"Towards Global Technological Excellence"

A Project Report on

An IOT Based Vehicle Accident Detection And Alert System

Submitted to

Sant Gadge Baba Amravati University, Amravati

In partial fulfilment of the Requirements For the Degree of

Bachelor of Technology in

Electronics and Telecommunication Engineering

Submitted by

Ankit Ravindra Jangle

(ID-18104006)

Saurabh Satish Girpunje

(ID-17004032)

Mahesh Gopalrao Thorat

(ID-17004048)

Supervised by

Mrs. S. S. Thorat

Department of Electronics and Telecommunication Engineering

Government College of Engineering, Amravati

(An Autonomous Institute of Government of Maharashtra)

Maharashtra State, India.

2020-2021

GOVERNMENT COLLEGE OF ENGINEERING, AMRAVATI-444604
DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

CERTIFICATE

This is to certify that the project report entitled, **"An IOT Based Vehicle Accident Detection And Alert System"**, which is being submitted herewith for the award of fulfillment of degree of **'Bachelor of Technology'** in **'Electronics and Telecommunication Engineering'** is the result of the project done by **Mr. Ankit Ravindra Jangle ID-18104006, Mr. Saurabh Satish Girpunje ID-17004032 and Mr. Mahesh Gopalrao Thorat ID-17004048** under my supervision and guidance.

Prof. Mrs. S. S. Thorat
Supervisor
Department of Electronics and
Telecommunication Engineering
Government College of Engineering,
Amravati.

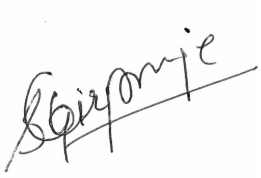
Head of Department
Department of Electronics and
Telecommunication Engineering
Government College of Engineering,
Amravati.

Principal
Government College of Engineering,
Amravati.

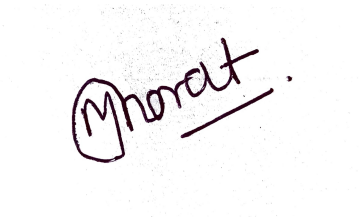
DECLARATION

We hereby declare that we have formed and written the project report entitled **"An IOT Based Vehicle Accident Detection And Alert System"** under the guidance of **Prof. Mrs. S. S. Thorat**, Assistant Professor Department of Electronics and Telecommunication Engineering, Government College of Engineering, Amravati. It has not been previously submitted for the basis of the award of any degree or diploma or certificate nor been submitted elsewhere for the award of any degree or diploma.

Ankit Jangle
(18104006)



Saurabh Girpunje
(17004032)



Place: Amravati
Date:

Mahesh Thorat
(17004048)

ACKNOWLEDGEMENT

We wish to express our deepest sense of gratitude to our guide **Mrs. S. S. Thorat**, Assistant Professor, whose encouragement, valuable guidance and supervision really helped us in completing this project. We express sincere thanks to **Dr. D. V. Rojatkar**, Head of Department of Electronics and Telecommunication Engineering for extending necessary help, providing facilities and time to time variable guidance. We would like to thank **Dr. R. P. Borkar**, Principal, Government College of Engineering Amravati, who has been morally supporting throughout.

Also we would like to thank all the staff members of Electronics Engineering Department and the Robo-Tech Forum, GCoEA, for providing with the necessary electronic equipments and Tools, required for system development.

Ankit Jangle

(18104006)

Saurabh Girpunje

(17004032)

Place: Amravati

Date:

Mahesh Thorat

(17004048)

ABSTRACT

The advent of technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. The fundamental reason for the undertaking is to use the remote innovation effectively for the vehicle conditions by using the IoT Technology if there is any event of mishaps of vehicle utilizing GPS, besides with hostile to burglary framework in the vehicle utilizing vibration sensor, GPS, pulse sensor. This project will provide an optimum solution to this draw back. According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal or if a car rolls over, and vibration sensor will detects the signal and sends it to NodeMCU ESP8266 controller. Also alcohol detection using alcohol sensor is performed by NodeMCU and sends the essential data to the parents or a rescue team. So the person can immediately then after conforming the location necessary action will be taken. If the person meets with a small accident or if there is no serious threat to anyone‘s life, then the alert message can be terminated by the driver by a switch provided in order to avoid wasting the valuable time of the medical rescue team. The other modules like GPS is integrated with the system to obtain the location coordinates of the accidents and sending it to registered numbers and nearby ambulance to notify them about the accident to obtain immediate help at the location.

Contents

LIST OF FIGURES

LIST OF ACRONYMS

Acronym	Illustration
IoT	Internet of Things
IDE	Integrated Development Environment
ESP	Espressif Modules
MCU	Microcontroller Unit
MPU	Motion Processing Unit
MEME	Micro Electro Mechanical Systems
ADRS	Accident Detection and Response System
GPS	Global Positioning System
GSM	Global System for Mobile Communications
SWM	Support Vehicle Machine
SDA	Serial Data Line
SCL	Serial Clock Line
GPIO	General Purpose Input Output
PCB	Printed Circuit Board
WIFI	Wireless Fidelity
I2C	Inter-Integrated Circuit
CV	Computer Vision
AO	Analog Output
XDA	Auxiliary Serial Data
XCL	Auxiliary Serial Clock
RF	Radio Frequency
HTTPS	Hypertext Transfer Protocol Secure

1 INTRODUCTION

In present days the rate of accidents is increasing rapidly. Due to employment the usage of vehicles like cars, bikes are increasing. And most of the accidents happened due to over speed. People are going under risk because of their over speed. And most of the times the victim did not get help on time because no one knows about the accident. To reduce this in the country this project introduces an optimum solution as shown in Figure 1.1. IoT based vehicle accident detection and alerting system is introduced.[1]

1.1 Introduction

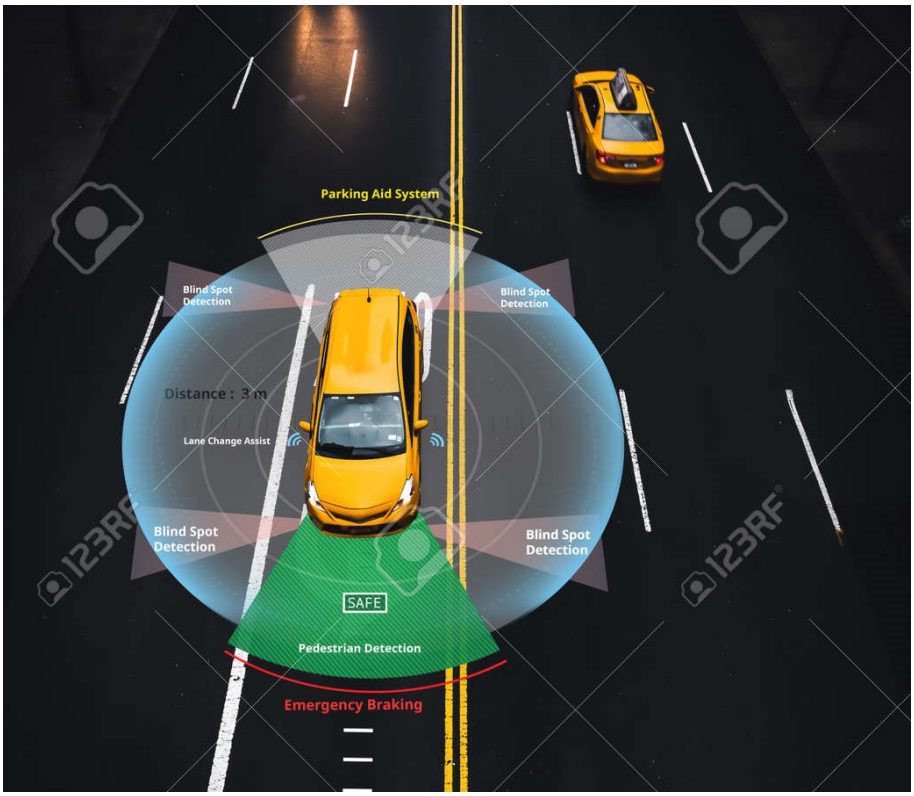


Figure 1.1 Auto Accident Detection Concept.

[Courtesy: "https://www.orcad.com/cn/node/6581/accident_detection_concept"]

The main objective is to provide fast help and save lives by sending a location and alert message to the registered email address and registered mobile number

and emergency numbers if the accident is major. When an accident occurs, the notification is sent to the registered mobile and email services and IoT platform in less time. Esp8266 (NodeMCU) is the heart of the system which helps in transferring the message to different devices in the system. MPU-6050 which is a 3-Axis Accelerometer and Gyroscope sensor detect if the accident occurs and the information is transferred to the registered number and email using ESP8266 and GPS system will help in finding the exact location of the accident spot.

Vehicle following frameworks have conveyed this technology to the daily existence of the basic individual. Today GPS is utilized as a part of autos, ambulances and police vehicles which are regular sights on the streets of created nations. All the current technology bolster following the vehicle area and status. The GPS/IoT based framework is a standout and unique amongst the most imperative frameworks, which coordinate the two GPS technology and upcoming IoT or Internet of Things phrasing.

GPS is one of the innovations that are utilized as a part of countless today. One of the applications is following your vehicle and keeping general checking on them. This following framework can help us to illuminate the area and course went by a vehicle, and this data can be seen from some other remote area. It additionally incorporates the web application that gives us the correct area of the objective. This framework empowers us to track the objective in any climate conditions. Our proposed system is designed to track and monitor vehicles that are used by certain party for particular purposes, also to stop the vehicle if stolen and to track it online for retrieval. This system is an integration of several modern communication technologies. To get the latitude and longitude data, there are various web-based geolocation services.[3]

1.2 Need

About 1.24 million people die each year as a result of road traffic crashes. Without action, road traffic crashes are predicted to result to in the death of around 1.9 million people annually by 2020. Decade of action for road safety (2011-2020)

with the aim of saving millions of lives by improving the safety of roads, vehicles and improving emergency services.

Researchers have been exploring similar fields of research as to ADRS system. The idea has been discussed on many occasions but lack of implementation as well as design according to geographic and demographic requirements has not been seen.[2]

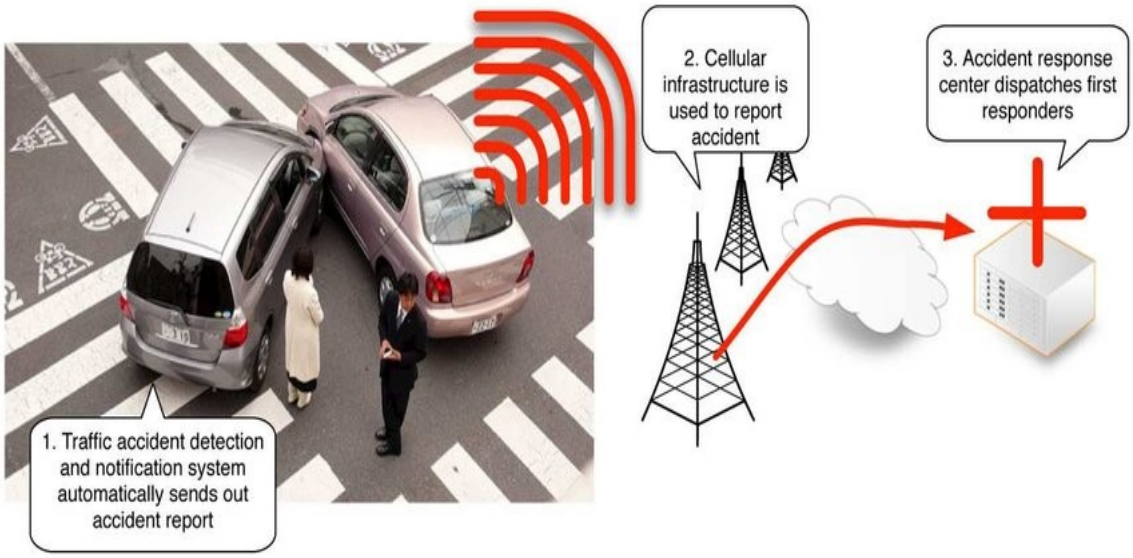


Figure 1.2 Integrated Alert System.

