

ACCIDENT DETECTION AND MONITORING SYSTEM USING IOT

Dr. D.Karunkuzhali¹, D. Madhubala², Y.Nisha³, S. Rajeswari⁴,

Professor¹, Student^{2,3,4}

Department of Information Technology^{1,2,3,4},
Panimalar Engineering College^{1,2,3,4}, Chennai.

Abstract— *Nowadays we faced the lot of accidents and also many people lose their life due to the accidents. So our project will provide an optimum solution to this drawback. According to this project when a vehicle meets with an accident immediately Vibration sensor and Micro electro mechanical system (MEMS) sensor is used to detects the accident and also send the information to the server. Arduino mega controller sends the alert message through the GSM and GPS. GPS MODEM is used to trace the immediate location of the victim by receiving the information. Then the necessary action can be taken after conforming the location. This paper is useful for detecting the gas inside the vehicle and also measure the heartbeat of the victim.*

Keywords—Arduino Mega, GSM, GPS, Heartbeat sensor, Vibration sensor.

1. INTRODUCTION

IOT or Internet Things refers upcoming technology. Today everything will be based on IOT, it is the network of the physical objects that can be connected and exchange the message themselves without the human interaction. It has been formally defined as an “Infrastructure of Information Society” because it has been used in all kind of mediums such as Home Automation System, IOT home security model, raspberry pi, home automation, smart water metering. Thus, the physical object which can be provided with an IP address to enable data transmission over an IOT system by embedding them with electronic hardware such as sensors, Arduino software and networking gear.

Internet is different than IOT such a way it transcends Internet connectivity by enabling every objects that utilizes embedded circuits to interact with each other utilizing the current Internet infrastructure. Since the scope of IOT has grown by ever green tremendously as currently everything will be based on IOT at the end 2020 the technology will be reached at the top. With the advent of IOT the manufacture has great scope.

Manufacturers had the great impact over how their products are used and how they perform in the real world and also economically developed on the other hand

consumers have the ability to integrate and control devices for a more customized. In this paper, we are able to clean the dustbin by using IOT. As the accident is the major causes for developing cities, so it is important to detect the accident and monitoring system. In this system we will use ultrasonic sensors.

The sensor measure the distance between the vehicle and also it has been placed front side of the car. When the car will occur a crash with another then the automatically the motor will be off. So we cannot meet the accident. Then the information is send to the server and it has been send via a message for the recuse team.

The concept of IOT is when used in this field will result in a save the people. This system will helps to reduce accident in the cities. It can be used to save the people in a right time. And also send the information for recuse team.

2. SURVEY

System Driver Drowsiness Monitoring and Controlling System which can detect fatigue of the driver and issue a timely warning. Since a large number of road accidents occur due to the driver drowsiness. Hence this system will be helpful in preventing many accidents, and consequently save money and reduce personal suffering. Here we use Arduino controller to coordinate the details from vibration sensor and the distance of the object from ultrasonic sensor. Heart beat sensor measures the heart rate and send it to Arduino. GPS is used to share location to service center simultaneously about the driver. All these details were collectively compared with normal data stored in controller. If miss match occurs it sends a signal via IOT. And the vehicle will be automatically stopped. Data are displayed using LCD. [1]

At present time, drowsy driving has become one of the major issues of the traffic collision. According to statistics, a large number of road accidents occur due to drowsy driving which results in severe injuries and deaths. For this reason, various studies were done in designing systems that can examine the driver fatigue and alert him beforehand, thus preventing him to fall asleep behind the wheel and cause an accident. However, such techniques are usually intrusive as electrodes are required to be placed on the head and body.

Furthermore, there are few existing researches in which subjective measurements are used as the input for the system, but, such methods can distract the driver and lead to an ambiguous result. In this paper, we proposed a system that is absolutely non-intrusive and real-time. Our proposed system used the eye closure ratio as input parameter to detect the drowsiness of the driver. If the eye closure ratio deteriorates from the standard ratio, the driver is alerted with the help of a buzzer. For our system, a Pi camera is used to capture the images of the driver's eye and the entire system is incorporated using Raspberry pi. [2]

