Smart System in Vehicles

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Abstract **- Transportation problems are turning into more critical due to the complication of traffic structure and increase of vehicles on roads. The proposed system provides a free space to the vehicles to communicate among them to avoid collision. The vehicles share information about its speed and position to avoid collision. ATMEL controller controls the whole working of the system and through Zigbee the information are transferred between the vehicles. A warning is given as alert to the driver to prevent collision. In addition to this same methodology we have developed a Signboard Detection System (SDS) which will alert the driver at the early stage of the road sign. And an Automated Toll Collection is the another system in which the money is collected only for the distance travelled on the highways. The integration of these three systems in the name of Smart System in Vehicles is the answer of issues and problems in the roadways.**

Keywords – Vehicle Collision Avoidance, Signboard Detection, Automated Toll Collection, Enhanced safety and cost effective.

I. INTRODUTION

A. Vehicle Collision Avoidance System

Vehicles play an important role in human's daily life, at the same time they may cause dangerous problem to life of people and property due to accidents. Every day around the world, several hundreds of people die from various collisions of vehicles. The National Highway Traffic Safety Administration (NHTSA) estimates that about 88% of rear-end collisions in the United States are caused by driver inattention or by vehicles following too closely The main challenge encountered to avoid accidents is to avoid collisions. In order to avoid collisions there has been a great amount of work done in this field, many papers featuring different Collision Avoidance Systems (CAS) have been published.The communication and sensor technologies are largely considered research and development to make roads safer and smarter. Since today's vehicles are enabled with sensors to sense the surrounding environment, the further step is to allow the vehicles to communicate with each other. Vehicle communication is a network that allows vehicles and Roadside units to communicate regarding safety warnings and traffic information. These connected vehicles provide a building block to improve safety and comfort of driving. The growing wireless communication technologies promise to reduce the delay in propagating emergency warning signals.

B. Signboard Detection System

Each government imposes some sets of rules and regulations to ensure a safe traffic system. Each person specially the vehicle driver must obey these rules and regulations for a secure travel. Some of those laws are represented as visual language such as different signs and texts that are known as traffic signs. There are various categories of traffic signs that we can see beside the roads. An efficient driver must notice each of the road signs in front of him and need to act accordingly. A driver may not notice each of the road signs in front of his car due to lack of care or human perception errors. Therefore, it is desirable of having a automatic road sign detection and recognition system to assist the driver to ensure a safe travel.

C. Automated Toll Collection

The highway transportation has become more and more important in modern road network and the traditional manual toll collection system has become outdated due to its drawbacks. By employing automated toll collection system, driver of vehicles need not to stop at a window or toll machine and waste time waiting in a long queue to pay their toll. This reduces the consumption of fuel, reduce road congestion, increase road safety and traveler become pleased. Electronic Toll collection (ETC) system is basically designed for an uninterrupted toll collection, which has become an important part of intelligent transportation system. This paper presents the concept of Automated ETC using ZigBee transceiver instead of RFID technology. The communication range is increased comparatively. ZigBee automated ETC can eliminate manual toll collection, require minimum employee, and thus lower the cost of operation.

II. EXISTING SYSTEM

Vehicle collision avoidance system using wireless sensor networks. The collision avoidance can be done by Laser sensor. Vehicle collision avoidance system can be identified by using Laser rays with the laser transmitter and laser receiver. Laser transmitter is connected to the laser sensor. Can controller is connected to the all sides of the nodes and send the information via Zigbee and transmit the message to the LCD output on the driver side. Laser receiver is connected to the can controller. But based on the output of laser sensor it may cause many false alert.

Android Based signboard detection is one such approach where the driver gets information about upcoming hurdle in advance. Also, whenever it detects a pedestrian movement the vehicle stops and speed reduces in speed limited zones, At night it is difficult for driver to keep track of signboards.

There are two methods of collecting tax presently used they are First is the traditional manual method where one person collects money and issues a receipt. The other one is the Smart Card method where the person needs to show the smart card to the system installed at the toll tax department to

open the Gate. Both the above mentioned method for collecting tax is time consuming method. Chances of escaping the payment of tax are there. It leads to queuing up of following vehicles.

III. PROPOSED SYSYTEM

In this project we discuss the use of received signal strength (RSS) of beacons from a proposed vehicular network as a way to detect dangerous approaches among vehicles with zone detection system. This system operates by recording and processing signal strength information at multiple base stations positioned to provide information in the area of interest. It combines euclidean distance technique with signal strength matrix obtained during offline measurement to determine the location of user. The experimental results presented in this report demonstrate the ability of this system to estimate user's location with a high degree of accuracy.