[Courtesy: "https://www.chipsaway.biz/advanced-driver-assistance-systems"]

The Lexus 2014 models are equipped with a new feature called the Lexus Enform. A feature called the Safety Connect detects an accident through a force sensor at the rear end and sends an automatic notification to the response service center through the smartphone. The biggest disadvantage with the system is service change to use the system as well as requirement of a smartphone.

1.3 Objectives

The objective of the following system are-

- this project is about the detection of accidents and provide fast help by sending a location via email about the place of accident

- this is an application to provide easy assistance and users registered can update their mobile numbers and email
- this system will continuously track the gps coordinates
- MPU6050 (Accelerometer + Gyroscope) module tracks the position of the vehicle to be in fixed axis
- provide pre-checking for the drunk driver which is major cause of accident

1.4 Organisation of Report

This report is organised into five chapters. After this introductory chapter, chapter 2 describes the literature read by us for the accomplishment of the project.
Chapter 3 deals with the technologies used to accomplish this project.
Chapter 4 deals with the thorough methodology used in preparing the working model and the report. It also emphasizs on the details of the components used for the hardware implementation, software belongings, technology used and the communication protocols with the system architecture including the block diagram of the flowchart.
Chapter 5 describes the performance analysis and result of this project.
Chapter 6 presents the conclusion of the work performed.

2 LITERATURE SURVEY

Currently, a vehicle cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In literature, a number of approaches to provide security and safety through monitoring the vehicle's real time precise positioning and information using different technologies have been proposed.

To protect the vehicle and tracking so many advanced technologies are available now a days. In olden days the information of accident can be transferred, but most of the time place of accident spot cannot be identified. In all vehicle airbags are designed, air bags are used for security and safety travels. The air bag system was introduced in the year of 1968.[4]

2.1 Pre-existing Systems

There are various proposed systems but in comparison many have limitations and this limitations has to identified. Some previous technologies are described here.

- Sadhana B have proposed Smart helmet intelligent safety for motorcyclist using raspberry pi and open CV. The idea is obtained after knowing that there is increased number of fatal road accidents over the years. This project is designed to introduce safety systems for the motorcyclist to wear the helmet properly

- Sarika R. Gujar proposed advanced Embedded System of Vehicle Accident Detection and Tracking System. The main objective of this system is to first detect the accident location and call for the emergency services. Vehicle accident detection is possible with the help of sensors. A GPS and GSM module helps to trace the vehicle.[6]

- Shailesh Bhavthankar proposed Wireless System for Vehicle Accident Detection and Reporting using Accelerometer and GPS. In this paper, Accelerom-

eter sensor is used to detect crash and GPS give location of vehicle. In case of any accident, the system sends automated message to the pre-programmed number such as family member or emergency medical services via GSM.

- Jagdish A.Patel proposed Raspberry Pi based smart home. This paper aims at designing a basic home automation application on Raspberry Pi through Interfacing camera as security purpose and the algorithm for the same is implemented in developed in python environment which is the default programming environment provided by Raspberry Pi.

- Tushara and Vardhini proposed a solution for accident detection that uses a micro controller to control operations like detecting and reporting. The system focuses on minimizing the action time after an accident has occurred. A number is pre-fetched on the system, to which an alert is sent on occurrence of accident. The accident is detected using a vibration sensor.

- Nicky Kuttukkaran proposed heartbeat a major factor for differentiating accidents then preferred Bluetooth for sending alert signals. This approach is limited by the range of Bluetooth and heartbeat is not a suitable measurement for accident verification because it is subjective to interpretation.

2.2 Proposed System

Proposed system will provide an automatic detection and alert of accident it also locates the location of the vehicle and send it to emergency numbers and registered mobile number and send alert on email. The system we made has the lower cost than others as we are not using any expensive device like GSM and other sensors. The system just uses the NodeMCU as a main controller of the system which helps in transferring the message to different devices in the system. and other than that, we are using MPU-6050 3 Axis Accelerometer and Gyroscope sensor to detect the accident occurs and NE0-6M GPS module to locate the exact position of the vehicle.[5]

The proposed system will check continuously whether an accident has occurred or not. Whenever an accident occurs, the notification is sent to the registered

mobile and email using iftt IoT platform in less time and notifies to nearest medical centres and registered mobile numbers and Email about the place of accident using NodeMCU and GPS modules. The location can be sent through tracking system to cover the geographical coordinates over the area.

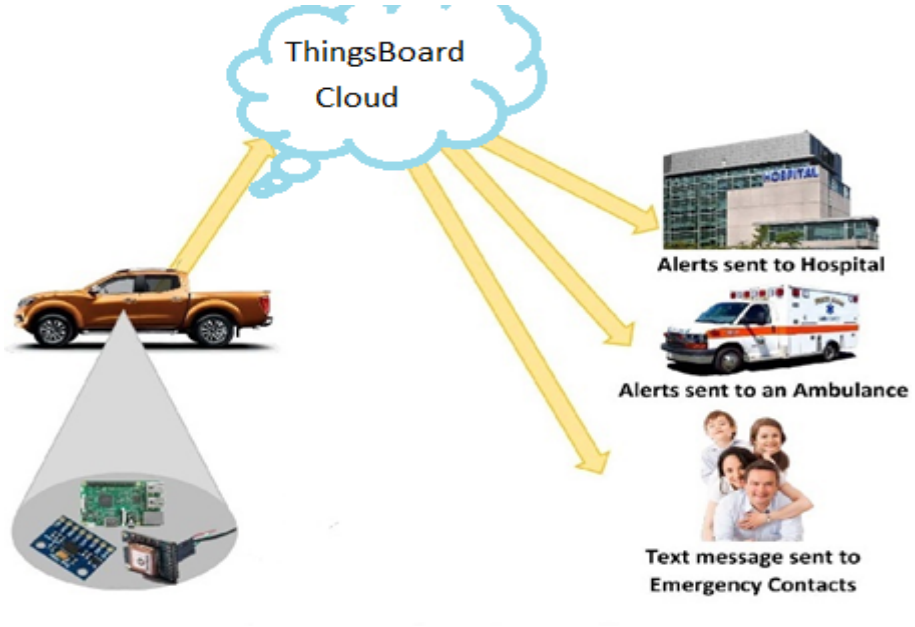


Figure 2.1 Overview of proposed system.

[Courtesy: "https://www.chipsaway.biz/advanced-driver-assistance-systems"]

2.3 Concluding remarks

Many other systems have been proposed to deduce the accident. The existing system deals with two sensors where MEMS sensor is used to detect the angle and vibration sensor is used for detection the change in the vehicle. The other existing system uses IOT and cloud computing system. Where the vehicle detection is done through SVM (support vehicle machine) that is developed by Ant Colony Algorithm (ACA). Here IOT will monitor the vehicles using magneto resistive sensors. Existing system also provides the location of the accident using Atmega 328 Microcontroller and RF transmitter and receiver. The information is sent to the saved mobile numbers. Some existing system also provide location and alert on mobile numbers by using GPS and GSM device.

3 TECHNOLOGIES USED

3.1 Internet of Things

The internet of things, or IoT, is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. IoT devices are empowered to be our eyes and ears when we can't physically be there. Equipped with sensors, devices capture the data that we might see, hear, or sense. They then share that data as directed, and we analyse it to help us inform and automate our subsequent actions or decisions. By means of low-cost computing, the cloud, big data, analytics, and mobile technologies, physical things can share and collect data with minimal human intervention. In this hyperconnected world, digital systems can record, monitor, and adjust each interaction between connected things. The physical world meets the digital world and they cooperate.

An IoT ecosystem consists of web-enabled smart devices that use embedded systems, such as processors, sensors and communication hardware, to collect, send and act on data they acquire from their environments. IoT devices share the sensor data they collect by connecting to an IoT gateway or other edge device where data is either sent to the cloud to be analyzed or analyzed locally. Sometimes, these devices communicate with other related devices and act on the information they get from one another. The devices do most of the work without human intervention, although people can interact with the devices for instance, to set them up, give them instructions or access the data. IoT applications use machine learning algorithms to analyze massive amounts of connected sensor data in the cloud. Using real-time IoT dashboards and alerts, you gain visibility into key performance indicators, statistics for mean time between failures, and other information. Machine learning–based algorithms can identify equipment anomalies and send alerts to users and even trigger automated fixes or proactive counter measures.

3.2 Inter-Integrated Circuit

I2C stands for Inter-Integrated Circuit and can also be called IIC or I squared C. The I2C protocol is used to establish communication between two or more ICs (Integrated Circuits), hence why it's known as Inter-Integrated Circuit (I2C) communication. However, it should be noted that I2C could also be used as a communication protocol between two ICs that are located on the same PCB. to establish short distance communication within the same board or device, you can use I2C. It requires only two bidirectional wires for transmitting and receiving information. You also need to know that I2C protocol supports serial communication only. The protocol is very popular and multiple peripheral ICs are connected in master-slave configurations. Talking about master-slave configuration, you have a lot of flexibility when it comes to using the I2C protocol. I2C allows designers to establish two-way communication between multiple master ICs and slave ICs. In fact, you can connect as many as 1008 slave devices.

The I2C protocol supports multi-master, multi-slave communication, which implies you can add a lot of functionality to your design. More than one master IC controlling and communicating with the slave ICs can speed things up and add functionalities to the embedded system. I2C protocol doesn't complicate the design. It requires only two bidirectional signal lines to establish communication among multiple devices. Further, the pin count is low as well.

3.3 Global Positioning System

The Global Positioning System (GPS) has been developed in order to allow accurate determination of geographical locations by military and civil users. It is based on the use of satellites in Earth orbit that transmit information which allow to measure the distance between the satellites and the user. If the signals from three or more satellites are received, simple triangulation will make it possible to determine unambiguously the location of the user. They continuously emit coded high-frequency radio signals which may be received by special GPS receivers. These signals contain information about the exact orbits of the satellites and the

time of atomic clocks onboard the satellites. When comparing the arrival times, the time delay between emission and receipt is measured and from the speed of light, just below 300,000 km/sec, the distance between the satellite and the receiver is computed.

