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Review on Design & Implementation of Road Side Symbol Detection In VANET

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Abstract—
Establishment of vehicular ad-hoc network plays important role in smart traffic management system. Researcher can create VANET by information sharing of road side unit, vehicle and traffic system & implementing it in real world. This system implemented to detect road signs from a moving vehicle. In this technology vehicle is able to detect traffic signs which are on the road side boards e.g. "speed limit" or "school" or "turn ahead". Consider a condition, user is driving a car at night or in rainy season then it is not possible for driver to keep watch on each and every road symbol or the message plates like turn, speed breaker, school, diversion etc. Here in this proposed system every road side board or symbol will use one signal transmitter and the moment vehicle passes from that road side board the vehicle will receive signals with the help of receiver and indicates the symbol on LCD display which is in the car. So that the driver can able to concentrate on driving vehicle.
Key Words: In-Car System, Microcontroller, RF, RSU, VANET

I. Introduction

In day-to-day life due to different reasons vehicle driver can face various problems while driving vehicle. Consider an urban area with number of vehicles. While driving vehicle drivers are interested to get information about their route. For example, driver want to get traffic conditions one mile ahead or one mile before, availability of oil pumps, also availability of hospitals, hotels etc. This type of information is useful for driver to optimize their journey, to avoid accidents, to avoid unnecessary driving, to avoid traffic jam. These pictures tells the problem which driver have to faced during driving. Due to various reasons the problems raised may be rusting of symbols on road side due to whether, hidden symbols in the trees or somewhat collapsed. Due to these various reasons many times while driving driver cannot able to see symbols clearly and may mismatch the massage on road side boards and also not able to drive concentrately. This may lead to cause accidents.

"Fig.1 current scenario"

So, to avoid the problems of driver we are implementing this system. Normally road sign firstly represented by colors such as brown, blue, green, red etc. Secondly they are in specific shapes like square, circular, triangular, octagonal etc. Thirdly the contents of road side symbols depending on application of symbol. In VANET for passing information of vehicles important thing is its infrastructure. The database which is mobile distributed stored at fixed location which is updated with an accuracy, overhead, acceptable delay is big challenge. The contents of road side symbols mainly focuses by this proposed system. This system alerts driver about upcoming symbol on

road side boards so that it helps to avoid accidents mainly.

II. Literature Survey

For applications of vehicular such as intelligent transportation systems (ITSs), navigation, and location-based services (LBSs). Global Navigation Satellite Systems (GNSSs), such as the Global Positioning System (GPS) there is need of Real time position information, are the most useful positioning tools which can be considered for these applications.[1],[2],[3]. Earlier sign detection technology performs tasks like detection, tracking and classification along with detection technique of colour and shape.[4]

1) In April 2014, Noopur Patne and Mangala Madankar published a paper on "Design and implementation of traffic information sharing through road side unit". In this symbols on road side unit are detected by vehicle in-car-system but the road side units are battery operated.
2) In 2014, S.S.Meshram, Mrs. S.S.Golait Mr. N.A. Ghodichor published a paper on "Inter-Infrastructure and Vehicle Communication for Traffic Information Sharing in VANET". In this the system is able to share infrastructure to vehicle and vehicle to vehicle communication with massage, sign and symbol detection.

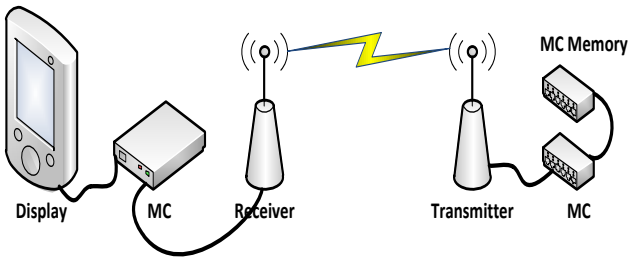
3) In March 2013, Nima Alam, Asghar Tabatabaei, and Andrew G. Dempster, published a paper on " Relative Positioning Enhancement in VANETs". In this relative positioning is used for many applications, including collision avoidance and LBSs, Global Navigation Satellite Systems (GNSSs). Cooperative positioning (CP) techniques, used to improve performance of VANET. But the VANET CP systems are mostly based on radio ranging which is not viable
4) In DEC- 2012, Nazmus S. Nafi and Jamil Y. Khan published a paper on "A VANET based intelligent road traffic signaling system". In this paper they develope a safe and conflict free movement of vehicles through different roads , junctions and other traffic structures. The system faced difficulty in information gathering, display road side symbols and building reprogrammable transmitter module.

