Intelligent Transport System Based Automatic Vehicle Controller

Satyawati Konanti[1], Samina Mulani[2], Puja Late[3] , Sarika.B.Patil[4]

[1,2,3] BE Students, Department of Electronic and Telecommunication, NMIET, Talegaon, Pune, India
[4]Professor Department of Electronic and Telecommunication, NMIET, Talegaon, Pune, India

---***---

Abstract – *This paper aims that to avoid accidents so as to provide safety to all citizens. We are developing a system that will alert the driver about safe distance from other vehicle so as to avoid collision. This is possible by using ultrasonic sensor. This sensor will detect the distance between other vehicles or any obstacle and will transmit information to driver so as to take decision needed to avoid collision. The two ultrasonic sensors are required one is to transmit signals and one to receive signals. We use android application which uses Bluetooth to provide communication between two or more vehicles. The Bluetooth transmitter is identified by using the hardware address which is unique for each transmitter.*

Key Words: Ultra-sonic sensor, VTV communication, Blue tooth, Congestion control, Smart phone.

1. INTRODUCTION

During last years the world wide traffic density is increased to great extent. Due to this it affects safety of population since 1.2 million people has been killed each year by road incidence. The paper is deals with safety in automobiles which are categorized as autonomous breaking system. The automatic breaking is done when the distance between two moving vehicles is below 5m or 5m i.e. the vehicle starts slowing down the speed of vehicle whenever this condition is met. To achieve this the ultrasonic sensors are used which are placed on the front pair of vehicle. This sensor continuously transmits pulses when an obstacle or vehicle is detected it receives echo pulses so it is possible to detect distance between vehicles and information is send to driver so as to take decision to avoid collision. An android application is developed to provide communication between vehicles. This is possible by using Bluetooth the Bluetooth transmitter is identified by using the hardware address. This is possible by pairing the Bluetooth devices in the mobile phone and the Bluetooth device in the car. We use the engine heat detector sensor to avoid any fire to the vehicle and also LDR as a fog detection this will indicate if there is darkness across vehicle.

2. LITERATURE SURVEY

1) A Self-adaptive V2V Communication System with DSRC:

The Dedicated Short Range Communications (DSRC) is defining short   to medium range communication services that support public safety in vehicle-to-vehicle (V2V) communication environment. DSRC has capability of self-adaptive frequency configuration which achieves good wireless communication in vehicular environment in term of dramatically low delay and low packet loss rate. DSRC are efficient in the transmission distance ranging from 300m to 400m and with the relative distance more than 400m, the packet loss rate and the delay of both V2V schemes are increasing dramatically while our system obtains a better perform.

2) Traffic Congestion Control through Vehicle-to-Vehicle And Infrastructure Communication:

In this paper vehicular ad-hoc network (VANET) technology is used. VANET is one the best solution which enable vehicle to vehicle communication. VANET are the forms of mobile ad-hoc networks (MANET) that provides communication between nearby vehicles and nearby fixed equipment's. This kind of networks are self-configuring networks composed of collection of vehicles and elements of roadside infrastructure connected with each other without requiring an underlying infrastructure, sending and receiving information and warning about current traffic situation to achieve efficiency in transportation.

This approach is based on following points:

1. Data packets are generated and broadcasted by affected vehicle itself which contains decision message.
2. Based on decision vehicles adapt the driving behavior and helps in controlling congestion.
3. Roadside infrastructure monitors the traffic and if traffic is above threshold value it broadcasts the messages.

---

3) A Novel Forward Vehicle Collision Avoidance Methodology through Integration of Communication Technologies:

In this paper GPS (Global Positioning System) is used. GPS based collision avoidance system for a host vehicle includes a global positioning system residing on the host vehicle for determining the host vehicles location as the host vehicle travels based on signals received from one or more satellites, a map database having digital maps corresponding to area including the location of the host vehicle as determined by the global positioning system. A vehicle to vehicle communication system residing on the host vehicle operative for receiving signals including location information acquired by GPS residing on other vehicles directly the other vehicles including location of other vehicle and a navigation system includes display on the vehicle for displaying images. GPS source may be the mobile phone of the automobile passenger.

