GPS and GSM Based Accident Detection System

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***Abstract*: The fast development of innovation and foundation has made our lives simpler. The coming of innovation has additionally expanded the traffic dangers and the street mishaps occur oftentimes which causes enormous death toll and property due to the poor crisis offices. The accident identification venture will give an ideal answer for this downside. An accelerometer can be utilized in a vehicle caution application with the goal that risky driving can be identified. It very well may be utilized as an accident or rollover finder of the vehicle during and after an accident. With signals from a ultrasonic sensor, a serious accident because of a deterrent can be perceived. At the point when a vehicle meets with a mishap or if a vehicle turns over, the accelerometer and ultrasonic sensor distinguishes the sign and quickly sends it to microcontroller. Microcontroller sends the alarm message through the GSM module including the area to police control room or a salvage group. So the crisis assist group with canning promptly follow the area through the GPS module, in the wake of getting the data. The area can likewise be seen on Google maps. In the wake of adjusting the area important move is made. At the time when nobody met accidents the driver can end the message being sent.As a future execution a remote webcam can be included for catching the pictures of the mishap scene.**

***Keywords*: Vibration/ultrasonic sensor, GSM, GPS, Arduino board.**

I. INTRODUCTION

Right now pace of accidents can be expanded quickly. Because of business the utilization of vehicles like autos, bicycles can be expanded, as a result of this explanation the mishaps can be occurred due to over speed. Individuals are going under chance as a result of their over speed, because of inaccessibility of propelled methods, the pace of mishaps can't be diminished. To decrease the mishap rate in the nation this paper presents an ideal arrangement. Programmed alert framework for vehicle mishaps is presented; the principle objective is to control the mishaps by making an impression on the enrolled versatile utilizing remote correspondences procedures. At the point when a mishap happens at a city, the message is sent to the enrolled versatile through GSM module in less time. Arduino is the core of the framework which helps in moving the message to various gadgets in the framework. Vibration sensor will be enacted when the mishap happens furthermore, the data is moved to the enrolled number through GSM module. GPS framework will help in finding the area of the mishap spot. The proposed framework will check whether a mishap has happened and informs to closest clinical focuses and enlisted versatile numbers about the spot of mishap utilizing GSM and GPS modules. The area can be sent through following framework to cover the land organizes over the territory. The accident can be recognized by a vibration sensor which is utilized as major module in the framework[3].

II. LITERATURE SURVEY

1. Vehicle accident is the paramount thread for the people's life which causes a serious wound or even dead. The automotive companies have made lots of progress in alleviating this thread, but still the probability of detrimental effect due to an accident is not reduced. Infringement of spFieed is one of the elementary reasons for a vehicle accident. Therewithal, external pressure and change of tilt angle with road surface blameworthy for this mishap. As soon as the emergency service could divulge about an accident, the more the effect would be mitigated. For this purpose, we developed an Android based application that detects an accidental situation and sends emergency alert message to the nearest police station and health care center. This application is integrated with an external pressure sensor to extract the outward force of the vehicle body. It measures speed and change of tilt angle with GPS and accelerometer sensors respectively on Android phone. By checking conditions, this application also capable of reducing the rate of false alarm[4].

2. Global Positioning System (GPS) is becoming widely used for tracking and monitoring vehicles. The system has been use for tracking vehicle in real time using GPRS (General Packet Radio Service) technology. The systems provide the possibility of tracking the location of vehicles at an affordable cost. The system can be built using the microcontroller. This is the heart of the system. The GPS receiver connecting to microcontroller through the serial port and used to obtain the current location. The GPS receiver acquires the current position of the location and this information of vehicle transmits to tracking server using GPRS modem. GPRS provide TCP/IP connection with tracking server. Tracking server receives vehicle location information via network and stores this information in database. This information is available to authorized users of the system over the internet on map[2].

III. DESIGN METHODOLOGY

a) ARDUINO

The Arduino UNO is a broadly utilized open-source microcontroller board dependent on the ATmega328P microcontroller and created by Arduino.cc. The arduino is the significant control unit to recognize or alarm when a mishap happens. It gathers the information from vibration sensor, GPRS and GSM modules and mirrors the yield either in show framework or on the other hand through a message. Here vibration sensor plays a significant job. This vibration sensor will get the vibrations of the vehicle which thus goes about as a mishap recognition module. Arduino accumulates the data from every other module and sends the message to the recipient however GSM module[3].

b) GSM MODULE

For providing communication between the GPS, GSM and the allocated mobile number GSM SIM900 module is preferred. The name SIM900 says that, it is a tri band work ranging a frequency of 900MHz to 1900 MHz such as EGSM900 MHz, PCS 1900 MHz and DSC 100 MHz Receiving pin of GSM module and transmitting pin of GPS module are used for communication between the modules and the mobile phone[3].

