# AN IOT BASED SMART ACCIDENT DETECTION SYSTEM WITH GPS TRACKING

Prof. Manoj Kharade[1], Shubham Jawalkar[2], Yuvraj Mhaskar[3], Shubham Bhargude [4], Karan Chavan[5]

[1] *Assistant professor, Department of Electrical Engineering, Trinity College of Engineering and Research, Pune, India.*
[2] *Department of Electrical Engineering, Trinity College of Engineering and Research, Pune, India.*
[3] *Department of Electrical Engineering, Trinity College of Engineering and Research, Pune, India.*
[4] *Department of Electrical Engineering, Trinity College of Engineering and Research, Pune, India.*
[5] *Department of Electrical Engineering, Trinity College of Engineering and Research, Pune, India.*

## ABSTRACT

*In our topic, an IOT based vehicle accident detection and assistance system is developed to detect vehicle accident and send the location information to the nearest hospital, family member and police station. With the help of GSM module. The communication between the web server and hardware device is established via GSM/GPS (GLOBAL SYSTEM FOR MOBILE COMMUNICATION/GLOBAL POSITIONING SYSTEM), and the location is traced by using the GPS shield/module. The accident is detected through vibration sensors, accelerator sensor and buzzer. The real time data collecting form the hardware device using sensors and information stored in the web server module, and then send notification to different users either through web application (police station , hospitals ,family member) , through android/iOS mobiles application or SMS. This module provides the accurate detection of the location of accident occurred with the help of GSM/GPS module. And send notification of the nearest police station, hospital and inform to family member.*

*The lack of treatment in proper time is the major reason for half of the deaths in road accidents now a days. This system aims to give quick detection of accidents and communication to the information immediately to the emergency responses on time to provide quick assistance for the injured person for saving that person life that suffers from that situation. Although vibration frequency overshoot the programmed maximum limit, and then the GPS module give message with all the necessary information is sent rapidly to the registered contacts of that person. This system assures to provide quick assistance to the person suffers from the accident. The results give exact locations of the accident. If rider met with an accident, to the registered mobile number using GSM module, an alert message will be sent. Secondly about the post alert system which use several method to detect the accident cause and confirm the occurrence of accident and latter alert the rescue team to provide medical facilities to the victims.*

**Keyword : -** *Alcohol Sensor,LM35, Safety, Arduino Uno, GSM SIM 900, GPS NEO 6M.*

## 1. INTRODUCTION

According to the Association for Safe International Road Travel (ASIRT), nearly 1.3 million people die in road crash research year, 20-50 million are injured or disabled. Road crashes cost USD $518 billion globally, costing individual countries from 1-2% of their annual GDP. According to the Association for Safe International Road Travel (ASIRT), nearly 1.3 million people die in road crash research year, 20-50 million are injured or disabled. Road crashes cost USD $518 billion globally, costing individual countries from 1-2% of their annual GDP. Currently, Road traffic crashes rank as the 9th leading cause of death and account for2.2% of all deaths globally.

Unless action is taken, road traffic injuries are predicted to become the fifth leading cause of death by 2030. 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. 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. The geographical data collected from this system could be relied upon as admissible evidence or indicator of the road state and conditions.

The ease liquor sensor is prepared in the auto for liquor location to stay away from mishaps because of liquor utilization controlling the speed of the auto utilizing sonic sensor while confronting the hindrances. The safety belt comprises of an inbuilt heart beat sensor to mechanize the start of the auto amid therapeutic crises.

## 2. LITERATURE SURVEY

Health has prime importance in our day-to-day life. Healthcare technology is one of the foremost popular studies nowadays. However, people within the country are still having a troublesome time to urge professional healthcare services because of the barrier of distance and lack of doctors. A far off patient monitoring system is one of the only solutions to beat this issue. The most recent trend in Healthcare communication method using IOT... Internet of things may be a catalyst for the healthcare and plays prominent role in big choice of healthcare applications. In these IOT groped the foremost of economic area specially automation and control. Biomedical is one of latest trend to provide better health care. Not only in hospitals but also the private health caring facilities are opened by the IOT technology. Within the recent years use of wireless technology is increasing for the need of upholding various sectors. Within this smart generation, researchers have found that Internet of Technology (IOT) has greater potential for critical data transfer in healthcare. At the same time, the blending of IOT features into medical devices going to reduces the overall cost and response time within the smart healthcare system.

