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Vehicle Collision Detection and Alert System

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ABSTRACT

In this technological revolution world there is no time for anyone to know what is happening around them they keep on moving without any care. As they give importance to their work rather than others. Due to reduction in moral values one cannot get proper help when they need. This can be solved by this technology itself. Due to time laps many lives are in risk. To reduce this risk factor vehicle collision detection andalertingplays a vital role. This can be implemented by using arduino. Reducing the time laps will reduce the death rate. In a relatively huge number of cases, the death causes due to the rescue time took more than two hours.As now a day's mobile is common electronic gadget that is present with everyone and this problem can be solved by it only. By the short message service (SMS) on of the fetcher of mobile will help to solve this problem. The location of the accident spot can also be send along with the SMS to the rescue team and other contact numbers that were pre-programmed. By using technologies GPS and GPRS one can easily locate the position of the accident. The main motive of this system is to reduce the time laps and preserve the lives of human.

Keywords: *- Accident monitoring, Accident detection, Arduino, GPS, GSM, SMS.*

1. INTRODUCTION

In a large country like India there are many kind of places like hilly area plateaus and due to improper road facilities accidents are more and death rate due to this accidents are more. India faces the highest number of accidents and accidental fatalities in the world. The maximum number of accidents are reported from the transport sector i.e. road as well as railways.

Some approximations claim that Indian roads alone accounted for approximately 105,000 accidental fatalities in 2010. This is almost 15 percent of the global road fatalities when India has just 1 percent of the total global vehicles. The incidents of accidental deaths have shown increasing trend during the decade of 2000-2010 with an increase of 50 percent in the year 2010 as compared to the year 2000.

According to Planning Commission of India, the total annual economic loss is 2.5 percent of India's GDP due to rising number of road fatalities.

In 2010, the highest number of deaths due to road accidents took place in Tamil Nadu (15,409 deaths) followed by Andhra Pradesh (15,337 deaths), Uttar Pradesh (15,099 deaths) and Maharashtra (14,063 deaths). In cities, highest number of road accidents took place in Delhi (7479 cases) followed by Bangalore (6490 cases) and Mumbai (4008 cases). Trucks and two-wheelers were responsible for over 40 percent of accident related deaths in India. Besides road accidents, accidents taking place at the workplace also pose a formidable risk to

employees' safety. It is hard to get reliable data of occupational diseases and workplace accidents in India due to lack of specific system for reporting and recording. As per the statistics put forth by Greenpeace, India, as many as 16 accidents have so far taken place from 1990–2010 in India's civilian nuclear power installations in which several people lost their lives.

According to Times survey In UP, the deaths increased by at least 30% (it was 15,175 in 2010), while in Punjab 3,613 people died in 2011 as compared to 3,400 in the previous year. "We are worried. The roads are getting better and people are driving at high speed, while there are deficiencies in traffic engineering. The figures supplied by the worst performing states have shocked the road transport and highways ministry, which is primarily responsible and accountable for nationwide road safety. Early this year some states had submitted provisional data that projected the likely fall of road deaths by 1% in 2011. India is signatory to the Decade for Action declaration by the United States to reduce deaths by 50% by 2020.

India's status as the world leader in deaths due to road accidents is a matter of national shame. The fact is that a large proportion of these deaths can be prevented by simple measures. The most important of these is strict enforcement of traffic rules, which is conspicuous by its absence in our cities as well as on highways.

2.ROAD ACCIDENTS STATISTICS AT A GLANCE

- **85%** of all road accidents occur in Asia pacific region.
- India occupies second place with **10%** of total road accidents in world.
- Nearly **1,275,000** persons are injured in road accident. Social cost of accidents is estimated at **$11,000.**
- Most of the accidents are occurring due to lack of professional drivers and positive driving culture.

According to government study in 2011 there was an accident in every minute in 2011 in the country that claimed the lives of 1.42 lakh people, according to a government study. The number of accidents in the previous year was 4.97 lakh injuring 5.11 lakh people, according to a report released by Ministry of Road Transport and Highways. The study attributed the high number of accidents, injuries and deaths to exposure to risk nature of traffic, lack of traffic separation, etc. The 2011 numbers are, however, marginally lower than the 5.27 lakh accidents and 1.42 lakh deaths in 2010.

2.1 MOTIVATION

When a traffic accident takes place, assisting injured passengers as soon as possible is crucial to minimize the negative effects on their health. Mortality from traffic accidents can be classified into three phases:

Stage-1: It involves casualties in the first few minutes or seconds after an accident (about 10% of all deaths).

