

AUTOMATIC VEHICLE ACCIDENT TRACKING AND ACTION SYSTEM

Ayush¹, Arun Rawat², Kushal Jublie³, Mansi Nautiyal⁴, Arvind Singh Rawat⁵

^{1,2,3,4} Students of ECE, UIT, Uttarakhand University, Dehradun

⁵ Assistant Professor, ECE, UIT, Uttarakhand University, Dehradun

ABSTRACT –

Real time analysis and alert can lead awareness towards the accident detection and the action is done to minimize the death index by providing the immediate ambulance facility to the people underwent road accident. This paper outlines the design and implementation of Automatic Vehicle Accident Tracking and Action System by using sensors like 3-axis accelerometer sensor and Piezoelectric Sensor which will notify about the occurrence of accident. Now once the notification arrives then all different modules will work in order to make ambulance reach to the accident location. These modules are like GPS (Skg13bl) and GSM (SIM 900A) with arduino uno as a microcontroller. Hence in this project i.e. Automatic Vehicle Accident and Tracking and Action System the message is sent to the cloud server with the current information. This project overcomes the slow response of ambulance service by using internet. This will help to decrease the chances of death during accidents.

Keywords: arduino uno, GPS, GSM, 3-axis accelerometer, Piezoelectric Sensor.

INTRODUCTION –

As the rate of road accidents increasing vigorously, thousands of people are losing their lives just because of slow response of medical facilities like slow response of ambulance. So, to help ambulance to reach to the accident area quickly we have proposed this methodology. First of all we have to use such a sensors (here 3-axis accelerometer) which will tell the microcontroller (arduino uno) about the occurrence of accident. Once the signal from 3-axis accelerometer is passed to the microcontroller the GPS attached to that vehicle will give the latitude and longitude of current place to microcontroller and then these two values (latitude and longitude) will be forwarded to the cloud server by using GSM. At cloud server we can use the algorithm which will send the received information (latitude and longitude) to the nearby ambulance from accident area like used by OLA and Uber Cabs. In OLA and Uber in place of ambulance there are cabs shown nearby to the current location. Hence once the nearby ambulance will be notified about the accident area, it will reach as soon as possible. Hence after implementing it in practical world the death rate due to accidents will decrease and world will head towards safe future.

WHY AUTOMATIC VEHICLE ACCIDENT AND TRACKING SYSTEM?

The main aim of Automatic Vehicle Accident and Tracking System is to provide the faster response of ambulance to the people who met with the accident. This can help in decreasing the values in death index.

LITERATURE SURVEY:

INDIA is the largest country in the south Asian region with all the problems faced by the rapidly developments nations especially motorization sage journal, in spite of such developments there are the limited data in the literature addressing the problem of road traffics injuries, times of India survey in 2017, 1.47 lakhs people died in the road accidents in India, which is equivalent to the entire population of the Shilong. In 2017 a road accident in India decreased by merely 3.27% with 4,64,910 road crashes as against 4,880,652 in 2016.

The numbers have pushed the international road federation (IRF), A Geneva based global body working worldwide for safer roads to express its concern at the number of increasing fatal road accidents in the capital the Hindu. A release issued by the group added that annually about 147 lakh people get killed in the road accident in the country it added that India accounts for more than 115of global road accident fatalities. The country is also a signatory to the united nation's decade of action for road safety that aims to reduce road accident fatalities by 50% by 2020. The 20 accident prone spots in the city some actions must be taken including much awaited vehicle act , improvements in the roads from the engineering perspective , road construction –beginning right from the planning stage, besides identification and remedy of the black spots which account for almost 90% of the road fatalities in the country will help reduce fatal road accidents. Now the vehicle protection and tracking system for protection like nowadays the airbags are introduced, seat belts and other safety measures are introduced. Here TPMS i.e. Tire Pressure Monitoring System which gives real time tire pressure information to the driver of the vehicle. Now the tracking control system implementation techniques move along the lines of providing to the drivers even if he is trapped in a remote location unable to respond. Vehicle tracking system is one of the biggest technological advancement to track the activities of the vehicle. The security system uses GPS to find the location of the monitored vehicle and then uses satellite and radio system to send the coordinates location data to the monitoring centre. At main server software are used to pot the location of the vehicle on the map in this way we are able to track the location on the real time basis.

PROPOSED WORK – This project has proposed great methodology toward the advancement of the automatic tracking and sensing applications. This project takes the help of Arduino uno and some sensors with some communication modules. This process can be divided into three units –

1. Accident Unit
2. Server Unit
3. Ambulance Unit

Let's understand the concept, suppose any vehicle goes under an accident then due to sensors like 3 axis accelerometer and piezoelectric sensor and algorithms used in the arduino microcontroller the message is sent to the central control room (Cloud Server). The message will contain that vehicle's position (latitude along with longitude), vehicle number and current time. For finding the current location of the vehicle we will use GPS module. As soon as the message is received by central control room it will start searching nearest ambulance to that place and notify the ambulance to reach the place immediately. Sometimes in case of accident is minor then for saving the precious time of the ambulance the loudspeaker inside vehicle speaks for 10 times "Ambulance is on the way if don't need it press that red button below driver seat. Thanks!!" If they response by pressing the push button that is installed on the vehicle the service will be cancelled.

1. Accident unit:

In this if the accident is happened then automatic detail is given by sensor i.e. 3 axis accelerometer and piezoelectric sensor by using arduino.

