

Smart Vehicle Accident Collision Detection System

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Abstract: Due to the large increase in the technology, the life is becoming easier to live. The Higher advancements in the population had also increased the traffic hazards. The smart vehicle collision accident detection system is designed to monitor the vehicle at real time in any location. If there is any occurrence of the accident, this system will provide immediate notification of location through messages by the emergency contacts. The embedded proposed system uses the arduino microcontroller and with the sensor of ultrasonic. This ultrasonic sensor is used to detect the distance of the obstacles from the vehicle to vehicle. By any chance of occurrence of the accident, the Global system for mobile communication (GSM) and Global positioning system (GPS) will be incorporated with the arduino for location tracing and sending the messages to the emergency contacts. To alert the driver the buzzer is incorporated in the vehicle and the display also give the alert information in the vehicle as the safety precaution.

Index Terms: Embedded, GSM, GPS, Ultrasonic, Arduino.

I. INTRODUCTION

Nowadays, due to the increase of the population occurrence of the accidents are more [1]. The manual help at the point of accidents are critical to observe and every minute counts to have our life. The delay of the emergency services due to the location tracing and providing necessary equipment may also lead to death of the people. In the most cases, the accident occurs due to the collision of the vehicle, hence it is very important to keep the strict detection systems in the vehicle. The main motive behind this concept of proposed design is to increase the safety enhancements in the vehicle. To alert the vehicle when the obstacle is nearby will cut off the rate of accidents. Due to this unreliable performance of the devices, the design of this system is developed. This system will automatically observe the obstacles at its distance and at the time interval of accident, the system alert before with the buzzer and indicate the information in the display. The second function is after the accident occurs the location of the vehicle is sent to the specific emergency contacts. This system has the main advantages of 1. Observing the surrounding systems 2. Real time monitoring of the vehicle [2]. For the alert sound, the driver/owner gets the help to take immediate decision and save the life. This solution of the proposed design is deployed in the vehicle with low cost and low complexity and designed to perform under the best requirements of the user. By using the simple solution the

security system gets prior satisfaction from the user in the market.

II. LITERATURE SURVEY

The existence of the current solutions for the safety of the vehicle is very less. The systems with this basic alertness of vehicle collision are high expensive to buy. To utilize the technology, the current natural behaviour of the driver or the vehicle driving person is observed by the tool and provides the required help in his location with identification of the problem [3]. Spurtishinde et al., did the survey on the accident detection system and alerting by the emergency services [4] and states that the cause of accidents are increased the state mortality rate. The tracking of the vehicle using the GPS system in many applications are observed in the web applications and monitors the vehicles continuously[5]. The tracking and monitoring the vehicles with the help of the android mobile system to find the location, distance and the estimated time to reach the final destination is also developed in the android app.

III. METHODOLOGY

The Methodology of the smart vehicle accident collision detection system is shown in the figure.1.

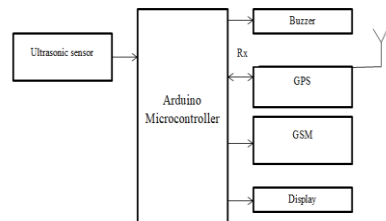


Fig.1. Methodology of the proposed design

IV. PROPOSED WORK

The proposed design of the smart vehicle accident collision detection system is using the ultrasonic sensor as an input. When the obstacle is nearer to the vehicle to collide, the ultrasonic sensor will observe the collision calculation with the help of microcontroller arduino and immediately alert the entire system. The system will increase the buzzer alert to caution the driver and also display the information. If the accident occurs, then the global position system (GPS) will trigger the vehicle latitude and longitude using the transmitter from the satellite by the triangulation method. The receiver of the GPS sends the location details to the microcontroller, and forwards the location along with the message using GSM to the specified emergency contacts. In this way, the proposed design monitors and acts smart in millisecond to reduce the accident occurrence.

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V. HARDWARE REQUIREMENTS

The hardware and software of the system is described in the below following sections

- A) Ultrasonic sensor. The ultrasonic sensor is used to find the distance of the object. By the power of 5V, the sensor gets active in the system. The echo and trigger continuously send the sound pulse wave used to track the obstacle. The figure of the ultrasonic sensor is shown in Fig.2.



Fig.2. Ultrasonic sensor

- B) Arduino

Arduino acts as a single board 32 bit microcontroller used in the electronic devices as a multidisciplinary way. It is more accessible. The hardware of the arduino consists of ATME16U2 Microcontroller with 14 digital I/O and 6 analog I/O pins. The firmware of Arduino is based on the ATME16U2. The arduino is developed by the ATME16U2 which is open source. The software used to code the execution is on Arduino IDE. The arduino is shown in the Fig.3.

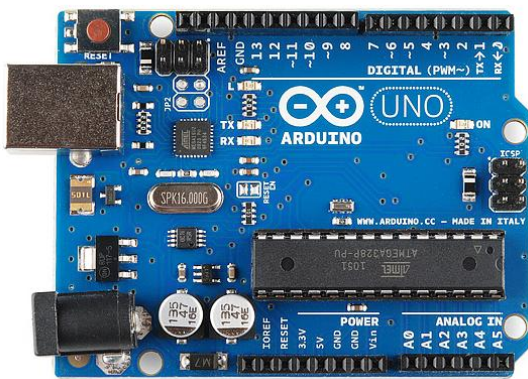


Fig.3. Arduino Microcontroller

- C) GSM/GPRS

Global system for mobile communications/ General packet radio services are based on the wireless communication service. In this device, the data is generated in the form of packets. The connection of the GSM is established between the vehicle and the device triggered by the input send the messages. The GSM/GPRS acts as a SIM in our mobile which is predefined to transmit and receive.

- D) GPS

The GPS module has small electronic circuit allows to connect the circuit to the arduino to get the location of the vehicle. The GPS uses the triangulation method to trace the latitude and longitude. GPS Neo-6m is used in this proposed design. The GPS uses the standard protocol NMEA to transmit the data via serial port

VI. EXPERIMENTAL RESULTS

The experimental results are shown in the below Fig.4,5.

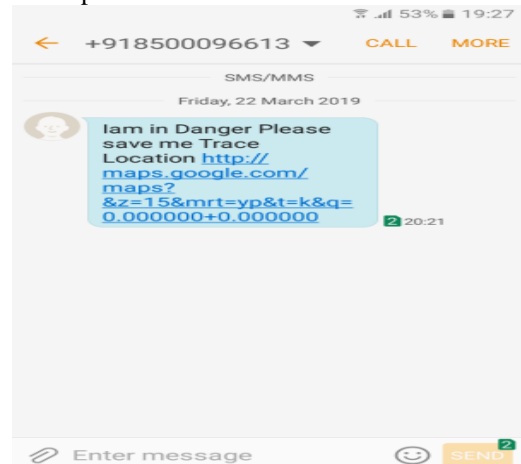


Fig.4. Messages through the GSM



Fig.5. Monitoring Display



Fig.6. Warning Message



Fig.7. Hardware overview of smart vehicle accident collision detection system

VII. CONCLUSION

By the use of the system, the accident detection is easily decreased in the transport systems. By introducing the design and implementing in the vehicle will provide the real time safety at the situation of accidents. This system can be pre-installed by the user for the safety. The experimental results of the design are low at cost and reliable.

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