Chapter 1

Introduction

The development in the field of automobiles is highly increasing and which leads to the accidents and so many hazards due to traffic. People's life are under high risk. This situation prevails, just because there is a lack of emergency facilities in our country. In our country, many people loose their life because of accidents. Because of causalities or improper communication to rescue team. We are in the process of solving this issue by proposing an efficient solution and toreduce the loss of lives as much as possible. In our theory, the design of the systemhelp us to detect accidents in significantly minimum time and transfer the fundamental information to the first aid centre within a few seconds covering the geographical coordinates, the time and the angle where the vehicle had met with anaccident. This alert message is sent to the rescue team(ambulance) and the registered mobile number within short period. This real time application saves many valuable lives .The message is sent through the GSM module and the location of the incident. The basic idea is to localize the vehicle system by receiving the real time position of the vehicle through GPS and send the information.

Chapter 2

Literature Survey

[1] Karthik P1, Muthu Kumar. B2, Suresh K3, Sindhu I.M4, Gopalakrishna Murthy C.R 1 Professor, Dept. of ECE, KSSEM, Bengaluru, India 2 Professor, Ramanathapuram, TN, India 3,4,5Assistant Professor, Dept. of ECE, KSSEM, Bengaluru, Dept. of CSE, Syed Ammal Engineering College,"Design and Implementation of Helmet to Track the Accident Zone and Recovery using GPS"

One of the most important issues after so many disasters, besides communication determines the damage caused by the disaster areas to reach a moment ago. The emergency rescue teams established for this purpose by making plans to take action on realistic maps are required. Not just as an ambulance during rescue, vehicles in a variety of business Machines correct route to take on the road safely. In this study, the image taken before and after the disaster has been segmented. Each segment with one another emerging feature based compared using statistical methods and information theory. Then we get a measure to path planning using Kullback-leibler distance. Consequently, create a new hazard map is obtained. This map is compared with using the existing path in a city map. In this way, the shortest and safest route to the destination is obtained**.**

[2] S. AytacKorkmaz, M. Poyraz, Petres, Clement, A. Stentz, Ryan, Schouwenaars, De Moor, B., Feron, E., & How, Boor, Valérie, Mark H. Overmars, and A. Frank van der Stappen"Path Planning for Rescue Vehicles via Segmented Satellite Disaster International Journal of Pure and Applied Mathematics Special Issue 182 Images and GPS Road Map"

In this work, 280 segmented training satellite images are investigated. Undamaged, slightly damaged or damaged probability values are obtained by exponential kernel. Damage probabilities of segmented satellite images are classified as undamaged slightly damaged or damaged via decision-making

algorithm developed. After finding all segments of the segmented images of disaster's d test values, according to damage rate compared with road map segmentation is most convenient way. When disaster comes, reach

to the disaster place with faster and safer to prevent loss of life and property was studied. Thus, recovery experts identify the shortest route to the safe and will help to facilitate the work of professionals.

[3]ShadmanSakib, Mohammad Sayem Bin Abdullah Department of Naval Architecture and Marine

Engineering Bangladesh University of Engineering and Technology Dhaka, Bangladesh.,"GPS based

Inland Vessel Tracking System for Automatic Emergency Detection and Position Notification"

In this paper, an upgraded version of vehicle tracking system is developed for inland vessels. In addition to the features available in traditional VTS (Vehicle Tracking System) for automobiles, it hasthe capability of remote monitoring of the vessel‘s motion and orientation. Furthermore, this device can detect capsize events and other accidents by motion tracking and instantly notify the authority and/or the owner with current coordinates of the vessel, which is obtained using the Global Positioning System (GPS).

Chapter 3

Problem Statement & Objectives

3.1 Problem Statement

The development within the field of automobiles is very increasing and which results in the accidents then many hazards thanks to traffic. People's life are under high risk. This situation prevails, just because there is a lack of emergency facilities in our country. In our country, many people lose their life because of accidents. Because of causalities or improper communication to rescue team. The rapid rise of technology and infrastructure has made our lives easier. The high demand of automobiles has also increased the traffic hazards and road accident.We are in the process of solving this issue by proposing an efficient solution and to reduce the loss of lives as much as possible. In emergency condition, each and every second is important is saving human's life. The use of vehicles increases in the proportion of the population. Due the traffic congestion, the accidents are also increasing day by day. This causes the loss of life due to the delay in the arrival of ambulance to the accident spot or from the accident spot to the hospital. So, it necessary to take the accident victim to the hospital as possible.