The signal of time is sent from a GPS satellite at a given point. Subsequently, the time difference between GPS time and the point of time clock which GPS receiver receives the time signal will be calculated to generate the distance from the receiver to the satellite. The same process will be done with three other available satellites. It is possible to calculate the position of the GPS receiver from distance from the GPS receiver to three satellites. However, the position generated by means of this method is not accurate, for there is an error in calculated distance between satellites and a GPS receiver, which arises from a time error on the clock incorporated into a GPS receiver. For a satellite, an atomic clock is incorporated to generate on-the-spot time information, but the time generated by clocks incorporated into GPS receivers is not as precise as the time generated by atomic clocks on satellites. Here, the fourth satellite comes to play its role: the distance from the fourth satellite to the receiver can be used to compute the position in relations to the position data generated by distance between three satellites and the receiver, hence reducing the margin of error in position accuracy.

4 METHODOLOGY

4.1 Block Diagram

The block diagram of the system is illustrated in Figure 4.1.

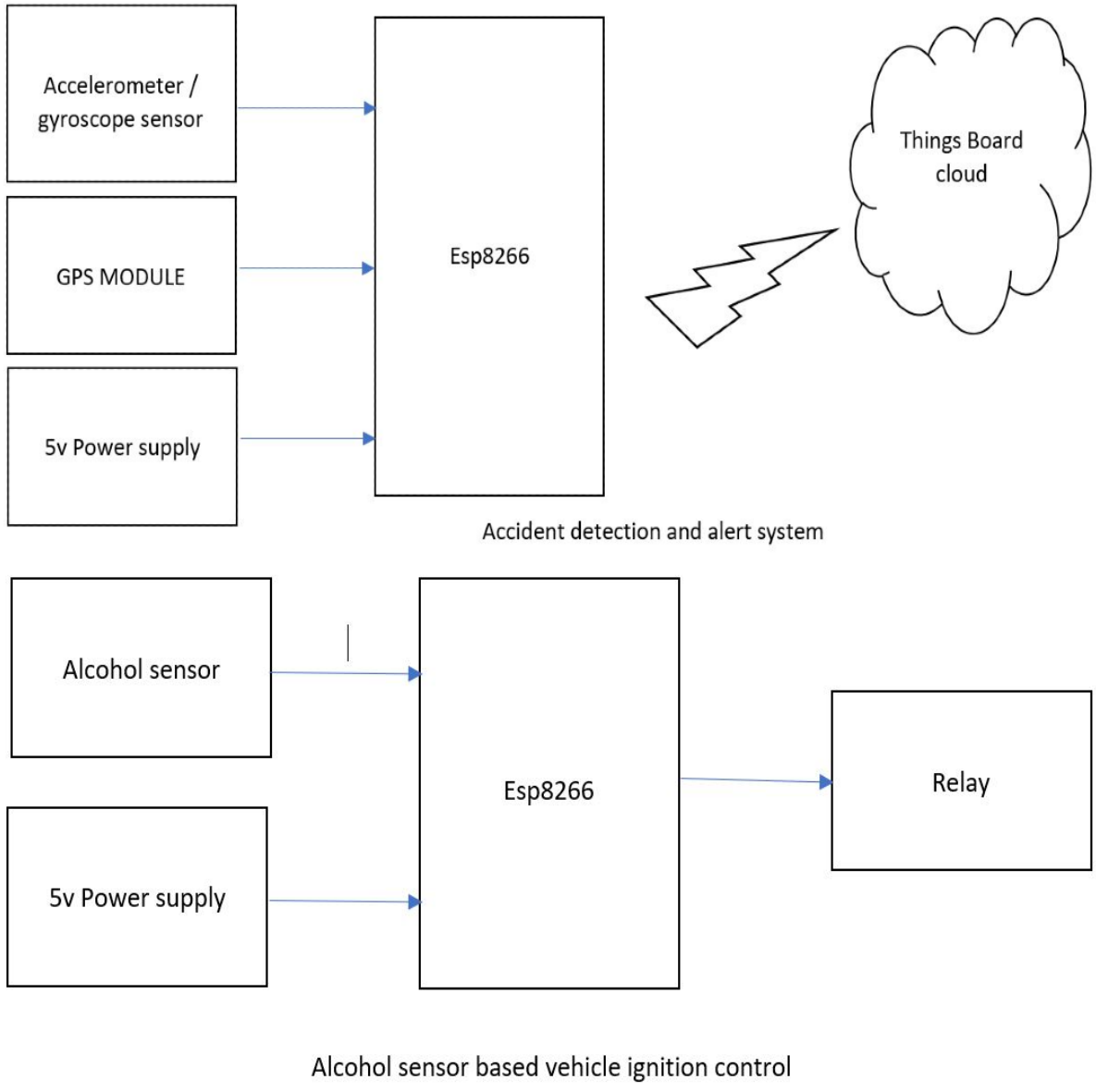


Figure 4.1 Block Diagram of Accident Detection and Alert System.

4.2 Device Flow

In device flow, the flow of the device is illustrated in Figure 4.2. All the steps are followed sequentially up to the end of the flow and the device does wireless transmission.

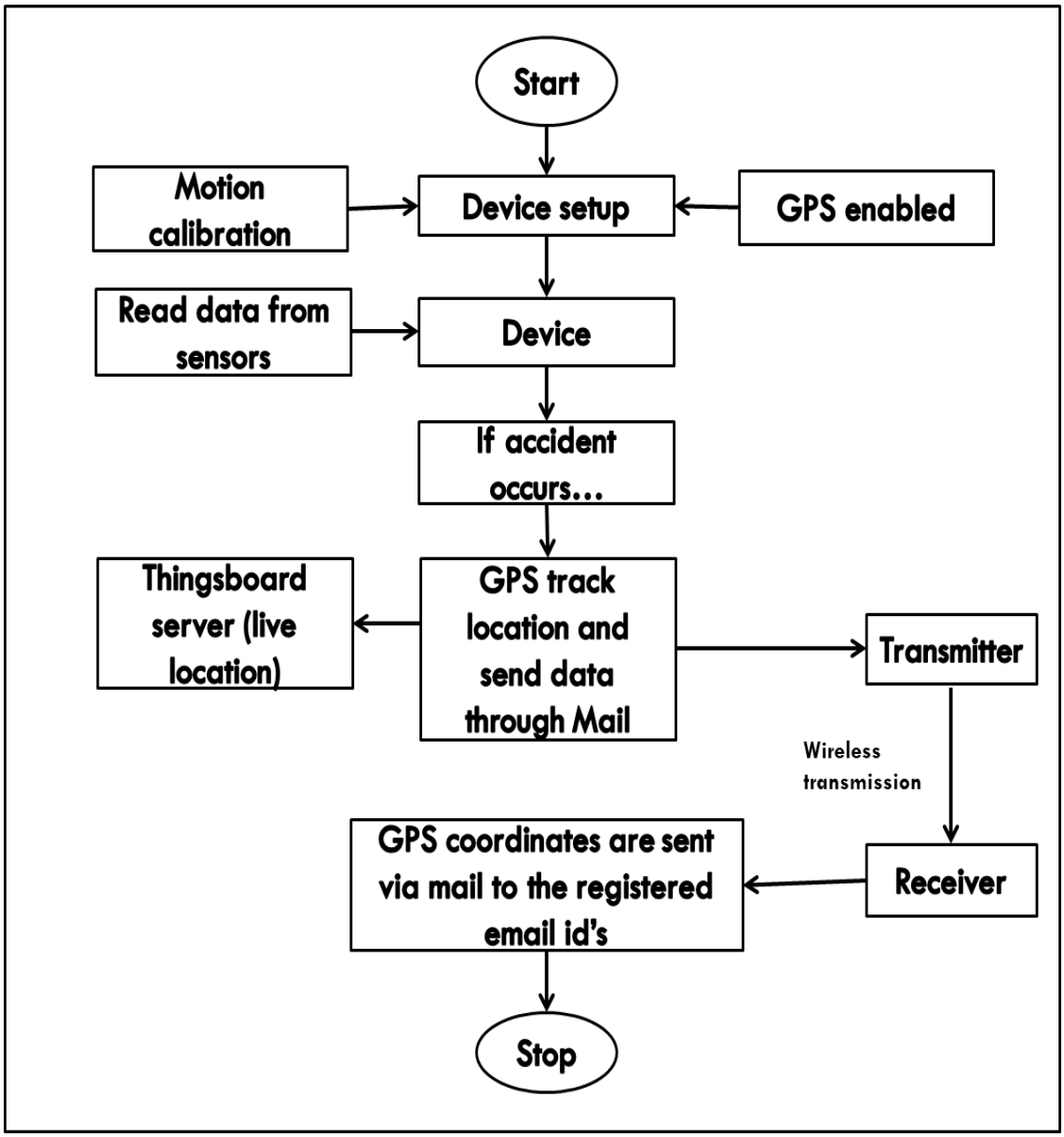


Figure 4.2 Device Flow of System.

4.3 Circuit Diagram

The circuit diagram of the model is created in the Eagle Software as illustrated in 4.3.

