

Autoronic V2V Anticollision and Accident Alert

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Abstract— “Autoronic v2v Anti-collision and Accident Alert System “is proposed here in order to avoid Vehicular Head to Head/Back and lateral collisions, that finds out the distance between the two vehicles. It incorporates distance finding between two vehicles using an ultrasonic range finder. The vehicle collision and its impact emerged as the major problem in all around the world when the use of the automobile increased to an extreme level. In this project, an accident alert will be produced as in the form, of an alarm when the distance between two vehicles become less than the assigned value. If an accident occurs, then by using a GSM the information is passing to the control police station/nearest hospital or his/her home itself. This system is reliable and cost-effective. These characteristics enable the vehicle anti-collision in an adaptive control environment.

Keywords— GSM, Autoronic, V2V, Accident alert, Anti collision

I. INTRODUCTION

All of us know that we are in the utmost level of development. As days pass our needs are increasing abnormally and we have no time to fulfil them. All are busy; they are not ready to stick on one place, they need to travel from one point to other. So here is the relevance of automobiles. The number of vehicles is increasing day by day. Hence the accident level too. We can't control it by controlling the number of vehicles because it's impossible in practice. In this modern world, vehicle usage is increasing day by day.

All of us know that population in our country is increasing day by day. As population increases our basic needs are also increasing. Traveling is an important factor in our day to day life. Hence as population increases vehicular population is also increasing which leads to a multi-vehicular collision. Due to this accident rate is also increasing.

Road transport in India is very popular for various reasons, but the condition of Indian roads is very poor. The rate of road accidents and fatality in the country is very high. Travel by road provides a lot of flexibility, convenience, speed, and reliability, particularly at short distances in cities and towns.

Therefore, it is the most preferred medium of transport. But Indian roads in cities, towns and those connecting them have been in a worse condition. Their development and maintenance have not kept pace with the growth in vehicular population. Consequently, there are accidents, serious injuries, and deaths all-around. Indian roads are red with human blood.

A multiple vehicle collision is a road traffic accident involving many vehicles. Generally occurring on high capacity and high-speed routes such as freeways, they are one of the deadliest forms of traffic accidents.

All the greatest achievements of the history, automobile are most probably the one which significantly changed human life. The periodical improvement in the technology gives the human race a new height. In the later years after independence the number of vehicles subsequently increased but in the last few years it spreads abnormally in every level of the society hence safety becomes the main factor. Road accidents account a severe threat to the lives in both ways physical as well as financial, even after digital control of the vehicle. However, due to human avoidance, circumstantial error and negligence accidents occur. Many people lost their lives every year in vehicle collision majorly due to drivers' inability to keenly observe the vehicles' vicinity while driving and in traffic condition.

In my project, I have introduced a system which can be used to detect the collision before it occurs and if any case of accident occurs, then by using a GSM the information is passing to the control police station, nearest hospital or his/her home itself. This system is reliable, cost-efficient and fault tolerable. These characteristics enable the vehicle anti-collision in an adaptive control environment.

The paper is organized as follows: section II presents a review of related works, section III

involves overall system requirement, section IV involves system architecture and section V includes results and conclusion.

II. LITERATURE SURVEY

The main purpose of the application of automotive lateral anti-collision warning system is to enhance the active safety of the automobile. When the vehicle is at a high speed, the collision between the car and lateral vehicle or the guardrail is typical of the traffic accident and the fundamental reason is that there is not enough lateral space between two vehicles [1].

The technical aspects of the sensors, their operation and their relationship with a functioning vehicle, the thesis sets out to examine and test the claim that weather detection by means of light and radar data gathering instruments, when used in concert with camera and other terrestrial sensing equipment, can generate a reliable set of data to inform vehicle and cloud based control systems. The integral components for meeting the challenges outlined above, contribute to cooperative driver assistant functionality in particular for driving safety or fuel efficiency, and the creation of a universally accepted, future autonomous vehicle design [2].

The system has to a large extent performed according to design expectations and specifications. The obstacle's distance to the transmitter is predicted by the time of arrival of the reflected signal, while the approaching angle is also determined by the angle of arrival method so employed in the design which was helpful in determining the appropriate positioning of the receivers for optimal system performance [3].

III. SYSTEM REQUIREMENT

The proposed embedded system consists of hardware block contains a transmitter section and a receiver section both of them indicates two vehicles.

1. *Microcontroller:* Arduino Uno microcontroller is used as the central part of the v2v communication system. It has a controller IC ATMEGA 328. The microcontroller has 6 analog inputs, 14 digital

input/output pins. Arduino IDE is the software used to develop the code.

2. *GSM module:* GSM stands for Global System for Communication. Here SIM900 is used, which is a complete quad-band GSM. The key feature of GSM is SIM (Subscriber Identity Module), and it is a detachable smart card.

3. *NRF24L01 module:* Vehicle to vehicle communication is possible by using NRF24L01. It's a 2.4GHz transceiver and having a voltage range of 3.3V-6V. It has a data rate of 2Mbps on air. It has an ultra-low power operation.

4. *Ultrasonic range finder:* Ultrasonic sensor used to find the distance between two vehicles. It has a maximum range of 400cm (4m). It has a precision of 3mm- the maximum possible error of a measurement.

5. *LCD Display:* 16x2 LCD display is used to verify student status at the time of entrance as well as exit. It is compatible with the Hitachi HD44780 driver. It can be easily interfaced with Arduino board. It forms part of school bus subsystem.

