AUTONOMOUS AND AUTOMATIC ACCIDENT RECOVERY SYSTEM USING GPS AND HAM RADIO

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ABSTRACT

In most of the cases, accident is due to sudden shock they acquire by seeing the vehicle coming in opposite direction or by having an obstacle when they are driving in full speed or by having time laps keeping their lives and other's in risk. Hence in this paper we are proposing automatic accident detection and rescuing technique by using an alarming circuit in vehicle driven along with GPS module, sensing elements and Ham radio.

Keywords: Accident Detection, GPS module, Ham radio.

INTRODUCTION

In most of the fatal accidents typical accelerations experienced by the passengers inside the vehicle exceeded three time the gravity(9.8 m/s^2). Due to this the passengers undergo a blackout due to loss of consciousness. After the collision impact, they tend to remain in that unconscious state which may become fatal to the victim. In some cases, when accidents occur during night times, it is even more critical to reach the victim in time. In such cases, immediate treatment is needed for the victims in order to save their lives. Once after the impact has occurred every single second is important for the victim. The time elapsed between the accident and the start oftreatment to the victim is considered as the 'golden hour'. Hence, if there exists an autonomous device which can sense the collision and sends an alert message to the required authorities, then the chance of saving the life of victim will be more.

According to the data collected from the US department of transportation-National Highway Transport and Safety Authorities (NHTSA), most of the fatal accidents occur during the collisions occurring with an end velocity of 56kmph and above. A large sudden change in velocities occurs in a short period of time which is typically in the order of milliseconds. Due to this the vehicle and the passengers inside undergo a large acceleration. This may lead to unconscious stage of victim. Not only this acceleration but also the heavy impact collision at such speeds causes the fatal damage to the vehicle and passengers. At some situations, they may get trapped inside the vehicle.

In a large country like India there is much kind of places like hilly area plateaus, abandoned roads and due to improper road facilities accidents are more and death rate due to these accidents is

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more. India faces the highest number of accidents and accidental fatalities in the world. The maximum accidents in India are reported from the transport sector i.e. Road ways and Railways. According to planning commission of India, the total economic loss is 2.5 percent of India's GDP due to rise in the number of accidents. According to the Hindustantimes[6] magazine, for every 3 minutes an Indian dies in a road accident. As per the 2012 statistics given by Government of India[7] nearly 5 lakh people faced the accidents and among them nearly 1.5 lakh people have faced fatalities by noting the accident severity(number of persons killed per 100 accidents) level to 28.2.

India's status as a world leader in accidents is a national shame. Some part of the death rate can be reduced by taking simple measures like enforcing the traffic rules strictly, which is conspicuous in our cities as well as in national highways.

Today in this modern world every individual running after time seeing his own safety and does not caring for others. If an accident occurred also some of us might leave them as they fear for some of the issues leading to death of the individuals indirectly.

The main objectives of this paper are

• To reduce the Human Death Ratio due to road accident in India.

• If an accident takes place, fast indication by message to emergency care centers to intimate about the accident and location of the accident.

• To provide maximum assistance even in the unpopulated area.

The GPS and HAM Radio devices[1] and other sensing elements are interfaced with the microcontroller for control and operation of these devices. An algorithm is designed, developed and burn into the microcontroller. Whenever the vehicle meet with the collision the interfaced devices like the GPS module[8] responses and converts the mechanical vibrations into corresponding electrical signals these are immediately processed to generating digital pulse of 5V which acts as a trigger signal for the microcontroller. The microcontroller continuously polls for this pulse and generates a alarm for a certain delay. After this delay has been crossed it immediately obtains the GPS data regarding the latitude longitude of the location from the GPS module and frames into the form if voice message for the HAM radio. These voice messages are sent to nearby police stations and ambulance services.

TECHNOLOGIES CURRENTLY USING

Many of the European countries have already implementing this accident deduction technique under the name of Crash recovery system[5] by designing a software module and implementing ineach and every vehicle that travels on the European roads including the railway network.