Smart healthcare monitoring systems provide better healthcare service by improving the availability and transparency of health data. However, it also poses serious threats to data security and privacy. This system which provides body temperature and pulse using LM35 and pulse sensor respectively. These sensors are interfaced with controller Arduino Uno board. Wireless data transmission is done by using Arduino through Wi-Fi module. This paper proposes a web of Things (IOT) based real-time remote patient monitoring system that's able to guarantee the integrity of the real-time electrocardiogram (ECG).

The Internet of Things (IOT) has already changed the earth and it influences both the way we live and work. The online is gradually becoming a necessary and important tool in our everyday lives. ECG self-interpretation algorithm are often implemented into the system so as that the system can detect the abnormal ECG signal and generate an alert. This system also can be expanded by adding more e-health sensors to collect various health parameters. Research on reducing the jitter delay and eliminating the noise signal are also required to reinforce the performance of the proposed system.

High sign, could also be a significant condition which can cause to wreck heart and other organs and increase the danger of attack and stroke. It'd be helpful to possess a convenient because of automatically take many sign readings throughout the day and over time to determine how often one's sign is high. LM35 sensor is used for measurement of body temperature. Sensor is connected to body for sensing the body temperature. It's calibrated linearly in Celsius. It's low self-heating capability. Pulse sensor is supposed to supply analog output of heart beat when a finger is placed on sensor. It starts working; LED on top side will starts blinking with each heartbeat. To determine the sensor output, output pin of sensor is connected to controller.

In previous days especially in medical field wireless sensors aren't available these are with wires and their power consumption is more therefore they getting more costly. Whenever the doctors or nurse

should got to keep the record of patient's parameters manually. Therefore there is no allowance to patients to maneuver freely etc. these things are very tedious. With the wide use of internet this work is concentrated to implement the online technology to work out a system which could communicate through internet for better health. Internet of things is predicted to rule the earth in various fields but more benefit would be within the sector of healthcare. The proposed IOT based patient health condition monitoring system is integration of embedded and IOT application, provides platform in cost efficient manner, solution for patient and doctor located at remote location. The key objective of developing patient monitoring system is to reduce health care cost by reducing ER, physician office visits, hospitalization and diagnostic testing procedures.

