DESIGN & IMPLEMENTATION OF DRIVER ASSISTANCE SYSTEM FOR SHARING TRAFFIC INFORMATION IN VANET

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Abstract—Vehicular ad-hoc networks establishment plays major role in smart traffic management system. In recent years many researcher can create VANET by information sharing between road side unit, vehicle and traffic system & implementing it in real world. From a moving vehicle to detect road signs this system implemented in the real world. In this technology vehicle is able to detect traffic signs which are on the road side boards e.g. railway crossing" or "school" or "U turn ahead". Consider a user is driving a car in bad weather or in rainy season then it is not possible for driver to see each and every road symbol or the message plates like U turn, speed breaker ,railway crossing, diversion etc. Here in this proposed one signal transmitter use by every road side unit or symbol and the time at which vehicle passes from that road side unit the receiver situated inside the car will receive signals and shows proper message on the LCD display. Due to which driver can drive the car more concentrately.

Key Words: In-Car System, Microcontroller, RF, RSU, VANET

"1. Introduction"

Vehicle driver have to face many problems during vehicle driving in daily life. Consider number of vehicles in an urban area. Many drivers are always interested to know information about their route during driving specially in hilly areas. For example driver want to know information about zebra crossings, U turn, avaibility of restaurents etc along route. Such information is usefull for driver for easy and safe driving, to avoid traffic jams, for avoiding unnecessary driving. The problems faced by the driver while driving have been told by the picture. The problems may be hidden symbols behind trees, uncleared symbols on road boards, partially bend boards. Because of this during driving driver cannot see the road side symbols clearly and faced the problems and not able to drive concentrately. This may lead to chances of accidents.

"Fig.1 current scenario"

Hence implementation of this system can help to avoid problems of driver. Firstly the road sign symbols can be represented by different colors like red, blue, green, brown etc. Then symbol boards in specific shapes like circular, square, octagonal, triangular etc. After that application of symbol decides the road side symbols contents In VANET infrastructure is important for

passing of vehicles information . The database which is mobile distributed stored at fixed location which is updated with an overhead , accuracy, acceptable delay is big challenge. This proposed system concentrates on the road side symbols contents. In this system driver has been alert about upcoming symbol on road side boards so that it helps to avoid accidents.

"2. Related Work"

For many applications of vehicular such as location-based services (LBSs), intelligent transportation systems (ITSs), navigation. Global Navigation Satellite Systems (GNSSs), such as the Global Positioning System (GPS) there is need of Real time position information, are most useful positioning tools considered for these applications.[1],[2],[3]. Earlier sign detection technology performs tasks like tracking, detection and classification of color and shape detection technique [4]. Hough transform is the common approach used here.
To identify stop signs kehtarnavaz et al applied this method. Due to expensive and memory demanding it is not suitable for a real- time implementation.

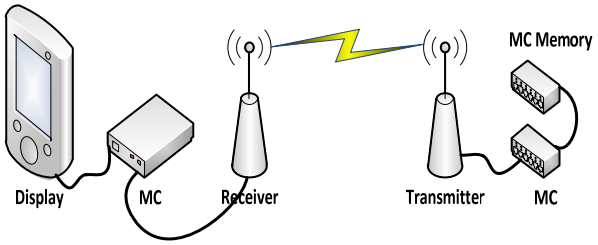
After that new techniques have presented by Loy and Barnes called fast radial transform for detecting triangular, octagonal and square road signs. Color is often the main clue explored to find the areas where road signs appear. The outdoor illumination that might affect the color acquired by the image sensor is the main defect of the color-based approaches. Many research groups work with the RGB space color Ritter et al have searched for color combinations within the images, as the key to an efficient way of finding road signs. But one of the greatest inconveniences of the RGB color space is that it is very sensitive to varying illumination. To avoid this, most of the researchers prefer working with spaces more immune to lighting changes. Although the CIELab, YCbCr and HSI color spaces have been used.

A tracking process is useful to reduce recognition errors. Most existing road sign tracking approach including Kalman filters and particle filter suffer from the same limitations that ego-motion considered; otherwise it will affect the tracking performance. The Lucas-Kanade algorithm is an intensity-based differential technique used to align images set. Recently,many road signs detection techniques have been developed[5]-[12].

