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Speed Control Management System for Vehicle Using Zigbee

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ABSTRACT: Now a day's traffic rules are frequently violated by the drivers and over speeding occur due to bad driving behavior. But sometimes it may not be possible to view the signboards placed by the Highway Department to alert the drivers in such kind of places and there is a chance for accident. The main objective of the Project is to design and develop a new system that can effectively detect speed violations on the road and supports the driver to obey traffic rules while driving by maintaining the speed of vehicle according to the speed limit prescribed by particular zone. It will use zigbee technology. The proposed system gives an alert with the help of buzzer and LCD. working model mentioned zigbee signal transmission 10-30 metres standby when vehicle coming to particular zone reciever side received it's signal give alert to driver via display. In this system, if over speeding vehicles don't get controlled manually, then system turns ON and will get controlled automatically.

KEYWORDS: Zigbee, Automatic speed control, Over speeding vehicles, GSM modem, Speed Sensor.

I. INTRODUCTION

The need to enhance road safety, traffic efficiency and to reduce environmental impact of road transport are serious change for both academics and industry. Researchers are greatly interested to develop vehicular communication and networking technology in two realistic ways vehicle to vehicle (V2V) in ad hoc mode and vehicle to infrastructure (V2I) with fixed nodes along the road. The potency to exchange information wireless via V2X is a foundation stone for building powerful Intelligent Transport Systems (ITS). In Europe, USA and Japan are great efforts made from automakers and governments to reach single standards through the several and common projects such as CAR 2 CAR Communication Consortium, Vehicle Safety Communication Consortium, EUCAR SGA etc. Result from common effort is an international standard, IEEE802.11p also known as Wireless Access for Vehicular Environments (WAVE). This standard will be used as the groundwork for Dedicated Short Range Communications (DSRC).
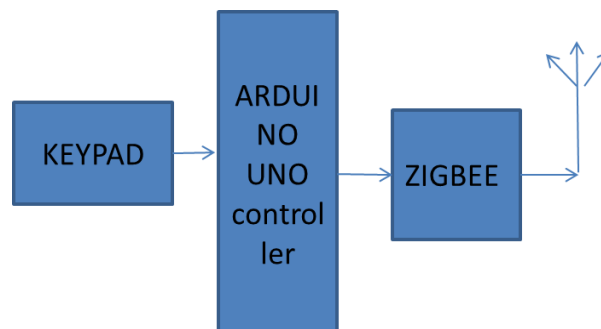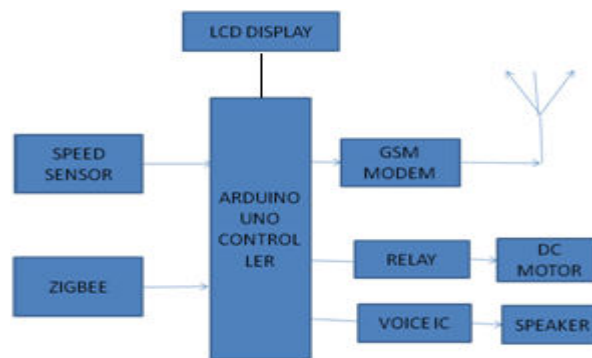
Fig1: Block diagram

This type of communication has potential to improve safety on the road, traffic flow and provide comfort for passengers and drivers with expedited applications such as INTERNET, network games, automatic electronic toll collection, drive-through payments, digital map update, wireless diagnostic and flashing etc. DSRC is the one step in the future, because it lets inter-vehicle and vehicle to infrastructure wireless communication. Wireless networking based on IEEE802.11 technology it has recently become popular and broadly available at low-cost for home networking and free Wi-Fi or commercial hotspots. The DSRC starting idea was to equip vehicular network nodes with off-the-shelf wireless technology such as IEEE802.11a. This technology is cost effective and has potential to grow and new versions have been recently produced. The latest standard of wireless local area network (WLAN) is IEEE802.11.The IEEE 802.11n standard promises to improve and extend most popular WLAN standards by significantly increasing throughput, reliability and reach. Nowadays dispositions of WLAN-based access technology is predominantly to stationer indoor and outdoor users who are most slowly moving and in range limited. Despite the fact that the standard has not been developed for fast dynamic usage, nothing limits it to be evaluated for vehicular communication systems. The motivation is to understand the interaction between the vehicle speed and goodput of WLAN-based network.

