IOT ACCIDENT DETECTION SYSTEM

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(08DEP20F1017)

JABATAN KEJURUTERAAN ELEKTRIK

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POLITEKNIK
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IOT ACCIDENT DETECTION SYSTEM

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CONFIRMATION OF THE PROJECT

The project report titled "IOT ACCIDENT DETECTION SYSTEM" has been submitted, reviewed and verified as a fulfills the conditions and requirements of the Project Writing as stipulated

Checked by:

Supervisor's name : Puan Annafaedzatul Binti Mohd Amin

Supervisor's signature :

Date :

Verified by:

Project Coordinator name :

Signature of Coordinator :

Date :

DECLARATION

I hereby declare that the work in this report is my own except for material used form other sources has been clearly identified and properly acknowledged and referenced.

Signature : ……

Name : **RESHVIN GOVINDAN**

Registration No. : **08DEP20F1017**

Date : **19 DECEMBER 2022**

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ACKNOWLEDGMENT

I gave this project my best effort. It would not have been possible, though, without the kind support and cooperation of many people and organisations. I would like to sincerely thank each and every one of them. I owe Mrs. Annafaedzatul binti Mohamad Amin a great deal for her guidance, regular oversight, and providing of the information required for the Project. I also value her assistance in finishing the Project.

I would want to express my gratitude to my parents and my supervisor for their excellent support and cooperation in helping me complete this assignment. I want to express my deep gratitude to the professionals who took the time to listen to me so intently.I am extremely grateful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future. Also, I express my thanks to my sisters and brothers for their support and valuable prayers. My special thanks to my friends for the keen interest shown to complete this project successful.

ABSTRACT

With an increase in population, there is an increase in the number of accidents that happen every minute. These road accidents are unpredictable. There are situations where most of the accidents could not be reported properly to nearby ambulances on time. In most of the cases, there is the unavailability of emergency services which lack in providing the first aid and timely service which can lead to loss of life by some minutes. Hence, there is a need to develop a system that caters to all these problems andcan effectively function to overcome the delay time caused by the medical vehicles. The purpose of this paper is to introduce a framework using IoT, which helps in detecting car accidents and notifying them immediately. This can be achieved by integrating smart sensors with a microcontroller within the car that can trigger at the time of an accident. The other modules like GPS and GSM are 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.

CHAPTER 1
INTRODUCTION

1.0 INTRODUCTION

Road accidents have become very common nowadays. As more and people are buying automobiles, the incidences of road accidents are just increasing day by day. Furthermore, people have also become more careless now. Not many people follow the traffic rules. Especially in big cities, there are various modes of transports. Moreover, the roads are becoming narrower and the cities have become more populated. Thus, road accidents are bound to happen. You pick up a newspaper and you will find at least one or two news about road accidents daily. They cause loss of life as well as material. People need to be more careful when on the road, no matter which mode of transport you are from. Even the ones on foot are not safe because of the rise in these incidences. Every day people witness accidents in the news, from relatives and even with their own eyes.

IOT ACCIDENT DETECTION SYSTEM is a way to help road users. As we already know in 2020 the number of deaths due to vehicle user accidents is 3692. This shows us a significant increase compared to the previous year. as an engineer I have thought of a way to reduce accidents by building a system that can detect accidents.

This system has an accelerometer that will detect vibrations and angle changes. with this system, all impacts with the vehicle will be detected. it only takes 3 seconds to send information to the entire system. This system has also been determined with the angle position with the help of studies that have been done.

with this help, all important user accident information will be sent to a number that has been set to help users get help faster.

THE TIMES OF INDIA

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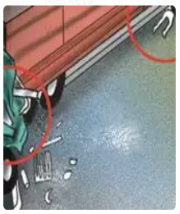
NEWS / Topic

Accident

Showing **137602** results



Accident

Accident is a sudden unfortunate incident that happens unexpectedly and unintentionally, typically resulting in major causalities, damage or injury. Every day hundreds of accident is reported in media across India including **road accidents**, plane crash, **train accidents** everyday.

The accident usually happens suddenly without any intent or volition although sometimes due to carelessness, ignorance or combination of causes and that produces an unfortunate result i,e, injury for which the affected party may be entitled to relief under the law or to compensation under an insurance policy.

EXAMPLE OF AN ACCIDENT ARTICLE

1.1 PROJECT BACKGROUND

In this study, several angle measures will be examined. What are the challenges that develop, notably influencing the impact received, network, and function, and how well can this system detect impact determines the effectiveness of the market suspension by examining whether it is affordable, fits the standards, and functions properly. Despite recent improvements attributed to graduated driver licensing, young drivers ' high rates of traffic crashes, injuries, and fatalities, and the high monetary costs of crashes are clearly unacceptable. Young people today are driving in a more complex traffic environment than ever before. There are more cars, more congestion, more complex intersections, and roadways, and today ' s drivers are considered by many to be more rude, aggressive, and distracted. Despite safer vehicles and roadways, driver behavior remains frustratingly less than ideal. Traffic enforcement alone can never adequately control driver behavior officers cannot be always in all places. Novice drivers are influenced by the complexity of this environment as well as the many other factors in their lives.

1.2 PROBLEM STATEMENT

Issues, particularly for users of vehicles. Due to the lack of precise location information, emergency assistance is frequently delayed after an accident. This delay can be a very serious situation because it could mean life or death. Additionally, accident victims are unable to speed dial emergency services since there is a good chance that they will be hurt during the collision and unable to do so, or that their phone will be shattered or lost in the aftermath of the collision. In addition, the general public, particularly the younger generation, does not comprehend the value of safe driving practices and has a tendency to drive carelessly.

1.3 OBJECTIVE

The project is implemented to achieve the following objectives which are:

I) To develop an IOT based software that can rescue victims

II) To design a hardware that can detect accidents.

1.4 SCOPE OF PROJECT

The target audience for this project is automobile owners because the device can be kept there without slipping out, unlike if it were put in a motorcycle. In addition, because they are less experienced and fresh to the world of driving, the younger generation is also the target audience for this initiative.

1.5 IMPORTANT OF PROJECT

For accident victims who struggle with delayed emergency aid, this effort is crucial. When an accident occurs in an area with no civilians, they frequently encounter scenarios where they are unaware to act by calling for help because they are unconscious.

CHAPTER 2
LITERATURE REVIEW

2.0 Introduction

This chapter extend the literature reviews that cater the information in accordance with the method of this project. The relevant information and other extra features were gathered as shown below.

2.1 Literature Review Topic 1-5

Summary paper

Item/Title	Paper 1	Paper 2	Paper 3	Paper 4	Paper 5
Objectives	The purpose of this paper is to introduce a framework using IoT, which helps in detecting car accidents and notifying them immediately. This can be achieved by integrating smart sensors with a microcontroller within the car that can trigger at the time of an accident. The other modules like GPS and GSM are 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.	The Internet of Things (IoT) can be used to produce an automatic notification and response to the scene. A signal from an accelerometer and a GPS sensor are automatically sent to the cloud and from there, an alert message will be received by whoever is subscribed to that car. The signal will indicate the severity of the accident and the GPS location. The ambulance will use the GPS	we proposed and implemented an IoT system which may help the community decreasing the death rates resulting from vehicles accidents. Results showed that this solution provided many advantages compared to traditional systems, namely, minimizing injured passengers interaction, providing basic medical information to rescue teams, recognizing	This paper is useful in detecting the accident precisely by means of both vibration sensor and Alcohol detection, eye blink sensor.. As there is a scope for improvement and as a future implementation we can add a wireless webcam for capturing the images which will help in providing driver`s assistance.	Vehicle collision detection is one of the essential thing in public place to detect the ground truth behind a collision scene. The collision between the vehicles are monitored most of the time by the vehicle owners or by the camera fixed over the vehicle. The public surveillance camera also be helpful in detecting vehicle collision scenes

		coordinates to get to the scene quickly.	exact and accurate accidents locations, and facilitating the routing process.		happening in the most crowded area. All such detection cameras and systems are connected with wired communication to such extent only.
Problem Statement	Nowadays, there is an increase in the number of accidents that happen in the world. As the population is increasing, there is the number of cars increasing on the road that contributes to severe accidents that happen daily. Around 80 per cent of accidents contribute to the loss of many lives. Mostly, the growing countries are being targeted by the day to day road accidents.	When there is a car accident someone has to actively seek help such as calling 911 for emergency services. There is no automatic notification to the police, ambulance, friends, or family.	The challenges imposed to local PSOs in saving human lives resulting from vehicles accidents have become a crucial concern due to the huge aforementioned number of departed people. As far as many injured could lose their lives, and since no on-site medical assistance has been provided promptly as a result of: (1) late accident reporting, (2) inaccurate geographic location, and (3) lack of injured medical information, the need for automated and	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. Our project will provide an optimum solution to this draw back.	Vehicle collision detection is one of the essential thing in public place to detect the ground truth behind a collision scene. Most of the transmission poles are kept on the public places for providing a better communication signal and the electric supply. The road side transmission poles are extremely not protected with any safety devices. Those poles are standing on its own strength on the materials used for making the