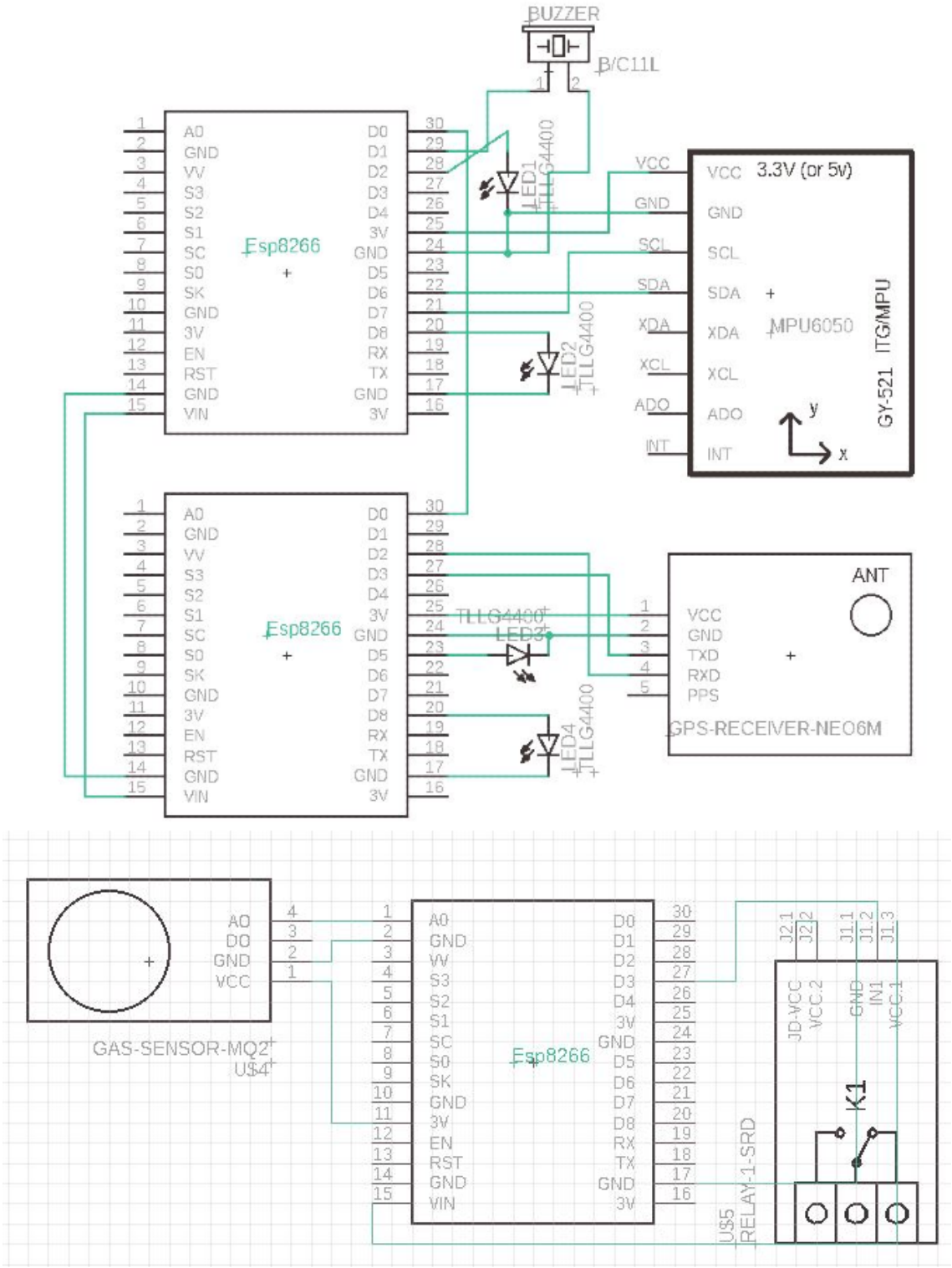


Figure 4.3 Circuit Diagram of Accident Detection and Alert System.

4.4 Working Principle

In this project we have used NodeMCU as microcontroller, MPU6050 as Accelerometer, GPS for live location coordinates, Alcohol sensor and a relay board (Relay boards are computer boards with an array of relays and switches). They have input and output terminals and are designed to control the voltage supply. Relay boards provide independently programmable, real-time control for each of several on board relay channels).

As seen from flow diagram, the working can be divided into majorly 4 sections:

(A) Device Setup

(B) Tracking of Data

(C) Input data acquisition

(D) Wireless Communication

Device Setup: The absolute initial phase in this undertaking working is the arrangement of the device with the calibration of MPU6050 sensor and GPS module. It sets up the system with the satellites through GPS and empowers the present area of the gadget. At the beneficiary end, information on the cloud is assembled and cleaned utilizing data cleaning. The cleaned information is then used to plot on the cloud dashboard. It can plot graph as requirement.

Tracking of Data: The MPU6050 module continuously scans the axis values and sends it to the micro-controller (ESP8266) and through it is send to the ThingsBoard Dashboard where it is process and graph is observed according to the requirement. GPS module links with the satellite and send the coordinates of the location of the device.

Input data acquisition: There are mainly 2 sensors integrated with the hardware-

- **MPU6050:** It is a customize module with accelerometer, gyroscope and temperature sensor integrated on a single chip. Thus, for the execution of

the system, gyroscope values have been detected. Gyroscope is the change in angular displacement of sensor with respect to the change in time. The sensor is interfaced with the MCU through I2C communication which a two is wired communication protocol having SDA and SCL lines. It is a type of synchronous communication in which the clock is shared by the master (MCU) with the slave (MPU6050).

- **NEO-6M GPS:** This board features the u-blox NEO-6M GPS module with antenna and built-in EEPROM. This is compatible with various light controller boards designed to work with a GPS module. The NEO-6 module series is a family of stand-alone GPS receivers featuring the high-performance u-blox 6 positioning engines. Innovative design and technology suppress jamming sources and mitigates multipath effects, giving NEO-6 GPS receivers excellent navigation performance even in the most challenging environments.

- **Alcohol Sensor:** The alcohol sensor is technically referred to as a MQ3 sensor which detects ethanol in the air. When a drunk person breathes near the alcohol sensor it detects the ethanol in his breathe and provides an output based on alcohol concentration.

Wireless Communication: Wireless Communication is achieved by the means through IoT platform. Wireless telemetry data is to be send on unique Token Id which has been created at dashboard. The device is firstly configured with that unique Id. That unique Token Id identifies the data has to be receiving from the specific device. Through this, Multiple devices can send their data and multiple dashboards can be formed as requirement. History of the data can also be obtained in case of any need.

4.5 Hardware Requirement

- NodeMCU – 32-bit ESP8266 development board
- MPU6050 (Accelerometer + Gyroscope) 6-axis
- GPS

- Alcohol sensor
- Relay Module
- Led's
- Buzzer

4.6 Hardware Layout

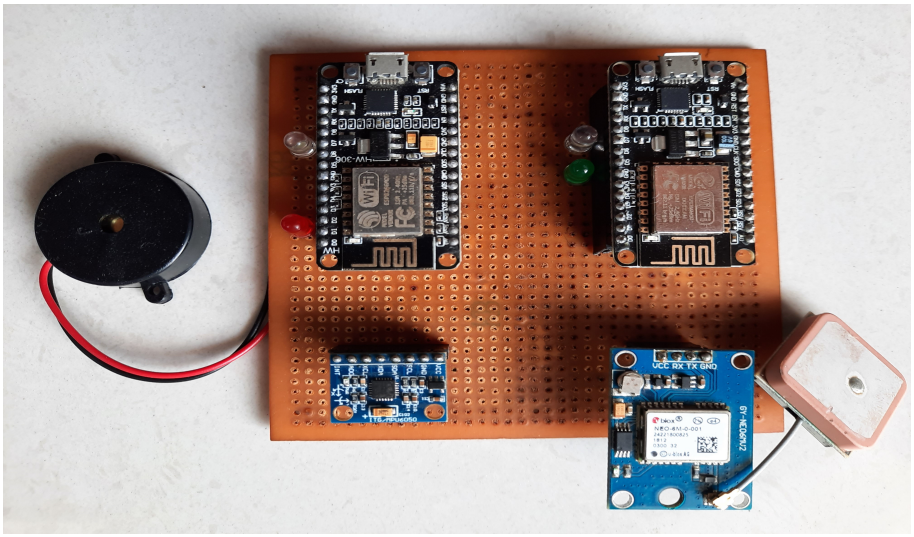


Figure 4.4 Hardware image of accident detction unit.

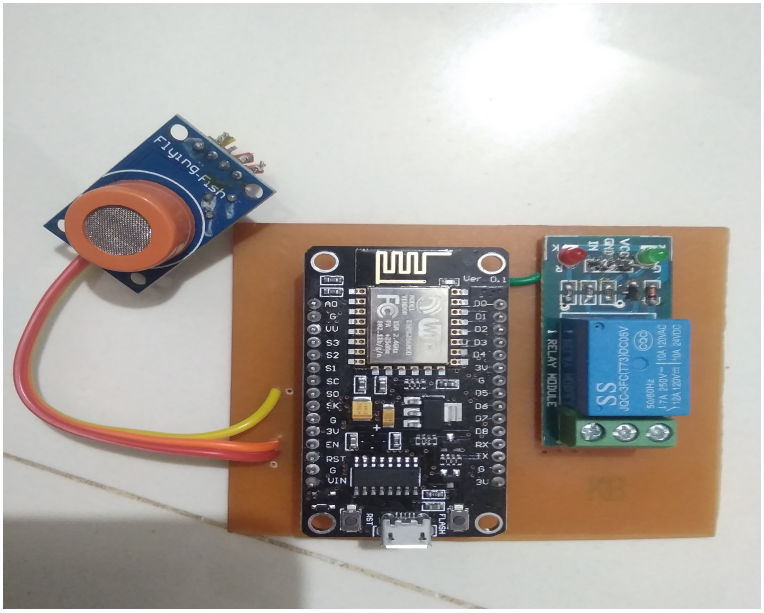


Figure 4.5 Hardware image of alcohol detection.

4.7 Device PCB Layout

The pcb layout of the model is created on the Eagle Software. All the modules and sensors are connected on this single layered pcb. Two layouts are made i.e. pcb layout of accident detection and for alcohol detection as shown in the Figure 4.6 and Figure 4.7.

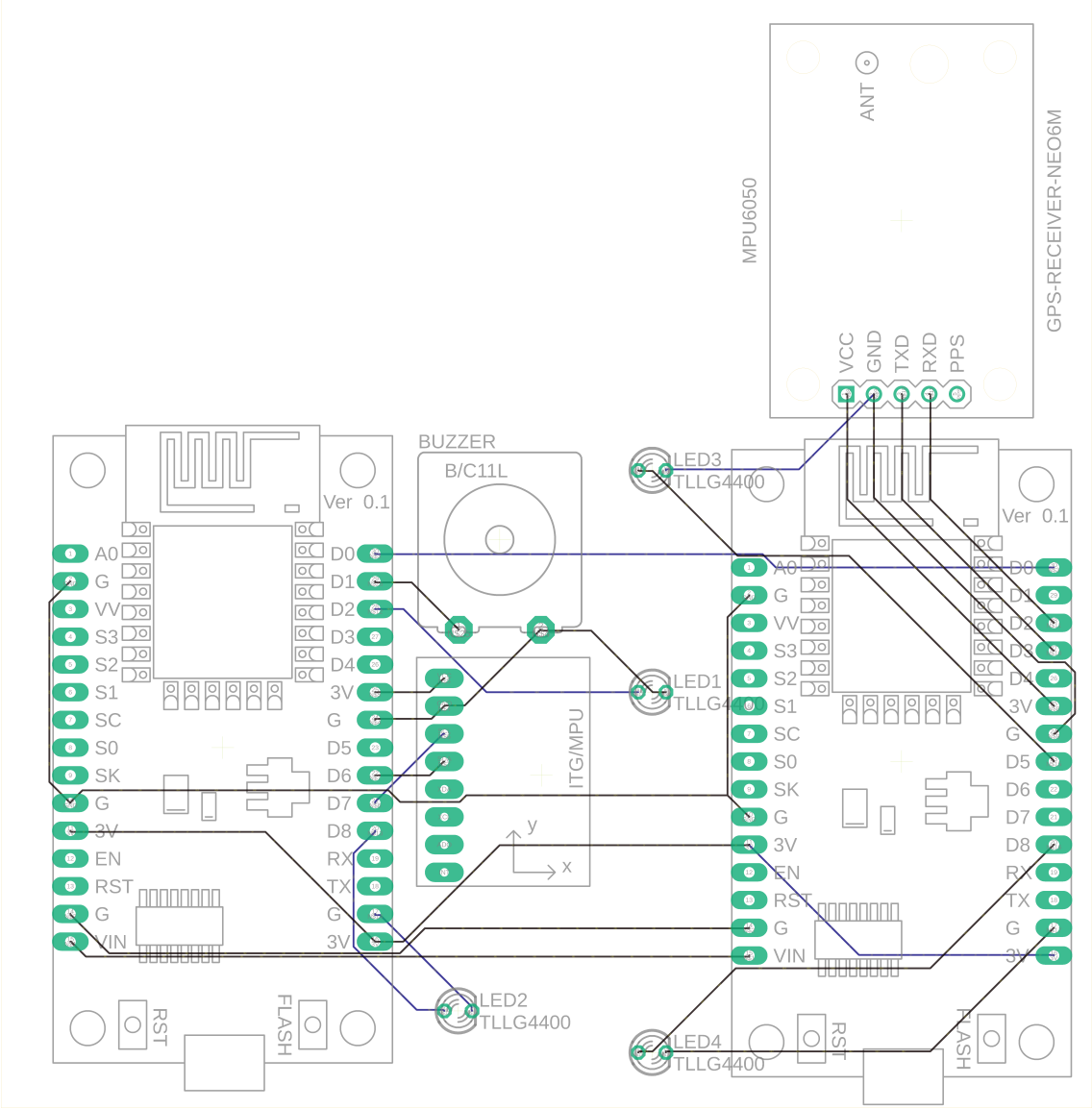


Figure 4.6 Pcb Layout of accident detction unit.