6. *Buzzer:* when the distance between two vehicles becomes less than the assigned value an alert will be produced as in the form of the buzzer.

IV. SYSTEM ARCHITECTURE

This system consists of a microcontroller; Atmega 328, ultrasonic range finder, an LCD display, an NRF24L01 module for communicating between vehicles and a GSM module.

The microcontroller receives an echo signal from the ultrasonic range finder.

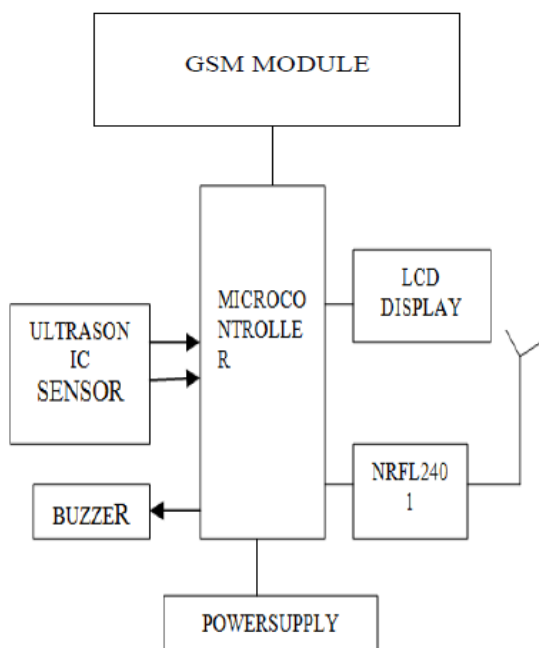


Fig. 1 Transmitter section

Ultrasonic sensors read the distance between 2 vehicles continuously. The output is displaying on the dashboard of vehicles. Vehicles are communicated by using the NRF24L01 module. If any accident occurs, range between 2 vehicles becomes zero. The message is passed through GSM module to related base control police station or nearest hospital or his/her home itself. It is giving as in the following Fig 1.

The receiver section consists of all the components present in the transmitter section except GSM module. Data transmitting from the transmitter can be received by the NRF24L01 module of receiver section. Then the corresponding buzzer in the receiver section will on and produce sound as the accident alert. This is shown in Fig 2.

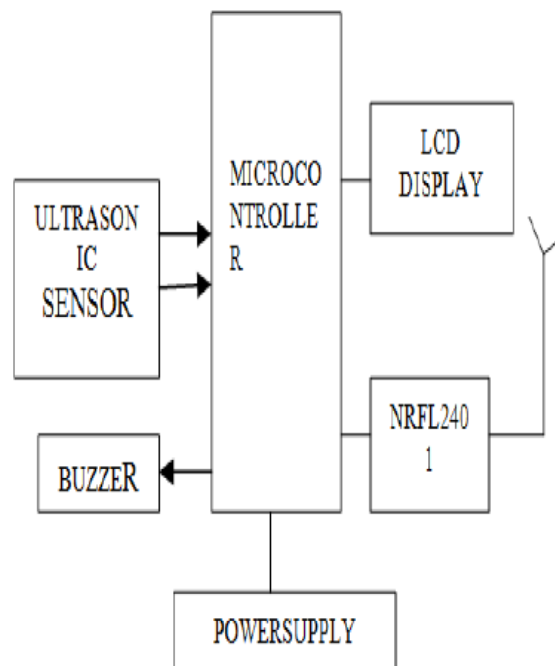


Fig. 2 Receiver section

V. RESULTS AND CONCLUSION

The proposed system provides a low-cost feasible solution to increasing accident rate. In this project Automatic v2v anticollision and accident alert system, range between two vehicles can be detected, if it's less than a particular value buzzer will on and its transmitted through NRF module to the receiver section and its buzzer will also on. If the range is less than 5cm here an accident alert will produce as in the form of a message by GSM. Fig 3 shows implemented the model of the product.



Fig. 3 Implemented model

An accident alert in the form of a message will be sent to the number which is saved in the code. Accident alert is produced by GSM module when the range sensed by the ultrasonic sensor becomes less than 5cm. Fig 4 represents the screenshot of accident alert message which is passing through the sensor.

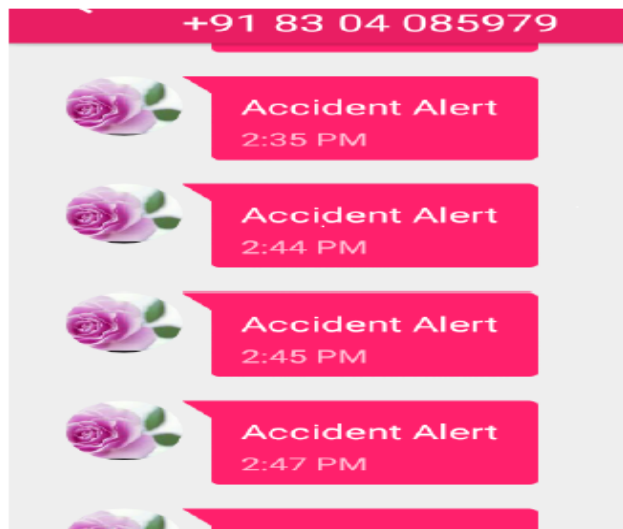


Fig. 4 Accident alert message

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