Stage-2: It is the first hour after the accident, the so called golden hour, has the highest mortality (75% ofall deaths) and is the phase during which the highest death rate can be avoided by proper initial health care.

Stage-3: Happens days or weeks after the traumatic incident, has 15% of mortality, and takes hard work and a high amount of resources to reduce mortality

As can be observed, the phase where more benefits can be achieved by reducing rescue response time is the second one. A fast and efficient rescue operation during the hour after a traffic accident significantly increases the probability of survival of the injured and reduces the injury severity.

For a noticeable reduction in rescue time, two major steps must be taken:

1) Fast and accurate accident detection and reporting to an appropriate public safety answering point (PSAP).

2) Fast and efficient evacuation of occupants trapped inside a vehicle.

2.2EXISTING SAFTEY MEASURES

Presently a lot of methodologies are available in vehicles that allow vehicle protection and tracking.Airbags are one of the most mandatory elements in vehicles. Front airbags have been standard on all new cars since 1998 and light trucks since 1999. Seat belts are also available in four wheelers. Tire-pressure monitoring system (TPMS) is an electronic system designed to monitor the air pressure inside the pneumatic tires on various types of vehicles. TPMS report realtime tire-pressure information to the driver of the vehicle, either via a gauge, a pictogram display, or a simple lowpressure warning light.An anti-lock braking system or anti-skid braking system (ABS) is an automobile safety system that allows the wheels on a motorvehicle to maintain tractive contact with the road surface according to driver inputs.

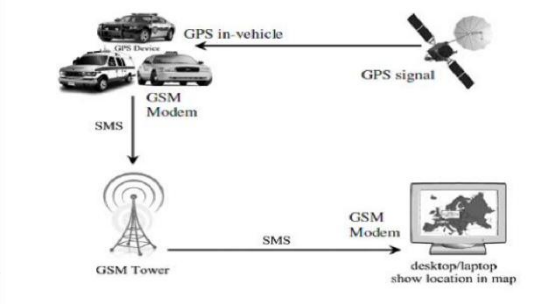
while braking, preventing the wheels from locking up (ceasing rotation) and avoiding uncontrolled skidding. Traction control and electronic stability control go hand in hand and is designed to prevent loss of traction of driven road wheels. The latest implementation techniques move along the lines of providing help to the driver even if he is trapped in a remote location unable to respond.

3.CONCEPT AND OVERVIEW

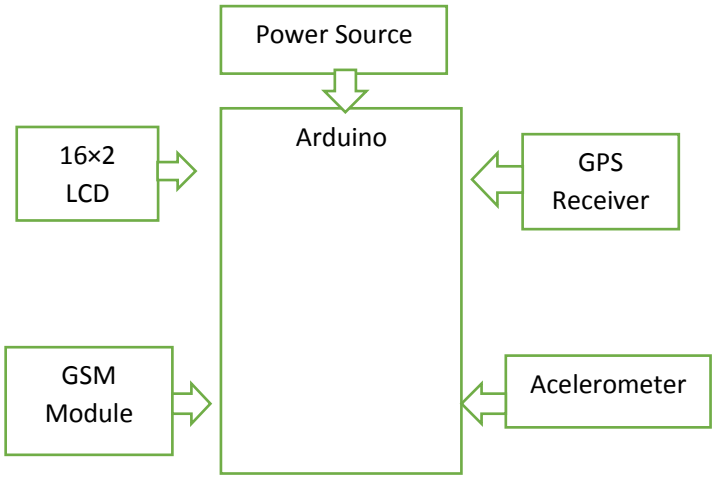
This vehicle tracking system takes input from GPS and send it through the GSM module to desired mobile/laptop using mobile communication. Vehicle Tracking System is one of the biggest technological advancements to track the activities of the vehicle. The security system uses Global Positioning System GPS, to find the location of the monitored or tracked vehicle and then uses satellite or radio systems to send to send the coordinates and the location data to the monitoring center. At monitoring center various software's are used to plot the Vehicle on a map. In this way the Vehicle owners are able to track their vehicle on a real-time basis. Due to real-time tracking facility, vehicle tracking systems are becoming increasingly popular among owners of expensive vehicle.

3.1. PROPOSED SYSTEM AND METHODOLOGY

This system is very efficient and hence worthy to be implemented. Accident detection and messaging system can be fitted in vehicle (Ambulance, Police or to the communication device of the near and dear) and they are informed about any such untoward incident at the go. Accident detection and messaging system is execution simple as the system makes use of GSM & GPS technologies. GPS is used for taking the coordinate of the site of the accident while GSM is used for sending the message to phone. To make this process all the control is made using Arduino whereas LCD is used to display the accident.