3.2 Objectives

General Objective: To layout and acquire a project "IOT Based Accident Detection system using node mcu ESP8266 with SMS Alert and Sound Alarm".

Specific Objective: The proposed design of the system can detect accidents in significantly lesser time duration and sends the relative information like accurate time and exact location of vehicle accident to the rescue team, which will help in saving precious lives.

Chapter 4

Proposed Methodology

To overcome the existing problem we will implement a new system in which there is automatic detection of the accident. A impact sensor is fitted in every vehicle and when an accident occurs, signals from the impact sensor are sent to the microcontroller. The signal is transferred from microcontroller to the central unit using IoT platform.

The GPS module provides the latitude and longitude coordinates of victim vehicle which are sent to the control using IoT platform. The central unit sends the location coordinates to the nearest ambulance and is instructed to pick up the victim. The central unit will be placed in a police stationor a hospital that receives the signals from vehicle unit. It sends an alert message tothe ambulance that is nearer to the location of the accident.

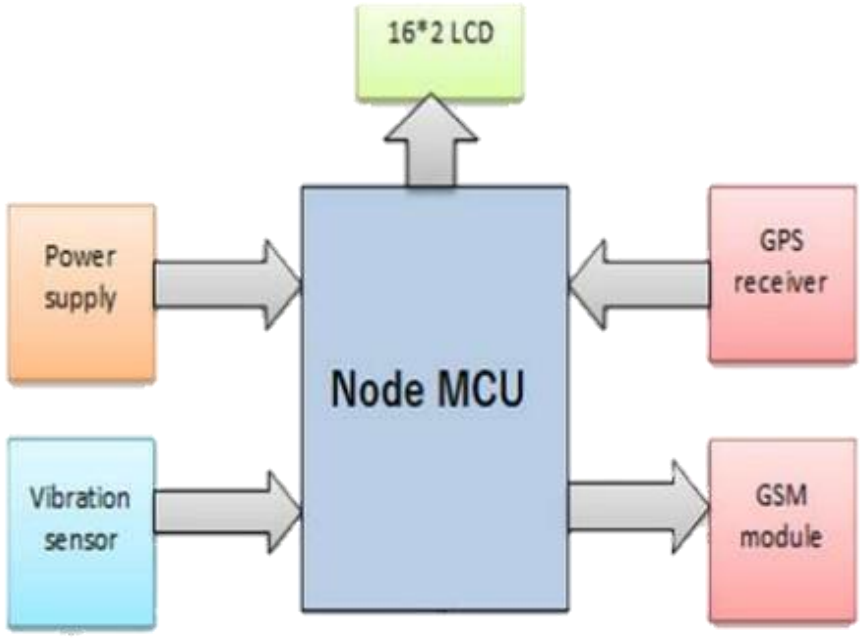


Fig 4.1 Block diagram of accident detection

The ambulance is also equipped with a GPS receiver for tracking of the accident location. This helps ambulance to reach the location in time and save the victim. The following hardware components are used in this system