The objective of this paper is to set in place a fully automated system design that will minimize the time gap between the occurrence of an accident and deployment of medical response. This can be done by combining accident detection and Emergency Medical Services systems. The proposed design makes use of an accelerometer and a piezoelectric sensor to trigger the microcontroller, which retrieves the user's location through the GPS. Communication between the IOT device and the database is done using a GSM/GPRS module. An Android app is designed to collect the relevant health information of the user, emergency contact information, and hospital details during initial registration. [3]

The sudden traffic slowdown especially in fast scrolling roads and highways characterized by a scarce visibility is one of the major causes of accidents among motorized vehicles. Typically, fixed traffic sensors installed on roads that interact with drivers' mobile App through the 4G network can mitigate such a problem, but unfortunately not all roads and highways are equipped with such devices. In this paper, we discuss a possible alternative solution for addressing such an issue considering mobile traffic sensors directly installed in private and/or public transportation and volunteer vehicles. In particular, we discuss an IOT Cloud system for traffic monitoring and alert notification based on Open GTS and Mongo DB. Our IOT Cloud system, besides for private drivers, it is very useful for drivers of critical rescue vehicles such as ambulances. [4]

Driver drowsiness is a major factor in most driving accidents. In this paper we present a robust and intelligent scheme for driver drowsiness detection employing the fusion of eye closure and yawning detection methods. In this approach, the driver's facial appearance is captured via a camera installed in the car. In the first step, the face region is detected and tracked in the captured video sequence utilizing computer vision techniques. Next, the eye and mouth areas are extracted from the face; and they are studied to find signs of driver fatigue. [5]

3. SYSTEM ARCHITECTURE

The overview of the Accident Detection and Monitoring system shown in fig. 2 is a very helpful to detect the accident and also easy to monitor the accident. When the Vibration sensor and Mems is used to detect the accident occurred or not. By using Mems When the car has been rollover it can immediately send the signal to the microcontroller. GSM and GPS will send the information to the server. It also send the SMS to the respective rescue team or Police station. In this SMS they show in which place the accident has been occurred and also show the level of the oxygen inside the car. So we can know the current status of the person inside the car. Information can be continuously monitored by webpage and also future notification can be send through the webpage .It is central severe which is monitored and record the detail of the car. It has been designed based on the heartbeat sensor, in which the accident has been occurred then the notification can be send to the rescue team. It help us the rescue team to measure the range of the heartbeat present and automatically updated into the webpage.

The ultrasonic sensor is used to measure the distance between the vehicles and automatically reduce the speed of the vehicle. Gas sensor is used to measure oxygen content inside the car, in which the accident occurred. Then the level of the oxygen has been updated in the webpage. When there is a small accident has been occurred but there is no effect inside the car, then the information cannot be send to the hospital by using switch.