3. PROPOSED SYSTEM WITH WORKING PRINCIPLE:

The block diagram of the system is shown in figure below. It includes sonar sensor which detects moving vehicles around the sensor. There is engine heat detector which reads temperature of engine and fog sensor detects fog towards the vehicle. The output of all these sensor is given to controller. The controller processes all these signals and then displays on LCD and according to output of controller the automatic break system will slows down the speed of vehicle. There is wireless module like Bluetooth is used which provides communication with other vehicles.
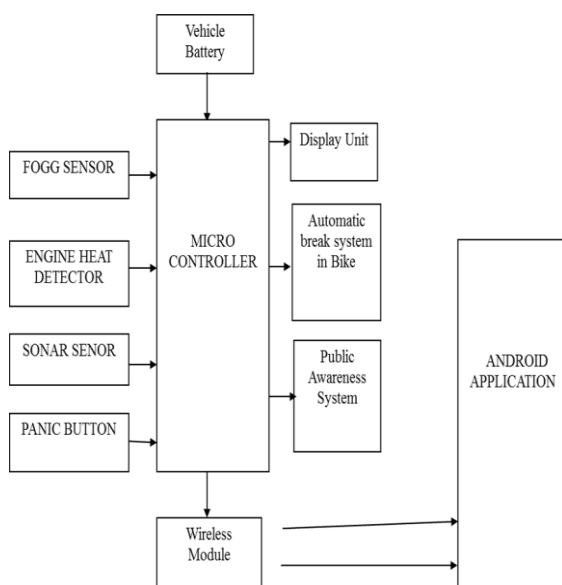

FIG 1: BLOCK DIAGRAM

4. Specifications Of The Hardware:

The following are the important elements in the block diagram:

1) Microcontroller

The signals from ultrasonic sensor and other sensor are given to the Microcontroller. Microcontroller processes all these signals and gives data to LCD display.

TABLE I: MICROCONTROLLER COMPARISON

	AT89S52	PIC	AVR
Flash Program Memory	8K	4K/8K	2K
Data Memory	256	192	128
Ports	4	3-5	4
Timers	3	3	2
ADC	8 channel	8 channel	Not present
Micro-Controller	8 bit	8 bit	32 bit
I/O Pins	32	22	15

2) Ultrasonic sensors:

They are also known as transducers they both send and receive the signal. They works on the principle of radar which evaluates attributes of target by interpreting echo's from radio or sound waves respectively. Sonar sensor uses a continuous wave and echo technic. In this technic the transmitter generates continuous output whose echo is detected by the receiver thus in this way an obstacle is detected by sonar sensor

TABLE 2: SENSORS COMPARISON

Parameter	Sonar sensor	IR sensor
Operating voltage	2.5-5 V	3.3 or 5 V
range	0-6.45 m	10-12 m
Current consumption	2 mA	6 mA
Affected by	Wind, hardness of object	Sunlight, color of object

3) Wireless module:

Bluetooth is devised to replace these cables. Bluetooth is a global standard for wireless connectivity. Bluetooth is used as wireless module.

TABLE 3: COMPARISON OF WIRELESS TECHNOLOGIES

Parameter	Bluetooth	Zig bee	Wi-fi
Range	10m	10-100m	Upto 100m
Data rate	1 Mbps	20,40,250Kbps	11&54 Mbps
Frequency	2.4 Ghz	2.4 Ghz	2.4&5 Ghz
Power consumption	Low	Very low	High
Current consumption	60 mA (Tx mode)	400 mA (Tx mode) 20 mA(standby mode)	20-35 mA (Tx mode) 3uA(standby mode)
Typical network join time	>3 sec	Variable, 1sec typically	30 msec typically
Number of channels	19	13	16

LCD:

The LCD requires 3 control lines (RS, R/W & EN) & 8 (or 4) data lines. The number on data lines depends on the mode of operation. If operated in 8-bit mode then 8 data lines + 3 control lines i.e. total 11 lines are required.