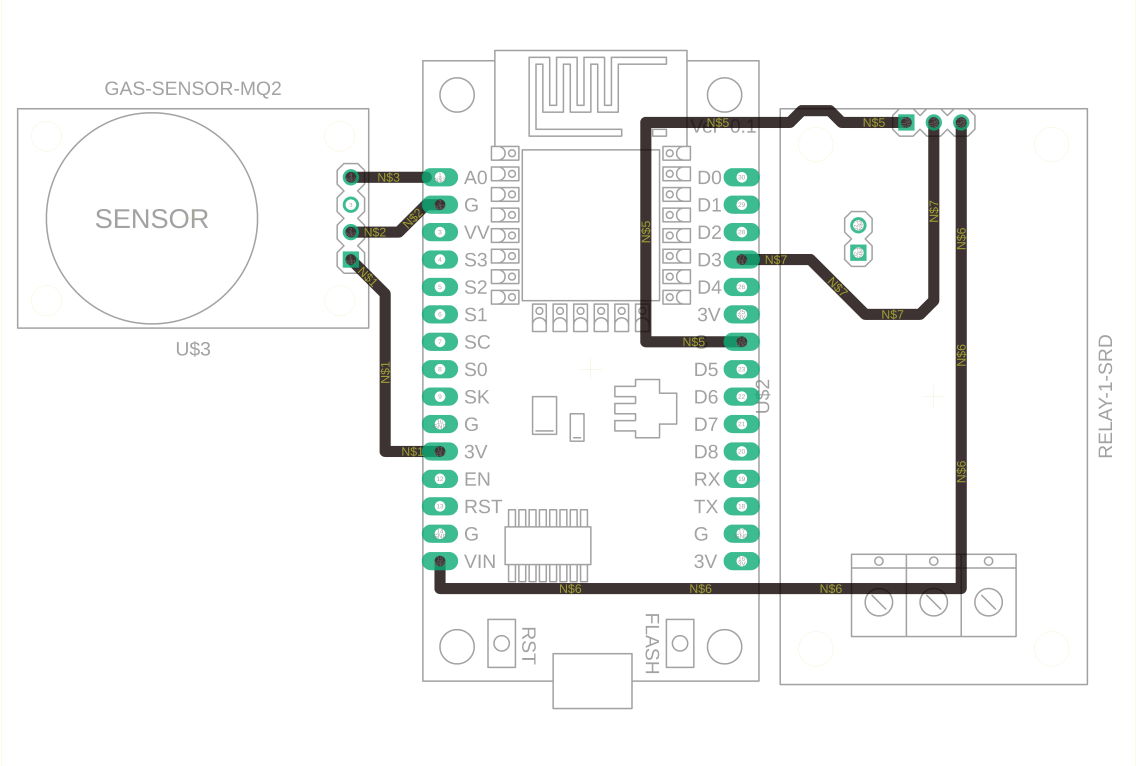


Figure 4.7 Pcb Layout of alcohol detection.

4.8 Software Requirement

- **Arduino IDE:** For programming the hardware using Embedded C coding. The basic libraires in the code includes TinyGPS.h (for interfacing location coordinates), Wire.h and MPU6050.h (for interfacing MPU6050 sensor), SoftwareSerial.h. Refer appendix for Arduino code.

- **Eagle (PCB designing):** For product development, a PCB was designed on Eagle software. The PCB was designed in accordance to keep the compact size, power consumption

- **ThingsBoard IoT Platform:** ThingsBoard is an open-source IoT platform that enables rapid development, management, and scaling of IoT projects. Our goal is to provide the out-of-the-box IoT cloud or on-premises solution that will enable server-side infrastructure for your IoT applications.

5 PERFORMANCE ANALYSIS

5.1 Implementation

The project basically demonstrates that if there is any sudden change in the values of the axis of the accelerometer, it should detect an accident and send gps coordinates via Email. At present the project is only in the testing phase but it should give you an understanding on connecting it up ready for installation. The ESP8266 MCU handles the sensors data through I2C and Serial communication. It can be attached with 3 sensors for more as requirement according to the application of the project. When an accident is detected by the sensor, email logic is activated in the ESP8266 which sends an alert message via Email. Google Maps link has been sent through email, which gets you live location of the accident. You can directly open the Google Maps link in the email received. Same telemetry data has been viewed live on the ThingsBoard dashboard.

- Step 1: Setting up the components

  We started by mounting all the components on the breadboard for testing purposes. Buzzer and Led's are been connected.

  For this demonstration you will need to make the following connections:
  GND - Common GND
  VCC - 5V from the power source
  GPIO5 - Pin of 2 ESP's are interconnected for flag purpose
  GPIO12 - SDA of MPU6050
  GPIO13 - SCL of MPU6050
  GPIO4 - TX of GPS
  GPIO0 - RX of GPS
  GPIO14 - For Buzzer
  GPIO15 - For indicating that WIFI is connected or not
  3.3v - Output to sensors and modules
  ESP - USB ADAPTER

TX - RX

RX - TX

GND - GND

5v - Regulator Vin

GPIO4 - Relay

A0 - Analog output of MQ3

- Step 2: Getting your dashboard ready

  As stated in the introduction, firstly you have to need to create your device on the dashboard by providing specific name to it. After the device has been created, configured that Access toked id with your device and MCU for communications. Then create the dashboard and observe the output.

  Steps for creating device:

  -Go to the demo.thingsboard.io

  -Create a new account

  -Go to the devices and create a new device

  -Copy Access Token as it is required to configure with the ESP8266

  -Go to the latest telemetry where all latest data entries are obtained

  -Select any latest telemetry after configuration and then click show on widgets

  -Add that to the dashboard and open it

  -According to the requirement, dashboard can be change into bar-graphs, columns, analog gauges, etc.

  Now dashboard is ready and when the device has been provided with the WiFi connection, it will show the latest telemetry on the dashboard. Track of past data is also possible.

- Step 3: Setting Up the Firmware

  Installing ESP8266 Community Files:

  You will need to have installed the ESP8266 community library in order to upload anything to the ESP from Arduino IDE. If you haven't already done so. To do this open Arduino IDE, Goto File then preferences and enter :http://arduino.esp8266.com/stable/packageesp8266 into the additional

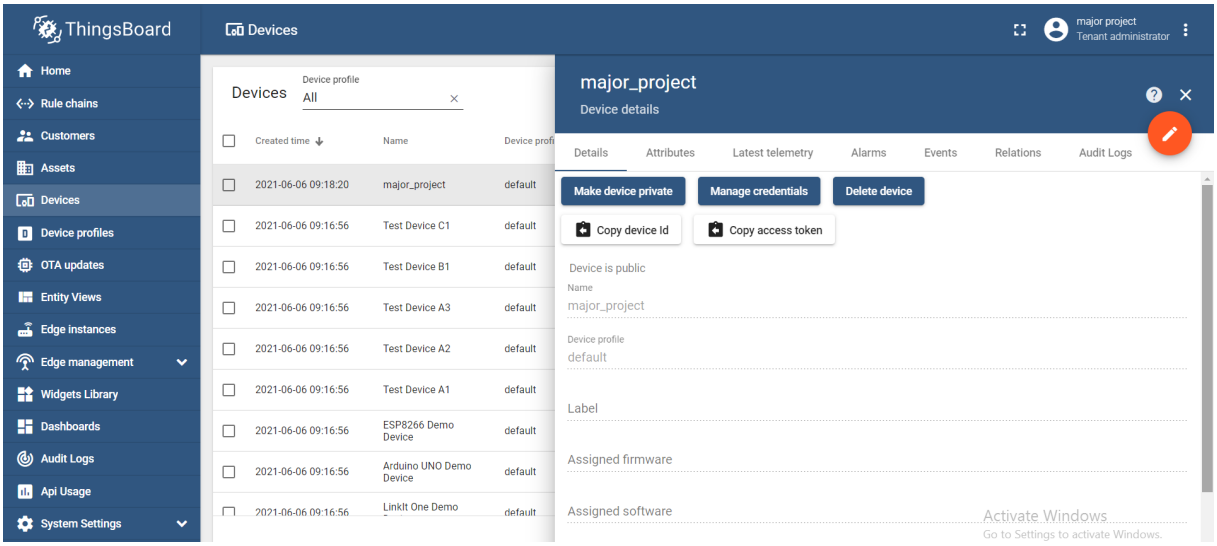


Figure 5.1 Pre-required setting in ThingsBoard Dashboard.

boards manager URL's' text box. Then return to the main screen and go to Tool-Board then Boards Manager Scroll down to the ESP community files and install the package.

- Step 4: Uploading the Sketch for Testing

  Once the firmware has been setup you should be ready to upload the sketch to the ESP8266. To get the firmware uploading there are only a couple of settings to change from standard Arduino boards. From the tools menu select:– Board - NodeMCU 1.0–Frequency 80 MH–Upload Speed then baud rate 115200 and then select the available port. Now upload your sketch to the ESP8266 can observe the progress in orange at the bottom of the sketch window, at 115200 baud this will take a couple of seconds.

5.2 Result

Once the Arduino code is implemented, output is obtained as follows.

MPU6050 sensor will provide x, y and z axis values as well as current temperature. GPS will provide the current coordinates as soon as it links with the satellite. Values can be seen at the Serial monitor of the Arduino IDE with the baud rate of 115200. The data which has been payload to the IoT platform can be observed in the ThingsBoard dashboard.

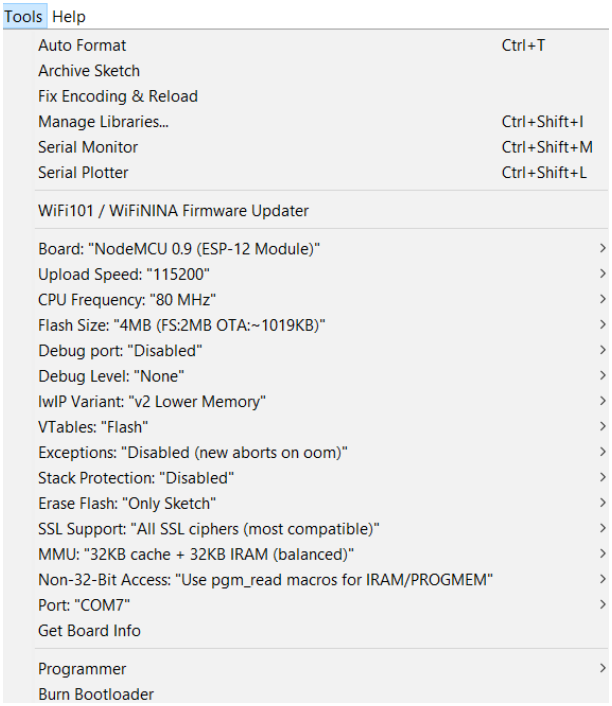


Figure 5.2 Pre-required setting in Arduino IDE.