III. Comparision Table

Sr No	Authers Name	Title Of Paper	Technique Approach
1.	Noopur Patne Mangala Madankar	Design and implementation of traffic information sharing through road side unit(2014)	In this RF Technique is used by which a vehicle is able to recognize the traffic signs which are on the road e.g. "speed limit" or "school" or "turn ahead". And RSU's are battery operated.
2.	S.S.Meshram, Mrs. S.S.Golait ,Mr.N.A Ghodichor	Inter-Infrastructure and Vehicle Communication for Traffic Information Sharing in VANET (2014)	In this VANET field has been used which causes vehicle to vehicle communication and also share information like vehicle location, vehicle health.
3.	Nima Alam, Asghar Tabatabai, and Andrew G. Dempster	Relative Positioning Enhancement in VANETs (2013)	In this paper a CP method is presented to improve the relative positioning between two vehicles within a VANET fusing the available low-level Global Positioning System (GPS) data. The proposed outperforms differential GPS (DGPS)..
4.	Nazmus S. Nafi and Jamil Y.Khan	A VANET based intelligent road traffic signaling system (2012)	In this adaptive signalling schemes optimizes the signals duration based on real time traffic estimation technique. The adaptive signalling systems, vehicle mobility model, communication netwok model cooperate with each other within same control platform.

IV. Proposed System

In the existing system of displaying massages on road side boards, the driver is not able to see massages status continuously. The google map facilitates satellite view and available destinations on the digital data, also it is not feasible 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 at night or in rainy season then it is not possible for driver to see every massage or road side symbols like speed breaker, railway crossing, oil pumps etc. Therefore to solve such issues a system is proposed which will lead to get over its drawbacks. So that driver drive the vehicle safely and he has available information of his route.



Inside Car On Road side boards

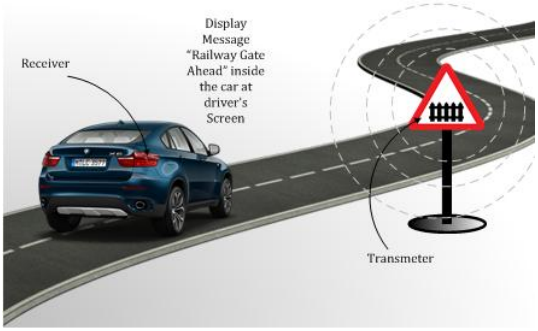
"Fig. 2 research idea"

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. For wireless frequency matching and device identification transmitter consists channel and device ID setting system. In predefined channel to read the frequency receiver is there and fetched broadcasted information of transmitter. A microcontroller based hardware module is develop and software code for defined platform is designed to read information. Develop a LCD or graphics LCD based display module and write a code to print defined text or display graphics symbol.

4.1 RF Module (Rx/Tx)

The corresponding frequency range varies between30 kHz & 300 GHz. In this RF system, the variations in the amplitude of carrier wave represents digital data. Such type of modulation is called as Amplitude Shift Keying (ASK). RF transmission is better than IR (infrared) due to many reasons. First, signals through RF can travel for longer distances which is suitable for long range applications. Also, while IR operates in line-of-sight mode, RF signals can travel though there is an obstruction between transmitter & receiver. Next, RF transmission is more strong and reliable than IR transmission. RF communication uses a particular frequency which is needful whereas other IR emitting sources affects to IR signals. This RF module consists of an RF Transmitter and an RF Receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434 MHz. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps. The RF receiver receives transmitted data which also operate at a frequency of 434 MHz. The RF module is often used along with a pair of encoder/decoder.

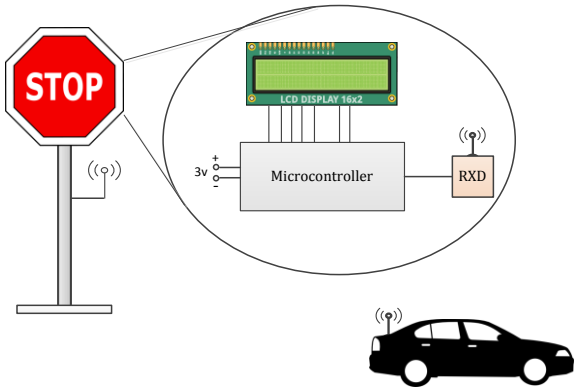
4.2.Scenario diagram of system



"Fig. 3 block diagram of system"

In this system the signal transmitted by the transmitter will be received by the Receiver which will be forward to the processor through port. The data will be fetched depending on value of port. Then the software placed inside the 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 it will display the information or massage with the image placed in database, on the display unit (LCD).

4.3 Radio frequency module



"Fig 4. block diagram of radio frequency module"

The system is connected to RF module with parallel port. The software embedded in processor handles the further processing and displays the final output on the Screen (LCD). A radio tuner is needed to tune in to particular frequency.

V. Conclusion

In this paper an approach towards roadside symbol detection is presented. This system is designed to assist driver and symbol can be shown in the car on LCD. So that driver can drive vehicle concentratelly. If further implemented, this system can provide more applications such as text reorganization on the road side boards. The road side boards should be battery as well as solar operated so that the system will not be interrupted. The solar power will remove the limitation of road side unit and helps to give continues performance also minimize the maintenance. This system is very much helpful for the driver on the highways.

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