In this, tile-monitoring application is presented which allows the doctor to seem at the patient's vital parameters remotely and dynamically during an internet site in real time. Doesn't need to have any special requirement on the PC; all he needs is a web access. For the patient side, a home based Lab VIEW application which is embedded in home PC is required.
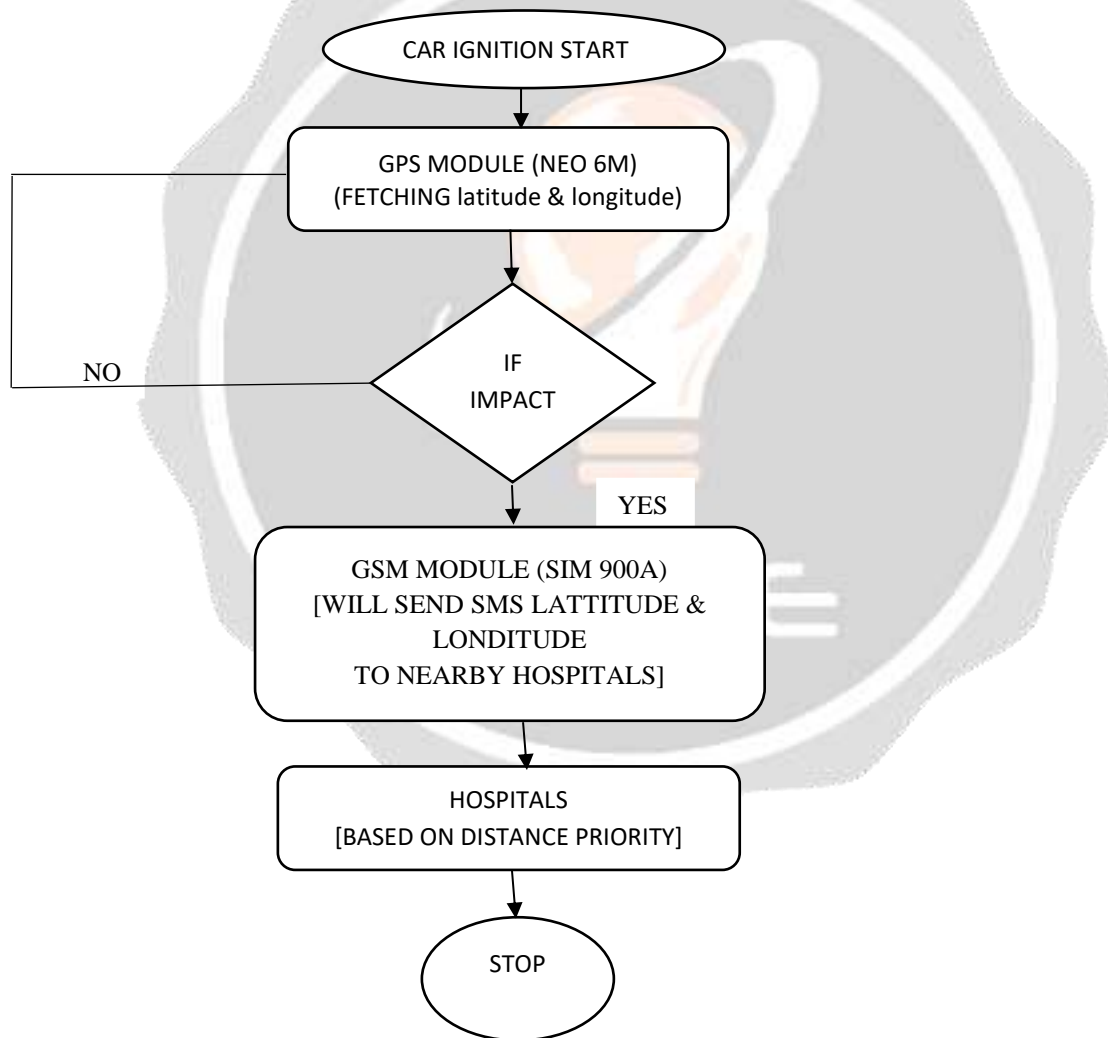
## 3. METHODOLOGY AND WORKING



**Chart -2**: FLOW DIAGRAM OF THE SYSTEM

A new method in which the vehicular body will be equipped/embedded with sensors all around it which would sense the impact in the accident, and then will send the data to the MCU which will process the data and in case if the readings are above the permissible values it will set up an alarm which would ring for 10 to 12 seconds to

avoid sending SMS to the services in case of any false accident or if the driver is safe. In case if the alarm not off would send a Text message containing the current whereabouts of the vehicle along with its registration number and the owner's name to the nearest medical service along with to the two numbers provided by the Vehicle owner to be contacted in case of any emergency. Hence by this method the victim is relieved from contacting the medical services or to his near and dear ones on his own when we propose he is not in the condition to do so. B. Some new ideas. The victim is relieved from the manual labor required in contacting his near and dear ones and medical services on his own. • The victim does not have to be dependent on the passengers passing by. • As it is difficult to track an individual's where about after an accident, by this method this scenario will be minimized. • Fuel efficiency will also increase as through the GPS driver will be having knowledge of the correct orders and the path to take for the place where one is going• It will be easy to provide the victim with the quick medical aid even in hilly areas, national highways or in remote areas where it is very difficult to locate an accident spot.