			intelligent mobile solution tackling this burden becomes a must.		poles. Due to aging and several other factors there are chances for such poles to get damage very easily
Methodology	In our approach, we are addressing the gaps by adding an accelerometer, vibration sensor and most importantly heartrate sensor. These components contribute to the hardware setup of the system. Also, we would like to introduce an algorithm for general road accidents that is appropriate for this hardware setup. We have considered a few parameters which are helpful for accident detection and notification. These parameters are vehicle acceleration, retardation, crash impact, the value of	In this system, there will be an automatic response to an accident. The use of sensors and microprocessor to detect an accident and send the location to the Cloud. From the Cloud, the notification is sent to the hospital, ambulance and emergency contacts. The unit involves the use of a Raspberry Pi single board computer and GPS which takes advantage of data such as position and location. The device is meant to immediately detect a collision involving the vehicle it is	The IoT device encompasses four modular components: shock sensor, GPS, NFC reader, and cellular IoT. Those combined modules altogether spontaneously notify the rescue organization headquarter whenever an accident takes place, pinpoint the exact location, and recognize the passengers inside the vehicle on the headquarter map. The triggered sensor signal reports the vehicle's identifier along with the accident's location which appear on a	Our 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 RASPBERRY PI controller. Alcohol detection, eye blink is performed by the RASPBERRY PI Microcontroller sends, it alert mail through the IOT to the parents or a rescue team. So the person	The transmission poles are usually be in two types. One type is made up of metals and the other type is made up of cement concrete. Both of these kind of poles are comes up with different heights for transmitting the electricity wires and other signal lines. As these transmission poles are kept over the roadside place, it has more chance for getting affected with small and huge vehicle collision. During such condition the transmission poles were kept as it is

	heart rate sensor (embedded within the belt) and information of accident location which is tracked by GPS. It is then sent to emergency services/family members by GSM communication.	installed in. This is done using the ADXL345 accelerometer.	web-based interface in the rescue center. This enables the rescue teams to respond immediately	can immediately then after conforming the location necessary action will be taken.	with the damage part to continue its service
Sensor Used	Arduino, GPS, Vibration sensor, heart rate sensor, accelerometer	Temperature sensor, heartbeat sensor, mems sensor, GSM	GPS, NFC reader, cellular IoT	Vibration sensor, alcohol sensor	Vibration sensor, microcontroller

1. **Paper 1: IoT based car accident detection and notification algorithm for general road accidents**

-With an increase in population, there is an increase in the number of accidents that happen every minute. These road accidents are unpredictable. There are situations where most of the accidents could not be reported properly to nearby ambulances on time. In most of the cases, there is the unavailability of emergency services which lack in providing the first aid and timely service which can lead to loss of life by some minutes. Hence, there is a need to develop a system that caters to all these problems and can effectively function to overcome the delay time caused by the medical vehicles. The purpose of this paper is to introduce a framework using IoT, which helps in detecting car accidents and notifying them immediately. This can be achieved by integrating smart sensors with a microcontroller within the car that can trigger at the time of an accident. The other modules like GPS and GSM are 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.

2. **Paper 2: Smart Car: An IoT based accident detection system**

-The Internet of Things (IoT) offers limitless possibilities to both the public and private sectors. Automobile manufacturers are interested in IoT applications to increase the safety of their vehicles, to meet customers' demands and ultimately to offer cutting-edge products which maximize profit. The healthcare industry is concerned with how the IoT can improve the speed and accuracy of communication. This paper describes the feasibility of equipping a vehicle with technology that can detect an accident and immediately alert emergency personnel. When there is a car accident someone has to actively seek help such as calling 911 for emergency services. There is no automatic notification to the police, ambulance, friends, or family. The Internet of Things (IoT) can be used to produce an automatic notification and response to the scene. A signal from an accelerometer and a GPS sensor are automatically sent to the cloud and from there, an alert message will be received by whoever is subscribed to that car. The signal will indicate the severity of the accident and the GPS location. The ambulance will use the GPS coordinates to get to the scene quickly.

3. **Paper 3: An IoT approach to vehicle accident detection, reporting, and navigation**

-One particular concern that Public Safety Organizations (PSO) must account for whilst engaging in many activities is decreasing the effect of vehicle accidents, aiding as many injured people as possible and providing 24/7 on the spot rescue. The Red Cross humanitarian organization is one of the most known PSOs to be present on-site whenever an accident or a disaster takes place. However, some of the rescue teams face difficulty in reaching the injured people to due late alerts and insufficient information of the specific accident location. The advent of the mobile phone and Internet of Things (IoT) industries reshaped the way people communicate and brought a paradigm shift to public and private services [1]. This everevolving technology marked the beginning of new era affecting the lives of people and various businesses. This paper conveys a smart and reliable IoT system solution which instantly notifies the PSO headquarter whenever an accident takes place and pinpoints its geographic coordinates on the map. When an accident takes place, a shock sensor detects it. Then, an algorithm is applied to process the sensor signal and send the geographic location along with some ancillary information to the PSO headquarter, indicating accident occurrence. This is a promising system expected to aid in the tedious rescuing process by reporting in a matter of seconds the location of an accident, the passengers injured, blood types, thus lowering death's rates. The geographical data collected from this system could be relied upon as admissible evidence or indicator of the road state and conditions.

4. Paper 4: Sign Board monitoring and vehicle accident detection system using IoT

-The Rapid growth of technology and infrastructure has made our lives easier. 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. Our 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 RASPBERRY PI controller. Alcohol detection, eye blink is performed by the RASPBERRY PI Microcontroller sends, it alert mail through the IOT 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. This paper is useful in detecting the accident precisely by means of both vibration sensor and Alcohol detection, eye blink sensor.. As there is a scope for improvement and as a future implementation we can add a wireless webcam for capturing the images which will help in providing driver`s assistance.

5. Paper 5: A Wireless collision detection on transmission poles through IoT technology

-Transmission poles plays a major in the wired telecom communication as well as in the electrical transmission. The wireless communication receivers and antennas are also need poles for holding the antenna and several other peripheral units to its nearby. Most of the transmission poles are kept on the public places for providing a better communication signal and the electric supply. The road side transmission poles are extremely not protected with any safety devices. Those poles are standing on its own strength on the materials used for making the poles. Due to aging and several other factors there are chances for such poles to get damage very easily. Vehicle collision is an important factor in damaging the transmission poles kept near the road side. The proposed method is designed to identify the collision detection on the poles to alert the maintenance team to take immediate action against the faulty poles. It is achieved with the help of IoT technology connecting several peripheral units to a microcontroller.

2.2 SUMMARY

After reading the paper in the literature study, I discovered that the accelerometer sensor is the most crucial element of our project; without it, the project would be useless. I also discovered that the Wi-Fi module is crucial. In addition, in order to determine whether or not there has been an accident, we must calculate the angle of the car and its speed and set those values to the device. y-axis z-axis.

CHAPTER 3
METHODOLOGY

3.0 Introduction

Methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques.

To realize this Project as a product that ready to use with safety characteristic, a very comprehensive plan is undertaking. A step-by-step procedure is done so that the Project can be completed in time. Data was gathered because of earlier study conducted by other academics using books, periodicals, papers, and the internet. This previous study alludes to previous research, and this research was conducted to supplement the thesis title's research.

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3.1 PROJECT DESIGN AND OVERVIEW