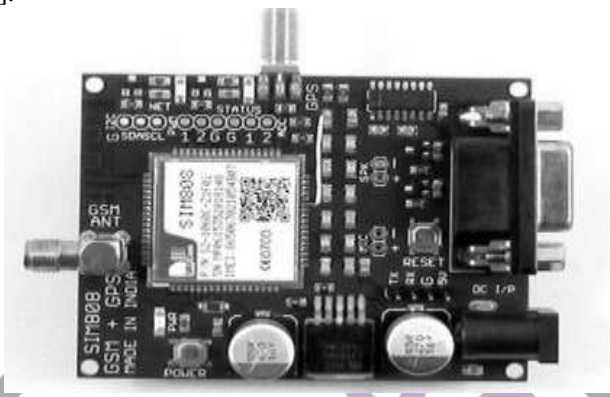

Fig 1. GPS GSM GPRS module

c) GPS MODULE

To discover the area on the earth the entire is isolated into a few directions where the area can be handily caught by a module called GPS module. Here the GPS utilized is SIM28ML. This GPS module will discover the area of the vehicle and the data brought by the GPS collector is gotten through the directions and the got information is first send to arduino and the data is transmitted to the spared contact through GSM module. The recurrence is worked in the scope of 1575.42 MHz and the yield of GPS module is in NMEA position which incorporates information like area continuously.

d) LCD DISPLAY

To display the numbers, alphabets and special characters an LCD module with 16x2 alphanumeric types is used. Using the higher bit data lines of LCD pins such as pin 11,12,13 and 14 are interfaced to digital pins of Arduino such as pin 8,9,10 in 4 bit mode as shown in the below figure. RS and E pins of LCD are connected to pin 12 and 13. To perform the write operation on LCD the read/write pin is connected to ground[3].

e) VIBRATION SENSOR

There are three main types of accelerometers: piezoelectric, piezoresistive, and capacitive MEMS.The working principle of vibration sensor is a sensor which operates based on different optical otherwise mechanical principles for detecting observed system vibrations.

The sensitivity of these sensors normally ranges from 10 mV/g to 100 mV/g, and there are lower and higher sensitivities are also accessible. The sensitivity of the sensor can be selected based on the application. So it is essential to know the levels of vibration amplitude range to which the sensor will be exposed throughout measurements.

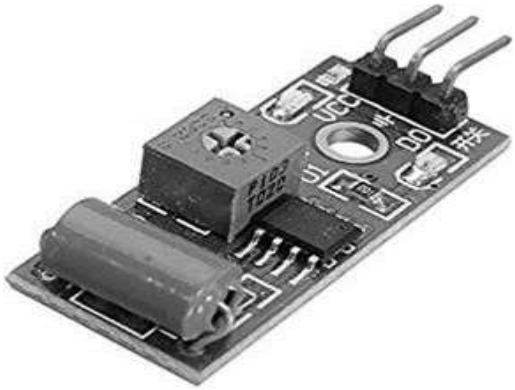

Fig 2. Vibration sensor or Motion Sensor

f) BLOCK DIAGRAM & WORKING

The accident detection project will provide an optimum solution to this drawback. An accelerometer can be used in a car alarm application so that dangerous driving can be detected. It can be used as a crash or rollover detector of the vehicle during and after a crash. With signals from an ultrasonic sensor, a severe accident due to an obstacle can be recognized. When a vehicle meets with an accident or if a car rolls over, the accelerometer and ultrasonic sensor detects the signal and immediately sends it to microcontroller. Microcontroller sends the alert message through the GSM module including the location to police control room or a rescue team. So the emergency help team can immediately trace the location through the GPS module, after receiving the information. The location can also be viewed on Google maps. After conforming the location necessary action is taken. If the person meets with a small accident or if there is no serious threat to anyone`s life, then the alert message can be terminated by the driver by a switch provided in order to avoid wasting the valuable time of the medical rescue team.

V. FUTURE SCOPE

This project is useful in detecting the accident precisely by means of both accelerometer and ultrasonic sensor. As a future implementation a wireless webcam can be added for capturing the images of the accident scene.

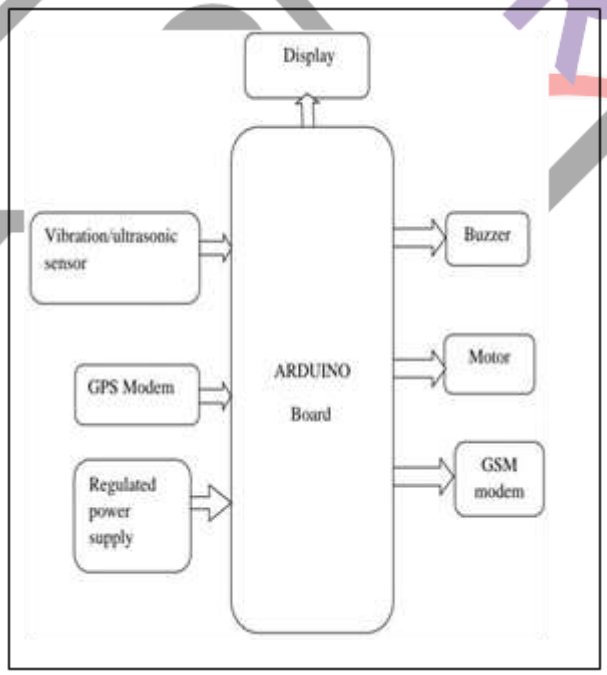

Fig 3. Block diagram of accident detection system

IV. RESULTS & CONCLUSION

The proposed system manages the accident alarming and identification. Arduino is the core of the framework which helps in moving the message to various gadgets in the framework. Vibration sensor will be initiated when the accident happens what's more, the data is moved to the enlisted number through GSM module. Utilizing GPS the area can be sent through following framework to cover the land arranges over the zone. The accident can be identified by a vibration sensor which is utilized as significant module in this system.

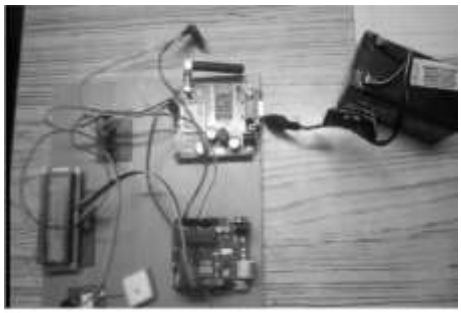

Fig 4. Interconnections of modules

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