A Vehicle to Vehicle Communication System

Prajakta Kunjir[1], Bhagyashree Shinde[2], Sachin Kolate[3], Disha Samge[4], Pratiksha Patil[5]

[5]*Professor, Electronics and Telecommunication Engineering, Keystone school of Engineering, Maharashtra, India*

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Abstract - *This paper presents the specific applications of wireless communication. Automotive wireless comm. is also called as vehicle to vehicle communication. It also explains the technology used for automotive wireless comm. Along with the various automotive applications relying on wireless communication. Our project proposes a vehicle to vehicle communication system for cooperative collision warning. One vital technical challenge viewed in this project is to achieve low latency in delievering immediate alerts in various road situations. Advanced wireless technology for vehicle to vehicle communication playing important role to reduce the number of accidents by providing early alerts. Based on a analysis application requirements, we design vehicle to vehicle communication system. This system consisting traffic control policies and methods for emergency warning broadcasting. Simulation outcomes displays that the proposed system gives less delay in delievering emergency alerts and bandwidth used efficiently in stressful road situation. The wireles data communication between two vehicles is provided by introducing wifi technology. It is implemented for low power consumption to allows battery last forever. The distance measurement is provided by ultrasonic sensors. These sensors are transmitting and receiving ultrasonic signals.*

Key Words: ARM 7, sensors, Android Application.

1. INTRODUCTION

Traffic accidents have been taking thousands of lives each year, outnumbering any deadly diseases or natural disaster as far as India is consider, India having less than 1% of the world's vehicle, the country accounts for 6% of total road accidents across the world and 10% of total road victims. Every year in the united state road accidents account for a harsh risk to human lives from both injuries and financial perspective. Given that vehicle are designed to provide a smooth means of transportation, based on principle of reliability and safety manufacturer have long been in the process of design vehicle. However, due to reasons such as human-error, conditional error and negligence accident occur.

Today, main focus is on the technologies that can reduce road accidents. Past work in this domain includes the use of vehicle infrastructure (V2I) communication by having a centralized system in which all vehicles approaching an intersection communicate with the intersection manager. The intersection manager is the computational infrastructure installed at intersection and to make reservations for each approaching vehicle and manages all vehicles crossing the intersection[].due to high total system cost Implementing centralized module at every intersection is not possible many times. In this work, we advocate use of vehicle to vehicle(V2V) communications. V2Vcommunication systems are simple to design initially because of their dependace on wireless comm. For intelligent transportation systems various forms of wireless communication technologies have been discovered. Radio modem commit ITS UHF and VHF frequencies are mainly used for short and long range communication. By using IEEE 802.11 protocols short distance communication of 350 m can be installed. The dedicated short range communications standard being promoted by the intelligent transportation society of America and the United States Department of Transportation. Theoretically the range of these protocols can be extended using mobile ad-hoc networks or mesh networking. Longer range communications have been proposed using infrastructure networks such as Wi-MAX(IEEE 802.16), Global System for Mobile Communications(GSM) or 3G.

1.1 Literature Survey

Literature surveyed some different papers to get information about the existing work which have been done Reza Azimi, Guarav Bhatia investigate the use of vehicle-to-vehicle (V2V) communications[1]. To enable the navigation of traffic intersections, to decrease collision risks, and to increase intersection throughput significantly. Specially, we design a vehicular network protocol that integrates with mobile wireless radio communication standards such as Dedicated Short Range Communications (DSRC) and Wireless Access in a Vehicular Environment (WAVE). This protocol depends on using V2V communications, GPS and other automotive sensors to safely navigate intersections and also to enable autonomous vehicle control.

 Debasis dad, Rajiv Misra [2] proposed An Inter vehicular communication systems has the potential to comfort of travel everyday increase the safety efficiency and comfort of travel I VANETS.

In this project we proposing an efficient V2V communication protocol to avoid collision in VANETS.

Abdulsalam, Raya Al Hajri [3] presented initial designs and results of a small-scale prototype of a vehicle to vehicle communication system using Radio frequency (RF) technology, a new technology that was implemented in the recent few years, which still needs more transparency on its sustainability for outdoor vehicular networks. The most effective solution is vehicle to vehicle communication in order to lessen vehicle accidents. The proposed use of RF technology in this paper contains mainly light-emitting diode (LED) bulbs as means of connectivity by transmitting data through light spectrum as an optical wireless medium for signal propagation. The need of complex wireless networks and protocols is eliminate by an LED. Several case studies imitating the vehicle to vehicle communication are implemented in this work. Both numerical simulations using Proteus package.

