VEHICLE VETTING SYSTEM

Harsh[1], Sachit Bandhu[2], Saurav Panwar[3], Siddhant Saxena[4]

[1234]*Student, Department of Electronics & Communication, IMS Engineering College, Ghaziabad, India*

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Abstract: The aim of our project is to provide the medical aid to the accident location as soon as possible by means of sending the coordinates of the location where the accident has been occurred. It's a cost efficient system that why we use cost efficient modules. Instead of heavy controller board we use a systematic Arduino Uno Board .In this System We use a combination of GSM and GPS module which send the location to the local authorities .For batter accuracy we can use GLONASS but GPS system is more reliable

Key words: GPS (Global Positioning System); GSM (Global Service for Mobile Applications); Microcontroller

1 INTRODUCTION

We know that frequency of road accident occurring in our society is increasing day by day. According to the Insurance Institute for Highway Safety (IIHS), new cars and its high-tech safety features have helped to lessen auto related deaths over the past 12 years. Though it credits technology for lessening auto accidents, yet the IIHS cannot help accusing bad driving behaviors like drunken driving, speeding and not using seatbelts for still causing major traffic deaths. Automatic vehicle accident detection and messaging system is an embedded intelligence implanted into the automobile. The Main purpose of this project is to provide medical help and avoid the causality which happens by delay in medical aid. In order to give treatment for injured people, first we need to know where the accident happened through location tracking and sending a message to your related one or to the emergency services. So in this work we are using Arduino Uno Atmega328P for cost effective and also for easy understanding. Here we used assembly programming for better accuracy and GPS and GSM modules which helps to trace the vehicle anywhere on the globe. The exact coordinates of the location is send by GSM module in real time.

2 WORKING PRINCIPLE

Our paper describes about the Automatic Vehicle Accident Detection and Alerting System using GPS and GSM technologies. We are using the basic Arduino Uno Atmega 328P in our project. When the system is switched on, LED will be ON indicating that power is supplied to the circuit. We have integrated glass break detector and two Vibration sensors together in AND gate logic. If one sensor crosses the threshold frequency, (example when a car jump over speed breaker one vibration sensor crosses its threshold value) module will not be activated and message will not be send If both the sensor, glass break detector on breaking the glass and vibration sensor on crossing the threshold frequency", module will be activated The GPS receives the location of the vehicle that met with an accident and gives the information back. This information will be sent to a mobile number through a message. Now the GSM module comes in scenario and send the message to the local authorities. The coordinates of the location is contained in the message. Using these values the position of the vehicle can be estimated. Modulation and demodulation is performed by Modem during transmission and reception respectively. The Working of GSM module is quite similar to the mobile phones instead of speakers and display GSM module has only communication medium. Feedback is given in the form of message to the cell phone. LCD used in the circuit displays the reception of messages

Most digital logic circuits and processors need a 5 volt power supply. We use a 12v power supply to actuate the GSM module at above this voltage module may be heat up and burnt.

3. GLOBAL POSITIONING SYSTEM

Global Positioning System is developed by the UNITED STATES in 1995. GPS System is working on 24 satellites in which Twenty two Satellite are in active mode. First GPS Technology is launched for only defense organization but after that it is use for commercial purpose. Military uses

GPS technology for security purposes. But in the 1980s, the government made the system available for civilian use. GPS is working in any condition any weather without any charges. It does not require any setup charges or subscription charges. GPS. Distance = Velocity * Time here Velocity of the GPS signal is the speed of light, approximately 300,000 Km/s.

Fig-GPS Module

3.1 FUNCTIONS OF G.P.S.

The Global Positioning System satellites transmit the signals directly on the ground base. GPS receivers passively receive all satellite signals they are not design to transmit signal to the satellites. GPS receivers works only in clear environment, so they often do not perform well in large obstacles. It does not require any need for dependency of GPS on very precise time, that atomic clock provide. GPS satellite transmits data that directly indicates the location and the current time with proper coordinates of the location. The signals which contain the speed of light are slightly different to each other just because not all satellite are in same position .The distance to the GPS satellites can be determined by estimating the amount of time it takes for their signals to reach the receiver. When the receiver locked at least four GPS satellites, it can calculate its position in three dimensions. There are 24 satellites which continuously track the GPS receiver at time. The satellites, operated by the U.S. Department of Defense, orbit with a period of 12 hours (two orbits per day) at a height of about 11,500 miles travelling at near 2,000mph. Ground stations are used to track the satellite which are present in space, the minimum no of satellite which has to be locked to track the coordinates of the location are 4.

