

Accident Detection and Avoidance System Using GPS and GSM



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ABSTRACT

Accident detection and messaging system is proposed to inform the Ambulance and Police of the accident site and arrange for necessary steps to control the situation. This system is not only efficient but also worthy to be implemented. The system can be fitted in the vehicle. Ambulance or the Police as well as the concern people whose contacts are provided by the user are informed about the incident when it occurs. The system also keeps track of the consumption of alcohol by driver and alerts him to stop the vehicle if he is drunk or drowsy. Headlight also turns off and on automatically according to surrounding light intensity. Also ultrasonic distance meter is implemented to measure the distance between the car and the other object to avoid collision.

Keywords: GPS and GSM module, alcohol sensor, ultrasonic distance meter.

ARTICLE INFO

Article History

Received :5th April 2016

Received in revised form :

7th April 2016

Accepted : 9th April 2016

Published online :

11th April 2016

I. INTRODUCTION

The Rapid growth of technology and infrastructure has made our lives easier. India had earned the large distinction of having more number of fatalities because of road accidents in the world. Road safety is emerging as a major concern around the world especially in India. The growth in technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life as well as property because of the poor emergency facilities. The main ambition of this paper "Accident Detection with GPS and GSM modem" is to provide prompt help to road users at the time of accidents. Drinking and driving is already a serious public health issue, which is likely to emerge as one of the most significant problems in the near future. The important role of alcohol in traffic safety has made controversies. A drunk driver may become a murderer as he cannot perform his tasks without risks and dangers of road safety. An intensive drive against drunk driving is the need of the hour to promote road safety. It important to bring about new steps for road safety. After drinking, the judgment power of the driver gets reduced which is a threat to road safety. Due to its effects, the driver takes more time to react. Our ambition is to curb drunken driving. When the car hits an object and the driver is hurt the GPS module finds the location of the car and send the location to the ambulance as well as relatives of the driver.

An alcohol sensor will detect the alcohol content in the driver and switch of the vehicle. The ultrasonic sensor will find the distance of obstacles surrounding the car and help to avoid collision. The headlights of the car are automatically adjusted as per the requirement.

II. LITERATURE SURVEY

The proposed system design has been developed by having an overview of wireless black box using MEMS accelerometer and GPS tracking system. It is developed for accidental monitoring. The system consists of components such as an accelerometer, microcontroller unit, GPS and GSM module. The family member, emergency medical is alerted accordingly. To detect fall or accidents, threshold algorithm and speed of motorcycle are used. The system developed by him is compact and easy to install under rider seat. The system has been tested in real world applications using bicycles. The test results show that it can detect linear fall, non-linear fall and normal ride with high accuracy ^[1]. Also the serious phenomenon for drunk driving, a MCU electronic circuit board is used in the system. ADC0809 is used for the detection signal which is converted to digital signal and handled directly by MCU. With alcohol sensor MQ303A, the alcohol concentration is detected. According to the digital signal, the vehicle or

car is controlled automatically and can't be driving after driver's drinking, thus it avoids the occurrence of drunk driving [2]. One more system is analyzed, tracking of vehicles is done and useful in many applications including security of personal vehicles and public transportation systems. Using fleet management and others, short message is sent for indicating the position of vehicle. This system provides users with the capability to track vehicle remotely via mobile network. This paper presents the development of hardware prototype of the vehicle tracking system. Specifically, the system uses GPS to obtain a vehicle's coordinate and transmit it [3].

After analyzing theory related to corresponding system "ACCIDENT DETECTION SYSTEM", work on the system has been carried out. The system was designed for a vehicle with GPS and GSM module, so that the module detects the vibrations when accident takes place and sends its current location with the help of GPS module to respected recipients. Ultrasonic distance meter, in this system, is used for measuring the distance between vehicle and the obstacle which coming nearby and which helps driver to avoid collision between the two by automatically stopping the vehicle.

Alcohol sensor is also used as an avoidance parameter as if the person sitting in the car who has consumed alcohol beyond preset limits, the car will not start and future complications have been avoided.

