Artificial Intelligence for Accident Detection and Response

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Abstract :

In a today's life we see everywhere like newspaper, TV news that the death of peoples due to accident .The rate of death due to road accident is increased tremendously ,especially accident occurred on highways and some are at the nights due to lack of sufficient light. The always advancing technology has created our day to day lives easier. The rise in technology has exaggerated the rate of road accidents that causes loss of life. The poor emergency facilities out there in our country simply boost this downside. There are no proper precautions to reduce the accidents in our country. So, in our project is going to provide a solution to these problems. According to our project when a vehicle meets with an accident or also providing the accident prevention before its occurring, a sensor situated on the vehicle will detect it immediately and send a message to the microcontroller. The microcontroller then sends the alert message with the help of GSM modem to a police control room or rescue team which will include the location with the help of GPS. Also the alert message containing the situation of accident are going to be send to the relatives of the victim. In case there is no casualty the driver can terminate the alert message by a switch provided in the vehicle. This will save the valuable time of rescue team. Our project is beneficial for detecting the accident exactly with the assistance of sensors and microcontroller. Keeping in mind the scope for improvement, we can add a wireless webcam which will capture the images at the time of accident which will help in providing accurate help to the victim as quick as possible. It may be interfaced with vehicle airbag system and a bomb detector.

Key Words: *Sensor, microcontroller, GPS module, GSM module, alert message*.

I.   INTRODUCTION

The advent of technology has also redoubled the traffic hazards and therefore the road accidents. Due to the lack of best emergency facilities available in our country the lives of the people are under high risk and we also facing the lack of accident prevention mechanisms.

By placing the sensors in the vehicles these will detects the vehicles location and compares with other vehicles on the road. When the two vehicles comes closer then sensors in the car will generates the beep sound. By these we can reduce the accidents. An automatic alarm device for vehicles is introduced in this paper which sends the basic information to the medical rescue team , police station and family members within a few seconds of an accident[1]. This device will find accidents and sends an alert message to rescue teams in considerably less time which is able to facilitate in saving the lives of the people.

II.   LITERATURE SURVEY

At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In literature, a number of approaches to provide security and safety through monitoring the vehicle's real time precise positioning and information using different technologies have been proposed, and currently there is no system to prevent the accidents before its occurring[2]. This project is focused on both the accident prevention before its occurring and gives immediate response after the accident.

III.   PROPOSED SYSTEM

Accident detection

A sensor will sense the occurrence of an accident and give its output to the microcontroller. Here a button sensor is used for detection which will get pressed when the vehicle meets with an accident. A buzzer is present in this system with starts beeping indicating that the system is now activated. The GPS detects the latitude and longitudinal position of the vehicle. It is essential to locate the position to provide medical assistance[2]. The phone numbers are pre saved within the EEPROM by the user. These numbers can be changed at any point of time. The microcontroller sends an alert message to these pre saved numbers using the GSM module. Any message can be pre entered in the system by the user.

A LCD screen displays the status of the output. In case there is no casualty, the sending of the message can be terminated with the help of a switch. The switch can restart the microcontroller and its operate can begin from the beginning.

When the sensors detects the any emergencey at any time then by using the automatical braking system will works and car is going to stop there itself. By these technique 40% of the accidents are reduced.

Fig 1: automatic emergency braking

Accident response

In these we are building a **Arduino primarily based vehicle accident alert system with the help of GPS, GSM and accelerometer**. Accelerometer detects the unexpected change within the axes of vehicle (car) and GSM module sends the alert message on your Mobile with the exact location of the accident. Location of accident is distributed within the style of Google Map link, derived from the latitude and line of longitude from GPS module. The Message is also contains the speed of vehicle in knots.

The alert message contains the geographical coordinates, time and angle in which the accident has occurred. In cases where there is no casualty the message can be terminated with the help of a switch in order to avoid wasting the valuable time of the rescue team.

When an accident occurs it is detected with help of a sensor which activates the device, the sensor gives its output to the microcontroller. The microcontroller sends the alert message automatically to the police station and the relatives of the person and ambulance with in less time of occurrence. The message is distributed through the GSM module and therefore the location of the accident is detected with the help of the GPS module. Hence with this project implementation we can detect the position of the vehicle where the accident has occurred so that we can provide the first aid as early as possible[4,5].
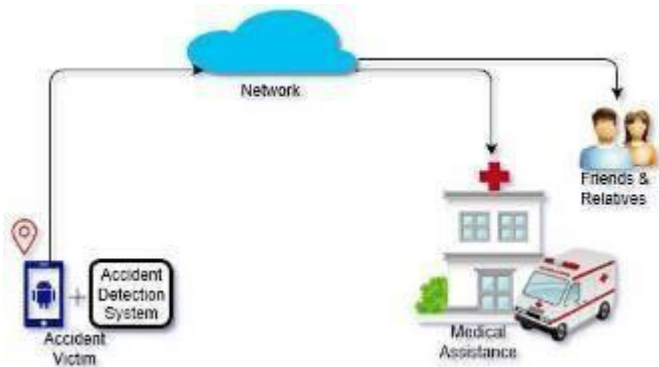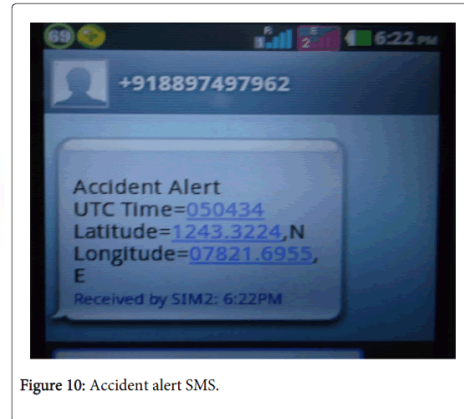