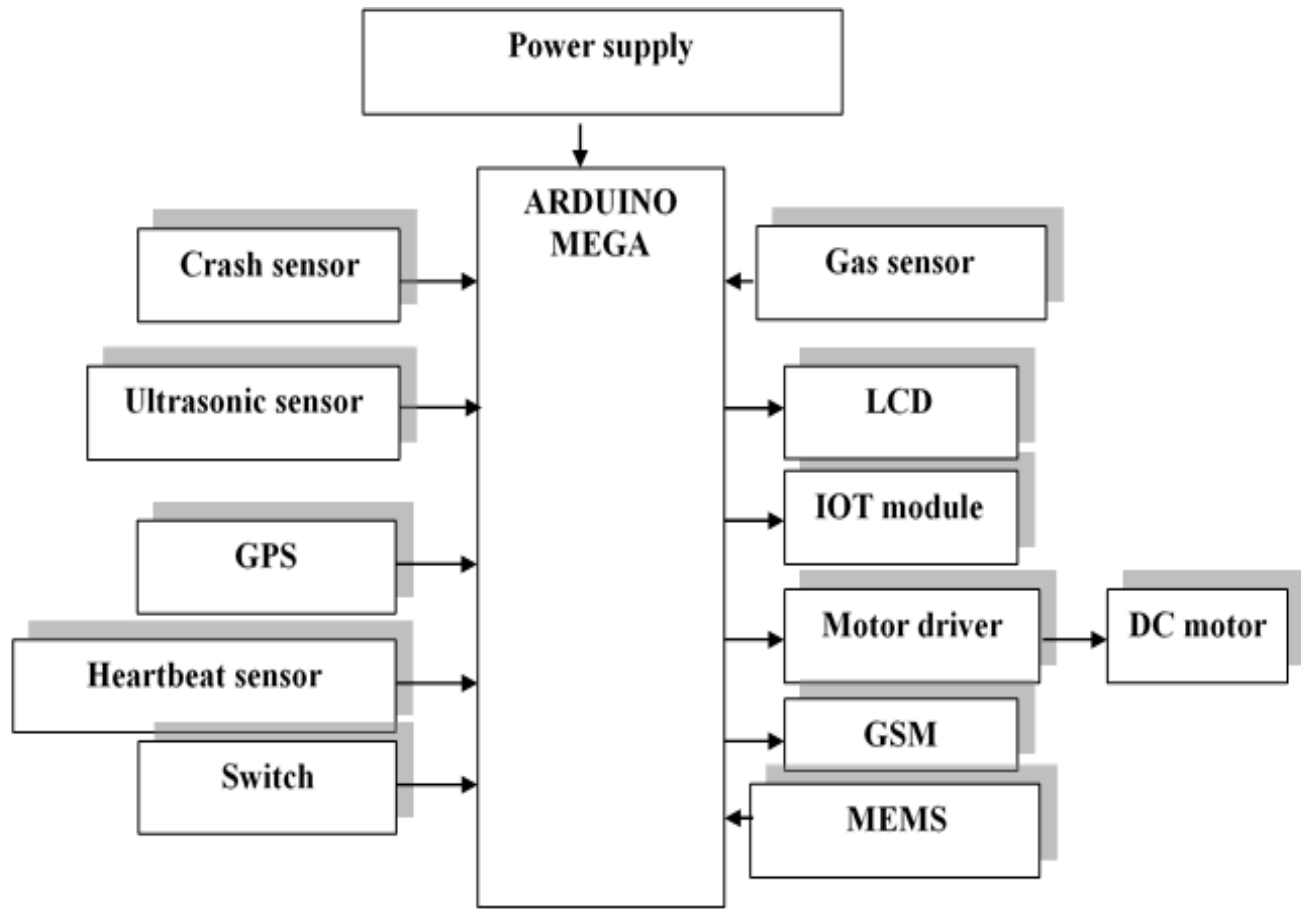


Fig-1 Architecture diagram

3.1 ARDUINO MEGA

The ATmega1280 (datasheet) is based on the microcontroller of Arduino mega. It has digital input/output pins of 54 pin (PWM outputs used for 14 pin), analog inputs has 15pin ,hardware serial port of 4UART, and also crystal oscillator of 16MHZ. It support to the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. Arduino Duemilanove or Diecimila.is used for designing the compatible Mega Arduino. Here it can be shown in the diagram of fig.2.



Fig-2 Arduino Mega

3.2 GSM MODULE:

GSM is Global System for Mobile Communications. The European Telecommunications Standards Institute (ETSI) is

developed the GSM. They describe the protocols for second-generation (2G) digital cellular networks used by mobile phone by this fig. 3.

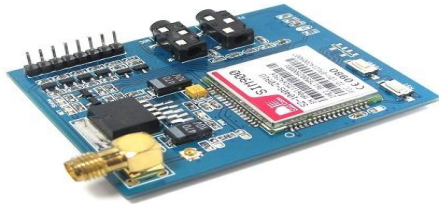


Fig-3 GSM

3.3 HEART BEAT SENSOR:

The heart beat sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the maximum light must pass spread in finger and detected by detector. Now, when the heart pumps a pulse of blood through the blood vessels, it can be reached by the detector and also it has slightly more opaque from the finger.

The detector signal varies with each heart pulse. This variation is converted to electrical pulse. This signal is amplified and triggered through an amplifier which outputs +5V logic level signal. The LED which blinks on each heart beat indicates the output of the pulse. It can be shown in the fig.4.