1.2 Block Diagram and discription
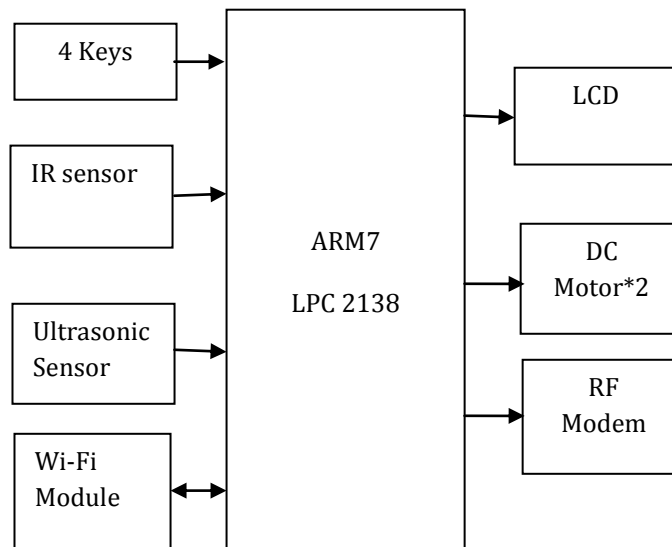
Fig -1: Block diagram of proposed system

1)ULTRASONIC SENSOR:

Ultrasonic sound vibrates at a frequency above the range of human hearing. It uses single transducer to send a pulse and receive the echo. It will measure the distance by using ultrasonic waves. The sensor generates an ultrasonic wave and receives the reflected wave. High frequency sound waves reflect from boundaries to produce distinct echo pattern.

IR SENSOR:

Here we are connecting an IR base obstacle sensor. The 50 ohm resistor is used for current limiting. The current through the LED is 5v/50 ohm =100mA, which is high for a LED but to the increase the range of an obstacle sensor we are using a lower range resistor (50 ohm). In reverse bias the IR receiver is connected on the receiver side. So when the light falls on the IR receiver, the anode voltage goes on increasing and when the anode voltage exceeds than the cathode voltage then the LED enters into forward bias mode and start conducting.

Wi-Fi Module:

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. Each ESP8266 module comes pre-programmed with AT commands.

DC Motor:

DC motor is electric motor it runs on direct current electricity. It can operate directly from rechargeable batteries providing the power for the first electrical power. DC motors where used to run machinery, often eliminating the need for a local steam engine or internal combustion engine. Today DC motors are still found in applications as well as small toys and DC drives. With power electronic devices modern DC motors are often operated in conjunction.

The brushed DC electric motor generates torque directly from DC power supplied to the motor by using internal commutation, stationary magnets and rotating electrical magnets like all electric motors or generators, torque is produced by principle of Lorentz force , which states that any current carrying conductor placed within an external magnetic field experiences a torque or force known as Lorentz force

LCD:

LCD can used to check the output of different modules interfaced with the microcontroller. Thus LCD plays a vital role to see the output and debug the system modules wise in case of system failure in order to rectify the problem. Here we have used 16*2 LCD which indicates 16 columns and 2 rows. So, we can 16 characters in each line. So, total 32 characters we can display on 16*2 display.

Power Supply:

 It provides supply to the circuit. We use 12v power supply in our project. It is used to provide DC voltage to the components on board. 3.3V for lpc2138 and 4.2v for Wi-Fi module is apply from power supply. 5V is required for relay applied from power supply.

ARM 7:

The LPC 2138 microcontroller is based on a 16 or 32 bits ARM 7 TDMIS CPU with real time emulation and embedded support, that combile the microcontroller with the 32 kB, 64kB, 128kB, 256kB and 512kB of embedded high speed flash memory. A 128 bit wide memory interface and unique acceralator architecture enable 32 bit code execution at maximum clock rate. For critical code size application the alternative 16 bits thumb mode reduces code by more than 30% with minimal performance penalty. Due to their tiny size and low power consumption, this microcontrollers are ideal for applications.

Table -1: Comparison with existing technique

Sr. No	Author names	Paper	Advantages	Disadvantages
1	Reza Azimi, Gaurav Bhatia,	IEEE 2016 Vehicular networks for collision avoidance.	It improves flexibility and collision avoidance. Pedestrian and Bike safety.	The protocols evalute do not take into controller model for the cars. Low scalability.
2	Debasis Dad, Rajiv Misra	IJARCCE 2014 Efficient vehicle to vehicle communication	Fast speed internet which will change the automobile on board system from an effective widget.	Complex algorithm. Costly.
3	Abdul Salam, Raya Al Hajri	IJEEE 2015, vehicle to vehicle communication	In this system the use of LED eliminates the need of complex wireless network with the help of RF technology.	Expensive, harder to understand.

2. CONCLUSION

The substantial fraction of automotive collision occurs on highways. Furthermore highways are often traffic bottlenecks contributing to significant trip delays. In this paper our goal to design vehicle to vehicle management protocols using only vehicle to vehicle communications to addressed these two core issues of safety throughput. It reduces amount of road collision and deaths of drivers. Also we are design accident avoidance system using Ultrasonic and IR sensors. Also we have design lane drift system in which driver is not allowed to change lane without giving indicators. Using this system there is no need of honking and it will also decrease noise pollution. The use of wireless communication can be easily intercepted by hackers who want to take everything you have.V2V communications could one day lead to people not having to drive and could help with those who make the dumb decision to drink then drive. This prevents them from hurting innocent people and would definitely be something worth investing it.

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