ISSN NO: 9726-001X
Volume 06 Issue 04 2018

JOURNAL OF CURRENT SCIENCE

ENHANCED DETECTION OF EMERGENCY RESPONSE VEHICLES THROUGH TRANSCEIVERS AND RADIO FREQUENCY

[1]Babu Rao Paddam,[2]Banoth Rama Naik,[3]Dasari. Bhavani

[1] HOD& Assoc.Prof,[2]Assistant Professor,[3]Student
Department of EEE
Abdul Kalam Institute of Technological Sciences, Kothagudem, Telangana.

ABSTRACT- This project proposes an intelligent lane clearance and collision avoidance system as a prototype, which avoids delay and crashing of ERVs (EMERGENCY RESPONSE VEHICLE) and provides greatest security to the ERVs. Here ultrasonic sensoris used to continuously track for any obstacle. If the obstacle is detected then microcontroller will continuously compare the distance given by the ultrasonic sensor. If the obstacle is closer tothe ERVs then a control signal is sent to the nearby vehicle and itsspeed is controlled by the microcontroller placed in the obstacle. The lane clearance is done based on the warning signals given to the nearby vehicles. A warning display unit and sound producing unit is placed on the dashboard of the vehicles. Here RF transmitter and receiver are used to communicate between the two microcontrollers. The Microcontroller used in the project is programmed using Embedded C language.

Keywords : ERV, ultrasonic sensor, IR sensor, microcontroller.

I. INTRODUCTION

There are several advanced technologies which are available for vehicle safety. Even though there are advanced technological innovations for vehicle safety, the growth in number of accidents and increase in death rate due to delay is continuously increasing. And these accidents are due to collision or intersectional accidents and due to delay in reaching the accident spots and to hospitals. Delay of ERVs is because of vehicles not giving side this is becauseof mainly two reasons. They are car's audio and sound isolation mayprevent a driver from hearing an ERV siren. Collision of vehicles occurs due to mistakes done by driver and intersectional accidents are caused due to bad weather conditions and over-speeding. Hence, to overcome these mistakes an intelligence collision avoidance and lane clearance system is proposed. Only sports cars and other luxury vehicles consist of antilock brake system, speed sensor, and other automatic systems. But these cars are not affordable by everyone.

II. LITERATURE SURVEY

Mr. Kiran. N. Patil et al., [1] proposed "Accident avoidance using transmission and reception" an advanced signal recognition system as a prototype, which avoids accidents. To avoid accidents, it is necessary to alert the driver and to control speed of vehicle automatically. This project is developed based on RF technology and microcontroller. Every zone like school, tunnel, speed breaker and etc. it may have a transmitter tag to transmit the zone information byRF signal and RF receiver in the vehicle to receive information. When a vehicle enters into a danger zone then signal will be detectedby the receiver which was transmitted by the transmitter placed in the respective zone. The signal received will be decoded by the microcontroller and alert the driver through an

LCD screen.

R. Rathina kumar et al., [2] proposed "Wireless Accident Information System Using GSM and GPS", a Smart Display and Control (SDC) which will monitor the zone and maintains thespecified speed in the zone levels, which runs on an embedded system. This system includes three modules; automatic speed control module, accident detection and information sending module and security enabling module. Automatic speed control module includes RF transmitter placed in specific location and RF receiver in the vehicle. Accident detection module includes GSM and GPS technology. Security enabling module includes sensory units which ensures the condition of seat belt and the driver. This moduleincludes alcohol sensor and eye sensor. The smart display and control are composed of two separate units: Zone status Transmitterunit and Receiver (speed Display and Control) Unit.

Chesti Altaf Hussain et al., [3] proposed "Emergency Vehicle Detection System using RF module and Ultrasonic Sensor" intelligent lane clearance and collision avoidance system as a prototype, which avoids delay and crashing of ERVs (EMERGENCY RESPONSE VEHICLE) and provides greatest security to the ERVs. Here ultrasonic sensor is used to continuouslytrack for any obstacle. If the obstacle is detected then microcontroller will continuously compare the distance given by theultrasonic sensor. If the obstacle is closer to the ERVs then a controlsignal is sent to the nearby vehicle and its speed is controlled by themicrocontroller placed in the obstacle. The lane clearance is done based on the warning signals given to the nearby vehicles. A warning display unit and sound producing unit is placed on the dashboard of the vehicles. Here RF transmitter and receiver are used to communicate between the two microcontrollers.