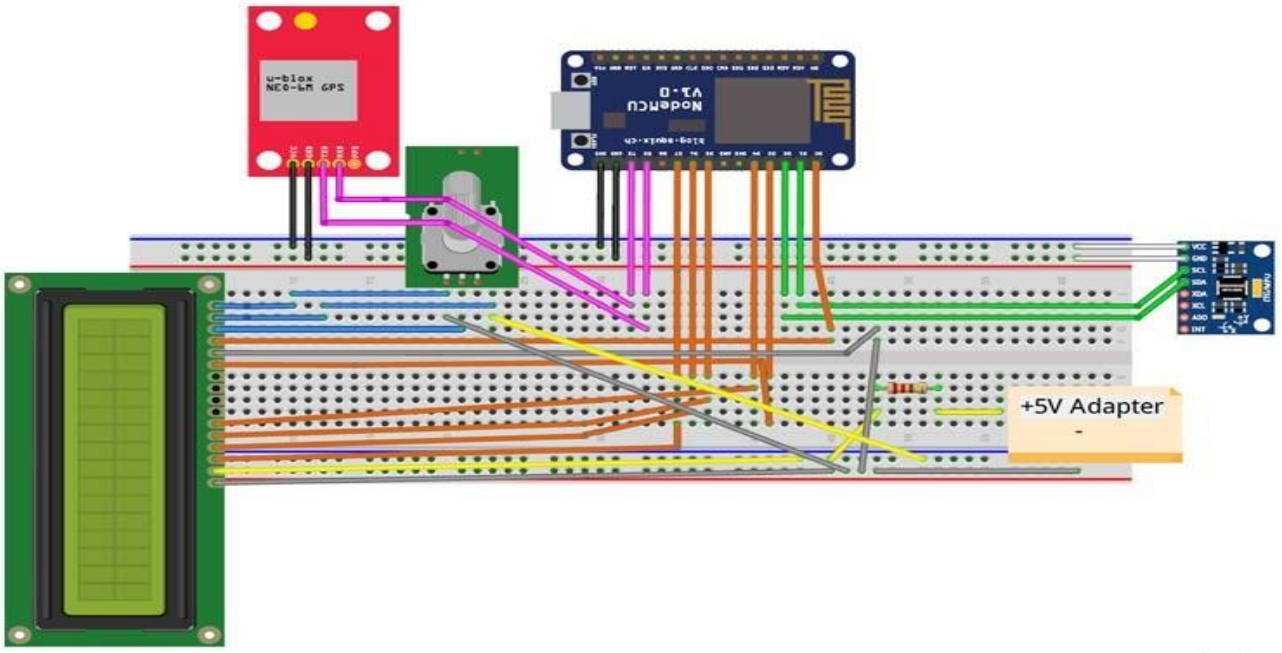


Fig 4.2 CIRCIT DIAGRAM OF ACCIDENT DETECTION SYSTEM

Chapter 5

Hardware and Software Used

5. Hardware component required

The hardware components that are used to design the above-mentioned system as outlined by the problem statement and proposed methodology and its working process; the following are the list of hardware components that ensures the efficient working of the model.

SI.NO	NAME	SPECIFICATION	QUANTITY
1.	nodemcu	Esp8266	1
2.	location	GPS	1
3.	Sensors	MPU6050 Sensors	1
4.	12C BUS	LCD	1

Table 5 : List of required hardware components.

1. NODEMCU ESP8266

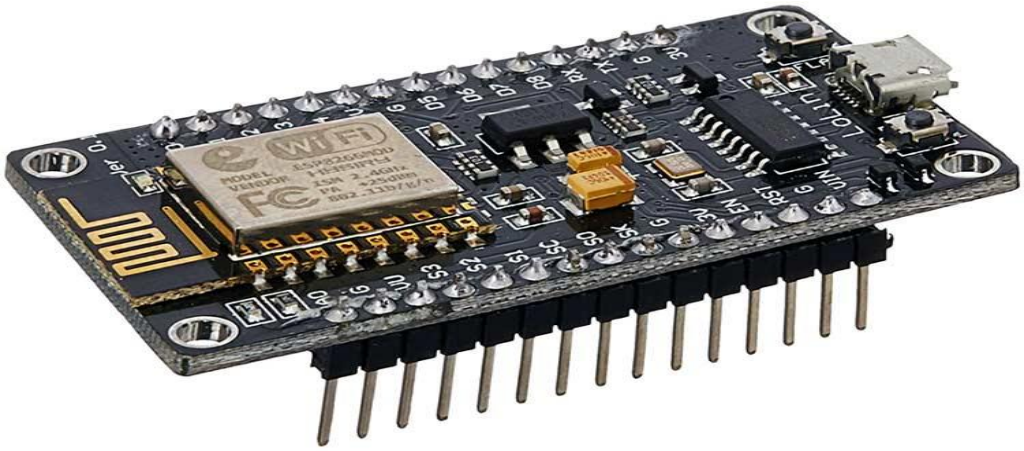


Fig 5.1 :NODEMCU ESP8266

NodeMCU is configured to work on the **Arduino IDE** as an open-source firmware platform. There are also opensource prototyping board designs available. The firmware is scripted using Lua. It can act both as a standalone microcontroller and also as a node in an IoT ecosystem. The module used here is an **ESP-12 based NodeMCU module**.

