCD, OLED screens are way more competitive, which has a number of advantages such as high brightness, self-emission, high contrast ratio, slim outline, wide viewing angle, wide temperature range, and low power consumption. It is compatible with any 3.3V-5V microcontroller, such as Arduino.

Pin Definition:

A.GND: Power ground
B.VCC: Power positive
C.SCL: Clock wire
D.SDA: Data wire.
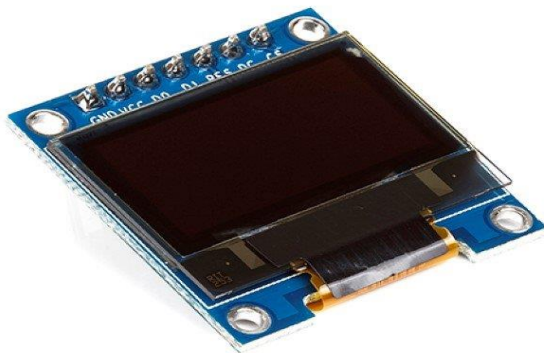
Figure-3.6

5.Relay Module

This 1 channel 5V 10A relay control board module with optocoupler modules is compliant with international safety standards, control and load areas isolation trenches it has a single relay a genuine.

The inputs of 1 Channel 5V 10A Relay Module are isolated to protect any delicate control circuitry.

The power supply and relay instructions, lit, a disconnect are off. The input signal, signal, common Terminal and start conducting. It can be used as a single chip module for appliance control and work with both DC or AC signals where you can control the 220V AC load.

A wide range of microcontrollers such as Arduino, AVR, PIC, ARM and so on can control it. Note: On the high level and low level-triggered mode, friends who do not understand, have a look

1. High-level trigger refers to the signal voltage between input and trigger, can be understood as a signal input with VCC cathode short-circuit triggered a way;
2. Low-level trigger refers to the signal voltage between the input terminal and Earth OV trigger, can be understood as a signal input terminal and the GND negative electrode short circuit triggered is a way 1-channel relay module connection.

Features:

1. High impedance controller pin

2. Pull-down circuit for the avoidance of malfunction

3. One normally closed contact and one normally open contact

4. Triode drive, increasing relay coil

1. Power supply indicator lamp

2. Control indicator lamp

   With 4 fixed screw holes, hole diameter 3.1mm, convenient installation, and fixation
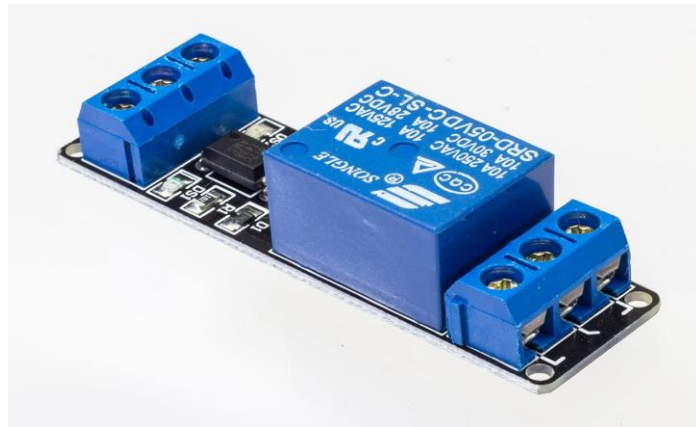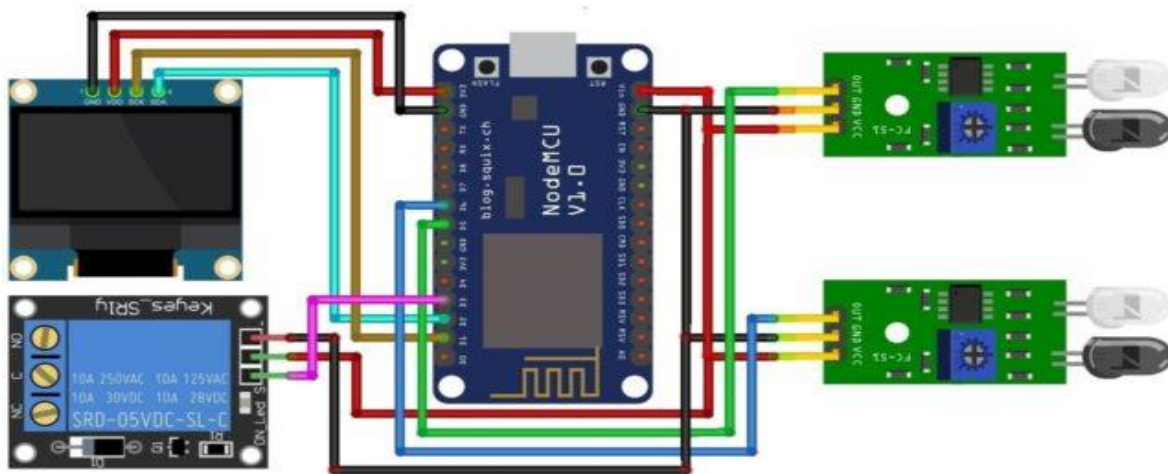