3.1.1 BLOCK DIAGRAM OF THE PROJECT

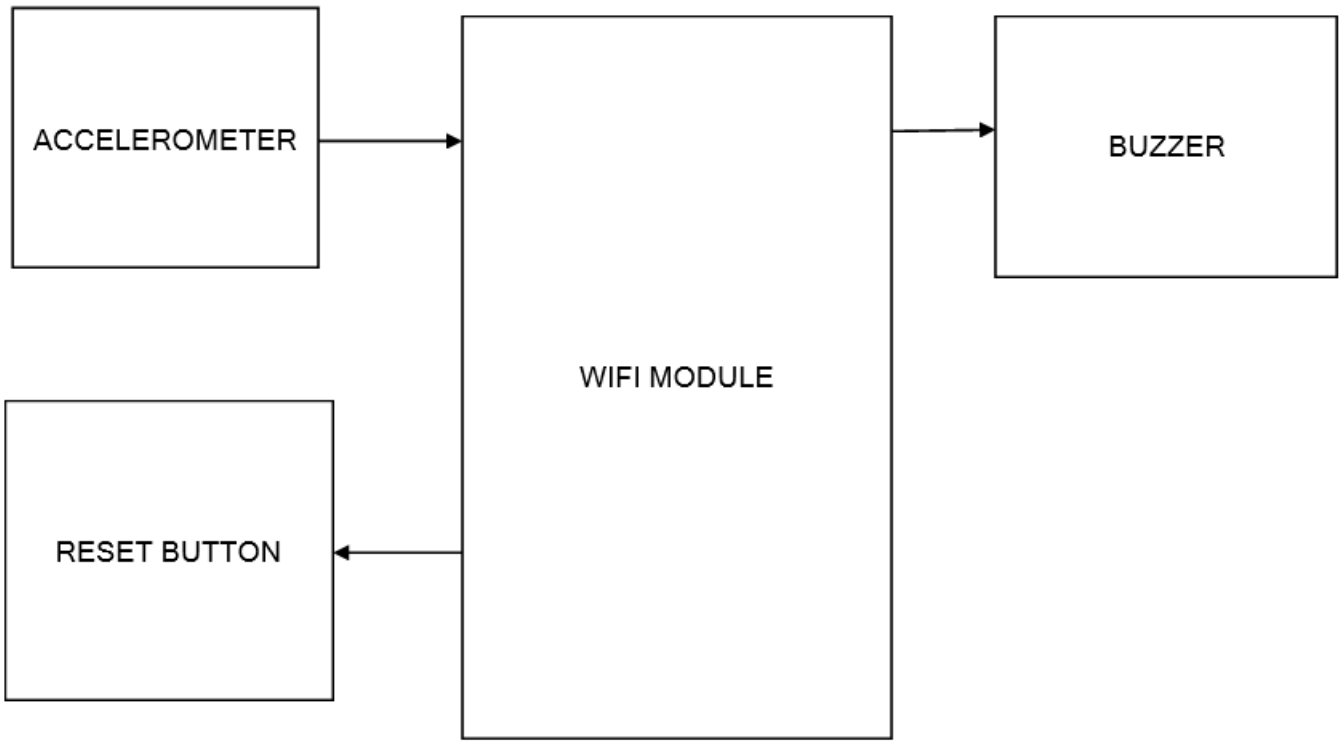


Figure 3.1 :Block diagram of the project

3.1.2 FLOWCHART OF THE PROJECT 1

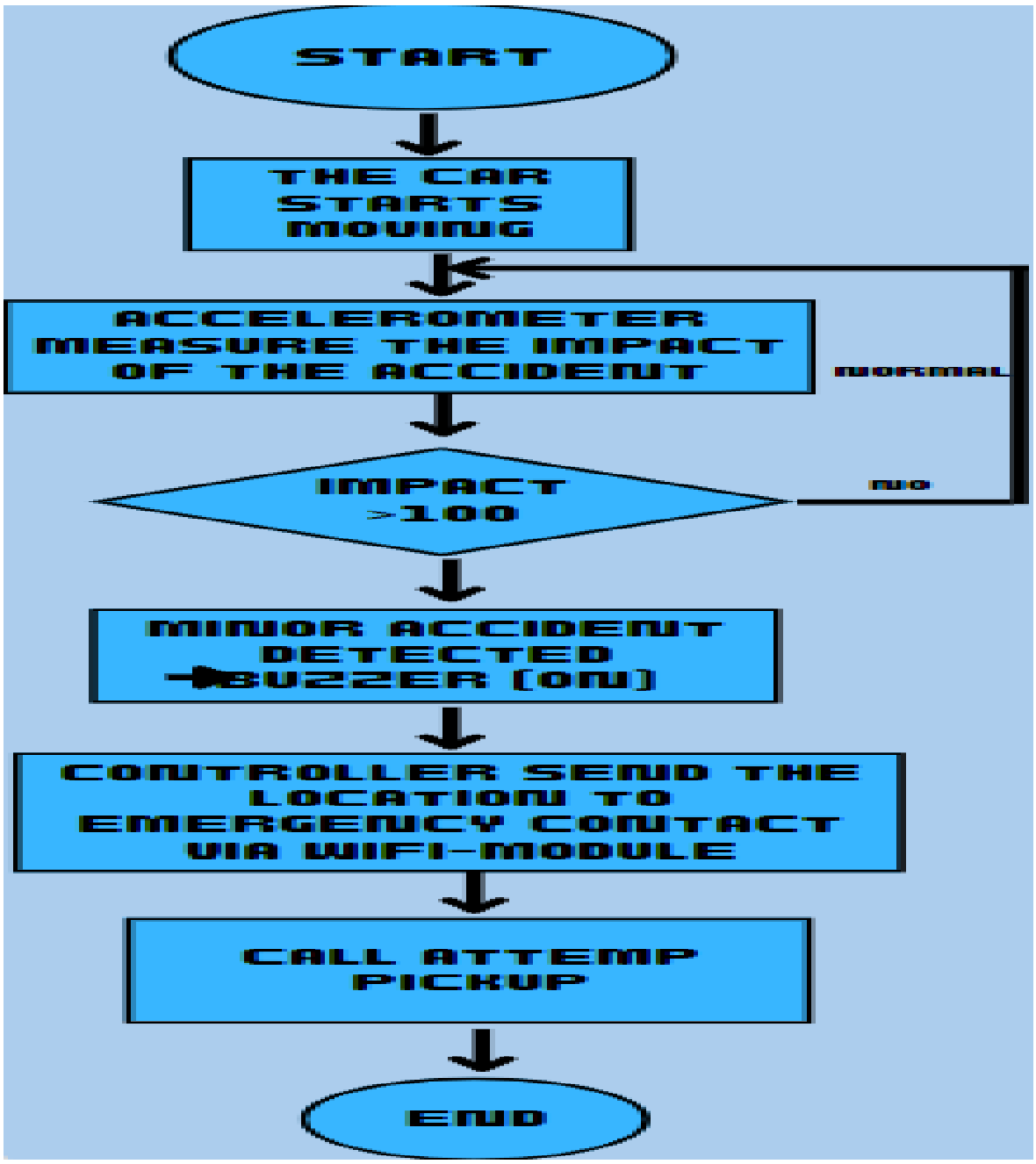


Figure 3.2 : Flowchart of the project

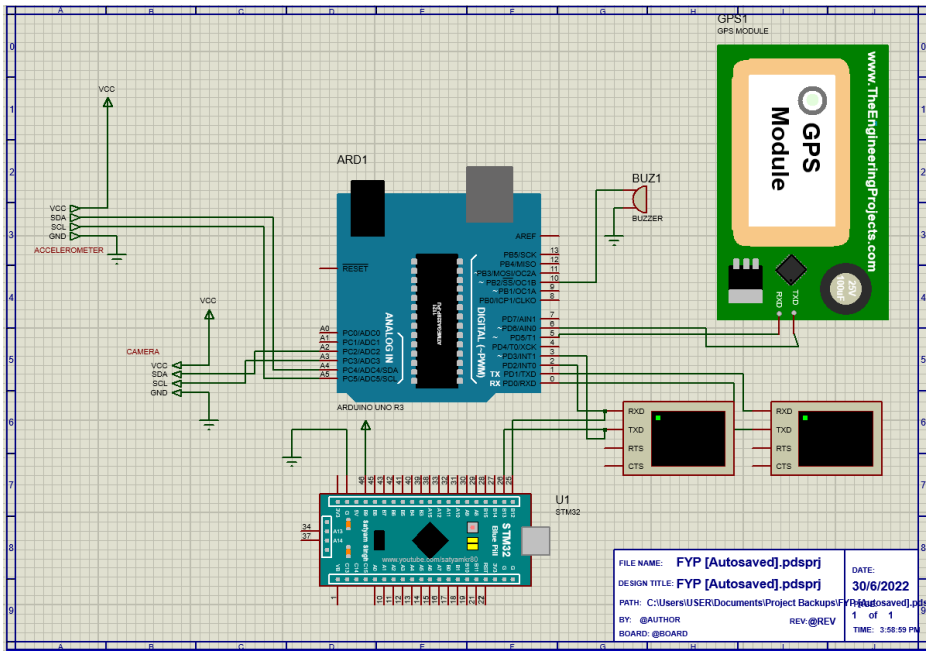
3.1.3 PROJECT DESCRIPTION

Based on the research and methods from the summary we are making a device that can detect accidents and send help so that victims can get rescued faster. We plan to do this by using accelerometer to detect the accidents and Wifi module to detect location and also a software to send the accident call and text.

3.2 PROJECT HARDWARE

3.2.1 SCHEMATIC CIRCUIT

Figure 3.2.1 : Schematic Circuit



3.2.2 DESCRIPTION

A circuit diagram is a graphical representation of an electrical circuit. A circuit diagram, also called an electrical diagram, elementary diagram, or electronic schematic, is a simplified graphical representation of an electrical circuit. Circuit diagrams are used for the design, construction and maintenance of electrical and electronic equipment.

3.2.2.1 ACCELEROMATER

Figure 3.4

Arduino/Genuino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller.

3.2.2.2 WIFI MODULE ESP8266

Figure 3.5: ESP8266

The ESP8266 WIFI module is a self contain SOC with integrated TCP/IP protocol stack that can give any microcontroller access to a WIFI network. These module is capable of either hosting an application or offloading all WIFI networking functions from another application processor.

3.2.2.3 BUZZER

Figure 3.6 : BUZZER

To issue orders, this component is used. Only so that they can decide whether to continue allowing the system to send information to the emergency number or not, this is meant to educate automobile accident victims.

3.2.2.4 RESET BUTTON

Figure 3.7 :RESET BUTTON

This component aims to reset the system if there is any problem with the device

3.2.2.5 ACRYLIC CASING

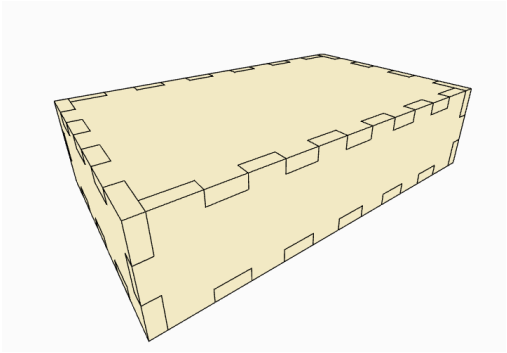


Figure 3.8 : Acrylic casing

To avoid the device from getting damaged by the impact of accident.

3.2.3 CIRCUIT OPERATION

In this circuit, I used Wifi Module as microcontroller to read the sensors(accelerometer) and then send it to the device connected.In the same time, the ESP8266 Wi-Fi module sends the GPS location with a premade text and call as well.

3.3 PROJECT SOFTWARE

3.3.1 FLOWCHART OF THE SYSTEM

Figure 3.3.1 Flowchart System

3.3.2 DESCRIPTION OF FLOWCHART

Figure 3.3.1 shows the flowchart system of the project. At the beginning, the Wi-Fi module connects to the Wi-Fi for sending out calls and to connect to the smartphone. Then the accelerometer is used to detect the severity of the accident. Next, Buzzer makes noise so people around will be alerted when the accident occurs. After that, your location will sent to the number saved as the emergency contact, then the prewritten text and a call will go through to inform the emergency contact.