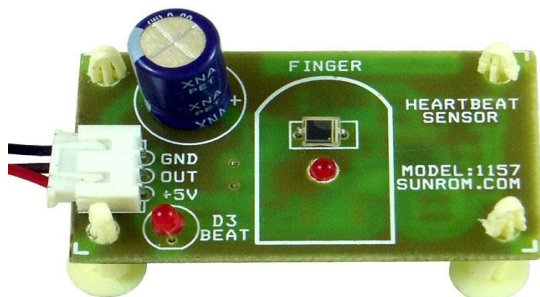


Fig-4 Heartbeat sensor

3.4 GPS MODULE:

The Global Positioning System (GPS) is a satellite-based navigation system made up of at least 24 satellites. GPS works in any weather conditions, anywhere in the

world, 24 hours a day, with no subscription fees or setup charges. It has been shown in the fig.5.



Fig-5 GPS Module

3.5 GAS SENSOR:

Gas sensor measures the concentration of gas in its vicinity. Gas sensor interacts with a gas to measure its concentration. Each gas has a unique breakdown voltage i.e. the electric field at which it is ionized. Sensor identifies gases by measuring these voltages. The concentration of the gas can be determined by measuring the current discharge in the device. It can be shown in the fig. 6.



Fig-6 WI-FI Modem

4. FLOW CHART:

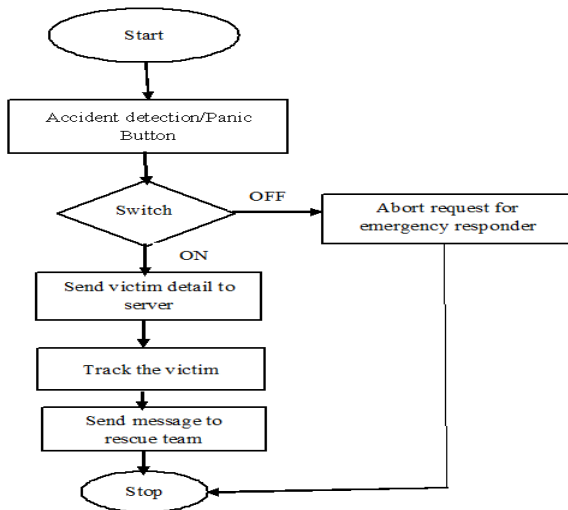


Fig-7 Schematic Flow Chart

5. ADVANTAGES:

- ✓ 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 position in which the accident has been occurred.
- ✓ The server will show the Graphical view in the webpage.

6. CONCLUSION:

The system provides the design which has the advantages of low cost, portability and small size. It consists of accelerometer sensor, GPS and GSM, interfacing which reduces the accident .It also overcome a lot of problems of automated system for accident location detection. Consequently ,it reduce the time for searching the location as soon as possible the person can treated immediately it leads to save many lives. Main motto of the accident system project is to decrease the chances of casualties in such accident. This device invention is much more useful for the accidents occurred in deserted places and those occurring at night time. This system will play an important role in day to day life in future.

7. FUTURE ENHANCEMENT:

Buzzer can include in order to detect accident. 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.

8. REFERENCE

- [1] Vikas Desai, “Design and Implementation of GSM and GPS Based Vehicle Accident Detection System”, IJIT, Vol 01, Issue 03,pp. 1- 4,2013.
- [2] C.Prabha, R.Sunitha, R.Anitha, “Automatic Vehicle Accident Detection and Messaging System Using GSM And GPS Modem”, IJAREEIE, Vol. 3, Issue 7, pp. 1-5, 2014.
- [3] Vikram Singh Kushwaha, Deepa Yadav, “Car Accident Detection System using Gps, Gsm and Bluetooth” in IJERGS May-June 2015.
- [4] AboliRavindraWakure,ApurvaRajendraPatkar, “Vehicle Accident Detection and Reporting System using Gps And Gsm.”, IJERGS, Vol 10,Issue 4,pp.-25-28, April 2014.
- [5] N. Watthanawisuth, “Wireless Black Box using MEMS Accelerometer and GPS Tracking for Accidental Monitoring of Vehicles”, IEEE conference in Jan, 2012.
- [6] Hoang Dat Pham, “Development of vehicle tracking system using GPS and GSM modem” IEEE conference in Dec, 2013.
- [7] Rashida Nazir, Ayesha Tariq, Sadia Murawwat, Sajjad Rabbani,“Accident Prevention and Reporting System using GSM (SIM 900D) and GPS (NMEA 0183)”, Int. J. Communications, Network and System Sciences, 2014, 7, 286-293 Published Online August 2014.