3.2 ACCURACY OF G.P.S.

The accuracy of GPS receiver is depends on the type of GPS Receiver Module. Mostly the accuracy range of GPS is about 10 to 20 meters .DGPS (differential GPS) types of GPS Receiver has high accuracy. DGPS requires an additional receiver fixed at a known location nearby. Stationary receiver is used to provide precise positions, and also produce accuracy more than 1 meter. At the early stage when GPS was created there is a limited use for non-military users and the accuracy was manipulated by adding the timing errors in module. This problem is eliminated by GPS module by May 2000

4. GLOBAL SYSTEM FOR MOBILE COMMUNICATION

GSM is a technology that is used for voice communication and for data communication. It is a digital technology. GSM needs base transceiver station module to communicate with the mobile device. The mobile device can change base transceiver station based on coverage and capacity. GSM operates in different frequencies band, 900 MHz and 1800 MHz allocate for GSM communications and Canada use 850 MHz and 1900 MHz for GSM. First, generation GSM used 400 MHz and 450Mhz. GSM contains Technologies like TDMA-Time Division Multiple Access. This technology is used widely, compares to CDMA.

Fig-: GSM Module

4.1 HISTORY OF G.S.M.

GSM is a cellular network technology which was introduced in earlier 90. GSM technology introduce the 2nd generation of mobile communication basically GSM networks operate in four different frequencies range but

the most common frequency range of GSM technology are 900 and 1800 Mhz. Some countries in the north Americas (including Canada and the United States) use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands were already allocated. But some countries like Scandinavia, use 400 and 450 Mhz because these frequencies were previously used for first-generation systems. The whole frequency is divided into two parts Uplinks frequency and Downlink frequency, the uplink frequency for GSM900 is 890- 915 MHz and the downlink frequency is 935 to 960 MHz channel bandwidth for GSM is 25 MHz which is subdivided into 124 carrier frequency channels and 200hz apart from each other. Time division multiplexing is used to allow eight full-rate or sixteen half-rate speech channels per radio frequency channel. There are 8 different time slots grouped into what is called a TDMA frame. Half rate channels use alternate frames in the same timeslot. The transmission power in the handset is limited to a maximum of 2 watts in GSM850/900 and 1 watt in GSM1800/1900 .GSM technology has increase data rate in compare of analog technology. Originally, two codec's, named after the types of data channel they were allocated, were used, called Half Rate (5.6 Kbit/s) and Full Rate (13 Kbit/s). In addition to being efficient with bitrates, these codec's also made it easier to identify more important parts of the audio, allowing the air interface layer to prioritize and better protect these parts of the signal. 4.2 GSM Features • Mobile Frequency Range Rx: 925-960; • Tx : 880-915 • Multiple Access Method : TDMA/FDM • Duplex Method : FDD • Number of Channels :24 (8 users per

5. ARDUINO

Arduino/Genuino Uno contains ATmega328p IC. It contains digital 14 I/O pins. Arduino UNO works with 16 Mhz Quartz crystal. Microcontroller have operating voltage of 7-12. It have 6 PWM Digital I/O Pins. The flash Memory is of 32KB(in which boot loader use 0.5 KB). Arduino helps to connect microcontroller to computer via USB cable. AC to DC adapter is used to power up the arduino.
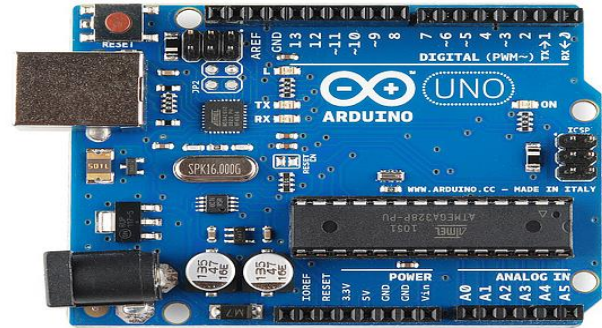

Fig-: Arduino Uno

6. VIBRATION SENSOR

Vibration sensors also known as piezo sensor are used for measuring, displaying, and analyzing linear velocity, displacement and proximity, or acceleration. It measures the change in above parameters by converting the change into the electrical signal .These sensor used in industries and many other applications, like in medical science, aeronautical and nuclear reactor instrumentation, and also in consumer electronics.

7. GLASS BREAK DETECTOR

A glass break detector is used to detect a broken glass. These sensors are commonly used in stores, to detect the broken glass, for safety purposes. It takes analog value and gives a digital value to microcontroller.

8. APPLICATION

1 Theft Control: with the help of GSM, integrate into the device, we can easily track the stolen vehicle. By this we can easily catch the thief and can control infringe activities

2. Goods surveillance and security: the path of a vehicle carrying goods can easily be tracked which ensures that the goods have been delivered to the right person.

3. Reduce death count: in 2013 about 1,30,000 people died in road accident which is more than the people that died in wars providing medical aid to the victim can reduce the number of death.

4. Ambulance traffic management: Vehicle vetting module will provide the location of accident spot. This will help the traffic police to control and manage the traffic so that ambulance can reach the hospital in the minimum time.

9. CONCLUSION

The aim which was to provide the low cost lifesaving module has been successfully achieved and the accident location and information of causality has been send to local authority in real time. The interfacing of GSM and GPS send the coordinates of location with the help of Arduino. The coordinates can be easily decrypted in Google map and it will give us real location in real time

10. ACKNOWLEDGMENT

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