Figure 10: Accident alert SMS.

Fig 2: information passing system   Fig 3: accident alert SMS
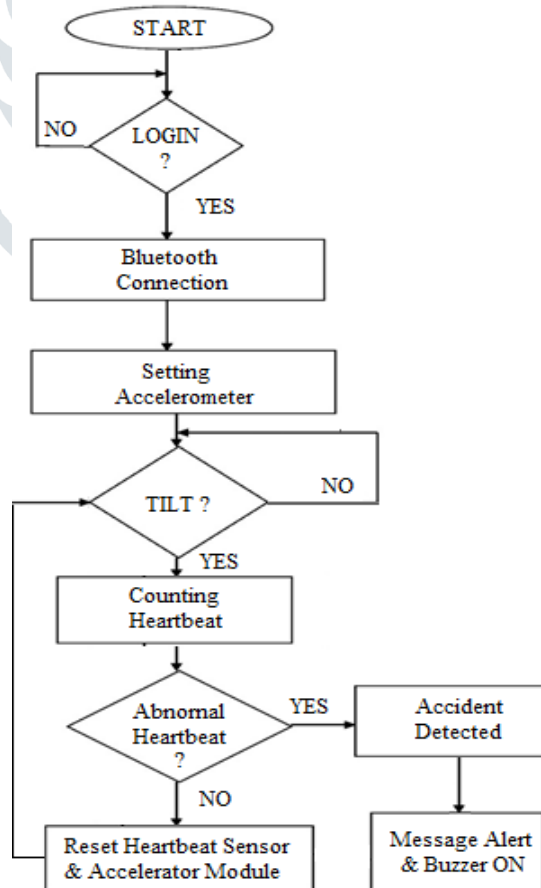
IV. FLOW CHART:

Fig 4: Flow char for accident detection and alert system

V.　MODULES

GSM- Global System for Mobile Communication

GSM is ssociate degree open, digital cellular technology is used for transmittal mobile voice and data service of it. The GSM system is that the most generally used cellular technology in use within the world these today. It has been a particularly successful cellular phone technology for a variety of reasons including the ability to roam worldwide with the certainty of being able to operate on GSM networks. It is also highly economic and less expensive[6].

GPS- Global Positioning System

GPS(Global Positioning System) may be a satellite navigation system which is used for determine the bottom position of an associate object. It is a worldwide navigation satellite system that has geolocation and time data to a GPS receiver anyplace on or close to the Earth. Here GPS is employed for each tracking and navigation. This enables a base station to keep track of the vehicles and navigation system helps the driver to reach the destination[6].

Arduino:

Arduino consists of each a physical programmable board which is one of the microcontroller and a bit of code, or IDE (Integrated Development Environment) that runs on your pc, used to write and transfer code to the physical board.