### 3.1 Alcohol Sensor

It's used as a part of the Breathalyzer or breath testers for the detection of ethanol in human breath. A touch tube is placed inside the sensor. This tube may be a heating plant that's made from alumina and tin dioxide and inside it there are heater coils, which practically produce the warmth. The analog gas sensor- MQ3 is suitable for alcohol detecting, this sensor are often utilized in a breath analyzer. It's a high sensitivity to alcohol and little sensitivity to benzene. The sensitivity can potentiometer sensitive material of MQ3 gas sensor is Sn02, which with lower conductivity in clean air. When the target alcohol gas exist, the sensors conductivity is higher alongside the gas concentration rising, use of straightforward electro circuit, convert change of conductivity to correspond output of gas concentration. MQ-3 gas sensor has high sensitivity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapor. Its fine sensitivity range around 2 meters. The sensor might be wont to detect alcohol with different concentration; it's with low cost and suitable for various application.
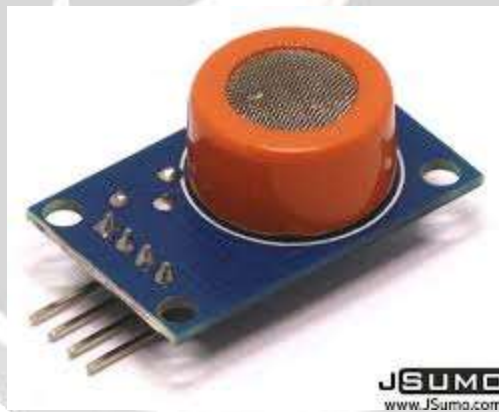


**Fig -1**: Alcohol Sensor

The Features
> Size: 20x20 mm
> Requires 5 volt of power supply
> Pin specification: 1-Output, 2-Gnd, 3-VCC
 > Analog Interference
> High sensitivity to alcohol
> Faster reaction time
> Highly stable, long life and low in cost

### 3.2 LM35 Temperature Sensor

This LM35 is a temperature sensor which measures temperature more accurately. This generates a higher output voltage than thermocouple and may not require that the output voltage be amplified. In this system temperature sensor is used to check engines temperature, if it is overheated, it indicates through alarm. The operating temperature range is from -55 to +150 degrees centigrade. It has three pins-2 pins for the power supply and one for analog output. The output pin provides an analog voltage output that is linearly proportional to the centigrade temperature. Pin 2 gives an output of Imv per 0.1 degree centigrade. So to get the degree value in Celsius, all that must be done is to take the voltage output and divide it by 10. This gives the value degrees in Celsius. LM35 GND Ground Vour Output Vs-Supply Voltage. The LM35 string is a detailed IC temperature sensor, as their result voltage can be directly proportional temperature in Celsius (centigrade). The sensor was shown in Figure 3. Therefore leverage comes LM35 around direct temperature sensors aligned ° Kelvin, as the user seriously isn't needed to take away a continuous voltage through its result to get helpful Centigrade scaling. The particular LM35, doesn't der outer calibration or maybe cutting down on to produce common a precision of ± 4° C to room temperature and 4° C for an aggregate -55° C to 150° C temperature range. Economic cost is normally guaranteed by clipping and adjustment in the measure of the wafer.
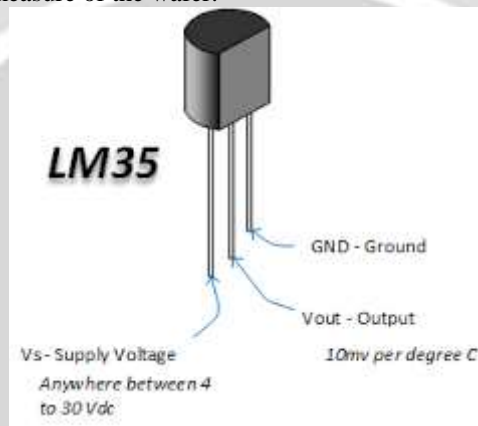