Srajan Saxena et al., [4] proposed "Accident Identification with Automatic Ambulance Rescue System", the usage of vehicles are rapidly increasing and at the same time the occurrence accident is also increased. Hence, the value of human life is ignored. No one can prevent the accident, but can save their life by expediting the ambulance to the hospital in time. A new vivid scheme called Intelligent Transportation System (ITS) is introduced. The objectiveof this scheme is to minimize the delay caused by traffic congestionand to provide the smooth flow of emergency vehicles. The concept of this scheme is to green the traffic signal in the path of ambulanceautomatically with the help of RF module. So that the ambulance can reach the spot in time and human life can be saved and the accident location is identified sends the accident location immediately to the main server. The main server finds the nearest ambulance to the accident zone and sends the exact accident location to the emergency vehicle. The control unit monitors the ambulance and provides the shortest path to the ambulance at the same time it controls the traffic light according to the ambulance location and thus arriving at the hospital safely.

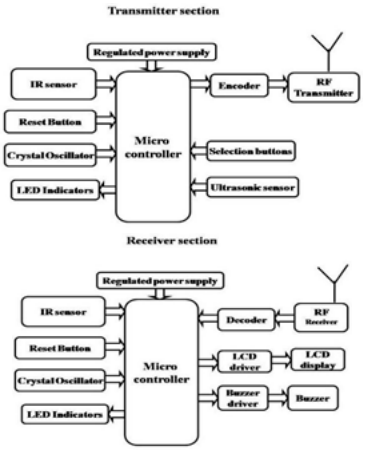
Vedanta Kathe et al., [5] proposed "Emergency Vehicle Assistant System", A circuitry that helps in reducing the time wasted by emergency vehicles at the traffic signals and thus help the people concerned with it. This system will reduce accidents which often happen at the traffic light intersections because of the hurdle caused while moving for emergency vehicles. As a result, this project is successful in analysing and implementing the traffic assistance system for emergency vehicles.

ISSN NO: 9726-001X
Volume 06 Issue 04 2018

JOURNAL OF CURRENT SCIENCE

III PROPOSED METHODOLOGY

The Block Diagrams below represent the transmitter section and the receiver section where transmitter section is the ERV (Emergency response vehicle) and receiver section represents the non- emergency response vehicle.



A. MICROCONTROLLER:

A Microcontroller is a programmable digital processor which is self- contained with the processor, memory and it can also be used as embedded system. The microcontroller used in this project is PIC16F72 which has 28 pins with 3 ports like port A (6 pins), port B (8 pins), port C (8 pins) excluding the supply pins (4 pins).

B. RECTIFIER:

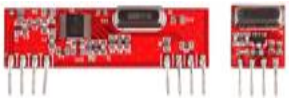
It is an electronic device which converts the alternating current to direct current. In case of rectifier, the current flows only in one direction. The inverter performs the reverse operation. This processis known as rectification.

C.CAPACITIVE FILTER:

The rectifier output is not in the form of Direct Current as it has some ripple factors which is pulsating DC. In order to eliminate theripple factors which are present in the output, we use filters. Filter isa form of circuit which allows the DC component to reach the load and removes the AC component present in the rectified output.

D. RF TRANSMITTER AND RECEIVER MODULE:

RF transmitter is an electronic device which is used to transmit the radio frequency signals. RF receiver is an electronic device which is used to receive the radio frequency signals.



LCD DISPLAY

Liquid Crystal Display is a flat, thin electronic visual display which uses the light modulating properties of liquid crystal. LCD'S are widely used in computer monitors, television, aircraft, cockpit displays, instrument panels, signage etc.