The prototyping hardware typically used is a circuit board functioning as a dual in-line package (DIP) which integrates a USB controller with a smaller surface-mounted board containing the MCU and antenna. The choice of the DIP format allows for easy prototyping on breadboards. The design was initially based on the ESP-12 module of the ESP8266, which is a Wi-Fi SoC integrated with a Tensilica Xtensa LX106 core, widely used in IoT applications

2. MPU6050 SENSOR

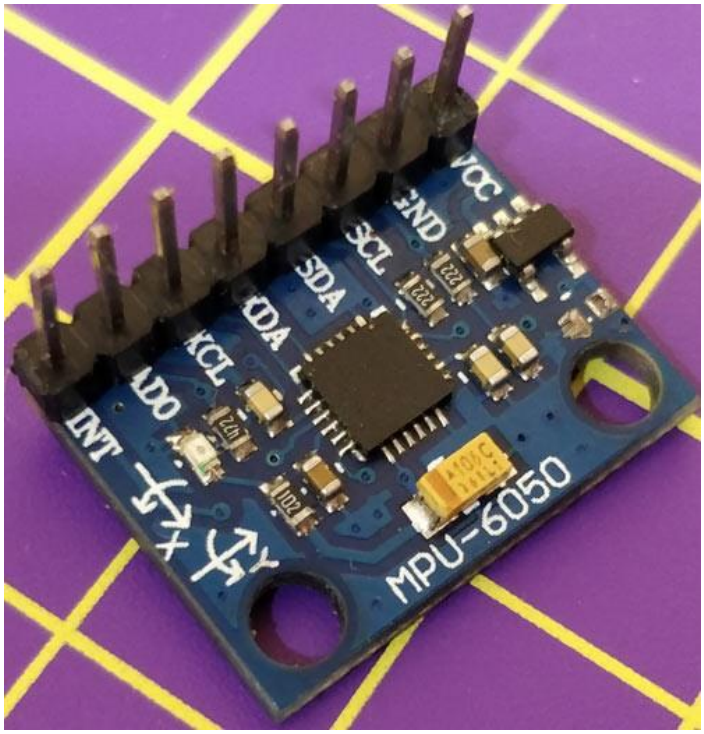


Fig 5.2 :MPU6050 SENSOR

MPU6050 sensor module is complete 6-axis Motion Tracking Device. It combines 3-axis Gyroscope, 3-axis Accelerometer and Digital Motion Processor all in small package. Also, it has additional feature of on-chip Temperature sensor. It has I2C bus interface to communicate with the microcontrollers.

It has Auxiliary I2C bus to communicate with other sensor devices like 3-axis Magnetometer, Pressure sensor etc.

If 3-axis Magnetometer is connected to auxiliary I2C bus, then MPU6050 can provide complete 9-axis Motion Fusion output.Let's see MPU6050 inside sensors.