**Fig -2**: LM35 Temperature Sensor

### 3.3 Safety belt using IR sensor

For detection of proper seat is placed on or not, for this purpose used IR sensor (for safety belt buckle detection) and encoder wheel for counting pulses of sensing what proportion length is pulling of safety belt. An output of those both sensors is given to the Arduino. Arduino decides the safety belt is correctly attached or not. If both sensor outputs are properly so microcontroller decides the safety belt is correctly attached otherwise safety belt alert sound continuously ringing. Safety belt is one among the first feature utilized in vehicle to avoid major injuries to the driving force driving the vehicle. Even after the govt norm that's wearing of safety belt is mandatory, accidental injuries increase thanks to negligence of occupants in vehicle of wearing safety belt. If safety belt isn't buckled correctly than the probabilities of accidental injuries increase. To avoid these, different companies found sort of safety belt systems like passive safety belt system, automatic safety belt system, and safety belt warning system then on. So, during this project we've proposed better safety belt system than this ones. This technique comprises of sensor, micro controller and locking mechanism in wheel and safety belt. During this system vehicle propels only safety belt and door are locked properly. Consistent with our estimation this technique can decrease fatality up to 70-80% as compared to present system. To line time as 1 second or above it, as "blink event" is different from "normal eye.

### 3.4 GPS NEO 6M (Global Positioning System)

The System (GPS Global Positioning) is an area age navigational device which can pinpoint your function anywhere at the globe, typically within a few yards or meters. GPS makes use of a constellation of 24 satellites in particular orbits approximately 12,000 miles above the earth. Then locking onto signal from minimal 3 one-of-a-kind satellites, GPS can calculate a latitude and longitude and track movement. With 4 or more satellites in view, the receiver can decide the consumer's range, longitude an altitude. The NEO-6M G module is a well-appearing complete GPS receiver with a built-in 25 x 25 x 4mm ceramic antenna, which offers a strong satellite for pc seek capability. With the energy and signal indicators, you may display the popularity of the module. Thanks to the information backup battery, the module can keep the information when the primary strength is close down by chance. Its 3mm mounting holes can ensure smooth assembly on your plane, which as a result can fly step by step at a fixed role, go back to Home robotically, and automatic waypoint flying, etc. Or you can apply it in your smart robot car for automatic returning or heading to a positive vacation spot, making it a real "clever" bot!

### 3.5 GSM SIM 900 (Global System for Mobile Communication)

GSM is worldwide device for cellular communication and used to send message to pre-programmed quantity. The modulation technique used is GSMK. The essential objective of this utility is each time accident occurs it'll send message and role of automobile which is accessed the usage of GPS to preprogrammed variety. This is an ultra-compact and dependable WI -fi module. The SIM900A is an entire Dual-band GSM/GPRS [2] answer in a SMT module which can be embedded inside the purchaser packages permitting you to gain from small dimensions and fee-powerful solutions. Featuring an industry-general interface, the SIM900A supplies GSM/GPRS [2] 900/1800MHz overall performance for voice, SMS, Data, and Fax in a small shape aspect and with low electricity consumption. With a tiny configuration of 24mm x 24mm x 3 mm, SIM900A can in shape almost all of the area necessities on your applications, especially for slim and compact demand of design.

### 3.6 Arduino Uno

Arduino Uno is a microcontroller board based totally at the ATmega328. Arduino is an open-supply, prototyping platform and its simplicity makes it perfect for hobbyists to apply in addition to experts. The Arduino Uno has 14 digital enter/output pins (of which 6 may be used as PWM outputs), 6 analog inputs, a sixteen MHz crystal oscillator, a USB connection, an electricity jack, an ICSP header, and a reset button. It incorporates the whole thing needed to support the microcontroller; honestly connect it to a laptop with a USB cable or strength it with an AC-to-DC adapter or battery to get began. The Arduino Uno differs from all previous forums in that it does not use the FTDI USB-to-serial driving force chip. Instead, it functions the Atmega8U2 microcontroller chip programmed as a USB-to-serial converter. "Uno" way one in Italian and is named to mark the approaching release of Arduino 1.Zero.