III. METHODOLOGY

5.1 Block Diagram

In this project we are going to use four patti switches which will be fitted on all four sides of the car. In case of accident, if the car hits some other vehicle or an object then due to the impact a signal will be sent to microcontroller. Microcontroller is the central processing unit CPU of the system. Once microcontroller gets this signal, then it immediately turns on the buzzer.

A key is provided for the driver. If the accident is very normal, or driver has hit the wall in some situations like parking then driver can press the key. This informs the microcontroller that this is a very normal accident. But if driver is not in situation to press the switch or if the accident is really a major accident then driver do not press the key.

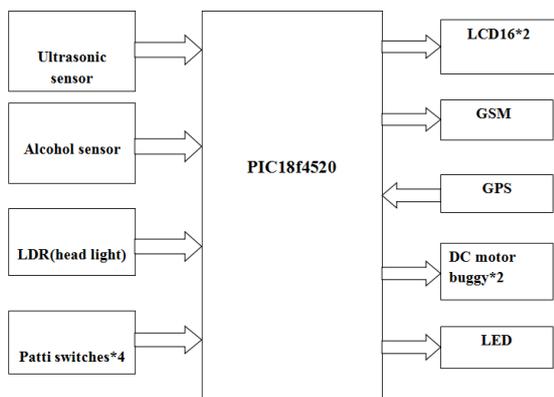


Fig. 1 Block Diagram.

Then microcontroller gets the coordinates from the GPS modem and sends this information to the GSM modem. GSM modem is used to send this information via SMS. SMS will be sent to the emergency numbers which are provided by the user, so that those persons can take immediate action to help the persons suffering due to this accident. The second objective provides a unique method to curb drunken people. The system has an alcohol sensor embedded on the steering of the car. Whenever the driver starts ignition, the sensor measures the content of the alcohol in his breath and automatically switches off the car if he is drunken more than the presets. In this system the sensor delivers a current with a linear relationship to the alcohol molecules from zero to very high concentration. The output of the sensor is fed to the microcontroller for comparison. If the measured value reaches the threshold, relay cut off automatically and the buzzer produces sound. There is an ultrasonic sensor which detects the distance and help in avoiding accident. The front headlights of the car can be automatically adjusted when there is no light then the light will turn on and if there is too much light the light will correspondingly turn off or dimmed.

CIRCUIT DIAGRAM

The proposed system is firstly designed on proteus_vsm_7.4 professional and the working of the system and PCB layout is analysed using HTC compiler. The circuit schematic of the overall design is shown in Figure 2.

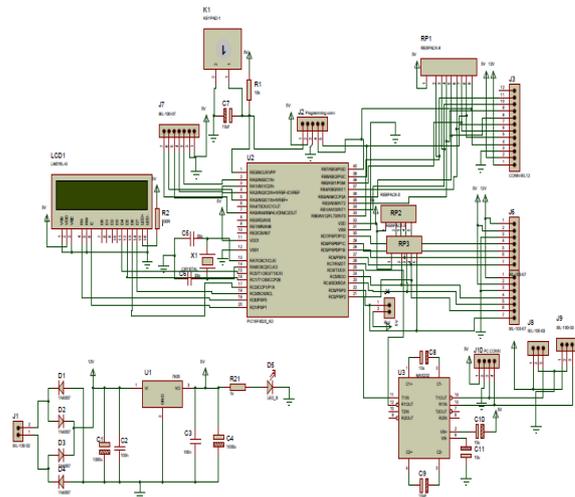


Fig. 2 Circuit diagram

The design is simulated by providing reset, clock and inputs. Inputs to the system, here, are provided using on/off switches. Some sensors are not available on proteus hence their output is verified practically and not using proteus.

IV. CONCLUSION

In this paper, a system has been developed to detect an accident and reported it to a call center. The end product

will be able to decrease emergency vehicle response time and possibly save someone's life.

The system has designed to increase the accuracy while cutting down the total cost. The system also uses the low power components in order to save the battery power which may be used for some other critical tasks. Sensors and the switches/other components used in system is distributed throughout the car hence provides more flexibility while mounting into the vehicle. Overall this system has increased the performance from every perspective which could be possible. The proposed system can also be used for traffic estimation and accidents survey in the country by health department with slight modification.

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