3.4 PROTOTYPE DEVELOPMENT

3.4.1 PRODUCT LAYOUT

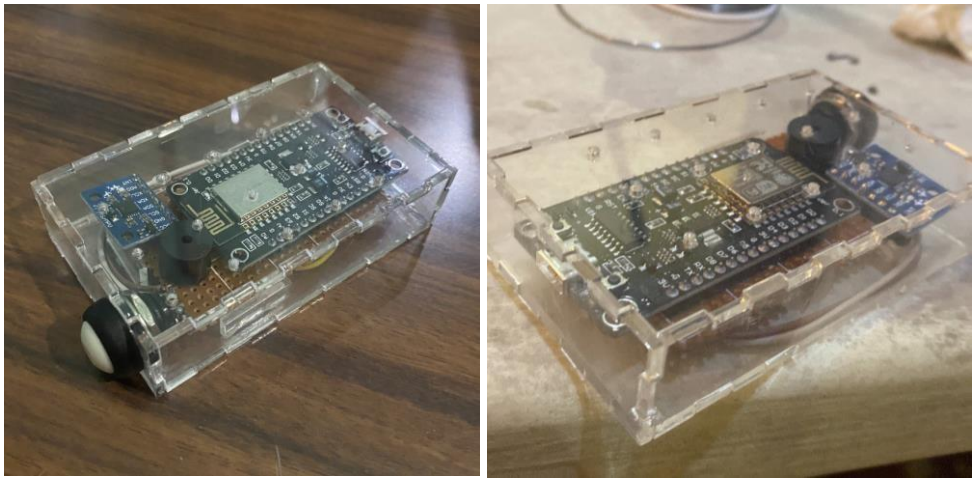


Figure 3.4

3.5 SUMMARY

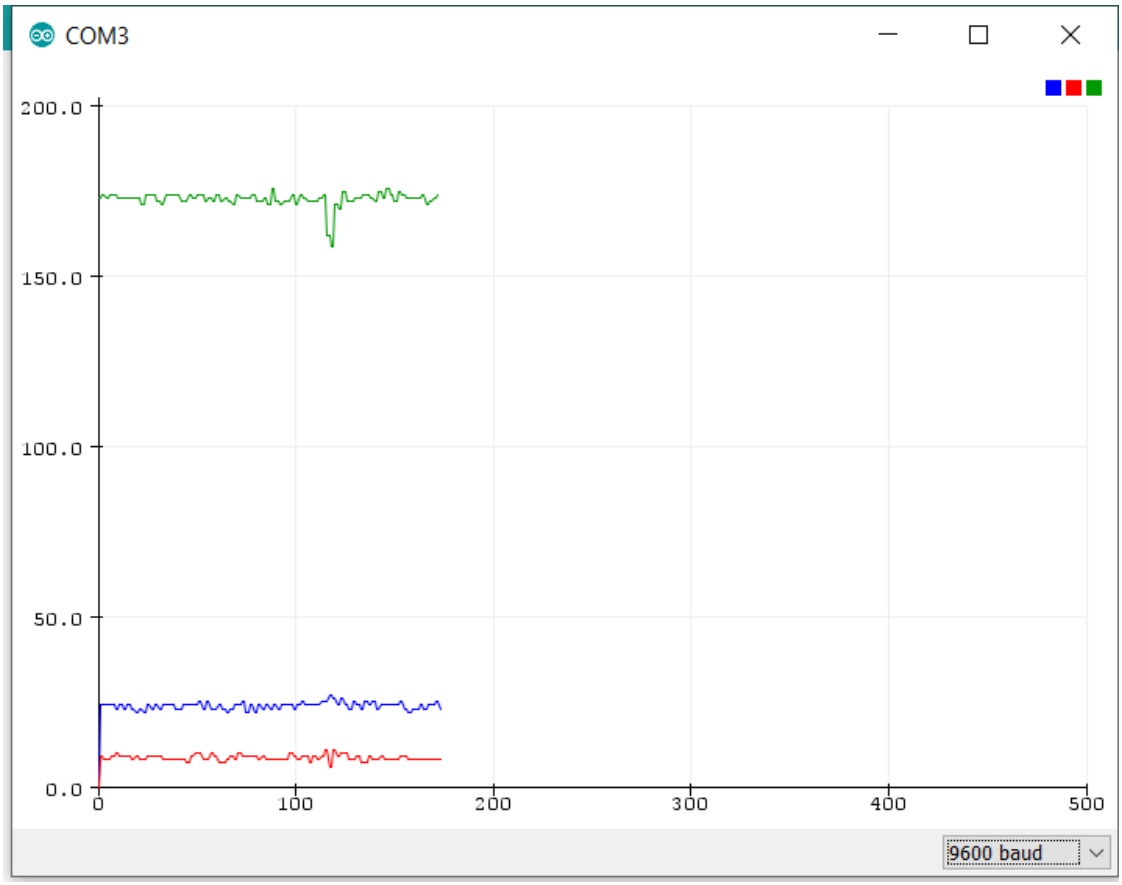
This chapter had explained that the result of the project has a great success rateas it develop well in the community. So much that I had learned from the resultand gradually practice it in this new norm. Even with so many hurdles I crossedpath, I had continuously gotten better to overcome the problem so as result it happen with flying colors. As the method I used, I had could do many of the electrical practices that been learn especially for the programming and the engraving machine. As already discussed, I have learned that this project is a good achievement for myself and others. I can see that this project brings me many good advantages as well as achieving the objective. For me, this project is a goodstart to gain more experience and knowledge about engineering and can lead us to help more people in the future as electrical engineering students. I use the process of 3D printing and engraving to make prototypes,and the material I use is acrylic. Acrylic is recyclable and biodegradable, making it the most environmentally friendly filament.

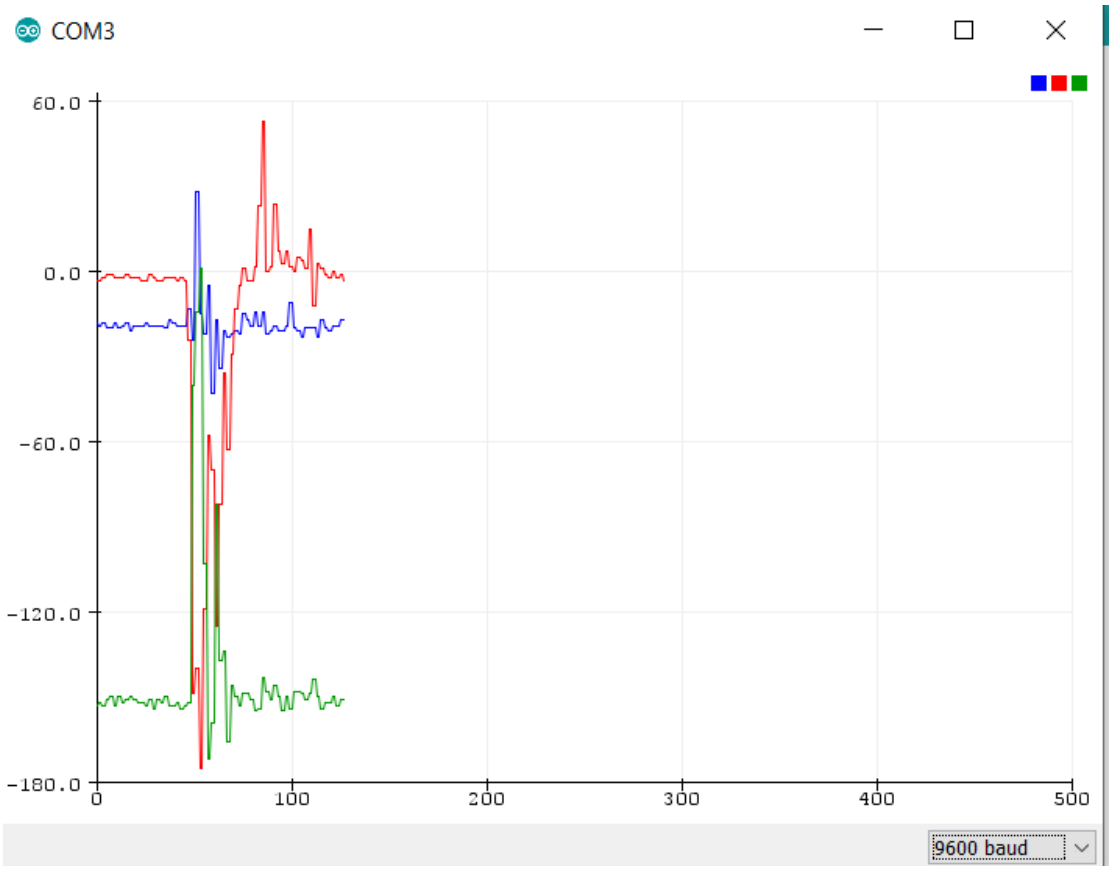
CHAPTER 4

4.0 EXPECTED RESULT

We have found a proper implementation model that includes a variety of sensor devices and other modules. In this implementation model we used ATMEGA 328 with Wi-Fi module. Inbuilt ADC and Wi-Fi module connects the embedded device to internet. Sensors are connected to Arduino UNO board for monitoring, ADC will convert the corresponding sensor reading to its digital value and from that value the corresponding environmental parameter will be evaluated. After sensing the data from different sensor devices, which are placed in particular area of interest. The sensed data will be automatically sent to the web server, when a proper connection is established with sever device.

Figure 4 shows the data of monitoring that been taking from Blynk app.