### 3.7 Vibrating Sensor

Vibration sensor is used at the start as vibration switch because of its high sensitivity; it's far sensitive to environment vibration, and generally used to hit upon the ambient vibration strength. When module did now not attain the brink in surprise or vibration power, DO port output gets excessive degree and while outside vibration strength exceeds the edge, D0 port output receives low degree. Small digital output D0 can be immediately related to the microcontroller, for the microcontroller to discover low stage, thereby to hit upon the ambient vibration. Small virtual output DO can immediately pressure the relay module, which may be composed of a vibration transfer.

## 4. CONCLUSIONS

This system deals with the accident alerting and detection. Arduino is that the guts of the system which helps in transferring the message to different devices within the system. Vibration sensor are getting to be activated when the accident occurs and thus the knowledge is transferred to the registered number through GSM module. Using GPS things are often sent through tracking system to cover the geographical coordinates over the planet. The accident are often detected by a vibration sensor then give sms to nearest center.

## 5. FUTURE SCOPE

This system deals with the detection of the accidents. But this may be extended by providing medication to the victims at the accident spot. By increasing the technology we'll also avoid accidents by providing alerts systems which can stop the vehicle to beat the accidents.

## 6. REFERENCES

[1]. M. Grewal, L. Weill and A. Andrews, Global positioning systems, Inertial navigation, and integration. New York: John Wiley, 2001.

[2]. O. Vermesan, Internet of Things: Converging Technologies for Smart Environments. River Publishers, 2013.

[3]. Prof. Bhagya Lakshmi V; Prof. Savitha Hiremath; Prof. Sanjeev Mhamane,"FPGA Based Vehicle Tracking and Accident Warning using GPS", International Journal of Scientific & Engineering Research (IJSER), Volume 5, Issue 2, February-2014.

[4]. "Cellular networks for massive IoT," Ericsson White Paper, Jan 2016

[5]. W. Chris Veness, "Calculate distance and bearing between two Latitude/Longitude points using haversineformula in JavaScript", Movable-type.co.uk, 2016. [Online]. Available: http://www.movabletype.co.uk/scripts/latlong.htmhttp://www.bmw.com/com/en/insights/technology/technology_guide/articles/airbag_safety_system.html?source=categories&article=airbag_safety_system

[6]. "Road Crash Statistics", Asirt.org, 2016. [Online]. Available: http://asirt.org/initiatives/informing-road-users/road-safety-facts/road-Crash-statistics.

[7]. A. App and P. LLC, "Auto Accident App dansl'AppStore", App Store, 2016. [Online]. Available: https://itunes.apple.com/ca/app/auto-accident-app/id515255099?l=fr.

[8]. "Auto Accident App -Murphy Battista LLP", Murphy Battista LLP, 2016. [Online]. Available: http://www.murphybattista.com/auto-accident-app.

[9]. Accident Report for Android", Appsgalery.com, 2016. [Online]. Available: http://www.appsgalery.com/apps/accident-report-34136.

[10]. B. AG, "BMW Technology Guide: Airbag/Safety-System", Bmw.com, 2016 Available

[11]. ShwaryaS.R; Ashish Rai; Charitha; PrasanthM.A; SavithaS.C," An IOT Based Accident Prevention & Tracking System for Night Drivers ", International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE), Vol. 3, Issue 4, April 2016.

[12]. *An IoTApproach to Vehicle Accident Detection, Reporting, and Navigation* ElieNasr, ElieKfoury, David Khoury Computer Science Department American University of Science and Technology Beirut, Lebanon enasr@aust.edu.lb, ekfoury@aust.edu.lb, dkhoury@aust.edu.lb