There has been a terrific growth in the traffic because of progression of the urbanization, automation and population. With growth in traffic, there is existence of more of problems includes traffic jams, accidents and traffic rule violation at the heavy traffic signals. During 2016, in India a whole of 2, 46,133 people were died in road accidents because of lack of speed control and violating the road rules. Road accidents can be minimized by implementingactions such as advanced Traffic management, civilizing the quality of road infrastructure and safer vehicles. To Safeguard decline in accidents and to progress road safety, speed control techniques such as speed control in school and college zones by using RF transceiver, automatic braking systems, Camera monitoring and control system, active control management systemand RFID technology based detection are implemented. The current techniques still doesn't able to reduce the number of accidents. Hence a new system has designed by using zigbeetechnology .This Zigbee module can be connected with the computer by using RS 232 protocol and speed is sensed by transmitter Arduino, which violation management provides efficient monitoring, registering and buzzing the system of speed of the vehicle which exceeds the limit. The driving behavior of the driver is monitored based on which penalty amounts are calculated thereby speed violation can be reduced.

II. LITERATURE SURVEY

[1] GummarekulaSattibabuet proposed a system that describes the advancement in the processor technology and microcontrollers has opened a new system designed to prevent the accidents caused due to negligence of drivers in seeing traffic signals alongside the road and other anomalies on the roads. So to intimate the driver about the zones and to automatically maintain the speed is accomplished by means RF technology. The main objective is to design an Electronic Display controller meant for vehicle's speed control and monitors the zones, which runs on an embedded

system and can be custom designed to fit into a vehicle's dashboard to display information on the vehicle. This system if adopted by some state can effectively reduce the number of road accidents caused by speeding vehicles losing control of the vehicle at speed breakers or by driver's negligence towards traffic signals. This paper presents a new design to control the speed of the automobiles at remote places for fixed time.

[2] Rubini.R, proposed a system has an alerting, recording and reporting system for over speed violation management. The Zigbee transmitter sends the speed limit of the particular lane entered by the vehicle and also gives alerts like "road works", "steep slopes", "school zone" in the form of acoustical messages and also in LCD. The receiver unit placed in the vehicle receives the messages and sends to the microcontroller. When speed of the vehiclenears the speed limit it displays the warning and if exceeds the limit, the microcontroller records the violated speed and time. The LCD displays the lane speed limit and shows the number of times, speed was violated. A GSM module sends message to the nearest traffic personnel immediately after a violation occurs. An authenticated device is also provided, which can be operated only by the traffic police in which he can retrieve the data stored at any time. Increase in the count of violation increases the penalty amount which can be collected in toll gates located nearby.

III. OVERVIEW OF WORKING MODEL

This model gives a reliable, accurate and efficient way of speed control of a DC motor. The Transmitter Module of system by which we can transmit the data at the rate of 250mbps, near about 10 to 100 meters distance .In this module we are using Zigbee technique to control the speed as well as direction of motor. This Zigbee module can be connected with the computer by using RS 232 protocol and speed is sensed by transmitter Arduino. Now At the Receiver side we ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than.
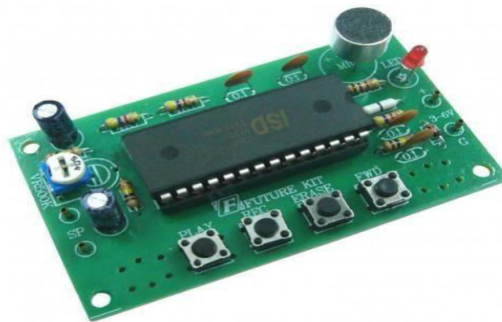