E. CRYSTAL OSCILLATOR

Crystal oscillator is basically an electronic

ISSN NO: 9726-001X
Volume 06 Issue 04 2018

circuit which produces an electronic signal which is electronic. These oscillators are more stable to temperature than any other types of oscillators.

F. IR SENSOR

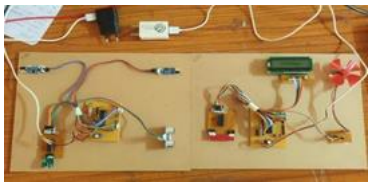
This sensor is used for motion detection of anyobject. IR sensor consists of an LED which is used to indicate the object reflection and the receiverdetects the object.

G. ULTRASONIC SENSOR

An ultrasonic sensor is an electronic equipment that produces ultrasonic sound waves and converts the sound which is bounced back into an electrical signal to determine the distance of a target item.

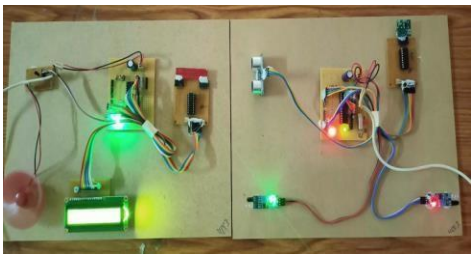
Distance range :2cm-
80cm Operating voltage
:5v Operating
Frequency: 40 HZ
Operating current
<15mA

H.FINAL HARDWARE



The PIC microcontroller used in this project executes the set of instructions given through the encoders and decoders through RF transmitter and receiver. The vehicle detection is done on the front side (mode 1), back side (mode 2), nearby (mode 3). The two prototypes used in this project are emergency response vehicle and non-emergency response vehicle. The ERV driver sends the warning signals to the warning units placed in the non- emergency vehicle thereby reducing the number of accidents taking place by applying intelligent lane clearance and collision avoidance system.

IV. RESULTS



Here, the ERV and non-ERV are displayed in working state where ERV acts as a sender and non- ERV acts as a receiver. In order to replicate the speedof a vehicle, we use a DC motor. The ultrasonic sensor used in this project detects the automatic distance of the nearby vehicle and sends the information to the non-ERV which is displayed on the LCD display.

V.CONCLUSION

The proposed system is designed as a prototype to display the working of the system.

By using this proposed system, the deaths due to delay and ERV collisions can be decreased.

The implementation of the system is also very

easy and it can be implemented at a low cost. The alert mechanism used in system will facilitate the ERV driver at any unusual movement of the vehicle. It can be integrated with the already existing systems.

There are a lot of techniques available for lane clearance and collision avoidance but in our project,ultrasonic sensors is used which are cheap and effective.

REFERENCES

1. Triveni Shinde and B. V. Pawar, ―Car anti- collision and intercommunication system using communication protocol‖, International journal of engineering sciences and research technology ISSN:2319-7064, Volume-2, No-6, pp.187-191,June-2013.
2. S. Saravanan, T. Kavitha, ―Vehicle navigation and obstacle detection system using RFID and GSM‖, Journal of Theoretical and Applied Information Technology, Vol. 38, No-2, pp.206-209, 30th April 2012.
3. N. S. Vaidya and A.V. Nikalje, ―Arm based invention in car mobility and atomization‖, International journal of engineering and innovative technology ISSN: 2277-3754, Volume-3, No-5, pp.238-244, november-2013.
4. Vivek agarwal, N. Venkata Murali, and C. Chandramouli, ―A Cost-Effective Ultrasonic Sensor-Based Driver Assistance System for Congested Traffic Conditions‖, IEEE Trans. Intel. Transp. Syst., vol.10, NO.3, pp. 486-498, Sep – 2009.
5. Shiva Dubey and Abdul Wahid Ansari, ―Design and development of vehicle anti-collision system using electromagnet and ultrasonic sensors‖, International Journal on Theoretical and Applied Research in Mechanical Engineering ISSN: 2319 – 3182, Volume-2, No-1, pp.80-83, Jan-2013.