The system which is capable of recognizing these signs are known as traffic sign recognition (TSR) system. This helps to improve road safety. In this paper we are using the wireless setup for communication to detect symbols on road side boards. Using Radio Frequency Identification (RFID) technology, the system manages to detect the signs on boards and driver inside the car can read out it with the help of transmitter and receiver and getting alerts about traffic information.

"3. Proposed System"

In the current system for displaying massages on road side boards, it is not possible for the driver to see the massages regularly. It is impossible to to add each and every symbol and message board on Google map with regular basis updation The research idea of the system which consists of microcontroller, LCD display, transmitter and receiver is shown in figure
below. For example a driver driving a vehicle in bad weather, at night or in rainy season then it is not possible for driver to see every massage or road side symbols like U turn ahead, railway crossing, restaurants etc. Therefore to solve such issues a system is proposed which will overcome its drawbacks. This makes driving safety and driver had information of his route.



Inside Car On Road side boards

"Fig. 2 research idea"

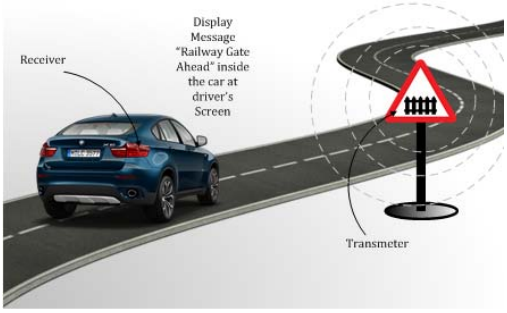
The proposed system requires developing of transmitter/receiver (Tx/Rx). A transmitter module is developed with reprogrammable broadcast message of symbol code. It will have two mode of power supply that is battery power or solar power. Transmitters have channel and device ID setting which is useful for device

identification and frequency matching wirelessly In predefined channel to read the frequency a receiver module is there and fetched broadcasted information of transmitter. A hardware module is develop which is microcontroller based and software code is designed for defined platform for reading of information. A LCD or graphics LCD based display module is develop and to print defined text or display graphics symbol a code has been written.

3.1 RF Module (Rx/Tx)

The frequency range has been varies between 30 kHz & 300 GHz. In this RF system, amplitude of carrier wave varies to represents digital data. This modulation is called as Amplitude Shift Keying (ASK). RF transmission is better than IR (infrared) due to many reasons. First, for long range applications RF is suitable which travel for longer distances. Also if there is obstacle between transmitter & receiver RF signals can travels where as IR signals does not. The transmission through RF is reliable and more strong. A particular frequency is used by RF communication. The RF module consists of an RF Transmitter and an RF Receiver. At a frequency of 434 MHz the transmitter/receiver (Tx/Rx) pair operates. Serial data has been received by RF Transmitter whereas through RF transmits it wirelessly. At the rate of 1Kbps - 10Kbps the transmission occurs. Along with a pair of encoder/decoder the RF module is used.

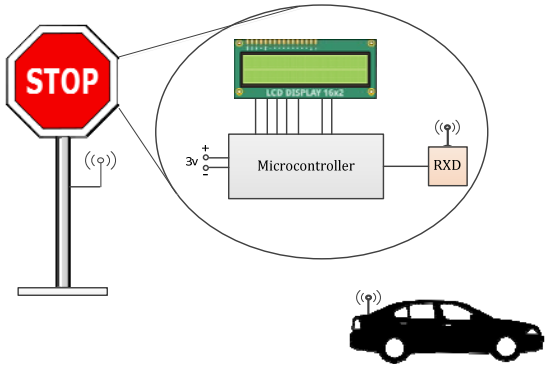
3.2. Scenario diagram of system



"Fig. 3(a) block diagram of system"

In this system signal will be received by the Receiver which will be forward to the processor through port and that signal is transmitted by the transmitter. Depending on value of port the data will be fetched. Then circuit will cause the signals to process and will match the stored frequencies in the database with the frequencies detected. If both the frequencies are matched equally then the information has been displayed on the LCD system in the car and also a pre-recorded sound has been played.