Figure-3.7

3.2.3 Circuit Layout

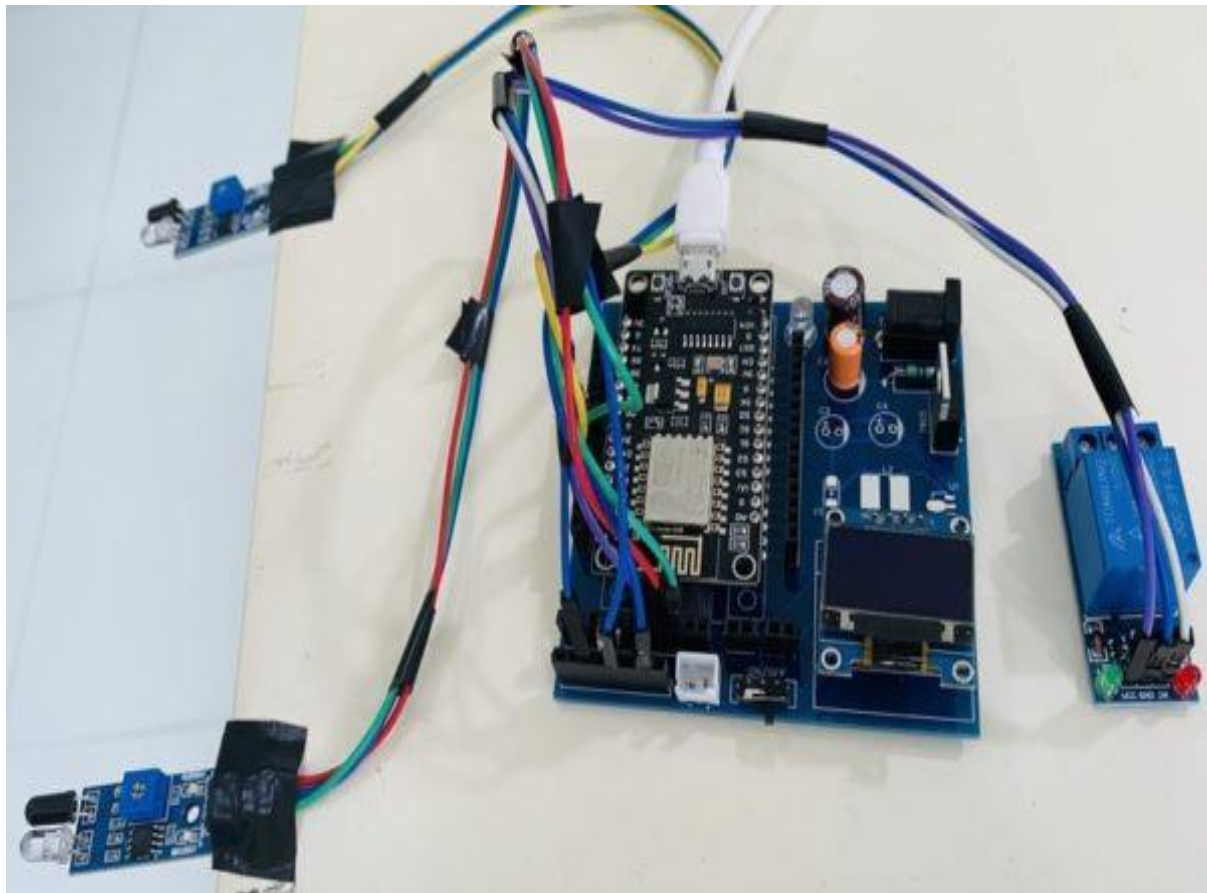**Figure-3.8**

3.2.4 Working Model
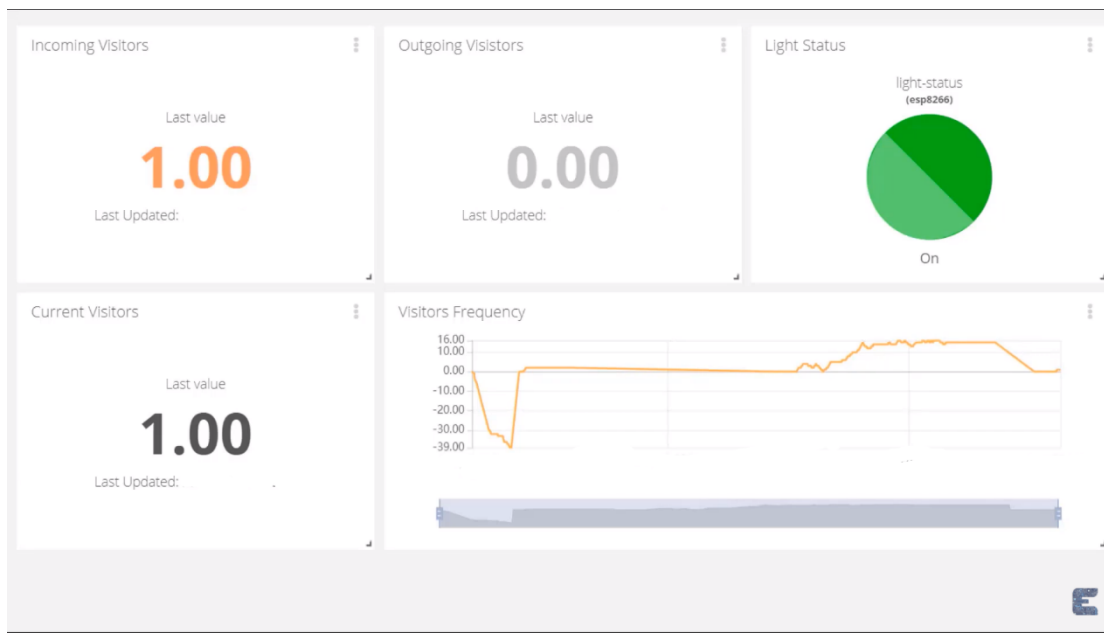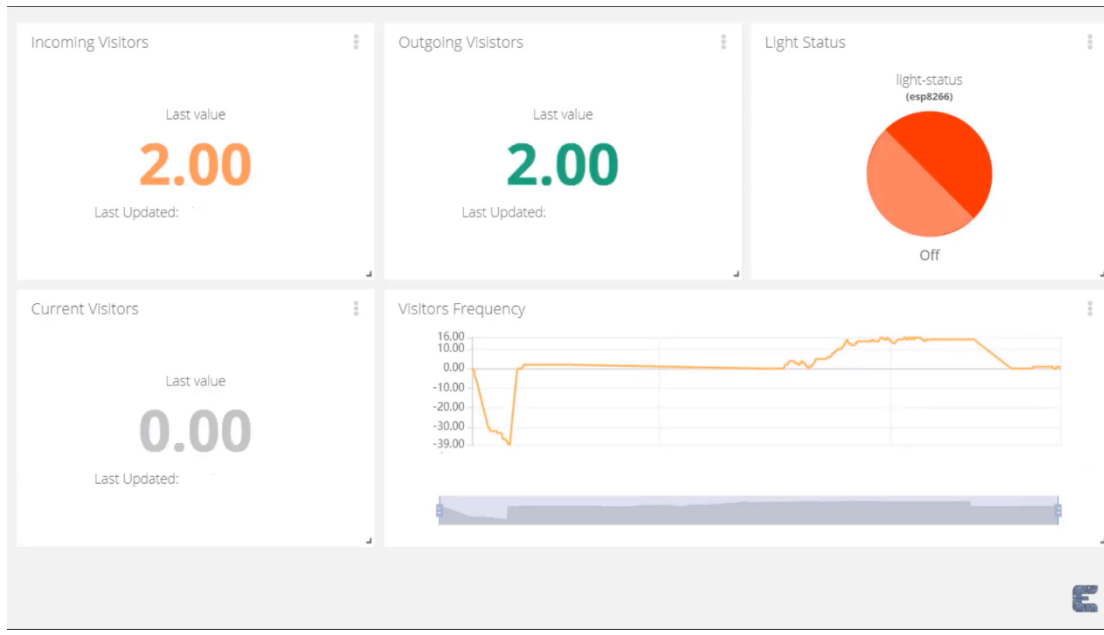

Figure-3.9

3.2.5 Analytics

Figure-3.10

3.2.6 Applications of the Project

1. The Bidirectional Visitor Counter can be used domestically to get an indication of the number of persons entering a party .