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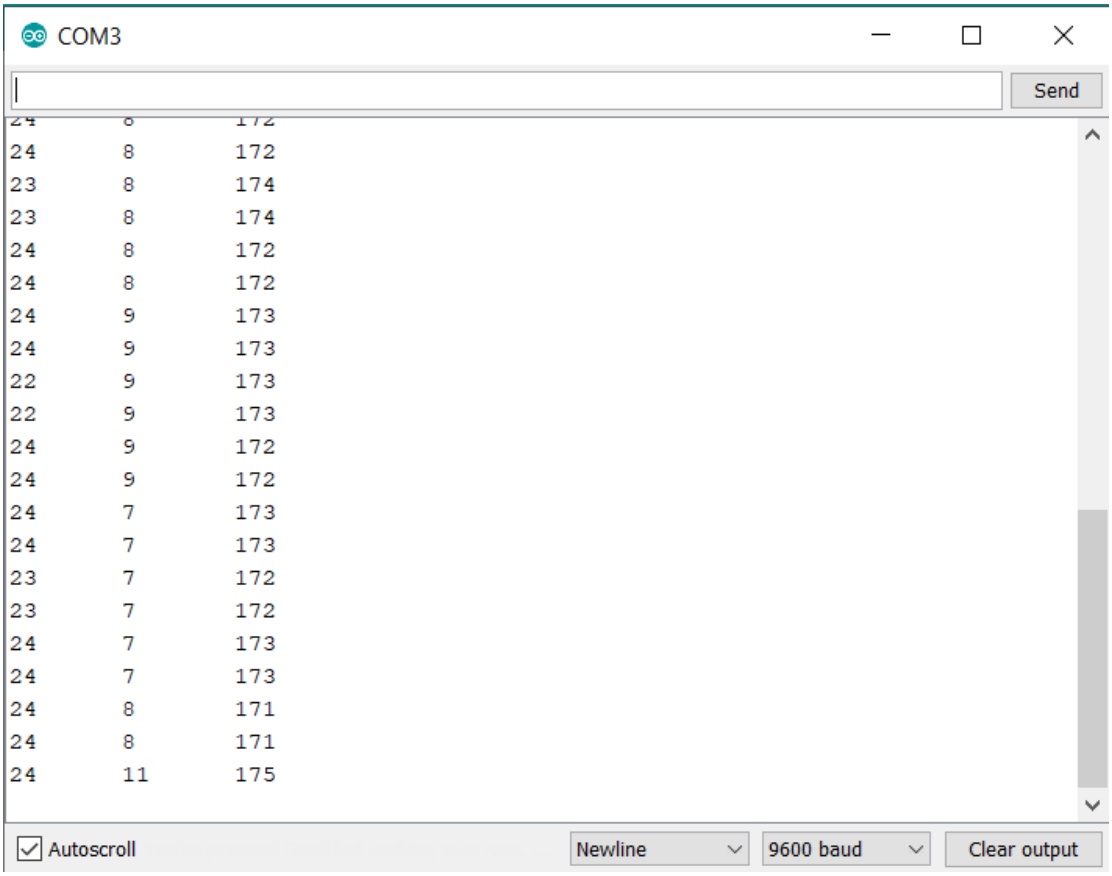
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Autoscroll
Newline
9600 baud
Clear output

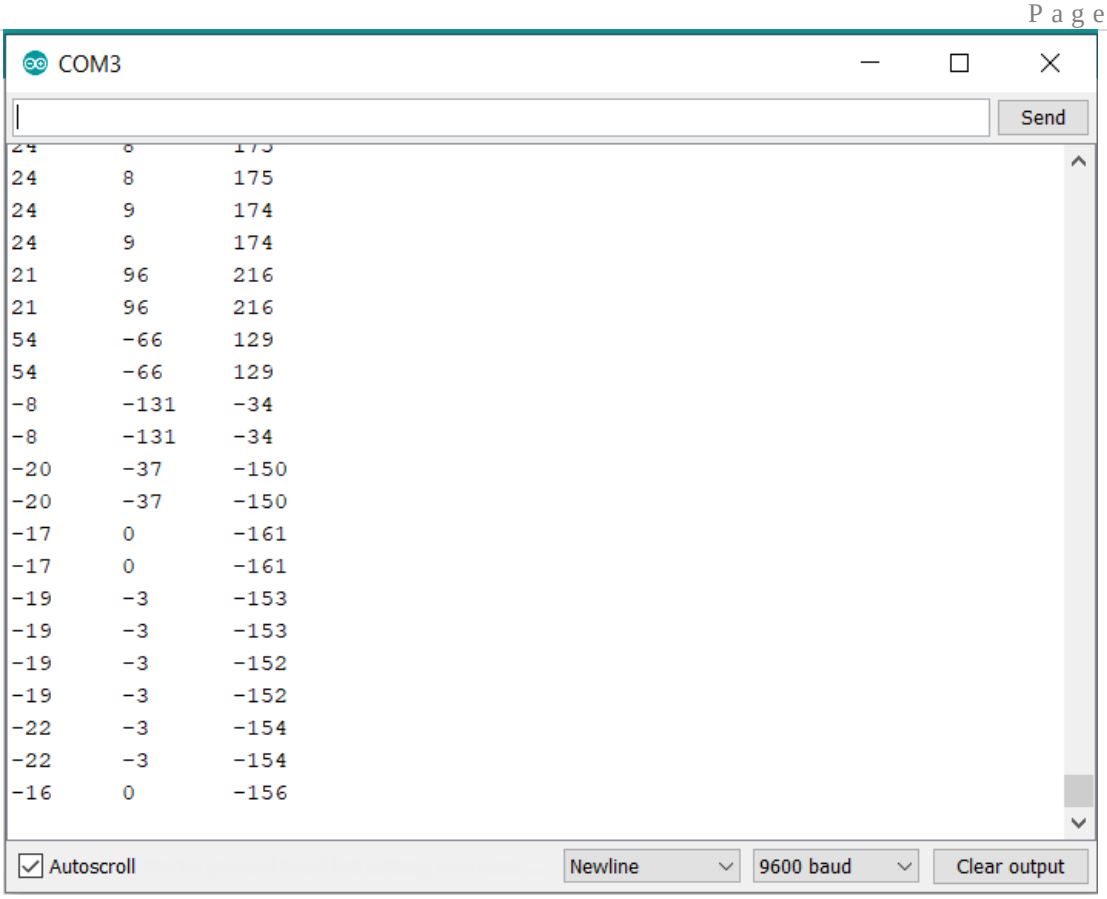


FIGURE 4.0: DATA MONITORING

Figure 5 shows the line graph based on data.

