

Sensor Technology for Accident Detection

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Abstract: As we know automobile industry is currently booming in india due to which number of vehicle also increasing day by day. In financial year 2019 approx 4.4 million cars were sold in india due to rise in number of vehicles rate of accident is also increasing. In year 2018 almost 1.5 lakhs lives were lost due to car accident. In our country many people still hesitate in helping a road accident victim because of legal formalities due to which many people loose there lifes. This project will help in detecting the accident and calling the medical assistance as soon as possible with the help of different sensors and Arduino uno. The aim of this project is to provide for the necessary aid to the victim and inform and report the accident in the least possible time by using IOT and sensors

Keywords: Internet of Things (IoT), Wireless Sensor Network (WSN), ADXL, GPS Receiver, GSM, AT (attention) commands.

I. INTRODUCTION

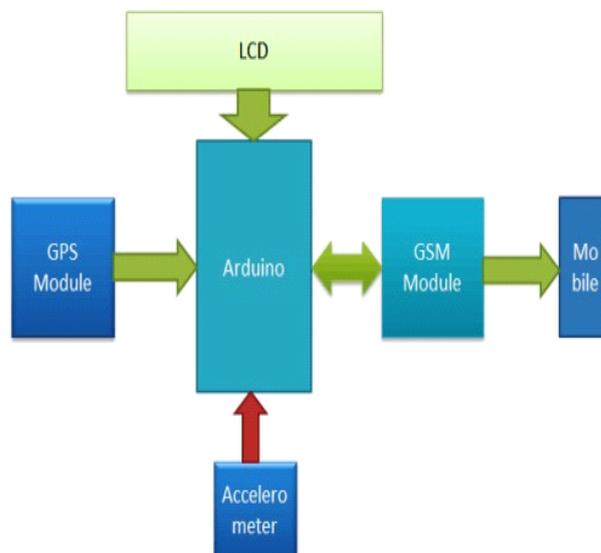
As number of accidents are increasing we need to develop a model which can be used to report the accident in less time. Reporting the accident immediately to help the victim is still a major issue in our country. So to automate this process we have a design in which we will place a device in the middle of the vehicle which will detect accidents in real time and if accident is detected by any sensor then it will send the basic information like current location (detected by the GPS module) in form of google map link, Time of impact to the respective helpline numbers (fire brigade, ambulance, police) and personal contacts of the person (by means of the GSM module) within a few seconds by using cellular networks. After receiving the emergency message medical team will confirm that they are heading towards location or in case if they can't assist the victim they will pass the message to another team. This alert message is sent in a less time, this alert can save the precious time which can be used to give medical assistance to the victim.

A Switch will also be provided which will be used to terminate the sending of a message if there is false triggering i.e if due to small bump or error if system is activated then we can terminate it by pressing that switch which will reset the system. So in case of no casualty this will save the precious time of the medical and rescue team. This system can provide solution to lacking emergency facilities in our country and provide accident assistance in the best possible way.

Key features of this system are:

- It can be modified using different sensors like fire detection sensor, alcohol detection sensor and gyroscope to make it more advanced and reliable.
- It can send the alert message to multiple people based on priority that the user decides, also it sends the message offline as text SMS.
- Data will be collected using IOT to analyse it further for different information like average speed, average distance travelled in a day.

II. BLOCK DIAGRAM



III. HOW IT WORKS.

- ADXL_335 is an accelerometer sensor which calibrates the value based on 3-axis (x-axis, y-axis, z-axis) and the value of any of the 3 axes will change then it will sense it as an impact based on a preset threshold value and it will give its output to the Arduino.
- A buzzer will start making a beeping sound once the system is activated and this indicates that the system is ready to send a message in a preset time.

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- Once the preset value will be crossed in accelerometer GPS module will detects the latitude and longitudinal co-ordinates of the vehicle along with other basic information like date , time and speed of vehicle.
- The arduino sends an alert message using the GSM module to the registered contact along with link of location in form of google maps.
- In case of no casualty, we can use the switch to terminate the sending of message. The switch will reset the arduino to start the module from beginning.

IV. HARDWARE COMPONENTS

A. GSM (GLOBAL SYSTEM FOR MOBILE COMMUNICATION):



GSM is an digital and open cellular technology which uses TDMA(time division multiple access) technique for communication process.It is the leading and very commonly used cellular technology currently present and used in the world today. It is mainly very famous because of many reasons like its global reach the capability to roam globally by using cellular technology with the ability to operate on the GSM networks. It is also famous for its compact and little cheap price. SIM900A: SIM900A Module can work on any GSM network provider SIM card similar to a mobile phone which has its own unique phone number. SIM900-A modem uses AT that is attention commands such as "AT" for checking the modem and,"AT+CMGF=1" for activating sms control.

B. GPS Module:

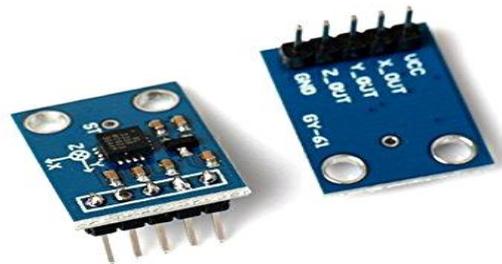


GPS(Global Positioning System) is a system which helps us detect the location of any object on the ground and provide a geolocation as well as the information of the time to a

receiver on the Earth. Thus, helping us keep a track of the vehicles running on the ground. It has low power consumption characteristics and uses 16mA for acquisition and almost 15mA for tracking. It supports different location and navigation application like SBAS, QZSS ranging and RTCM. It has a total of 22 trackings and 66 acquisition channel and has almost 210 PRN channels. it can operate on a temperature range of -40 to +85 degree celsius. SIM28ML:-This GPS receiver modem is based on SIMCOM's SIM28M/SIM28ML GPS module. SIM28M module is a standalone GPS receiver. With built in LNA, SIM28ML don't need an external LNA. SIM28M can also track low signal with no network assistance in the range of -165dbm. It also has very low power consumption requirement it uses only 16mA current during tracking.



C. Accelerometer Sensor Module:



It is a device that is used to measure the proper acceleration. The acceleration is given in two or three axis vector component that add to give the net acceleration. We can define our own preset threshold value which will be used to detect the changes in any axis. Here we are using the ADXL_335 sensor. ADXL335:-The ADXL335 is a complete 3-axis accelerometer which is very compact in size (4mm x 4mm x 1.45mm) in size and consumes very low power (350 micro ampere) and it works on single supply which range from 1.8 to 3.6V.. The product generally measures the acceleration on a range of +3 g to -3 g. It can measure both type of acceleration i.e static acceleration and dynamic acceleration based on motion of object , shock on object or even vibration occurred in object. we can set the calibrated value and by using these value we can set the threshold on which we want to activate the GSM modem.