3. Ublox-Neo 6M GPS Module:

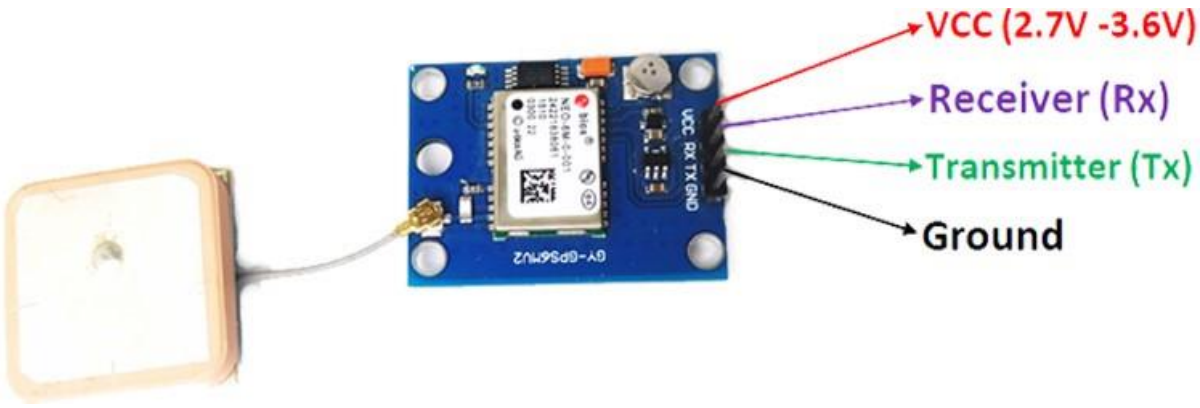


Fig 5.3 : Ublox-Neo 6M GPS Module

The NEO-6M module comes with a dimension of 16 x 12.2 x 2.4 mm package. It has 6 Ublox positioning engines offering unmatched performance. It is a good performance GPS receiver with a compact architecture, low power consumption, and reliable memory options.

It is ideal for battery-operated mobile devices considering its architecture and power demands. The Time-to-First-Fix is less than 1 second and it enables it to find the satellites almost instantly. The output is in the format of NMEA standards, which can be decoded to find the coordinates and Time of the location.

Once the infrared transmitter generates emission, then it arrives at the object & some of the emission will reflect back toward the infrared receiver. The sensor output can be decided by the IR receiver depending on the intensity of the response.

Features

- Power supply: 2.8V to 5V
- Interface: RS232 TTL
- Built-in EEPROM and external antenna
- Default baud rate: 9600 bps

4. LCD DISPLAY

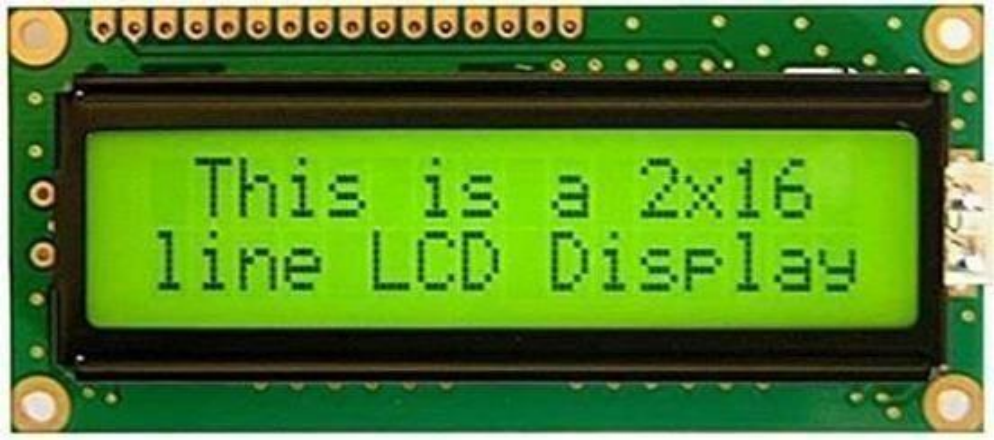


Fig 5.4 : LCD DISPLAY

LCD: LCD is employed for displaying the message indicating that" gas detected at zone" into the display, which is initially coded in program to display the danger. The message been displayed on the LCD, data and command both are register of LCD and it's shown in fig.4 The register selects is employed to modifythe registers. data register RS=1, whereas for the command register RS=0 is employed.

Software Details:

Arduino (/ɑːrˈdwiːnoʊ/) is an open-source hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices. Its hardware products are licensed under a CC BY-SA license, while software is licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL),[1] permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially from the official website or through authorized distributors.

Chapter 6

Result and Discussion

6.1 Result

The following results were obtained during the implementation of our Accident Detection System