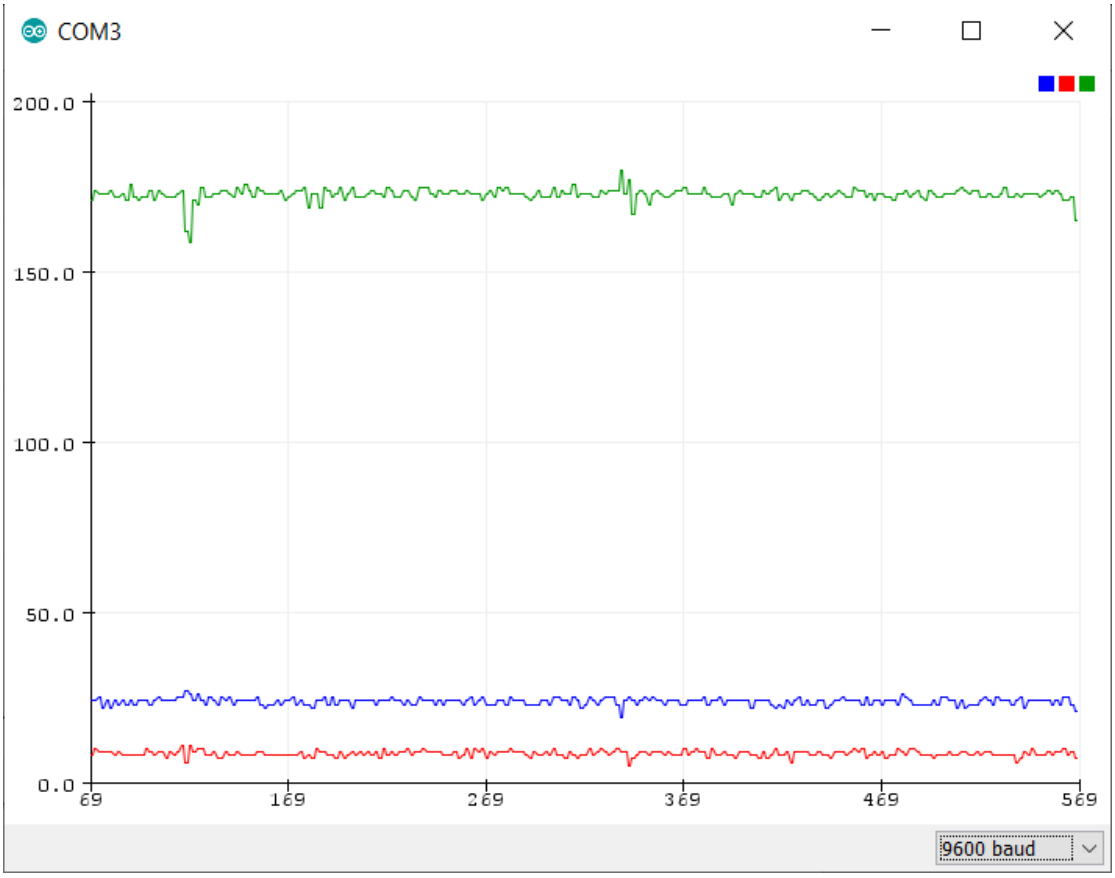


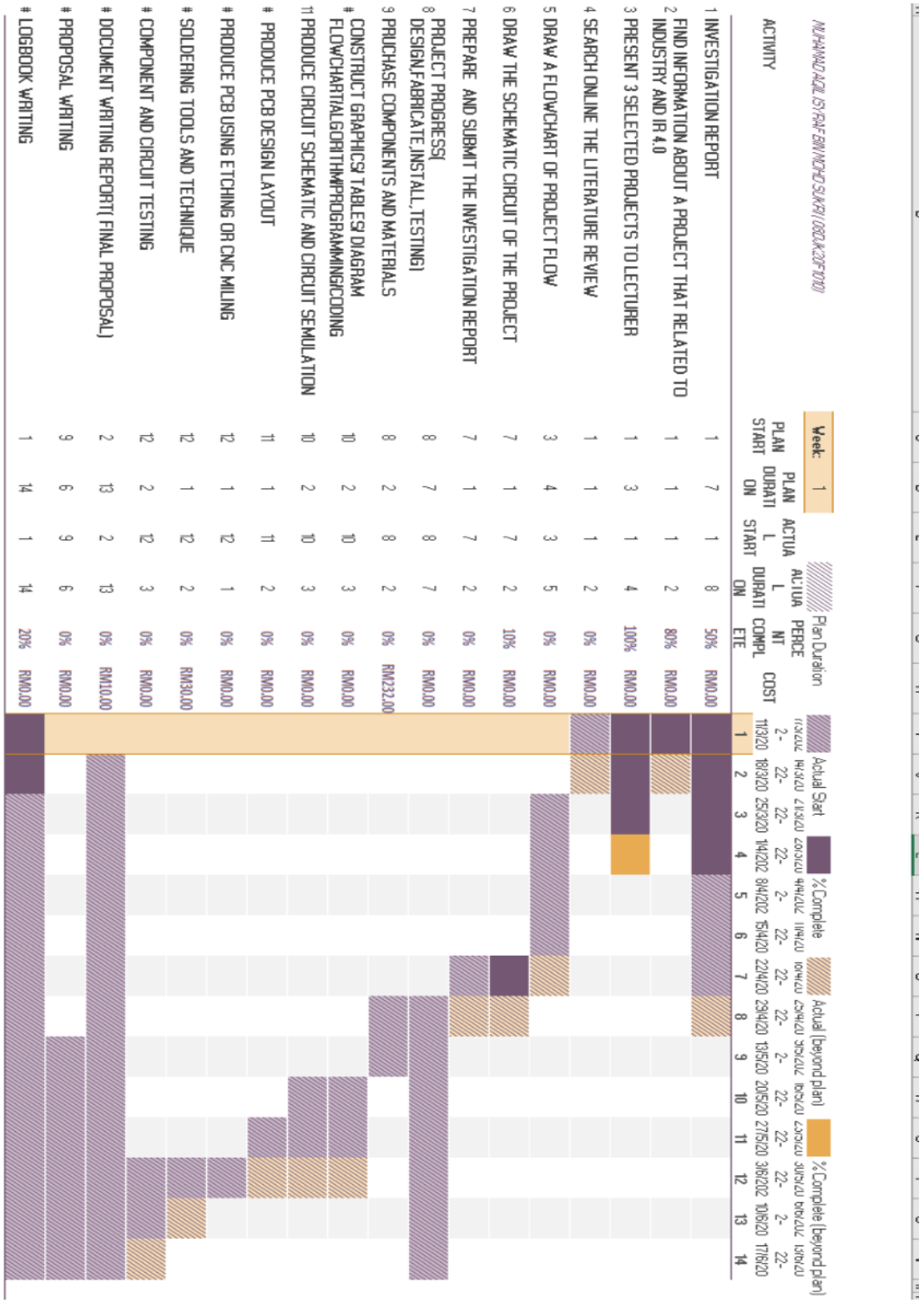
FIGURE 5 : GRAPH OF DATA MONITORING

Figure 6, The figure displays the resulting the accelerometers sensor condition and resulting values are displayed to the LCD or mobile app in real-time.

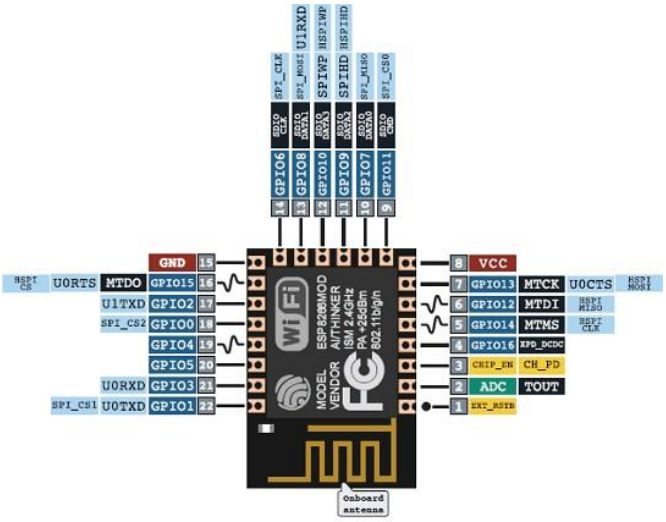
FIGURE 6.0 DATA MONITORING FROM APP BLYNK

APPENDICES

Appendix 1:Gantt Chart



Appendix 2:Datasheet



ESP8266MOD

DATASHEET WIFI MODULE

Budget of The Project

NO	COMPONEN	RM	QUANTITY	TOTAL (RM)
1.	WIFI MODULE	33.00	1	33.00
2.	BUZZER	3.00	1	3.00
3.	ACCELEROMETTER	20.00	1	20.00
4.	RESET BUTTON	3.00	1	3.00
5.	ACRYLIC	10.00	1	10.00
TOTAL				RM69.00