Arduino uno:

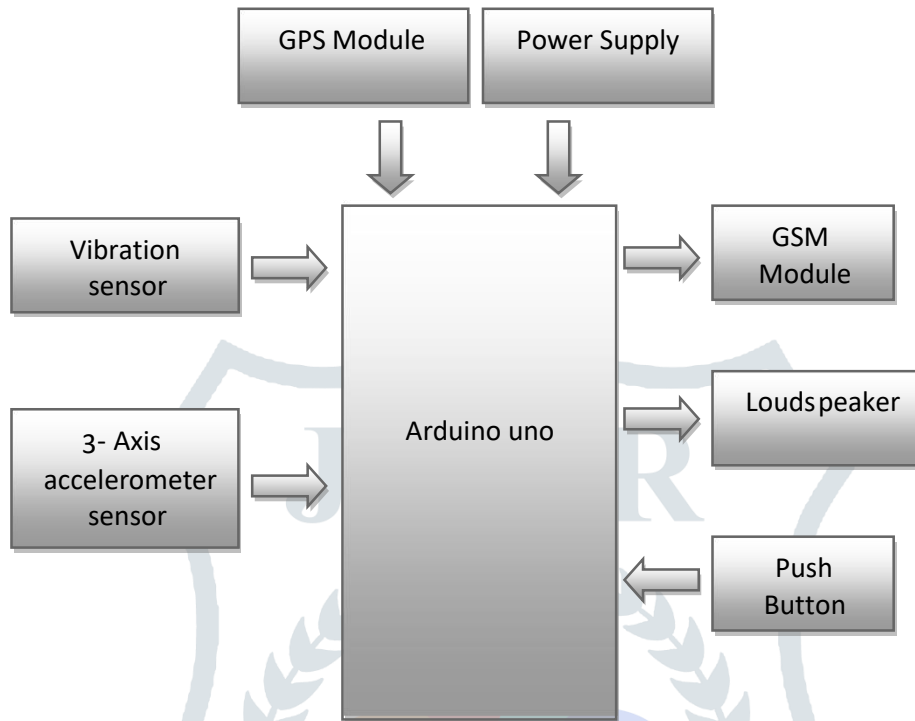


Fig1. Block diagram of Circuit inside the vehicle.

The arduino Uno is open source microcontroller based on ATMEGA328P microcontroller. It has the sets of analog and digital input/output pins that may interfaced with the other components .It has 14 digital and 6 analog pins and programmable with IDE, accepts voltage off 7-20 volts.

Power supply:

Provide electrical energy with 12v to the arduino uno, GPS, GSM, etc.

GSM:

GSM module stands for Global System for Mobile communication helps to set up the connection between the server and the accident vehicle and ambulance. The SIM900A is used in this project. The frequencies this module include are 800 MHz, 850 MHz etc.

GPS:

GPS stands for Global Position System provides the location and time information in all weather conditions through satellites.

3 axis accelerometer:

The ADXL335 is used in this project. It is small, thin, low power 3 axis accelerometer with gives the status along the x, y and z axis. Here the x axis gives the direction of left /right, for y axis it will be front/rare and for z axis up and down directions. It will happen due to turning or lane changing in x-axis. In case of y axis it will be acceleration or braking time. For z axis the direction may be done during road obstruction.

2. Server Unit –

It is a virtual server that provides the level of performance and security. It is basically works on virtual environment that can be accessed by users over a network. Depending upon your requirement it helps you to architect critical and non-critical workloads and maintain your infrastructure. It is a reliable networks that makes the compiling and computing of data easier for developers by providing to computing services which includes networking, storages, databases, software and many more. Cloud servers are often referred to as virtual.

In our project the use of cloud technology is as:

1. Store, handle the data information about the accident in real time basis.
2. Analyse data and searching.
3. Make connections.
4. Deliver the updates to an ambulance for further procedure.

3. Ambulance Unit –

After the accident there is a need of ambulance services must have the faster response but it is only possible when cloud server sends the information to the nearest ambulance within time. So the connection between the main server and the ambulance is done through the GSM module. After receiving the message containing latitude and longitude, Vehicle number and time from the main server the GPS placed inside ambulance can access the location of vehicle underwent accident. Here the server is responsible for the ambulance management by keeping track of ambulance and also identifying the nearest ambulance to the accident area and informing that ambulance about the accident and its location.

CONCLUSION –

This project helps to overcome the slow response of ambulance system during an accident. Automation of ambulance service can help the ambulance to reach the accident location quickly and save the precious life of human being.

REFERENCE –

- [1]Anisur Rahman khan¹, pranavsuri²,supriya patil³,tejaswani sonaane⁴,tejashree⁵of automatic accident detection in ijesc in 2018
- [2]humamal shammi, veton kepushka ,hazza alshami in international journal science and technology in real time vehicle tracking using arduino mega in 2016
- [3]aarya d.s¹,athalaya shukla²,anas p³,basil kuriakose ⁴,jerinsusanjoy⁵,leena Thomas international journal of advancement research in electrical electronics and instrumentation engineering on accident alert and tracking using arduino 4, April 2018.
- [4] global status report on road safety 2013
- [5] The Hindu report on road accidents in 2018 India published on jan 2019.
- [6]W.R Swihart, J D Woll,Integrated collision warning and information systems on heavy vehicles.