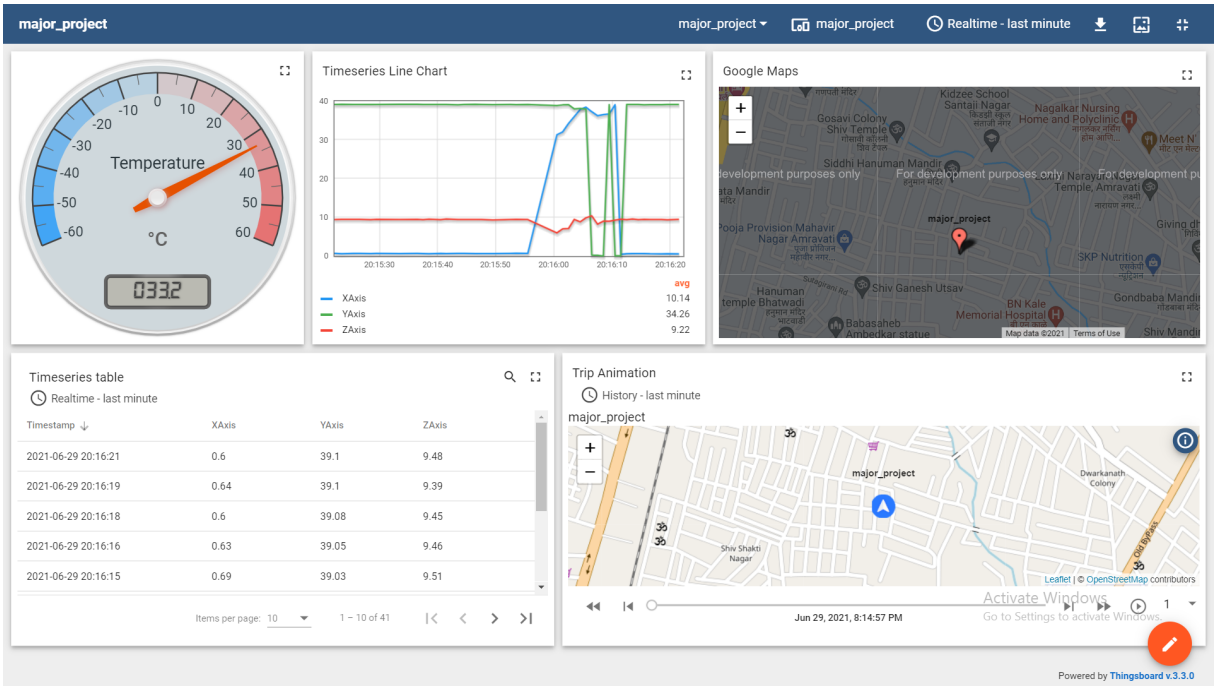


Figure 5.3 Telemetry data on ThingsBoard Dashboard.

Alcohol sensor (MQ3) provides the reading of alcohol concentration around it and according to that the esp8266 controls the on or off of realy to control the ignition of the vehicle. If the alcohol level is going beyond the limit it turns of relay so that the vehicle ignition will be off.

Following output data of the sensor modules can be seen on the Serial monitor. Both MPU6050 and GPS module are sending the payload to the Thingsboard.

Figure 5.4 Serial monitor window.

The output of Email send from the device using a specific Email Id and has been sent to the registered Email address. In Figure 5.5, email has been sent by the module if the accident occurs. The email will be sent as the condition satisfy.

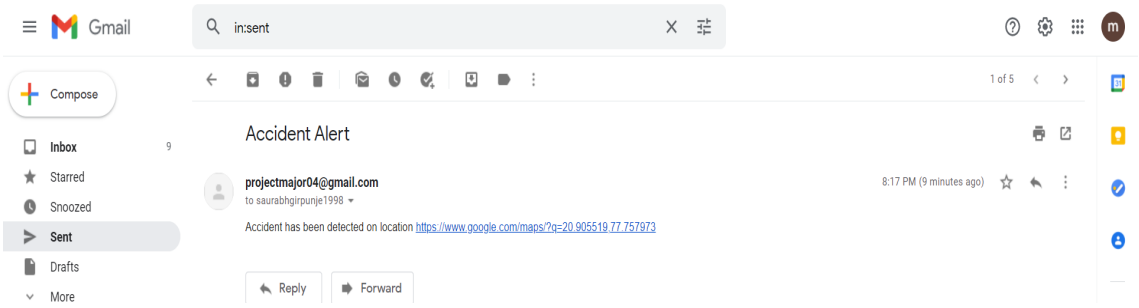


Figure 5.5 Email sent by the module.

Email is being received at the receiver's end on the registered email address and is shown in Figure 5.6.

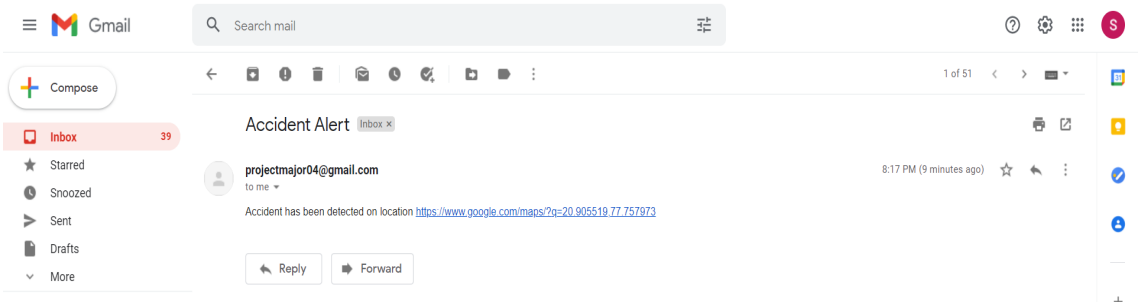


Figure 5.6 Email received at registered email address.

6 CONCLUSIONS

6.1 Conclusion

The proposed system deals with the accident detection and alert. ESP8266 is the heart of the system which helps in sending data to thing speak cloud and help to trigger the webhook event which will send location and alert to the specified number and email. mpu6050 sensor will change its reading drastically when the accident occurs and the information is transferred to cloud. Using GPS, the location can be sent through tracking system to cover the geographical coordinates over the area. The accident can be detected by a mpu6050 sensor which is used as major module in the system. By using this system, we can reduce the death occurs due to late help after the accident. The system is an application of Internet of Things 2.0 where devices interact without major human involvement. The system provides a solution for efficient accident detection and response to nations lacking emergency response infrastructure.

Real time implementation of this idea would result in saving of many lives lost due to inefficient accident response as well as eliminate the need of physically reporting the accident. This system also brings in reliability and accountability to the existing emergency service infrastructure, thus helping in improving the efficiency of emergency services. This system can be linked to drones in future for surveillance of area by the time medical help arrives and give real time inputs to medicos for efficient response. Drones can be manipulated to detect heart rate of victim and even administer first aid medicines through in-built I.V. syringes. The drones can also be helpful in predicting if air ambulance is required and nearest possible area for air ambulance to land of have access to. We are moving towards faster freeways in developing countries. In case of accident, it would become necessary to divert or stop traffic near the crash site. The System, when implemented extensively can also be used by authorities to conceal accident area and well as divert traffic, thus reducing incidents of traffic congestion due to an accident as well as restoring normalcy.

6.2 Advantages

1. The vehicle which has undergone to an accident can be identified by using tracking technology without any delay.

2. Accident alert are given to the nearest medical centres and registered mobile numbers and Email.

3. The immediate medication will be provided to the accident victim in the remote areas.

4. Map is display for the easy identification of the Accidental location.

5. Simple and Reliable Design. Due to simple design, it can be compact at small place also.

6.3 Limitations

1. In some places where there is no network provision it is difficult for communication.

2. In case of major accidents the phone can itself get destroyed and hence, no emergency action will be taken.

3. The damage of the hardware that is installed on the vehicle or the hardware carried by the user.

6.4 Applications

1. **Security, remote monitoring and transportation and logistics.** Even if the vehicle is stolen, live location of the vehicle is possible through GPS. Tracking of the Vehicle at the Real Time environment is a very big advantage.

2. **It is used in Automotive and transport vehicles to ensure the safety.** By transporting heavy goods, it is possible to monitor the vehicle location and speed of the vehicle even from thousands of kilometres.

3. **Detection of drunk person can be possible.** As soon as driver has crossed the alcohol limit, vehicle can't be ignited and alert message can also be sent at the maintenance department.

4. **Group Management is possible.** A group or a specific type of vehicle can be management with the help of MCU unit.

5. **When there is no police for monitoring the accidents, then this design will definitely reduce the road accidents.** As there is no need to continuosly monitoring the system as an alert messsage is sent as accident is detected.

6. **The data can be used by vehicle manufacturing company's.** The data can be used for making more advancements in the vehicle which helps in reducing accidents.

7. **Vehicle scheduling is also possible.** Proper scheduling if vehicle is also possible from remote areas.

6.5 Future Scope

The system can be interfaced with vehicle airbag system that prevents vehicle occupants from striking interior objects such as the steering wheel or window. This can also be developed by interconnecting a camera to the controller module that takes the photograph of the accident spot that makes the tracking easier. More research is needed in order to make the accident detection part more reliable and accurate which will help in reducing false positives. Adding additional sensors in combination with accelerometer for accident detection like gyroscope, microphone, camera (to automatically take pictures of the accident) and a voice recognition module to detect noises during a vehicle crash like noise when air bags are deployed, will drastically increase the reliability and accuracy of the system.

The multiple sensors, cameras used in future to ensure the safety and alert the system to avoid the accident. All the data collected at the server can be used for Big data processing in future to evaluate some results related to road accidents and to improve the efficiency, accuracy and safety.

REFERENCES

[1] Aboli Ravindra Wakure, Apurva Rajendra Patkar, "Vehicle Accident Detection and Reporting System Using Gps And Gsm." International Journal of Engineering Research and General Science, 2014.

[2] Miss. Monali D. More, Miss. Shivani L. Lamkane and Miss. Prajakta B. Jadhav, "Vehicle Tracking And Accident Alert System Using Microcontroller", International Journal of Research in Engineering and Science, 2021.

[3] T Kalyani, S Monika, B Naresh, Mahendra Vucha, "Accident Detection and Alert System", International Journal of Innovative Technology and Exploring Engineering, 2019.