Appendix 3: Program Coding

1.Programming for display LCD

```
//Working with ESP-01
#define BLYNK_PRINT Serial

 #include <ESP8266WiFi.h>
#include <BlynkSimpleStream.h>
#include "Wire.h" // This library allows you to communicate with I2C devices.

#define Buzz D3

// Your WiFi credentials.
// Set password to "" for open networks.
const char* ssid = "WIFI";
const char* pass = "12345678";

// You should get Auth Token in the Blynk App.
// Go to the Project Settings (nut icon).
char auth[] = "6a4Ep0AUj4lXh9zGmYKKqEpNP458z5Vg";
char server[] = "139.59.206.133";

int indexs=0;
int Alarm=0,Alarm1=0;
int TMPX=0;
int Almxx=0;
float IV=0,OldIV=0;
float PerIV=0,OldPerIV=0;
int MODE=0;
int Beat,BPM,SPO2;
int Counter,BeatCycle = 0;
int countsend=0;
int cycle=0;  float voltage=0;
String DATA="";
int P1=0, P2=0, P3=0, P4=0;
int Rly1=0, Rly2=0, Rly3=0, Rly4=0, Rly5=0;
int led1x=0,led2x=0,led3x=0,led4x=0;
int TotalUse=0;
int TotalAvai=0;
float Temp1=30.1423;
float PH=7;
float Temp2=30.2;
String Flat;
String Flon;
String Temp1x="";
String PHx="";
String Temp2x="";
String Temp1y="";
String PHy="";
String Temp2y="";
String Temp3y="";
String Temp3x="";
String Temp4y="";
```

```
String Temp4x="";
float latx,lonx;
int Timer=0;
int Mode=0;
int DataIn=0;
int ALERT=0;
float Sens1=0;
int ID=1;
String lats,lons;
String locationX="";
float lat,lon,alt,spd;
float oldlat, oldlon;
String loc;


WiFiClient wifiClient;

// This function tries to connect to the cloud using TCP
bool connectBlynk()
{
  wifiClient.stop();
 // return wifiClient.connect(BLYNK_DEFAULT_DOMAIN, BLYNK_DEFAULT_PORT);
  return wifiClient.connect(server, BLYNK_DEFAULT_PORT);
}

// This function tries to connect to your WiFi network
void connectWiFi()
{
  Serial.print("Connecting to ");
  Serial.println(ssid);

  if (pass && strlen(pass)) {
    WiFi.begin((char*)ssid, (char*)pass);
  } else {
    WiFi.begin((char*)ssid);
  }

  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
}



BLYNK_WRITE(V4)
{
   lat=param[0].asFloat();
   lon=param[1].asFloat();
   alt=param[2].asFloat();
   spd=param[3].asFloat();
}
WidgetMap myMap(V3);
//----------------------Manage Virtual Pin--------------------------
BLYNK_WRITE(V10)
```

```
{
  int pinValue = param.asInt(); // assigning incoming value from pin V1 to a variable
  Rly1=pinValue;
  if (Rly1==1){
    Alarm=0;
    Alarm1=0;
    Blynk.virtualWrite(V0, "NORMAL");
  }
  // process received value
}
BLYNK_WRITE(V11)
{
  int pinValue1 = param.asInt(); // assigning incoming value from pin V1 to a variable
  Rly2=pinValue1;
  // process received value
}

BLYNK_WRITE(V12)
{
  int pinValue3 = param.asInt(); // assigning incoming value from pin V1 to a variable
  Rly3=pinValue3;
  // process received value
}

BLYNK_WRITE(V13)
{
  int pinValue4 = param.asInt(); // assigning incoming value from pin V1 to a variable

  Rly4=pinValue4;
}
BLYNK_WRITE(V14)
{
  int pinValue5 = param.asInt(); // assigning incoming value from pin V1 to a variable

  Rly5=pinValue5;
}



//--------------------------------------------------------------------

const int MPU_ADDR = 0x68; // I2C address of the MPU-6050. If AD0 pin is set to HIGH, the I2C
address will be 0x69.

int16_t accelerometer_x, accelerometer_y, accelerometer_z; // variables for accelerometer raw
data
int16_t gyro_x, gyro_y, gyro_z; // variables for gyro raw data
int16_t temperature; // variables for temperature data

char tmp_str[7]; // temporary variable used in convert function
String Temp,x,y,z;
char* convert_int16_to_str(int16_t i) { // converts int16 to string. Moreover, resulting strings
will have the same length in the debug monitor.
  sprintf(tmp_str, "%6d", i);
```

```
  return tmp_str;
}


void setup()
{
pinMode(Buzz,OUTPUT);
  Serial.begin(9600);
  Wire.begin();
  Wire.beginTransmission(MPU_ADDR); // Begins a transmission to the I2C slave (GY-521 board)
  Wire.write(0x6B); // PWR_MGMT_1 register
  Wire.write(0); // set to zero (wakes up the MPU-6050)
  Wire.endTransmission(true);

  connectWiFi();

  connectBlynk();

  Blynk.begin(wifiClient, auth);

delay(3000);
Blynk.virtualWrite(V0, "NORMAL");
digitalWrite(Buzz,HIGH);
delay(30);
digitalWrite(Buzz,LOW);
delay(30);
digitalWrite(Buzz,HIGH);
delay(30);
digitalWrite(Buzz,LOW);
delay(30);

}

void loop()
{
int xx=x.toInt();
int yy=y.toInt();
int zz=z.toInt();

xx=xx/100;
yy=yy/100;
zz=zz/100;
 //--------------------------------------------------------------------------------
  countsend++;
  if (countsend>500){

   //  Blynk.virtualWrite(V1, TMPX);
     Serial.print(xx);
Serial.print("\t");
Serial.print(yy);
Serial.print("\t");
Serial.print(zz);


  Serial.println();
```

```
      if (yy<-110 || yy>110){
    if (Alarm==0){
      Alarm=1;
      Blynk.virtualWrite(V0, "MINOR ACCIDENT!");
    }
  }

  if (zz<-100 || xx<-100){
    if (Alarm1==0){
      Alarm1=1;
      Blynk.virtualWrite(V0, "MAJOR ACCIDENT!");
    }
  }

  if (Alarm>0 || Alarm1>0){
   digitalWrite(Buzz,HIGH);
delay(30);
digitalWrite(Buzz,LOW);
delay(30);
digitalWrite(Buzz,HIGH);
delay(30);
digitalWrite(Buzz,LOW);
delay(30);
  }



  countsend=0;


  }

  if (zz<-200 || zz>300 ){
    if (Alarm==0){
      /*
      Alarm=1;
      Serial.println("ACCIDENT DETECTED!!");
    //   Blynk.email("TEST@gmail.com", " EMERGENCY Need HELP!! at location", loc);
      Blynk.virtualWrite(V0, "ACCIDENT ALARM!!");
     // Blynk.email("test@gmail.com", "Need HELP!!", DATA);
  //   Blynk.email("ACCIDENT ALERT.. Need HELP!! at location ", loc);
  //   String MSGG="ACCIDENT ALERT..NEED HELP, LOCATION: " + loc;
  //   Blynk.notify(MSGG);
  */
    }
  }

    if (zz>>-200 ){
      if (Alarm==1){
 //  Alarm=0;
 //  Blynk.virtualWrite(V0, "NORMAL");
      }
  }
```

```
  //_____________________________________________

  //----------------------------------------------------------------
  // Reconnect WiFi
  if (WiFi.status() != WL_CONNECTED) {
    connectWiFi();
    return;
  }

  // Reconnect to Blynk Cloud
  if (!wifiClient.connected()) {
    connectBlynk();
    return;
  }

  Blynk.run();
Timer++;

//locationX=String(lat) + "," + String(lon);
// loc="http://www.google.co.in/maps/place/" + String(lat) + "," + String(lon);
    //  myMap.location(indexs,String(lat),String(lon),loc);
//if (oldlat!=lat){
//  indexs++;
//  oldlat=lat;
//   myMap.location(indexs,String(lat),String(lon),loc);
//}


/*
if (Rly2==1){
 Alarm=0;
     Blynk.notify("INCIDENT ACKNOWLEDGED..");

delay(1000);
 Blynk.virtualWrite(V0, "NORMAL");
  }

  if (Rly1==1){
   indexs=0;
   locationX=String(lat) + "," + String(lon);
  loc="http://www.google.co.in/maps/"+locationX;
      myMap.location(indexs,String(lat),String(lon),loc);



  }
  if (Rly2==1){
```

```
  }

*/

if (Timer > 1000){
/*
  if (oldlat!=lat){
  indexs++;
  oldlat=lat;
}

   locationX=String(lat) + "," + String(lon);
  loc="http://www.google.co.in/maps/place/"+locationX;
      myMap.location(indexs,String(lat),String(lon),loc);


 */

 Timer++;
 Wire.beginTransmission(MPU_ADDR);
  Wire.write(0x3B); // starting with register 0x3B (ACCEL_XOUT_H) [MPU-6000 and MPU-6050
Register Map and Descriptions Revision 4.2, p.40]
  Wire.endTransmission(false); // the parameter indicates that the Arduino will send a restart.
As a result, the connection is kept active.
  Wire.requestFrom(MPU_ADDR, 7*2, true); // request a total of 7*2=14 registers

  // "Wire.read()<<8 | Wire.read();" means two registers are read and stored in the same
variable
  accelerometer_x = Wire.read()<<8 | Wire.read(); // reading registers: 0x3B (ACCEL_XOUT_H) and
0x3C (ACCEL_XOUT_L)
  accelerometer_y = Wire.read()<<8 | Wire.read(); // reading registers: 0x3D (ACCEL_YOUT_H) and
0x3E (ACCEL_YOUT_L)
  accelerometer_z = Wire.read()<<8 | Wire.read(); // reading registers: 0x3F (ACCEL_ZOUT_H) and
0x40 (ACCEL_ZOUT_L)
  temperature = Wire.read()<<8 | Wire.read(); // reading registers: 0x41 (TEMP_OUT_H) and 0x42
(TEMP_OUT_L)
  gyro_x = Wire.read()<<8 | Wire.read(); // reading registers: 0x43 (GYRO_XOUT_H) and 0x44
(GYRO_XOUT_L)
  gyro_y = Wire.read()<<8 | Wire.read(); // reading registers: 0x45 (GYRO_YOUT_H) and 0x46
(GYRO_YOUT_L)
  gyro_z = Wire.read()<<8 | Wire.read(); // reading registers: 0x47 (GYRO_ZOUT_H) and 0x48
(GYRO_ZOUT_L)

  // print out data
 // Serial.print("aX = "); Serial.print(convert_int16_to_str(accelerometer_x));
 // Serial.print(" | aY = "); Serial.print(convert_int16_to_str(accelerometer_y));
 // Serial.print(" | aZ = "); Serial.print(convert_int16_to_str(accelerometer_z));
  // the following equation was taken from the documentation [MPU-6000/MPU-6050 Register Map and
Description, p.30]
 // Serial.print(" | tmp = "); Serial.print(temperature/340.00+36.53);
 x=convert_int16_to_str(accelerometer_x);
 y=convert_int16_to_str(accelerometer_y);
```

```
 z=convert_int16_to_str(accelerometer_z);
  Temp=temperature/340.00+36.53;
//  Serial.print(" | gX = "); Serial.print(convert_int16_to_str(gyro_x));
//  Serial.print(" | gY = "); Serial.print(convert_int16_to_str(gyro_y));
//  Serial.print(" | gZ = "); Serial.print(convert_int16_to_str(gyro_z));



  // delay


  Timer=0;
}



 while (Serial.available()) {
    // get the new byte:
    char inChar1 = (char)Serial.read();
  if (inChar1 == '*') {
      DataIn++;

    }

if (inChar1 == 'X'){
  if (ALERT!=1){

  DATA="";
  ALERT=1;
  DATA= "ALERT!";



  }

}

    while (DataIn > 0){
        while (Serial.available()) {
    // get the new byte:
    char inChar = (char)Serial.read();
    if (inChar == '*') {
      DataIn++;

    }
    if (inChar != '*' && inChar != '#' && DataIn==1) {
      Temp1x+=inChar;

    }
    if (inChar != '*' && inChar != '#' && DataIn==2) {
      Temp2x+=inChar;

    }
    if (inChar != '*' && inChar != '#' && DataIn==3) {
      Temp3x+=inChar;
```

```
    }
     if (inChar != '*' && inChar != '#' && DataIn==4) {
      Temp4x+=inChar;

    }


    if (inChar == '#') {
      DataIn=0;
     Temp1y=Temp1x;   PHy=PHx;      Temp2y=Temp2x;  Temp3y=Temp3x;  Temp4y=Temp4x;
     Temp1x="";
     PHx="";   Temp2x=""; Temp3x="";



    }
        }

    }

 //*************************************************************************************************
*************************


 //*************************************************************************************************
*************************

}
}
```

Appendix 4: Questionnaire

NEED ANALYSIS / MARKET ANALYSIS

The questionnaires were distributed through to the several students in my class because this project is focused on the youth and 28 students responded.

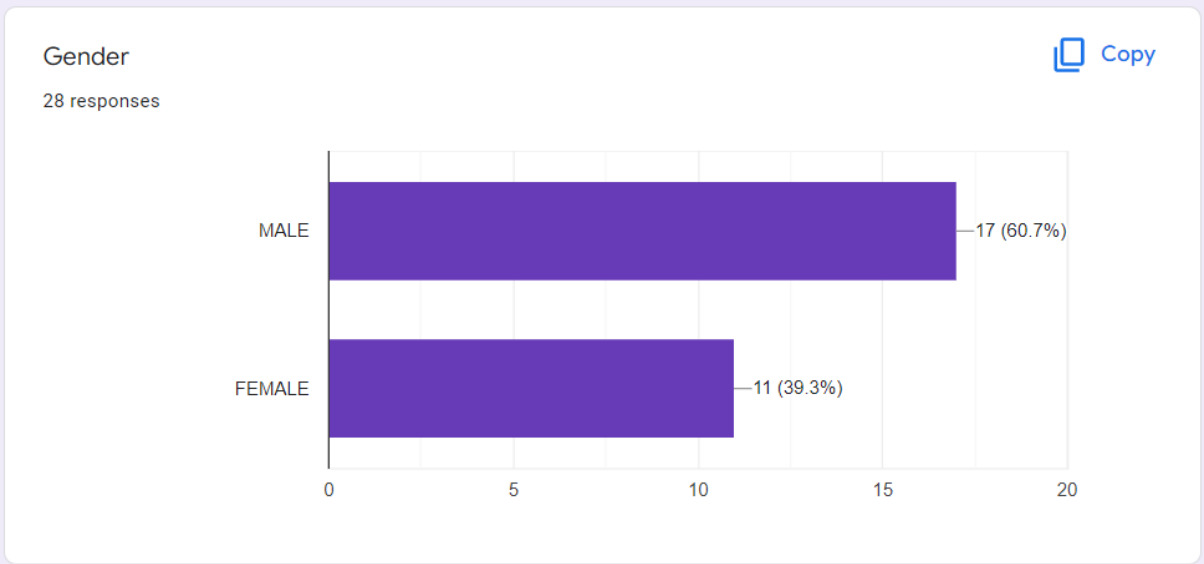


Figure 1.0 Gender

Figure 1.0 The result of the questionnaires found that 60.7% of students that drive are males and that is also equivalent to 17 students. The balance is 39.3% or 11 students that are female drivers.