VI.　WORKING

Arduino is employed for dominant whole the method with a GPS Receiver and GSM module. GPS Receiver is employed for detecting coordinates of the vehicle, GSM module is employed for sending the alert SMS with the coordinates and therefore the link to Google Map. Accelerometer specifically ADXL335 is employed for detecting accident or sudden modifications in any axis. And an optional 16x2 LCD is also used for displaying the additional status messages or coordinates. We have used GPS Module SIM28ML and GSM Module SIM900A[7,8].
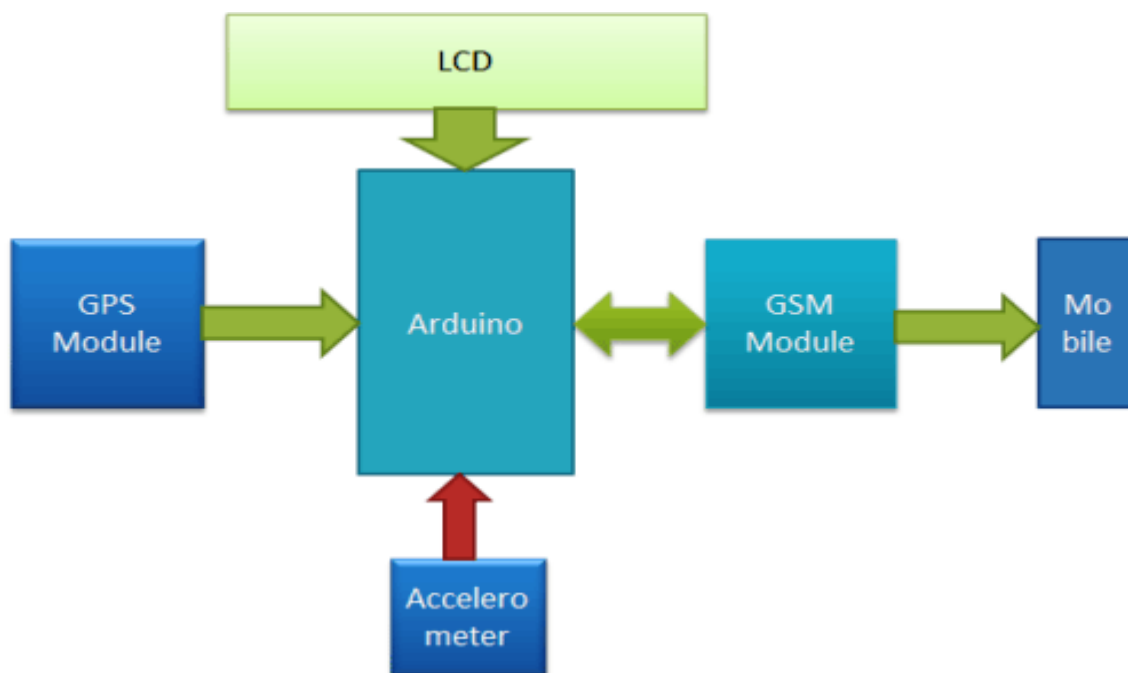
Fig 5: architecture of a system

When we are ready with our hardware after programming, we can install it in our vehicle and power it up. Now whenever there is an associate accident, the car gets tilt and accelerometer changes his axis. These values scan by Arduino and checks if any changes happens in any axis. If any change happens then Arduino reads coordinates by extracting $GPGGA String from GPS module information and send SMS to the predefined message to the police or ambulance or family member with the accurate location coordinates of accident place. The message also contains a Google Map link to the accident location, so that location can be easily tracked. When we a tendency to receive the message then we only have to be compelled to click the link and that we can send to the Google map and then we are able to know the exact location of the vehicle. Speed of a car, in knots (1.852 KPH), is also sent within the SMS and displayed on the LCD panel[9,10]. At first GPS module informs or recognized by these module and these information is passed to the ardino board. The program present in the arduino board is executed and these information is passed to the GSM module by these it will pass the information to the all the saved numbers of the mobiles and also it passes the information of the accident to the police station, family members of the person, hospitals. By these the time is reduced to pass the information so, that we can save the life of a person in less time.
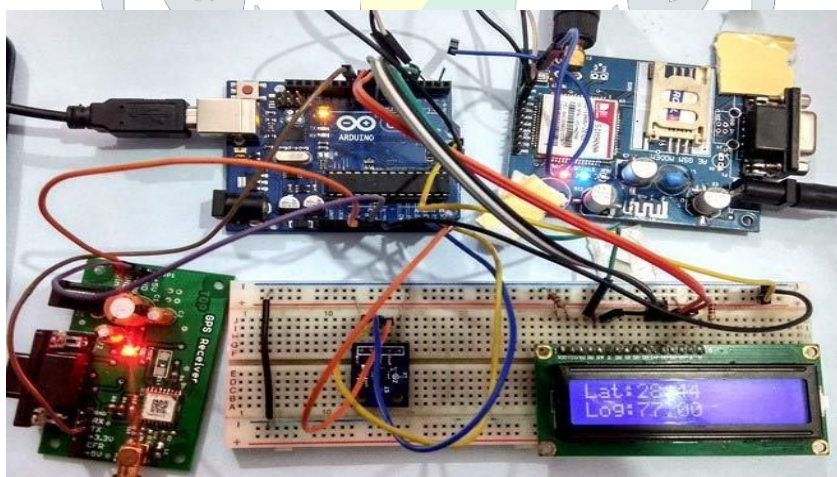

Fig 6: experimental view of a system

VII. CONCLUSION

At present situation we can't use the driver less cars, it is implemented but it takes some time. But we can't wait until it is implemented in our country. So, instead of the driver less cars we are taking some prevention measures and immediate response after the occurrence of the accident. So that this system provides the optimum solution to poor emergency facilities provided to victims in road accidents in the most feasible way. With the help of this technology immediate action can be taken when an accident occurs by alerting the respective people by sending a message so, that many lives are saved by this project. The drawback with this technique is that it doesn't work without a network. So in areas where there is no network then those areas we cannot will not be able to send the alert message. The proposed method is very helpful for the automotive business industry. This will used for the medical teams to reach the accident spot in time and save the precious human lives. There is a wide scope for new developments in the interfacing it with totally different systems.

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