Specifications:

- Lampex
- 16*2, backlit facility
- 100 mA current consumption

4) BATTERY

Batteries store energy being produced by given generating source and when this source is unavailable this energy can be used by loads.

Specification of battery:

- Operating voltage:-12vDC
- Current Rating :-1.3Ahr
- Type:-rechargeable
- Material used :-lead acid

6) MAX232:

MAX232 IC is used for serial communication.MAX232 is compatible with RS-232 standard, and consists of dual transceiver. Each receiver converts TIA/EIA-232-E C levels into 5V TTL/CMOS levels. Each driver converts TTL/COMS levels into TIA/EIA-232-E levels.

Specification of MAX232:

- MAX232 IC is used for serial communication.
- MAX232 is compatible with RS-232 standard, and consists of dual transceiver.
- Each receiver converts TIA/EIA-232-E C levels into 5V TTL/CMOS levels.
- Each driver converts TTL/COMS levels into TIA/EIA-232-E levels.

7) Dc motor driver (L293D):

Specifications:

- 600mA output current capability per channel.
- 1.2A peak output current per channel.
- Enable facility.
- Over temperature protection.
- Internal clamp diodes.
- Logical "0" input voltage up to 1.5V.

8) Dc motor: 30rpm

5. SOFTWARE SPECIFICATION:

- **Operating system:** windows 10.
- **Software used:** Proteus, Flash magic.
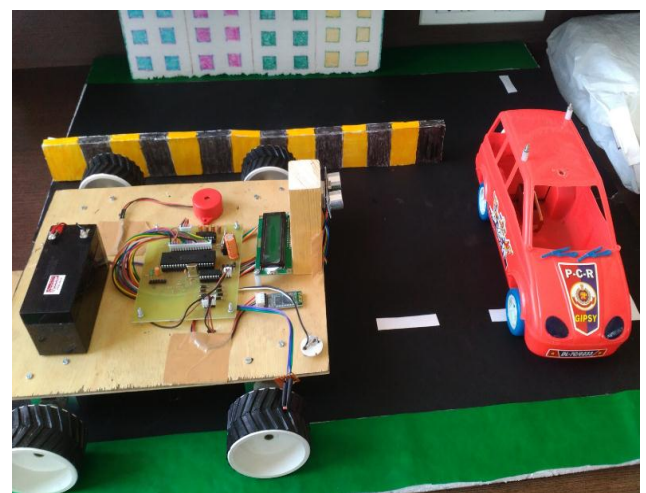- **Language:** embedded c.

6. WORKING MODEL:

FIG 2: WORKING MODEL

7. RESULT:

In this project we successfully design a system for automatic vehicle controller to avoid collision.

Proposed images:

Figure no. 3

When system is initiated the name of project will displayed.

Figure no. 4

When sonar sensor detects distance then distance will displayed on lcd.

Figure no. 5

When engine heated above threshold value then it displays this message.

8. CONCLUSIONS:

We have develop a system having ultrasonic sensors for detecting the distance between two moving vehicles and automatic breaking is done with the help of ultrasonic sensors which key component because of which the crashing can be controlled to a good extend.

REFERENCES

IEEE PAPERS:

1. Francisco M. Padron," Traffic congestion Detection using VANET", Thesis, Florida Atlantic University.
2. Varaprasad G., Wahidabanu R.S.D., "Flexible Routing Algorithm for Vehicular Area Networks", in Proc. IEEE Conference on Intelligent Transport Systems Telecommunications, Osaka, Japan, pp.30-38, 2010.
3. Biswas, S., Tatchikou, R. et al (2006). "Vehicle-to-vehicle wireless communication protocols for enhancing highway traffic safety. "Communications, IEEE, 44(1), 74-82.

REFERENCE BOOKS:

1. Muhammad Rashid.H, "Power electronics circuits, devices and applications", Eastern economy.
2. Charulata publication, "microprocessor and microcontroller".