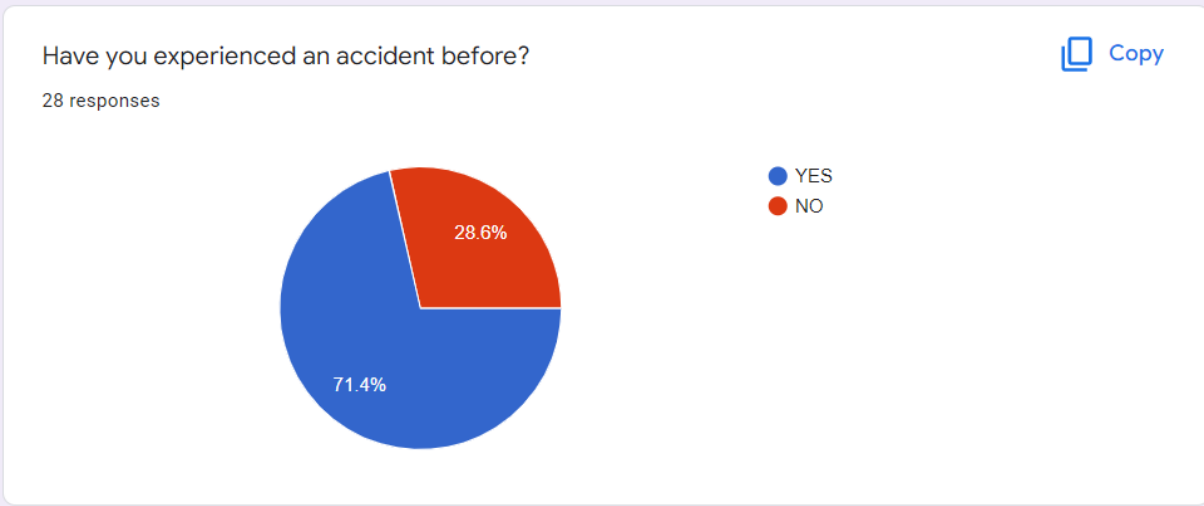


Figure 1.1 Who has met with and accident?

Figure 1.1 shows the percentage of students that met with an accident before. Majority of students 71.4% have met with an accident before.

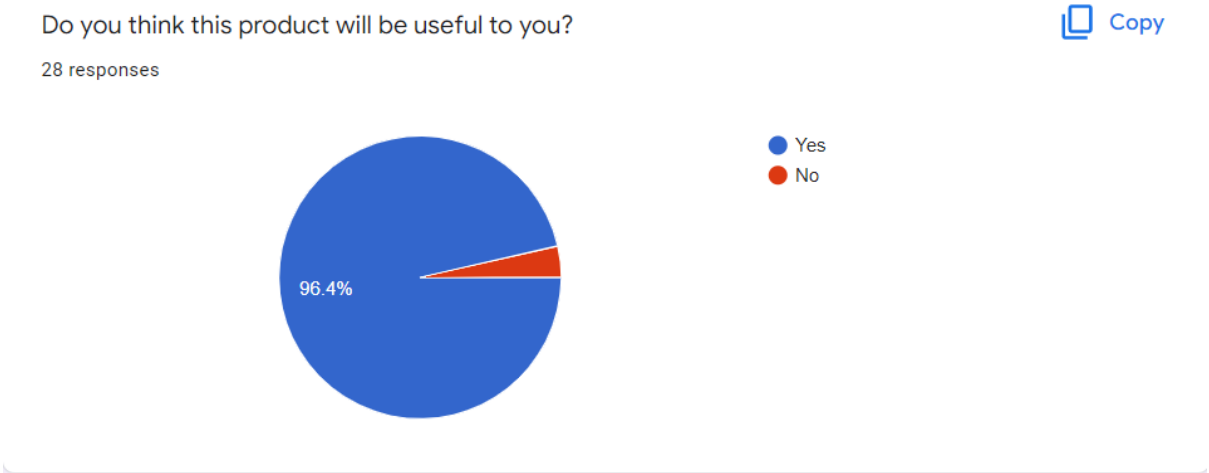


Figure 1.2 Product

Figure 1.2 shows that almost everyone thinks this product will be useful to them

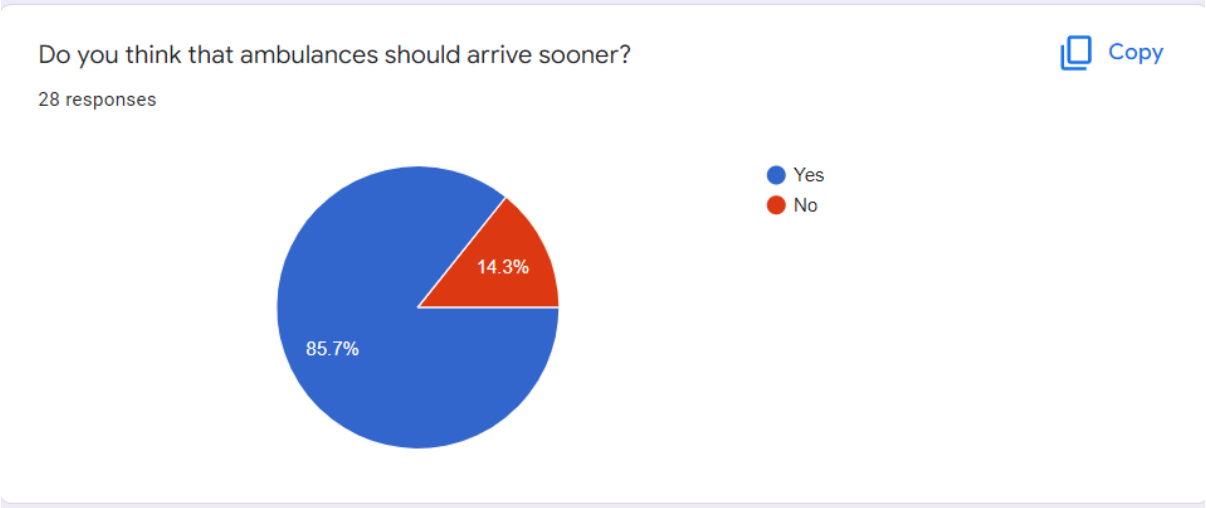


Figure 1.3 Option on ambulance

Figure 1.3 shows that 85.7% of students think ambulances should be faster and arrive sooner.

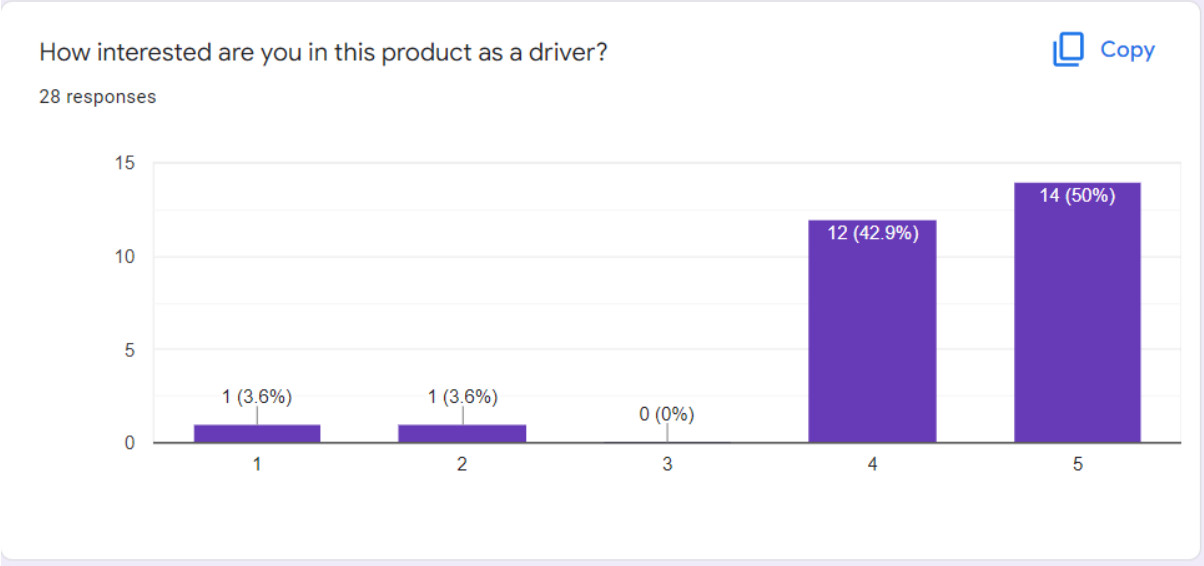


Figure 1.4 Option on product as a driver

In Figure 1.4 on a scale of 1-5 and 5 being the most interested, 50%(14 students) are very interested in this product as a driver themselves and 2 people are not interested

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