3.3 Radio frequency module



"Fig 3(b). block diagram of radio frequency module"

With the help of RF module system is connected with parallel port. The software embedded in processor handles the further processing and final output has been displayed on the Screen (LCD).To tune in to particular frequency a radio tuner is needed.

"4. Result And Discussion"

In this system as the driver cannot see all the road side symbols all the time somewhat during rainy season, bad whether etc. Here an approach towards road side symbol detection is presented. This system is helpful for the driver. An in-car-system will be placed inside the car.

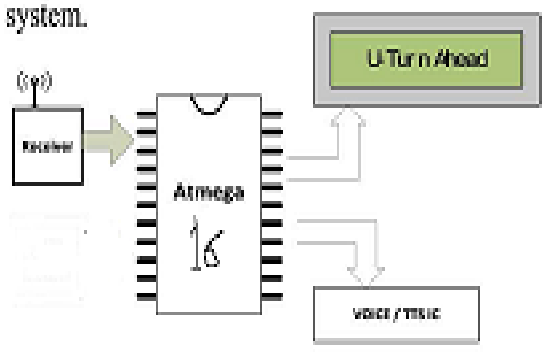


Fig.4. In -car System

In the proposed system the first phase is to design the In-Car System. This consists of RF module (Receiver), AVR based development boards, Atmega 16 Microcontroller, 16 X 2 LCD panel, ISP programmer, Voice/ TTS IC. The LCD will

shows the signal information about road side symbols. The in-car-system will be act as a receiver.

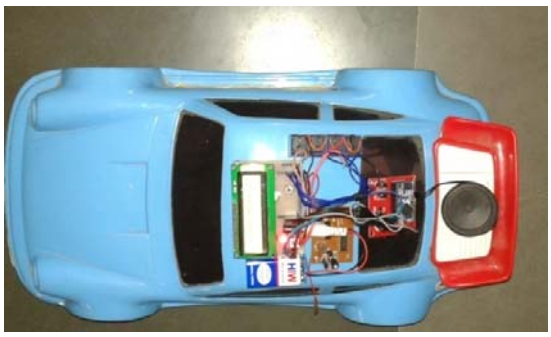


Fig 5- Working model of in-car-system

The road side boards can be fitted along with the transmitter, This road side boards can be battery operated and also solar operated. These transmitters continuously transmit data in message form. So, as soon as the car comes in range of transmitter the receiver placed inside the car receives the data and displays it on LCD.

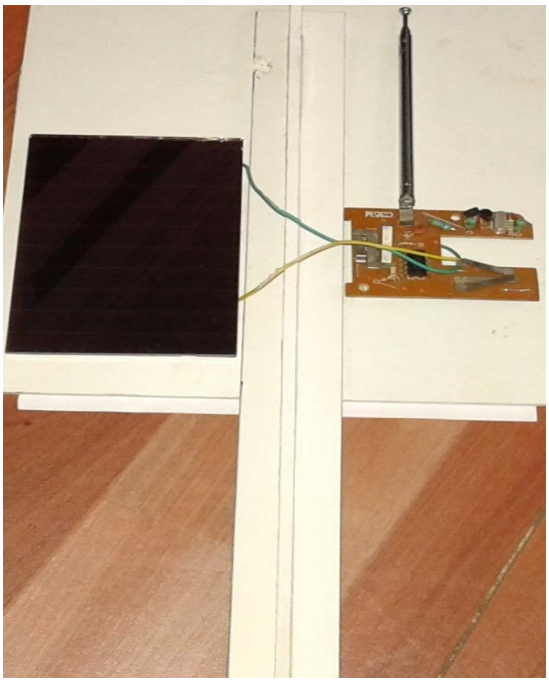


Fig. 6- Solar operated road side symbol

"5. Conclusion And Future Scope"

In this paper roadside symbol detection technique is presented. The system is designed to assist driver and symbol displayed on the in-car-system. Along with that a pre-recorded sound also played so that driver no need to see the LCD regularly and he can drive more concentrately. As the road side boards can also solar operated so that the system will not be interrupted and gives continues performance. This also makes need of maintenance minimized. This system is much helpful for driver in hilly-areas. If further implemented, this system can provide more applications such as text reorganization on the road side boards.

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