2. It can be used at official meetings.

3. It can be used at homes and other places to keep a check on the number of persons entering a secured place.

4. It can also be used as a home automation system to ensure energy saving by switching on the loads and fans only when needed.

3.2.7 Limitations

1. It is a low range circuit and cannot be implemented at large areas.

2. With frequent change in the count value, after a certain time the output may look confusing.

3. If there are multiple doors for the same room the project becomes quite complex.

4. IR sensor cannot detect if lots of people are entering at one time.

3.2.8 Future Enhancement:

1. GPS tracker base vehicle.

2. To improve design to make it more effective.

3. Enhanced safety feature to prevent accidents.

4. Passenger Alert System.

5. Better live object detection.

6. Load cell can be introduced for individual seat monitoring.

CHAPTER 4

CONCLUSION AND BIBIOGRAPHY

4.1 CONCLUSION

We have successfully sent the data of serial monitor to cloud platform and are able to display it in real time to the viewers. Our sensors give desirable reading and works efficiently. Via this we are successfully able to count the passengers and manage the system more efficiently.

Our project is about to build a proper technique for reducing the journey time for passengers. It will be beneficial to vehicle owner a Nobel system which can both sustainable and affordable by all also ensure the safety of vehicle and passengers. Time is precious in our daily life, thus we are inspired to develop this project.

This project has successfully achieved its objective. Bi directional visitors counter was successfully designed and implemented. The designed system works perfectly as a counter at the confined place. NodeMCU is able to differentiate the visitor whether they are entering or exiting the room.

The system displays the total visitor present in the confined place through the seven segment displays, the first seven segment display shows the number of people the enters the place, the second one displays the number of those that exits the place and the third display shows the difference between those that enters and those that leaves the confined place. A programming to count up and down visitor traversing a certain passage or entrance is operating successfully.

The construction was done in such a way that it makes maintenance and repairs an easy task and affordable for the user should there be any system breakdown. The project has really exposed me to practical electronics generally which is one of the major challenges I

shall meet in my field now and in future. The design of the variable dc power supply involved research and hard work.

Extensive work was done on the design, analysis and construction of this work. The project was quite challenging and tedious but eventually was a success. I wish to thank the department and my supervisor for giving me the opportunity to do this project. However, like every aspect of engineering there is still room for improvement and further research on the project as suggested in the recommendations below.

4.2 BIBLIOGRAPHY

[1] Kuchta, R.; Stefan, P.; Barton, Z.; Vrba, R.; Sveda, M, "Wireless temperature data logger Sensors", International Conference on new Techniques in Pharmaceutical and Biomedical Research, 2005 Asian Conference, Sept. 2005, PP. 208 - 212.

[2] Nur Farahin Binti Asa, "Counter System using microcontroller for visitors," universiti teknologi Malaysia, Malaysia, 2012.

[3] Sarath M, Sarath P, "Automatic Room light controller with bidirectional visitors counter,"Sree narayana Gurukulam College of Engineering Kadayiruppu, 2011.

[4] Shilpa V, "Bidirectional visitors counter," Indian Institute of Technology, India, 2011.

[5] H. McGraw, "PIC microcontroller project book," United States of America: McGraw hills companies, 2000.

[6] Dare Smith, "PIC in practice a project based approach", Elsevier's Science and Technology, 2006, PP. 11-15.

[7] Erdem, H, "Design and implementation of data acquisition for fuzzy logic controller", Industrial Technology, IEEE International Conference, vol. 1, May 2001, PP. 199 - 204

[8] "Allaboutcircuits," [online]. Available:http://www.allaboutcircuits.com [Accessed March 2016].

[9] RJ Maddock, DM Calcutt, "Electronics a course for Engineers", Published by Longman 1994, PP. 341-349.

[10] Microchip, "PIC16F84A Data Sheet," Microchip Technology, Inc., United States of America, 1999.

[11] Rakshit Singla, Abdul Aziz, Shivam Aggawal, Siddhaut Aggarwal, "Bidirection visitors counter," India institute of Technology, 2008.