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Vehicle accident detection System using GPS & GSM

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Abstract -This paper presents a review on the accident detection techniques and some future possibilities in this field. Now-a-days lots of accidents happen on highways due to increase in traffic and also due to rash driving of the drivers. And in many situations the family members or the ambulance and police authority is not informed in time. This results in delaying the help reached to the person suffered due to accident. Road accidents constitute the major part of the accident. The purpose of the paper is to find the vehicle where it is and locate the vehicle by means of sending a message using a system which is placed inside of vehicle system Most of the times we may not be able to find accident location because we don't know where accident will happen. This paper Real Time Vehicle Tracking and Accident Detection with GSM is designed to avoid such situations.

Key Words:GSM, Tracking, Micro electro mechanical systems (MEMS)

1.INTRODUCTION

The development of a transportation system has been the generative power for human beings to have the highest civilization above creatures in the earth. Automobile has a great importance in our daily life. We utilze it to go to our work place, keep in touch with our friends and family, and deliver our goods. But it can also bring disaster to us and even can kill us through accidents. Speed is one of the most important and basic risk factors in driving. It not only affects the severity of a crash, but also increases risk of being involved in a crash. Despite many efforts taken by different governmental and non-governmental organizations all around the world by various programs to aware against careless driving, yet accidents are taking place every now and then. However, many lives could have been saved if the emergency service could get the crash information in time. As such, efficient automatic accident detection with an automatic notification to the emergency service with the accident location is a prime need to save the precious human life.

This paper proposes to utilize the capability of a GPS receiver to monitor the speed of a vehicle and detect an accident basing on the monitored speed and send the location and time of the accident from the GPS data processed by amicrocontroller by using the GSM network to the Alert Service Centre.

2. GPS&GSM

2.1 GPS

Global PositioningSystem[1] was developed by the United States' Department of Defence. It uses between 24 and 32 Medium Earth Orbit satellites that transmit precise microwave signals. This enablesGPS 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.

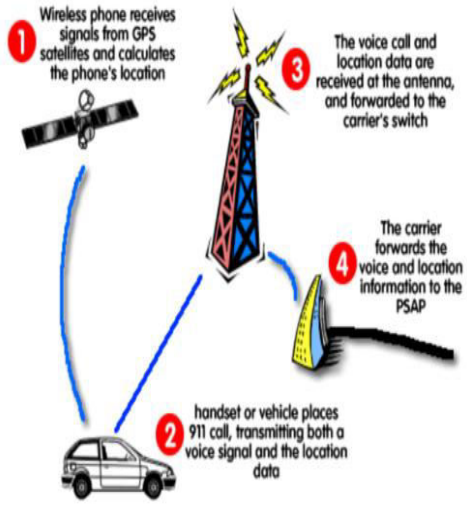

Fig -1: GPS SYSTEM

Fig -2: GPS Module

2.2 GSM

GSM (Global System for Mobile Communications, is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second generation (2G) digital cellular networks used by mobile phones. General packet radio service (GPRS) is a packet oriented mobile data service on the 2G and 3G cellular communication system's global system for mobile communications (GSM) where protocols means set of invisible computer rules that govern how an internet document gets transmitted to your screen and 2G is short for second-generation wireless telephone technology and provides advantages like to provide the services such as text messages, picture messages and MMS (multimedia messages). In simple language, GSM is primarily used to carry your voice on cell phone networks that uses that type of technology. GSM also introduced a series of features such as short messaging service (SMS), international roaming, fax and data messaging services. Another popular feature was the ability to let users download ringtones, logos, photos, that enabled the users to personalize their phones

Fig -3: GSM Module

3. EXISTING SYSTEM

Road accidents are a human tragedy. They involve high human suffering and monetary costs in terms of untimely deaths, injuries and loss of potential income. There are so many new techniques such as Antilock Breaking System (ABS), Adaptive Cruise Control (ACC), and Anti Collision System (ACS) to avoid accidents and in spite of all this, such large number of accidents takes place. Hence this paper presents a system which gives an idea about what can be done to provide medical help and other facilities after accident as soon as possible.

The drawbacksof this type of detection system is that

- Someone has to witness the incident.
- Moreover, there are delays and inaccuracies due to the expression problem of the witness.

4. PROPOSED SYSTEM

In this we have interfaced MEMS sensor with Arduino. If the MEMS got tilted then it mean to accident occur. Then the gps will track the location and will send to the number defined in the program by using GSM.