Fig2: **VOICE IC**

Liquid-crystal display (LCD) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

Fig3: Liquid-crystal display (LCD)

IV. METHODS

ZIGBEE

Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this ase is ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to 3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBee UART. The below table gives the pin description of transceiver. Data is presented to the XBee module through its DIN pin, and it must be in the asynchronous serial format, which consists of a start bit, 8 data bits, and a stop bit. Because the input data goes directly into the input of a UART within the X-Bee module, no bit inversions are necessary within the asynchronous serial data stream. All of the required timing and parity checking is automatically taken care of by the X-Bee's UART.

The ZigBee specification is intended to be simpler and less costly than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi. Applications include wireless light switches, electrical meters with inhome-displays, traffic management systems, and other consumer and industrial equipment that require short-range lowrate wireless data transfer. a low-power,wireless mesh network standard targeted at the wide development of long battery life devices in wireless control and monitoring applications. ZigBee operates in the industrial, scientific and medical (ISM) radio bands: 2.4 GHz in most jurisdictions worldwide; 784 MHz in China, 868 MHz in Europe and 915 MHz in the USA and Australia. Data rates vary from 20 Kbit/s (868 MHz band) to 250 Kbit/s (2.4 GHz band). Zigbee network consists of coordinator, router and end devices as shown. This wireless technology is used for variety of applications viz. home automation, smart grid, remote monitoring and control etc.

Fig4: **SPEED SENSOR**

Speed sensor or vehicle speed sensor is a type of tachometer. It is a sender device used for reading the speed of a vehicle's wheel rotation. It usually consists of a toothed ring

ARDUINO:

Arduino is an open source, computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits.Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.
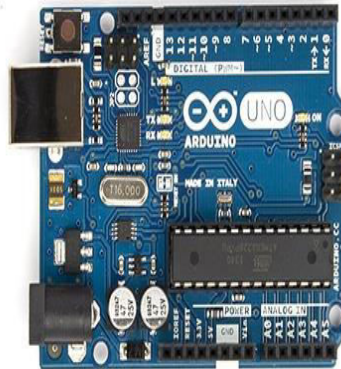

Fig5: **ARDUINO UNO**

The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits. The current Uno provide 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs, which can also be used as six digital I/O pins. These pins are on the top of the board, via female 0.1-inch (2.54 mm) headers. Several plug-in application shields are also commercially available. The Arduino Nano, and Arduino-compatible Bare Bones Board and Boardui.