[4] Mr. S. Iyyappan and Mr. V. Nandagopal, "Accident Detection and Ambulance Rescue with Intelligent Traffic Light System", International Journal of Advanced Technology and Engineering Research, 2013.

[5] Jorge Z, Carlos T., Juan C. and Pietro M., "Providing Accident Detection in Vehicular Network through OBD-II Devices and Android based Smartphones", Proceedings of the IEEE 36th conference on Local Computer Networks, Washington, DC, USA, PP.813-819, October 2011.

[6] A Review Paper on Accident Detection System Using Intelligent Algorithm for VANET" by Saad Masood Butt. Faculty of Computer Science & Software Engineering, University of Malaya, Malaysia Journal of Software Engineering and Applications November 2016.

[7] "An Efficient Vehicle Accident detection using Sensor Technology" by P.Kaliuga Lakshmi1, C.Thangamani2, Research scholar1, Assistant Professor2, P. K. R Arts College for Women, Gobichettipalayam. IJARCET Volume 5 Issue 3, March 2016.

[8] World Health Organization Road Traffic Injuries Fact which has Sheet No 358,

March 2013, Available from the website "http://www.who.int/mediacentre/factsheets/fs358/en/".

[9] Tanushree Dalai, "Emergency Alert and Service for Automotives for India", International Journal of Advanced Trends in Computer Science and Engineering (IJATCSE) Mysore India, vol. 2, no. 5, pp. 08-12, 2013.

[10] Amit Meena, Srikrishna Iyer, Monika Nimje, Saket JogJekar, Sachin Jagtap, Mujeeb Rahman, "Automatic Accident Detection and Reporting Framework for Two Wheelers", IEEE International Conference on Advanced Communication Control and Computing Technologies (ICACCCT), pp. 962-967, May 2014.

[11] Intelligent system for vehicular accident detection and notification "https://ieeexplore.ieee.org/document/6950048/references#references".

[12] Debopam Acharya, Vijay Kumar, Nicholas Garvin, Ardian Greca and Gary M. Gaddis "A Sun SPOT based Automatic Vehicular Accident Notification System" IEEE Proceedings of the 5th International Conference on Information Technology and Application in Biomedicine 2008, pp. 296-299.

[13] S. P. Bhumakar, "Intelligent Car System for Accident Prevention Using ARM-7", International Journal of Emerging Technology and Advanced Engineering. N.p., Apr. 2012.

APPENDICES

Appendix A: SOURCE CODE

Microcontroller Programming

```
//*************************Source code for MPU6050**********************//
#include <PubSubClient.h>
#include <ESP8266WiFi.h>
#include <Wire.h>
#include <MPU6050.h>
#include<SoftwareSerial.h>
#include <SPI.h>

int sendPin = D1;

MPU6050 mpu;

#define WIFI_AP "majorProject" //Wifi Name to be set
#define WIFI_PASSWORD "Project123"  //Wifi password to be set
#define TOKEN "iW6emu2pQIXfU9EzsUc2" //Token key to send the data to cloud
char thingsboardServer[] = "demo.thingsboard.io"; //cloud server

WiFiClient wifiClient;
PubSubClient client(wifiClient);
void reconnect();
void InitWiFi();
unsigned long lastSend;
int status = WL_IDLE_STATUS;

void setup()
{
```

```
  pinMode(D2, OUTPUT);
  pinMode(D8, OUTPUT);
  pinMode(D5, OUTPUT);
  digitalWrite(D5, LOW);

  Serial.begin(115200);
  Wire.begin(D6, D7);
  delay(10);
  mpu.begin();

  InitWiFi();

  client.setServer( thingsboardServer, 1883 );
  lastSend = 0;

  pinMode(sendPin, OUTPUT);
  digitalWrite(sendPin, LOW);
}

void loop()
{
  if ( !client.connected() )
  {
    reconnect();
  }
  digitalWrite(D2, LOW);
  Vector rawAccel = mpu.readRawAccel();
  Vector normAccel = mpu.readNormalizeAccel();
  float combine = normAccel.XAxis + normAccel.YAxis + normAccel.ZAxis;
  //Vibration data from MPU6050
  float temp = mpu.readTemperature(); //Temperature data from MPU6050
  Serial.print("Temperature: ");
```

```
Serial.print(temp);

if (normAccel.XAxis >= 6.50 && normAccel.XAxis <= 10.00) {
  digitalWrite(sendPin, HIGH);
  digitalWrite(D2, HIGH);
  digitalWrite(D5, HIGH);
  delay(100);
  digitalWrite(sendPin, LOW);
}
else if (normAccel.XAxis >= 29.56 && normAccel.XAxis <= 33.40) {
  digitalWrite(sendPin, HIGH);
  digitalWrite(D2, HIGH);
  digitalWrite(D5, HIGH);
  delay(100);
  digitalWrite(sendPin, LOW);
}
digitalWrite(D2, LOW);
digitalWrite(D5, LOW);

String payload = "{";  //Sting formation to upload the data
payload += "\"temperature\":";
payload += String(temp);
payload += ",";
payload += "\"XAxis\":";
payload += String(normAccel.XAxis);
payload += ",";
payload += "\"YAxis\":";
payload += String(normAccel.YAxis);
payload += ",";
payload += "\"ZAxis\":";
payload += String(normAccel.ZAxis);
payload += "}";
```

```
  char attributes[100];
  payload.toCharArray( attributes, 100 );
  client.publish( "v1/devices/me/telemetry", attributes );
  Serial.println( attributes );

  client.loop();
  delay(1000);
}

void InitWiFi()
{
  digitalWrite(D8, HIGH); //Connecting to wifi
  Serial.println("Connecting to AP ..."); // attempt to connect to WiFi

  WiFi.begin(WIFI_AP, WIFI_PASSWORD);   // connect to wifi
  while (WiFi.status() != WL_CONNECTED) // checking if connected
  {
    delay(500);
    Serial.print("."); // if not then print
  }
  Serial.println("Connected to AP");
  digitalWrite(D8, LOW);//Connected to wifi
}

void reconnect()
{
  while (!client.connected()) // Loop until we're reconnected
  {
    status = WiFi.status();
    if ( status != WL_CONNECTED)
    {
      digitalWrite(D8, HIGH); //connecting to wifi
```

```
      WiFi.begin(WIFI_AP, WIFI_PASSWORD);
      while (WiFi.status() != WL_CONNECTED)
      {
        delay(500);
        Serial.print(".");
      }
      Serial.println("Connected to AP");
      digitalWrite(D8, LOW);// wifi connected
    }
    digitalWrite(D8, HIGH); //connnecting to data server
    Serial.print("Connecting to Thingsboard node ...");
    if ( client.connect("ESP8266 Device", TOKEN, NULL) )
    // Attempt to connect (clientId, username, password)
    {
      Serial.println( "[DONE]" );
      // connected to the server
      digitalWrite(D8, LOW);
    }
    else
    {
      Serial.print( "[FAILED] [ rc = " );
      Serial.print( client.state() );
      Serial.println( " : retrying in 5 seconds]" );
      digitalWrite(D2, HIGH); //failed reconnecting to server
      delay( 5000 ); // Wait 5 seconds before retrying
    }
  }
}

//**************************Source code for GPS*****************************//
#include "Arduino.h"
#include <EMailSender.h>
```

```
#include <PubSubClient.h>
#include <ESP8266WiFi.h>
#include<SoftwareSerial.h>
#include<TinyGPS.h>
#include <SPI.h>

TinyGPS gps;
SoftwareSerial sgps(D2, D3); //rx, tx

int receivePin = D1;

float lat, lon;

#define WIFI_AP "majorProject" //Wifi Name to be set
#define WIFI_PASSWORD "Project123"  //Wifi password to be set
#define TOKEN "iW6emu2pQIXfU9EzsUc2" //Token key to send the data to cloud
char thingsboardServer[] = "demo.thingsboard.io"; //cloud server

WiFiClient wifiClient;
PubSubClient client(wifiClient);
void reconnect();
void InitWiFi();
unsigned long lastSend;
int status = WL_IDLE_STATUS;

EMailSender emailSend("projectmajor04@gmail.com", "major@2021");

void setup()
{
  pinMode(D8, OUTPUT);
  pinMode(D5, OUTPUT);
  digitalWrite(D5, LOW);
```

```
  Serial.begin(115200);
  delay(10);
  sgps.begin(9600);
  InitWiFi();
  client.setServer( thingsboardServer, 1883 );
  lastSend = 0;

  pinMode(receivePin, INPUT);
  digitalWrite(receivePin, LOW);
}

void loop()
{
  if ( !client.connected() )
  {
    reconnect();
  }
  digitalWrite(D5, LOW);
  while (sgps.available())  //GPS status
  {
    int c = sgps.read();
    if (gps.encode(c))
    {
      gps.f_get_position(&lat, &lon);
      String payload = "{";  //Sting formation to upload the data
      payload += "\"latitude\":";
      payload += String(lat, 6);
      payload += ",";
      payload += "\"longitude\":";
      payload += String(lon, 6);
      payload += "}";
```

```
      Serial.print("Latitude=");
      Serial.print(lat);
      Serial.print("Longitude=");
      Serial.println(lon);
      char attributes[100];
      payload.toCharArray( attributes, 100 );
      client.publish( "v1/devices/me/telemetry", attributes );
      Serial.println( attributes );
    }
  }

  int temp = digitalRead(receivePin);
  if (temp == 1) {
    digitalWrite(D5, HIGH);
    EMailSender::EMailMessage message;
    message.subject = "Accident Alert";
    String sendMessage = (String)"Accident has been detected on location " +
    (String)"https://www.google.com/maps/?q=" + String(lat, 6) + ',' +
    String(lon, 6);
    message.message = sendMessage;

    EMailSender::Response resp = emailSend.send
    ("saurabhgirpunje1998@gmail.com", message);

    Serial.println("Sending status: ");
    digitalWrite(D5, LOW);
  }

  client.loop();
}

void InitWiFi()
```

```
{
  digitalWrite(D8, HIGH); //Connecting to wifi
  Serial.println("Connecting to AP ...");//attempt to connect to WiFi

  WiFi.begin(WIFI_AP, WIFI_PASSWORD);//passing id password
  while (WiFi.status() != WL_CONNECTED) // checking if connected
  {
    delay(500);
    Serial.print("."); // if not then print
  }
  Serial.println("Connected to AP");
  digitalWrite(D8, LOW);//Connected to wifi
}

void reconnect()
{
  while (!client.connected()) // Loop until we're reconnected
  {
    status = WiFi.status();
    if ( status != WL_CONNECTED)
    {
      digitalWrite(D8, HIGH); //connecting to wifi
      WiFi.begin(WIFI_AP, WIFI_PASSWORD);
      while (WiFi.status() != WL_CONNECTED)
      {
        delay(500);
        Serial.print(".");
      }
      Serial.println("Connected to AP");
      digitalWrite(D8, LOW);// wifi connected
    }
    digitalWrite(D5, HIGH); //connnecting to data server
```

```
    Serial.print("Connecting to Thingsboard node ...");
    if ( client.connect("ESP8266 Device", TOKEN, NULL) )
    // Attempt to connect (clientId, username, password)
    {
      Serial.println( "[DONE]" ); // connected to the server
      digitalWrite(D5, LOW);
    }
    else
    {
      Serial.print( "[FAILED] [ rc = " );
      Serial.print( client.state() );
      Serial.println( " : retrying in 5 seconds]" );
      digitalWrite(D8, HIGH); //failed reconnecting to server
      delay( 5000 ); // Wait 5 seconds before retrying
    }
  }
}


//**********************Source code for Alcohol Detection******************//
void setup()
{
  Serial.begin(9600);
  pinMode(BUILTIN_LED, OUTPUT);
  pinMode(4, OUTPUT);
}

void loop()
{
  int data = analogRead(A0);
  Serial.println(analogRead(A0));
```

```
  if (analogRead(A0) > 400)
  {
    digitalWrite(BUILTIN_LED, HIGH);
    digitalWrite(4, HIGH);
    delay(100);
  }
  else
  {
    digitalWrite(BUILTIN_LED, LOW);
    digitalWrite(4, LOW);
    delay(100);
  }
}
```