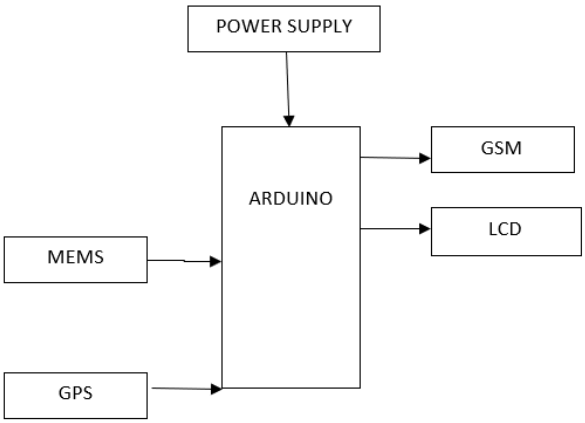

Fig - 4: Block Diagram

5. MEMS SENSOR

The MEMS accelerometers [4] can be divided into two important micro system architectures: piezo resistive and capacitive.

Fig -5:MEMS Sensor

Even though both of these two types of accelerometers possess internal proof masses which are excited by acceleration, the differences of these two architectures lie in the transduction mechanism which is used to the movement correlation of the internal proof mass to accelerate.

The Capacitive accelerometers possess a differential capacitor whose balance is disrupted by the proof mass movement. Piezo resistive accelerometers commonly rely on inducing, which attach the proof mass to the sensor which is used for identification of the movement of the mass.

Fujitsu successfully developed the 'FAR-S2AB' series, 3-axis Accelerometer, using state-of-the-art MEMS technology. This small and highly sensitive accelerometer can detect acceleration, inclination and vibration by measuring the motion in the x-, y-, and z-axis simultaneously. The MEMS 3-axis accelerometer consists of a Mass at the centre of the sensor's chip, which is suspended by 4 Beams doped with Piezo resistive material.

By sensing the mounting angle, the sensor can assist in compensating for the devices mounting angle, and therefore makes it possible to use ACCELEROMETER FACTSHEET MEMS [5] 3-AXIS ACCELEROMETER normal SMD technology in high density boards, and also to realise the precise detection of the inclination angle. An interface IC within the sensor package also has temperature sensing and self-diagnosis functions.

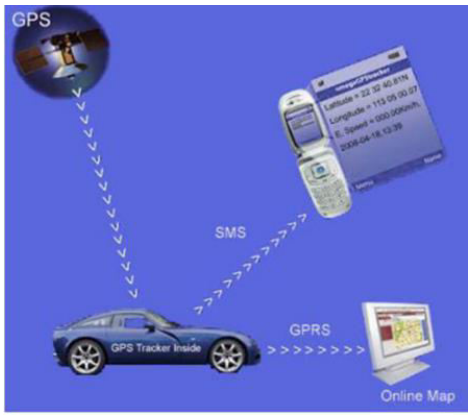

Fig -6: Tracking system using GPS and GPRS data

6. RESULTS

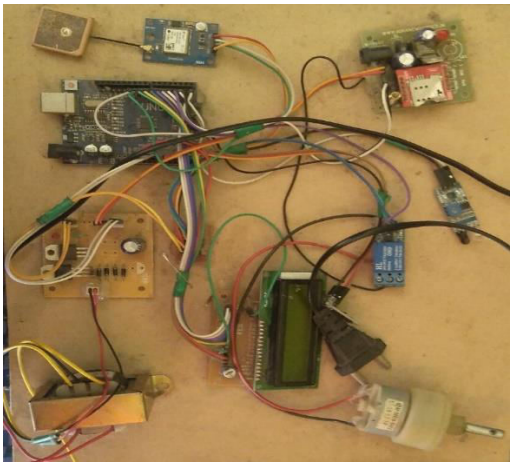

Fig -7:Hardware Kit

Fig -8:When the vehicle is in normal condition

Fig -9:When the car takes a tilt

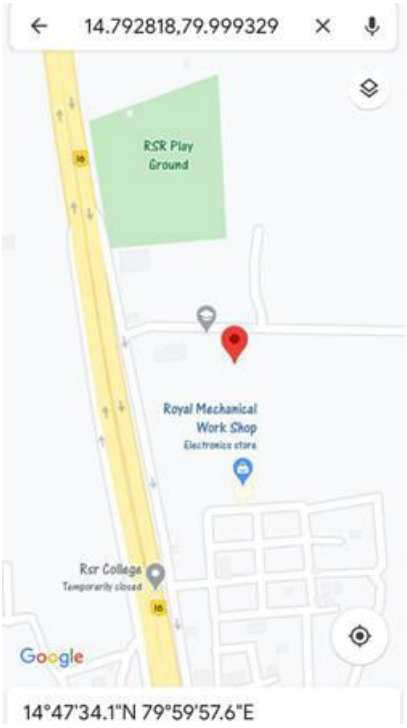

Fig -10:Google mapping

Fig -10:Text message received through GSM

6. CONCLUSION

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.

Main motto of this paper is to decrease the chances of casualties in such accident. Whenever accident occurs, paramedics are alerted and they reach the particular location to increase the chances of saving life.

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