In India also few proposals[2][3][4] have been made by many of the engineering students regarding this accident deduction system. We have studied all those technique and took as an inspiration to design this accident deduction technique by overcoming some of the lapses covered by previous papers.

WORK IMPLEMENTATION

This technique is implemented by using the GPS and Ham Radio that alert all the emergency centers when an accident occurs in a deserted area. When an accident occurs, firstly the alarming circuit gives an warning signal up to certain period of time (say 1 minute or 2 minutes). If the accident happened can be a recoverable one the driver or individual in the vehicle can stop the alarm within the delay period that has been introduced during the programming in the microcontroller. If the accident happened is a serious one and could not be recovered implies the alarm could not be stopped within the specified delay mentioned in the program. After this step the location will be trapped by the GPS system that has been interfaced with the module and in turn it transmits the latitude, longitude of the location to the Ham radios along with the emergency centers. This part of implementation comes for the frontend collisions. An accident can occur fromthe all the cases. In this regard we are implementing this part by placing distance sensors where another vehicle coming in the back and to the side will be limited to a certain gap with the vehicle and whenever the gap shortened alarm will be rang and the driver gets into action either by stopping the car or by giving way to the other vehicle.

This method of implementation also requires certain amount of time to work but it will be helpful during night time journeys in the deserted roads.

Whenever the vehicle hit forcefully, due to this force the vehicle may stop and the alarm circuit may fails. For this we are keeping backup power supply for this circuit such that even if the car stopped by the hit the circuit will function up to certain duration (say 10- 15 minutes).

ALARMING CIRCUIT

The alarming circuit is built around AT89C51 (8051) microcontroller. The sensing elements that are placed on all sides of the automobile are interfaced with the microcontroller by setting an optimum distance for each sensor based on their placement in the automobile. And then the output is driven by using a driver IC ULN 2003 to the alarming part namely a buzzer. The circuit can be shown as
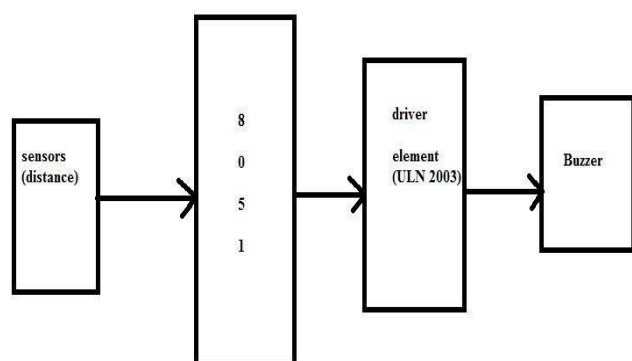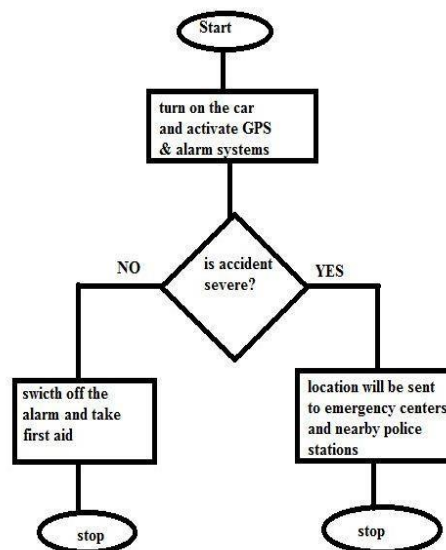
FIGURE: Alarming circuit

V.FLOW CHART:

CONCLUSION

The entire works have to be integrated with the automobile to validate its functionality and reliability. Thus this work will reduce the accident death ratio to a considerable amount even in unpopulated rural areas and it has a great importance in day to day life of the people in large countries like India.

Thus this work can provide vital information about the accidents that occurs even in unpopulated or abandoned roads so that emergency care center could be able to serve victims in a better way than before with better efficiency.

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