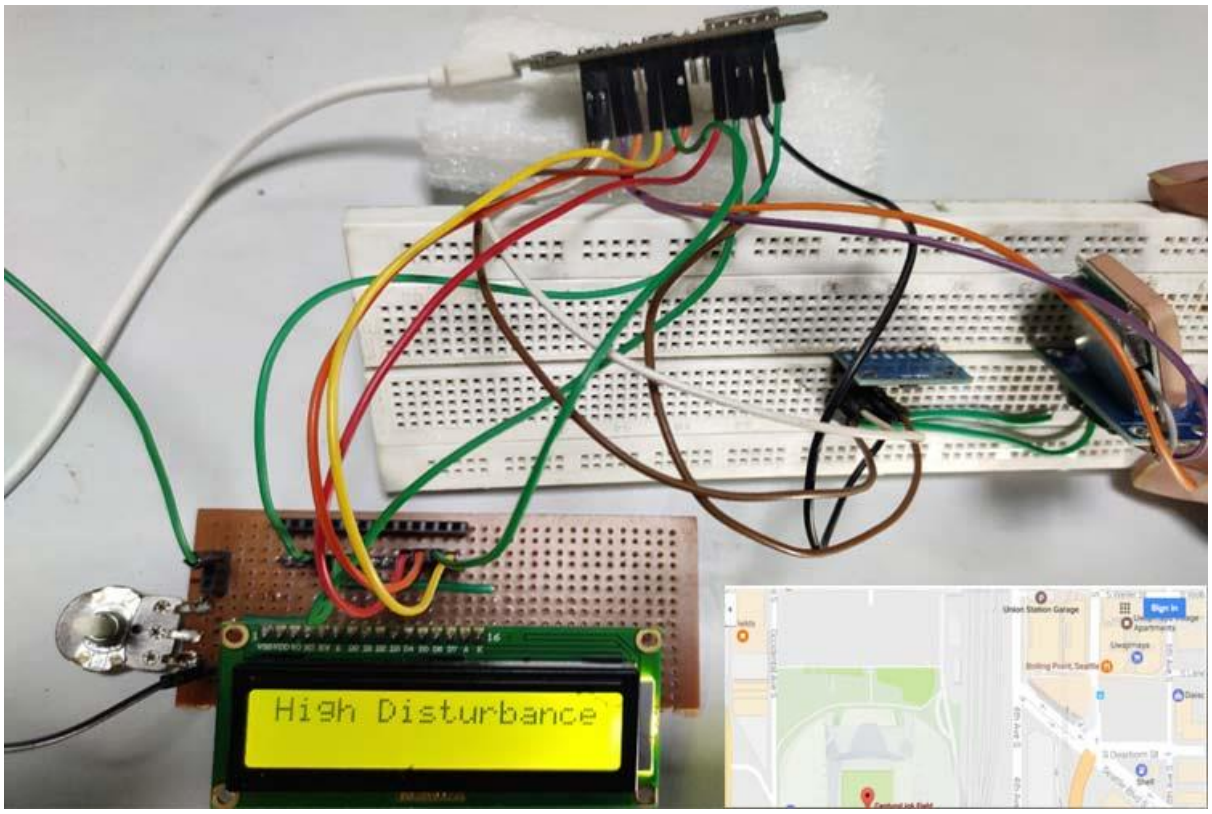


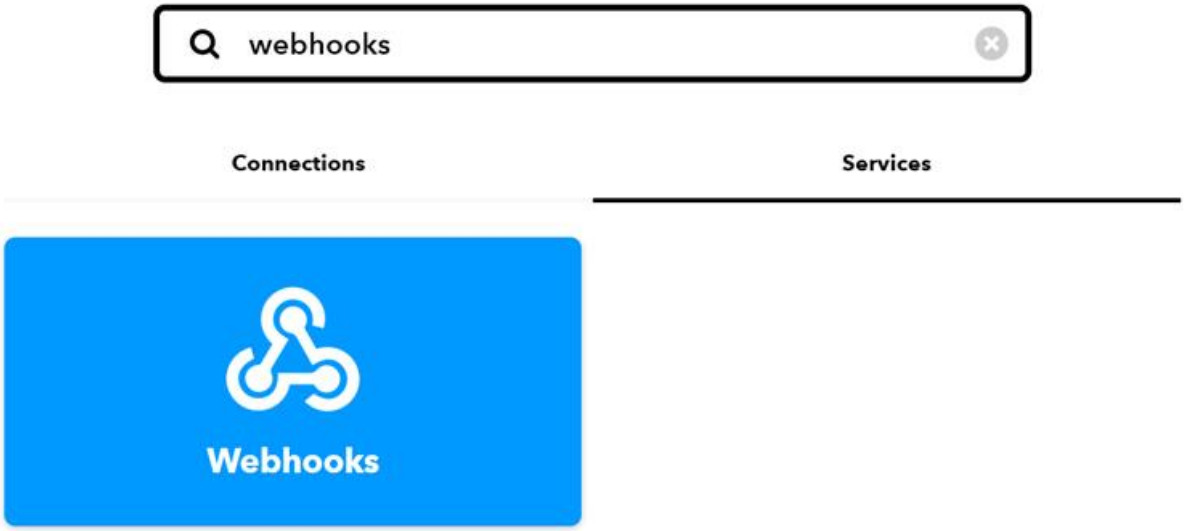
Fig 6.1: IOT Based Accident detection System

