

An Intelligent Vehicular Accident Notification System

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Abstract - Road safety is one of the main objectives on designing the assistance system. Nowadays everyone needs to have a safer transport. Even if any accident happens, no one take cares about it. A large number of precious lives are lost due to road traffics accidents every day. There is need to have effective road accident detection and information communication system in place to injured persons. The proposed system helps to identify the accidents in remote areas with the help of smart phone. It uses a vibration sensor which detects the variation of the vibration system, and makes a message to transfer the details about the location of accident to contacts .So we can save the life of people.

Keywords:-GPS Technology, GSM, Vibration sensor, Microcontroller

I. INTRODUCTION

Road transport in India is very popular for various reasons, but the conditions of the Indian roads are very poor and deplorable. The rate of road accidents and fatality in the country is very high. Travel by road provides a lot of flexibility, convenience, speed and reliability, particularly at short distances in cities and towns. Condition of roads is very poor. Their development and maintenance have not kept pace with the growth in vehicular population. Consequently there are accidents, serious injuries and deaths all around. So that Indian roads are full of human blood. The rate of road accidents and resulting loss in man in India is one of the highest [1]. Road accident is most unwanted thing to happen to a road user, though they happen quite often. The most unfortunate thing is that we don't learn from our mistakes on road.

Most of the road users are quite well aware of the general rules and safety measures while using roads but it is only the laxity on part of road users, which cause accidents and crashes. Main cause of accidents and crashes are due to human errors. The major reasons of accidents are over speed, drunken driving, distractions to driver, red light jumping, avoiding Safety Gears like Seat belts and Helmets, Non-adherence to lane driving and overtaking in a wrong manner etc.

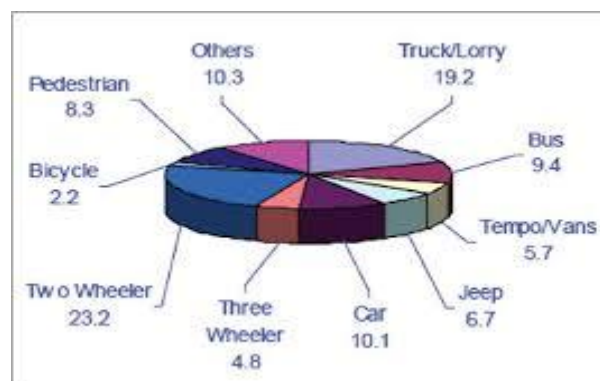


Fig.1. Representation of Accident rates

Speed is the main basic reason for vehicle accidents. Many lives could have been saved if emergency service could get accident information and reach in time. Nowadays GPS has become a integral part of a vehicle system. Traffic accidents have been taking thousands of lives each year. The studies show that about 60% roadway collision could be avoided if the operator of the vehicle was provided warning at least one-half second prior to a collision. Reporting indicated the number of fatalities from road accidents per year of about 1.3 million and 50 million injuries were recorded or average of 3000 deaths /day and 30000 injuries /day [2]. The existing system indicates the accidents in crowded areas. So that when the accidents are takes place people know the correct location, and help people. But in remote areas people cannot gain any information about the accidents. So it is necessary to design an efficient vehicular accident notification system.

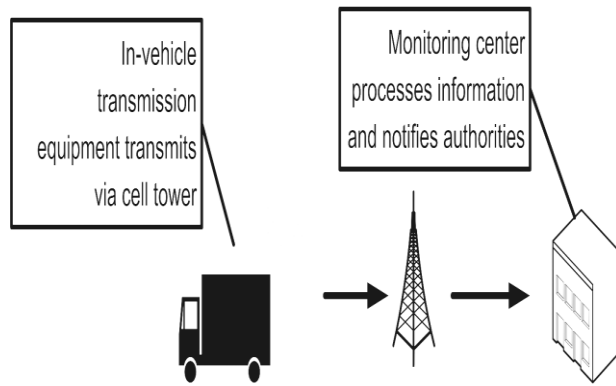


Fig.2. Traditional accident detecting system

II. SYSTEM DESCRIPTIONS

The system consists of two major parts: electronic system and software system. The electronic system consists of communication between microcontroller, and sensors, whereas software system includes the android application.

The first part of the system is to track accident's correct location. For that GPS, controller and GSM are necessary. Then the data is stored in the database. To implement a new system the choice of a processor with maximum possible speed this made. There should be a sufficient memory to store data and software tools for efficient processing.