GSM modem

Fig6: GSM modem

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone A GSM modem exposes an interface that allows applications such as Now SMS to send and receive messages over the modem interface. The mobile operator charges for this message sending and receiving as if it was performed directly on a mobile phone .
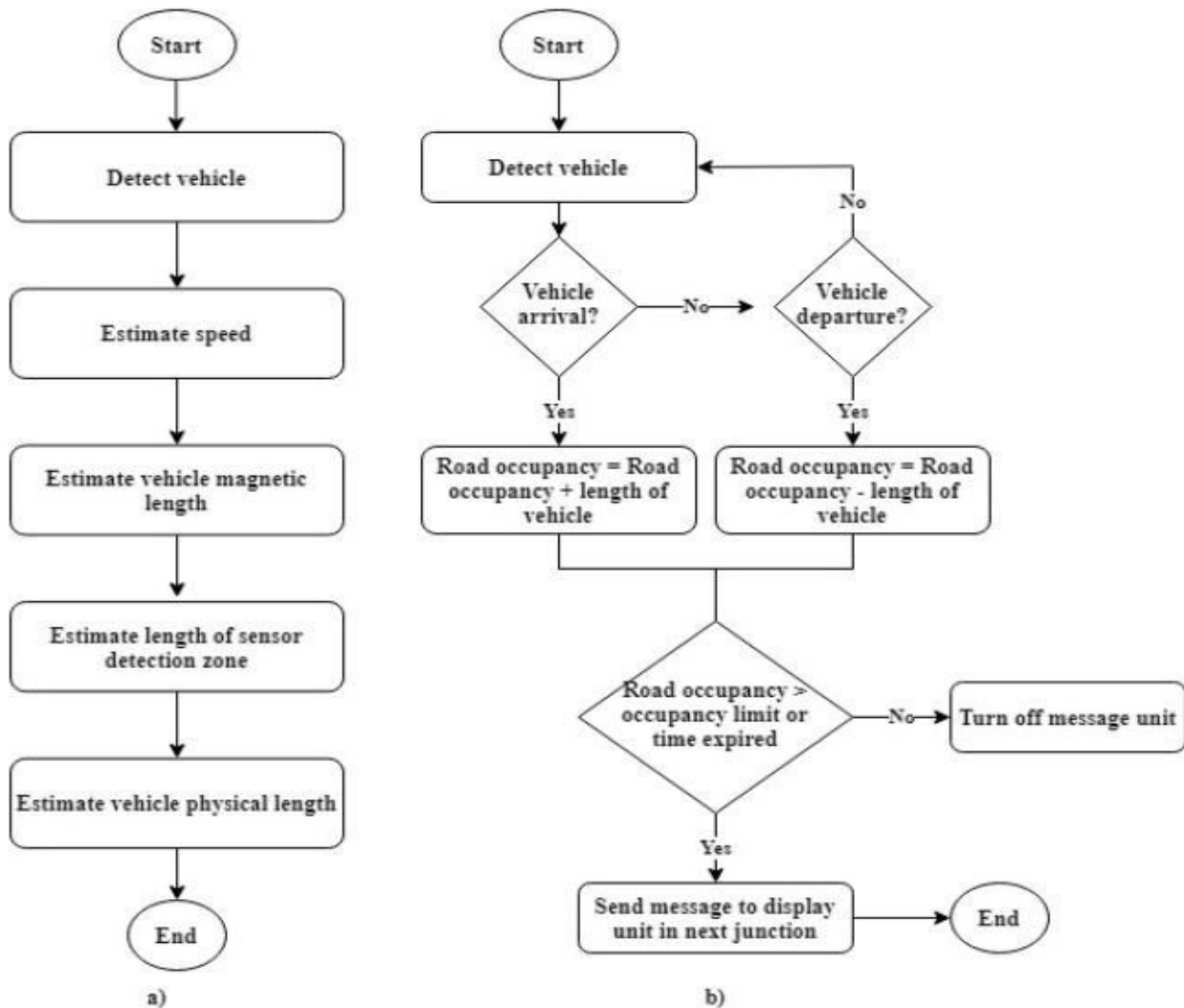

Fig7: Work flow

If the speed limit is less than the speed mentioned in the program, then no action is required. If the speed is greater than the prescribed speed ,then warning will be given to the vehicle. If the speed is controlled within in the minimum time no need to take any action else alarm buzzes .Based on the alarm penalty will be decided. As the D.C motor rotates hall sensor senses the speed of motor with the help of magnet which is placed on the motor, and gives signal to the arduino transmitter which are then transferred to the zigbee transmitter, from the zigbee transmitter signals caught by the zigbee reciver and then the signal are read by the arduino receiver. Already the programs are dumped in the arduino ,in that program minimum speed is mentioned .

V. CONCLUSION

In this paper the prototype design of a system that can deliver road sign to commuter's vehicles and can control the speed of the vehicle has been demonstrated. This project is very simple which is durable and is of low cost.It consumes

less power.The driver can get information without any kind of distraction. This prototype works even in bad weather conditions. This is easy to implement on present system which ensures maximum safety for drivers, passengers and pedestrians.

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