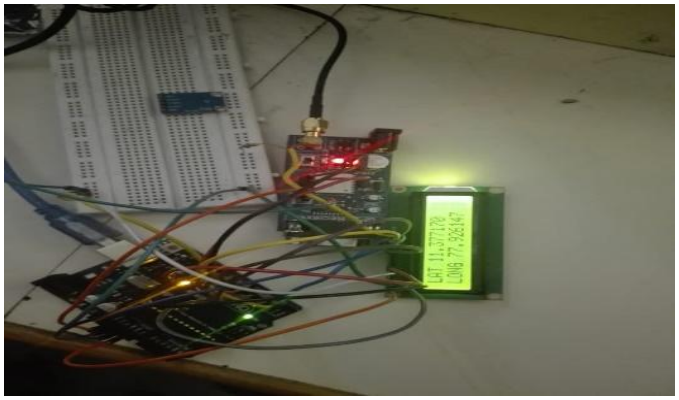
3.2 BLOCK DIAGRAM



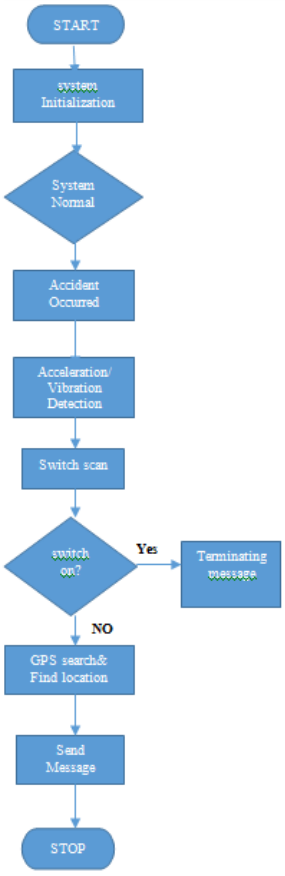
1.The Arduino UNO is a widely used open-source microcontroller board based on the ATmega328P microcontroller and developed by Arduino.cc.[The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board features 14 Digital pins and 6 Analog pins. It is programmable with the ArduinoIDE(Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts.

1. A power supply is an electronicdevice that supplies electrical energy to an electrical load. Here Arduino Uno, sensor, GPS, GSMoperates with DC 12V supply.
2. Accelerometer sensor: Accelerometer is a sensor that can measure calibration, velocity, tilts, and both static and dynamic changes in three axis basis.
3. GSM: There are different GSM module are available in the market. SIMCOM developed different frequencies module includes 800MHz, 850MHz, 900MHz, 1800MHz, 1900MHz. We select SIM900a module for the proposed work. It is compact easy plug in module. The baud rate of the GSM 900a module is 9600-115200. Initially modem is in auto baud mode. The modem needs only two wires(Tx, RX).
4. GPS: Global Position System(GPS) is a space based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the earth where there is an unobstructed line of sight to four or more GPs satellite. The system provides critical capabilities to military, civil, commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.
5. 16x2 LCD: 16x2 LCD means it can display 16 character per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, command and data. The command register stores the command instruction given to the LCD. A command is an instruction gives to LCD to do a predefined task like initializing it, clearing it's screen, setting the curser position, controlling display etc. The data register stores the data to be displayed on the LCD.

3.3SCREENSHOTS



4. FLOW DIAGRAM



5.RESULT

The system detects accident from vehicle and send message through GSM module. The message is received by another GSM module. Google Map Module It displays google map show you the exact location of accident and it details. It getsdetail SMS from the location of the accident. Hence there is small variation in the coordinates, initial value of latitude andlongitude are same but fractional value changes with small difference.

6. CONCLUSION AND FUTURE SCOPE

Proposed system is developed to provide the information about the accident occur and the location of the accident. It helps to easily provide the assistant and help to the victim of the accident. This system uses GPS module to locate the vehicle. GSM is used to provide the information of accident. The results of the proposed systems are satisfactory. Further this system can be implemented by using sound sensor, in order to make it more accurate and efficient to detect an accident. This is extended with alcoholic detection also. If the person took alcohol who is driving then the vehicle will be stopped immediately by giving alarm. This can also be developed by interconnecting camera to the controller module that takes the photograph of the accident spot makes tracking easier.

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