Appendix B: RESEARCH PAPER

Based on the complete study of this project work, a Research Paper has been published. This published paper is attached at the end of this report. Overall details of paper publication are as mentioned below:

1. **Title of the Paper:** "An IOT Based Vehicle Accident Detection and Alert System"
2. **Published in:** "International Journal of Research in Engineering and Science" (A Peer reviewed Journal)
3. **Publication link:** ‘‘https://www.ijres.org/v9-i5.html"
4. **Date of Pulication:** May 25, 2021
5. **Authors:**
    5.1. Ankit Ravindra Jangle
    5.2. Saurabh Satish Girpunje
    5.3. Mahesh Gopalrao Thorat

International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 9 Issue 5 ǁ 2021 ǁ PP. 69-72

An IOT Based Vehicle Accident Detection and Alert System

Ankit R. Jangle
Department of Electronics & Telecommunication Engineering,
Government college of Engineering, Amravati India

Saurabh S. Girpunje
Department of Electronics & Telecommunication Engineering,
Government college of Engineering, Amravati India

Mahesh G. Thorat
Department of Electronics & Telecommunication Engineering,
Government college of Engineering, Amravati India

Abstract
As we know the usage of vehicles are increasing drastically, the hazards due to vehicles is also increasing. The main causes of accidents are high speed, drunk and drive, diverting minds, over stress and due to electronic gadgets. This project intentionally deals with accident which occurs due to carelessness of the person who is driving the vehicle. In most of the cases family members or the ambulance and police are not kept informed on time. This results in delaying in getting help. Most of the time, we might not be able to locate the accident because no one knows where the accident will take place. The system introduces accident detection and alerting system which detect the accident. Once the accident occurs to the vehicle system will detect accident and send alert and location of the vehicle on email and to emergency phone numbers.

Date of Submission: 12-05-2021 Date of acceptance: 25-05-2021

I. INTRODUCTION

In present days the rate of accidents is increasing rapidly. Due to employment the usage of vehicles like cars, bikes are increasing. And most of the accidents happened due to over speed. People are going under risk because of their over speed. And most of the times the victim did not get help on time because no one knows about the accident. To reduce this in the country this project introduces an optimum solution. IOT based vehicle accident detection and alerting system is introduced. the main objective is to provide fast help and save lives by sending a location and alert message to the registered Email and registered mobile number and emergency numbers if the accident is major. When an accident occurs, the notification is sent to the registered mobile and email using iftt iot platform in less time. Esp8266(nodemcu) is the heart of the system which helps in transferring the message to different devices in the system. MPU-6050 3 Axis Accelerometer and Gyroscope sensor detect if the accident occurs and the information is transferred to the registered number and Email using nodemcu and GPS system will help in finding the location of the accident spot. The proposed system will check continuously whether an accident has occurred and notifies to nearest medical centers and registered mobile numbers and Email about the place of accident using nodemcu and GPS modules. The location can be sent through tracking system to cover the geographical coordinates over the area.

II. LITERATURE SURVEY

- To protect the vehicle and tracking so many advanced technologies are available now a days. In olden days the information of accident can be transferred, but most of the time place of accident spot cannot be identified. In all vehicle airbags are designed, air bags are used for security and safety travels. The air bag system was introduced in the year of 1968.
- Many other systems have been proposed to deduce the accident. The existing system deals with two sensors where MEMS sensor is used to detect the angle and vibration sensor is used for detection the change in the vehicle.
- The other existing system uses IOT and cloud computing system. Where the vehicle detection is done through SVM (support vehicle machine) that is developed by Ant Colony Algorithm (ACA). Here IOT will monitor the vehicles using magneto resistive sensors.

- Existing system also provides the location of the accident using Atmega 328 Microcontroller and RF transmitter and receiver. The information is sent to the saved mobile numbers.
- Some existing system also provide location and alert on mobile numbers by using gps and gsm device.

III. PROPOSED SYSTEM

Proposed system will provide an automatic detection and alert of accident it also locates the location of the vehicle and send it to emergency numbers and registered mobile number and send alert on email. The system we made is the lower cost then others as we are not using any expensive device like gsm and other sensors. The system just uses the nodemcu as a main controller of the system and other than that we are using MPU-6050 3 Axis Accelerometer and Gyroscope sensor to detect the accident occurs and NE0-6M gps module to locate the exact position of the vehicle.

IV. BLOCK DIAGRAM

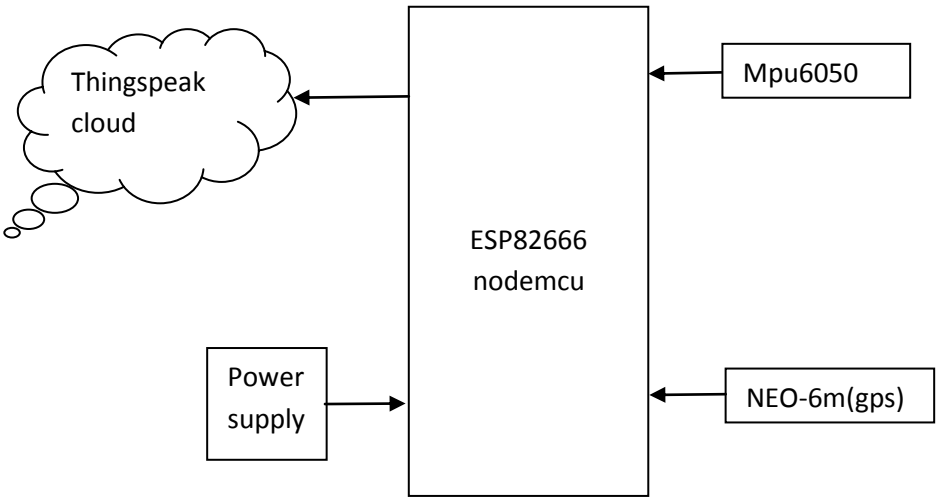


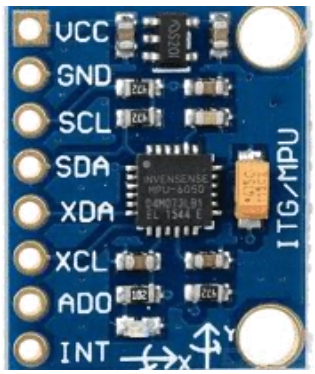
Fig.1: Block diagram of proposed system

Description:

ESP8266(nodemcu): we are using nodemcu for our design as it is low cost device which gives us feature like controlling the devices connected to it and according to the sensor data take action. It provide us an iot platform to send our sensor data on cloud server and take action according to that.

Fig.2: Nodemcu

MPU-6050: MPU6050 is based on Micro-Mechanical Systems (MEMS) technology. This sensor has a 3-axis accelerometer, a 3-axis gyroscope, and an in-built temperature sensor**.** It can be used to measure parameters like Acceleration, Velocity, Orientation, Displacement, etc.



MPU-6050 3 Axis Accelerometer and Gyroscope sensor

NEO-6M(GPS): GPS module is based on the NEO 6M GPS. This unit uses the latest technology to give the best possible positioning information and includes a larger built-in 25 x 25mm active GPS antenna with a UART TTL socket. A battery is also included so that you can obtain a GPS lock faster. This GPS module gives the best possible position information, allowing for better performance. The module has serial TTL output, it has four pins: TX, RX, VCC, and GND.

Fig.4: NEO-6M(GPS)

Power supply: 5v constant dc power supply is used as all the device is work on the regulated dc power supply and it need constant power.

V. WORKING

The system takes the continuous reading from MPU-6050 3 Axis Accelerometer and Gyroscope sensor. The sensor gives us the X,Y,Z axis reading according to that we do action. as first the we will take some reference reading of the x,y,z axis and according to that it detects the accident and send alert. If the accident occurs the reading of the sensor changes drastically and will detect accident according to that and the gps take the latitude and longitude reading and give it to nodemcu. As nodemcu get the reading it will send it to thingspeak cloud. And as the data upload on the cloud it will send email alert and text messages to the emergency number and the registered number. The system will use the IFTT webhooks to create the event and as the alert send to cloud server the webhook event will be trigger and the alert is sent to emergency number and registered number and email. The alert message includes the exact location of the vehicle.

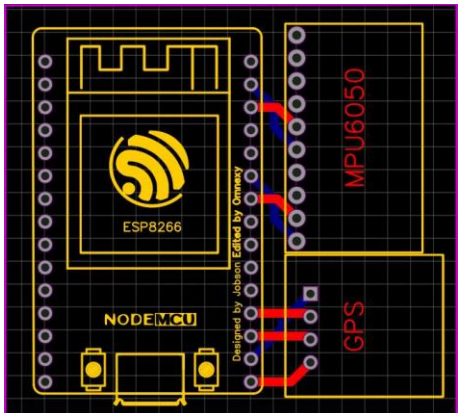


Fig.5: Circuit diagram

VI. CONCLUSION

The proposed system deals with the accident detection and alert. ESP8266 is the heart of the system which helps in sending data to thingspeak cloud and help to trigger the webhook event which will send location and alert to the specified number and email. Mpu6050 sensor will change its reading drastically when the accident occurs and the information is transferred to cloud. Using GPS the location can be sent through tracking system to cover the geographical coordinates over the area. The accident can be detected by a mpu6050 sensor which is used as major module in the system. By using this system we can reduce the death occurs due to late help after the accident

REFERENCES

[1]. Mr.S.Iyyappan and Mr.V.Nandagopal , "Accident Detection and Ambulance Rescue with Intelligent Traffic Light System", International Journal of Advanced Technology and Engineering Research, 2013.

[2]. AboliRavindraWakure, ApurvaRajendraPatkar, "Vehicle Accident Detection and Reporting System Using Gps And Gsm." International Journal of Engineering Research and General Science,2014.

[3]. Miss.Monali D.More,Miss.Shivani L. Lamkane and Miss.Prajakta B. Jadhav, "Vehicle Tracking And Accident Alert System Using Microcontroller", International Journal of Research in Engineering and Science,2021.

[4]. T Kalyani, S Monika, B Naresh, Mahendra Vucha, "Accident Detection and Alert System", International Journal of Innovative Technology and Exploring Engineering,2019.