To detect the accident, the sensor used. So, when accident happens, this sensor will be active [3]. And the information sends to microcontroller. At the same time, GPS and GSM modem will also active which are interfaced to the same microcontroller. Through GPS the exact latitude and longitude of the accident location is obtained.

The used preliminaries are:

1. GPS Technology

Global Positioning System was developed by the United States' Department of Defense. It uses between 24 and 32 Medium Earth Orbit satellites that transmit precise microwave signals. This enables GPS receivers to determine their current location, time and velocity. The GPS satellites are maintained by the United States Air Force. GPS is often used by civilians as a navigation system. On the ground, any GPS receiver contains a computer that "triangulates" its own position by getting bearings from at least three satellites. The result is provided in the form of a geographic position - longitude and latitude - to, for most receivers, within an accuracy of 10 to 100 meters. Software applications can then use those coordinates to provide driving or walking instructions. Getting a lock on by the GPS receivers on the ground usually takes some time especially where the receiver is in a moving vehicle or in dense urban areas. The initial time needed for a GPS lock is usually dependent on how the GPS receiver starts.

2. GSM Technology

The Global System for Mobile communication is an open, digital cellular technology used for transmitting mobile voice and a data services. GSM supports voice calls and data transfer speeds of up to 9.6 kbps, together with the transmission of SMS. GSM operates in the 900MHz and 1.86 Hz bands in Europe and the 1.96 Hz and 850MHz bands in the US. GSM system was developed as a digital system using time division multiple access technique for communication purpose. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot. The digital system has a ability to carry 64kbps to 120 Mbps of data rates.

3. Microcontroller

Microcontroller receives the coordinates from the GPS modem. Then it will send this information to the GSM modem. The GSM modem is used to send the information via SMS and it will send to another helping services. So they can do immediate and necessary actions. The microcontroller which performs all the operations related to controlling the embedded system circuit.

4. Vibration Sensor

The vibration sensor which is useful for a variety of different field has the ability to detect vibration in given area. This is help to alert someone to trouble with a system. The vibration sensor SW18010P is used for measuring and analyzing linear velocity, displacement or acceleration. Features of SW18010P, this is spring type directional vibration sensor, which can detect vibration in any angle.

Traditional [4] traffic accident prediction uses long-term traffic data such as annual average daily traffic and hourly volume. In contrast to traditional traffic accident prediction, real-time traffic accident prediction relates accident occurrences to real-time traffic data obtained from various detectors such as induction loops, infrared detector, camera etc. Real-time traffic accident prediction focuses on the change of traffic conditions before an accident occurrence, while traffic incident detection studies are concerned with the change of traffic conditions after an incident occurrence. Manual incident detection methods detects the accident from the motorist report, transportation department or public crews report, aerial surveillance or close circuit camera surveillance.

III. PROPOSED SYSTEM

The proposed methodology is the automatic system which will provide the solution for identifying the accidents in remote areas. In existing system people cannot get any information about an accident in unpopulated areas. This application is helpful to accidents over locations like forest

areas, hill tops where it will be very difficult to get help on time. The system is vibration sensor based mobile technology integrated with smart phone. We can set the normal vibration is 300HZ, if there is any variation from normal vibration range then the system detects the accidents. Then system will immediately transmit the location of the accident to the preconfigured contacts by broadcast message. This project provides the design which has the advantages of low cost, portability and small size. The platform of the system is vibration sensor, with GPS and GSM interface which helps to locate sites of accident accurately. This system can overcome the problems of lack of automated system for accident location detection. Consequently the time for searching the location is reduced and the person can be treated as soon as possible which will save many lives.

The proposed system is an android based application that is used to alert accidents in remote areas, for which the application and associated device to be installed in the vehicle. The application should be linked with the electronic devices installed in the vehicle. The electronic device will broadcast message during accident and just after receiving the message the application in the connected mobile will send notification and calls to the saved numbers and nearest police stations and hospitals and other guiding services. Also the voice call services works on any one number at time. After the accident warning broadcasting the system automatically makes a call to pre-set numbers, so that the user can speak to other end even if the mobile is not near to him.