A definitive and comprehensive vehicle accident and rash driving identification and alert system using NodeMCU. Unlike other projects across the internet, it has a fully functional and independent circuitry. It combines the features of Invensense's **MPU6050, Ublox Neo-6M GPS module with NodeMCU** to a great effect. MPU6050 is a combination of the accelerometer and the gyroscope, with both the modules help the other with the data to overcome the shortcomings.

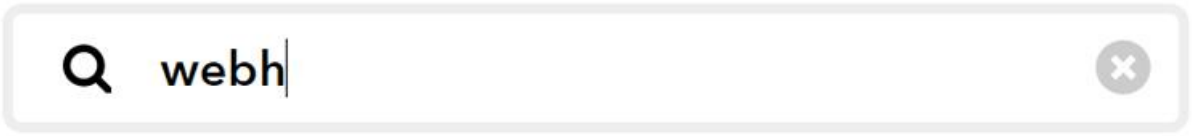
Accelerometer records the acceleration across 3 axes, whereas the gyroscope records the rotational velocity across the axis. The GPS module encodes the data in the form NMEA format, which can be used to carve out the exact location of the misfortune.

In addition to that, a mail is also sent to the registered mail id through an API call embedded with the google link. A service called IFTTT connects different services to help us send the mail. The email conveys the message and also **sends the location of the accident** to the user. You can also check-out the IoT based Vehicle tracking project if you want to track the location of the vehicle in real-time.

Step 1: Create an applet by launching webhooks.



Step 2: Create an applet by clicking the '+' icon and selecting webhooks and then select a 'receive a web request' and give the event



name.

Step 3: To include the google map link in the URL, go to the link attached here and copy the link highlighted in the picture attached below.

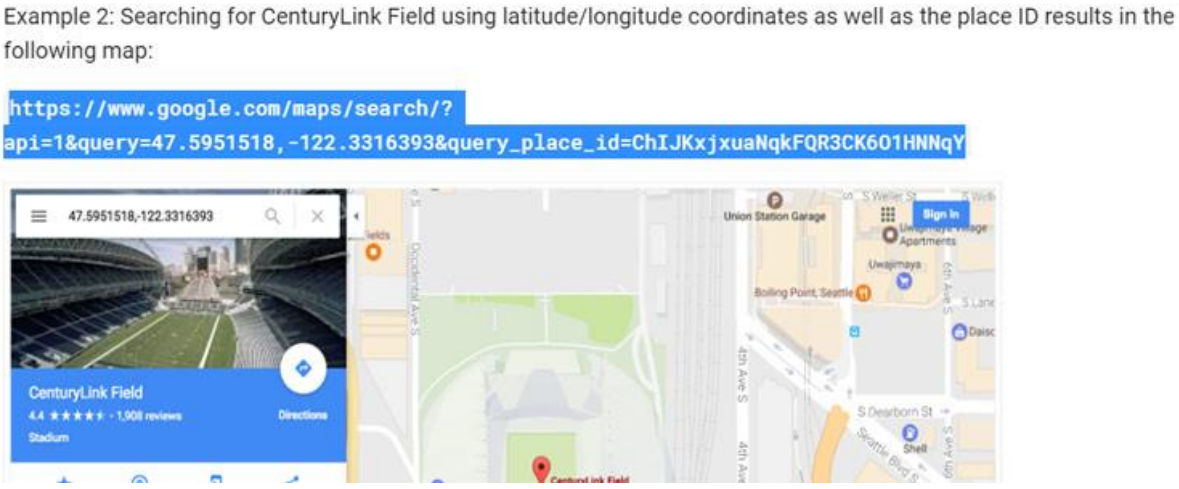


Fig : Sending the location

6.2 Discussion

Design and construction of line following robot was designed in this paper. This design is based on NODEMCU ESP8266. The robot moves left, right and forward direction on the black line of white surface by using four simple DC motors attached with four wheels. The speed of the motors is controlled by L293D driver circuit. The directions of the robot are controlled by using sensing signal of IR sensors from Arduino uno. The colour is sensed by using three IR sensors. If the sensing colour is white robot moves and if the sensing colour is black, robot car does not move.

Chapter 7

Advantage and Application

7.1 Advantage

- The server continuously monitor the accident.
- To save the people in a right time.
- Cost is less in this system.
- The message will be send to the respective persons or rescue team.
- It show the exact location of the incident place.

7.2 DISADVANTAGE

1) False alarm and message may be sent because of small crash
2) It may provide incorrect results if data not entered properly

7.2 Application

1) Automotive and transport vehicles.
2) It can be used in the vehicle for safety.
3) Save the life.
4) Easily get the location
5) This system also can be interfaced with vehicle alerting system.

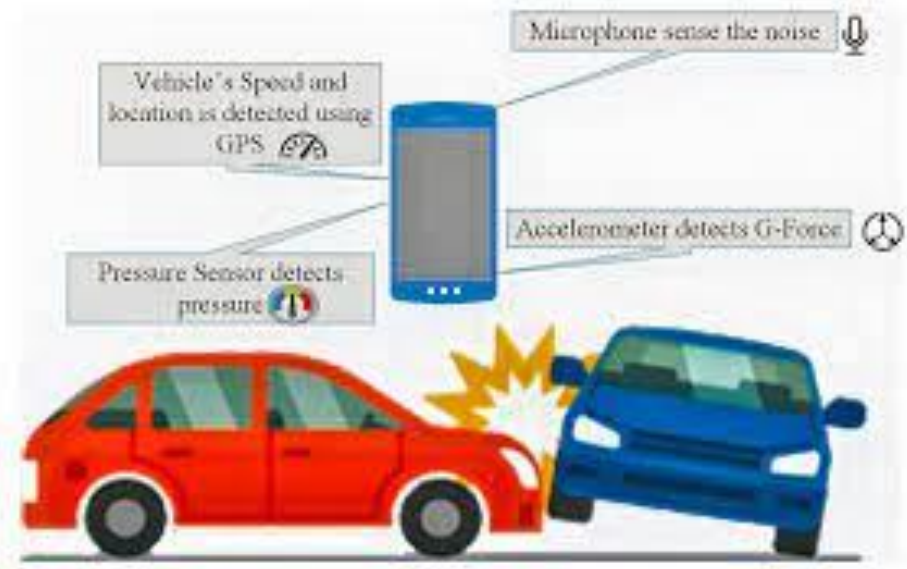


Fig 7.3: Components for accident detection

Chapter 8

Conclusion and Future Scope

Conclusion

The proposed system deals with the accident alerting andetection. Arduino atmega 328 microcontroller is the heart of the system which helps in transferring the message to different devices in the system. Impact sensor will beactivated when the accident occurs and the information is transferred to the registered email id through SMS module. 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 impact sensor which is used asmajor module in the system.

Future Scope

- The This 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
- If an accident occurs it alerts the neighboring place with the alarm sound. This is a single stage shock sensor, it detects any hard impact acted on it. These sensors are fixed on all sides of the car to detect impact occurred on it .In the future this can be converted by using the application.

Reference

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[5] Malik Tubaishat, Qi Qi, Yi Shang,Hongchi Shi ―Wireless Sensor-Based Traffic Light Control‖ IEEE CCNC 2008 proceedings1-4244-1457-1/08

6].Dr.AntoBennet, M , Thamilvalluvan B,Ashokram S ,SankarnarayananS―Efficient Energy Conservation Algorithm For MobileSensor Nodes in Wireless Sensor Networks‖, International Journal of Advanced Research inComputer Engineering & Technology (IJARCET), Volume 3 Issue 8,pp 2650-2655,August 2014.