There are 4 modules,

1. Accident detection and primary reporting:
This is an electronic module which will detect the accident on time and with the help of associated GSM module the microcontroller will broadcast message to the pre-stored numbers.
2. Accident broadcasting service:
While receiving the alert message the application in mobile will send a request to online server to find out the nearest hospitals and police stations. The located numbers will be alerted with a message having location. The location is set to get from GPS or through towers.
3. Broadcasting support server:
This server includes the contacts of many hospitals and police stations or any other helping services.
4. Emergency auto-calling:
Auto call service is activated after the messaging. User can talk to the other end as usual even if the mobile is at possible distance.

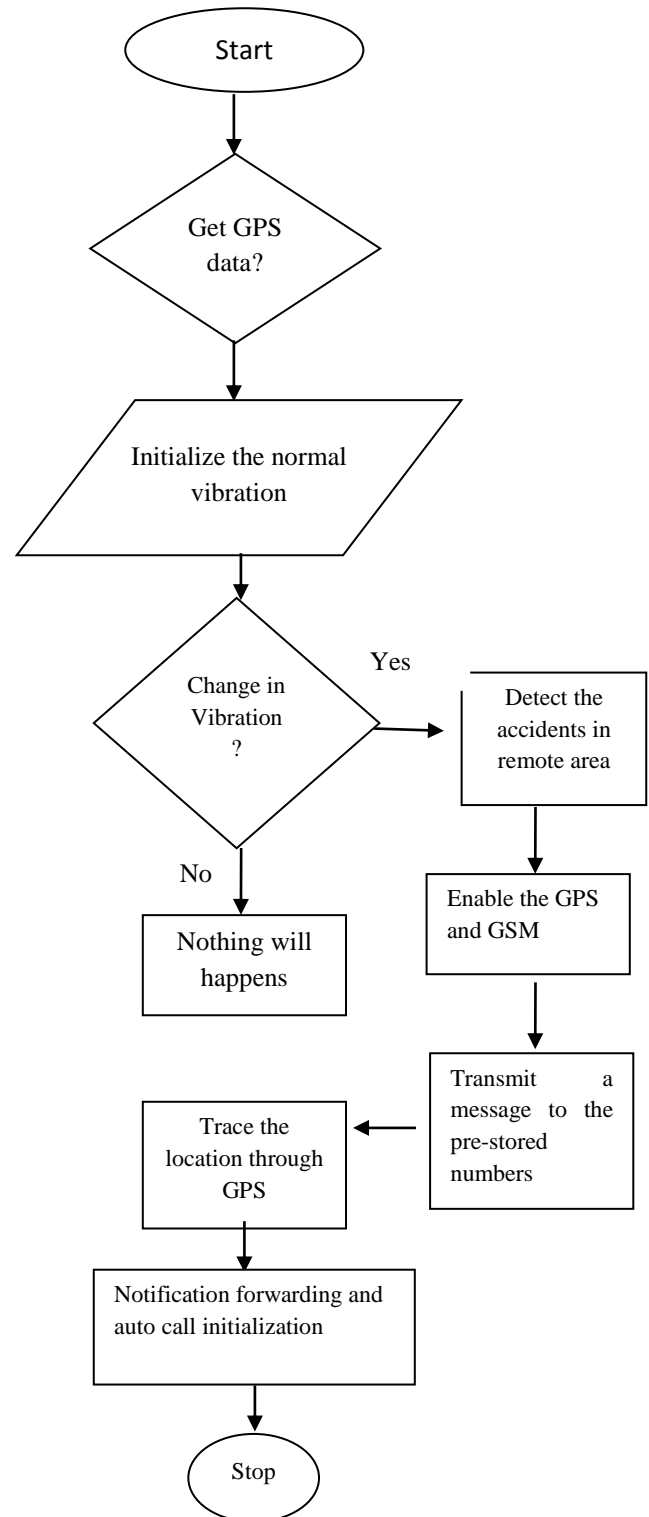


Fig.3. Proposed system

IV. CONCLUSION

This accident detection and alerting system provide emergency responds with crucial information at the earliest possible time. The rapid growth of technology and infrastructure has made our lives easier. The advent of technology has also increased. This paper will provide an optimum solution for the accidents in unpopulated areas. It is used to alert accidents, and device will broadcast a message during an accident and just after receiving the message the application in the connected mobile will send notification and calls to the saved numbers. And also provide a voice call services works on any one number at time. The GPS is enabled to trace the location .Location are traced and the rescue operations are performed. This paper is useful in detecting accidents precisely by means of vibration sensor. Thus the work ensures the reduction of death ratio and fatalities in the country and also which will have a greater importance in day to day life.

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