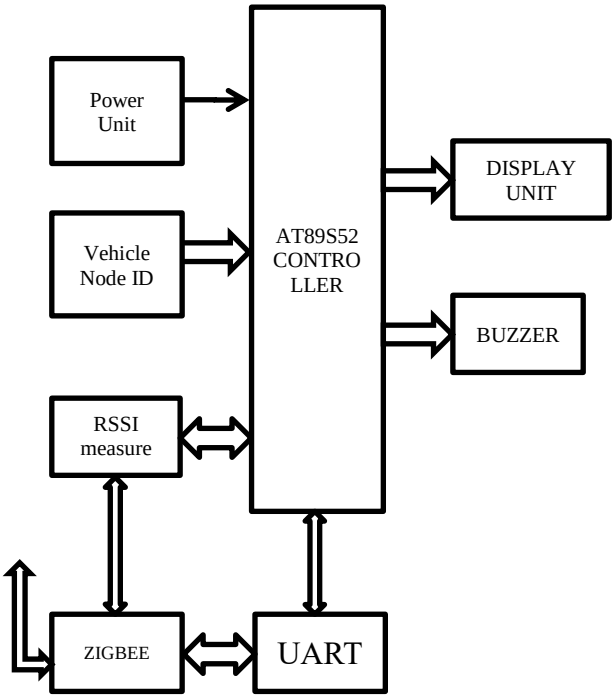


Fig (a) Vehicles Collision Avoidance System

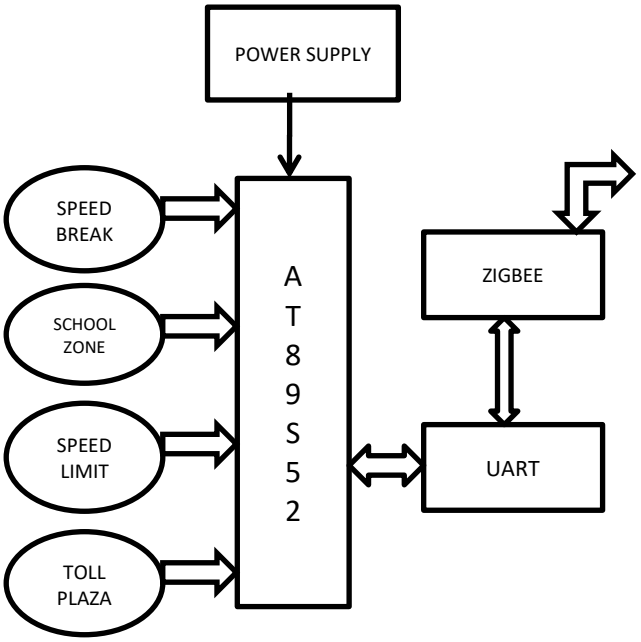


Fig (b) Signboard Detection System

For the collision avoidance, each vehicle will be equipped with the Zigbee 802.15.4 transceiver whereby they will transmit and receive their current position and predict whether both of them will collide or not along the way, By sharing vehicle state information, the protocol is able to predict potential collisions and deliver warning messages to address different emergency scenarios. collision warning systems (CWSs) based on inter-vehicle communication with non-line-of-sight (NLOS) avoidance capacity are more suitable for providing warning information for multilane conditions. Using reliable information transmission mechanism, one can effectively improve the performnce of CWSs.

When the vehicle enters in the vicinity of zigbee transmitter, it will transmit information about sign present at the zone, the receiver in vehicle receives transmitted information and display it in LCD display by alerting the driver to stay on the concentration in roads.

The zigbee transceiver mounted at all toll booth and service road it will read the prepaid (vehicle node ID) through zigbee transceiver and automatically respective amount will be deducted. Since every vehicle node ID is linked to users account, it can be deducted from the bank account directly.

IV. SYSTEM DESCRIPTION

AT89S52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

CC2530

The CC2530 is a true system-on-chip (SoC) solution for IEEE 802.15.4, Zigbee and RF4CE applications. It enables robust network nodes to be built with very low total bill-of-material costs. The CC2530 combines the excellent performance of a leading RF transceiver with an industry-standard enhanced 8051 MCU, in-system programmable flash memory, 8-KB RAM, and many other powerful features. The CC2530 comes in four different flash versions:

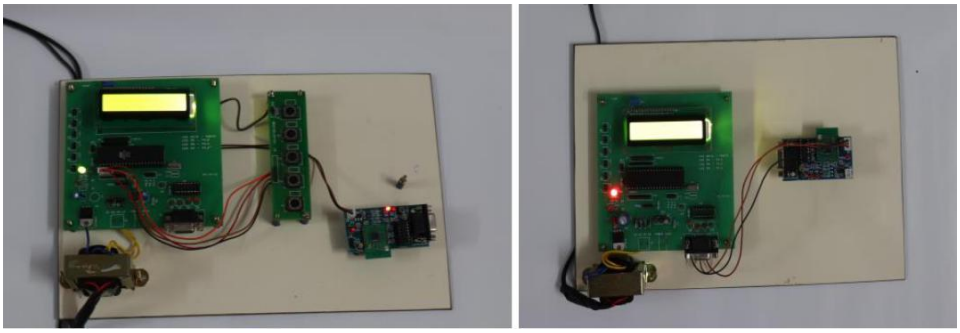
CC2530F32/64/128/256, with 32/64/128/256 KB of flash memory, respectively. The CC2530 has various operating modes, making it highly suited for systems where ultralow power consumption is required. Short transition times between operating modes further ensure low energy consumption

RSSI

GPS can be said to be the most popular tool against the outdoor position estimation problems. But the indoor localization problems, where no GPS signals are able to be received, require wireless sensor networks. Several distance estimation techniques, based on the communication between located sensors, are present. RSSI is the most applicable one with minimum cost. And the position estimation process is performed based on the distance data derived from the RSSI measurements

Distance	2m	4m	6m	9m	12m	15m	20m	25m
RSSI	-52.47	-53.35	-58.15	-63.17	-63.7	-70.27	-76.34	-82.89
St.Deviat.	1.091	4.186	0.309	0.480	0.367	0.848	0.649	2.206

V. IMPLEMENTATION



VI. CONCLUSION

Smart Systems in Vehicles provides safety, security and efficiency to people. The proposed system allows the vehicles to exchange the data regarding the collision, Signboard alert and Toll payments. Based on the received information, a warning is given to the vehicle driver. The proposed system is demonstrated and the outputs are obtained subjected to the real time environment. This system has the main advantage of reducing road crashes and reduces the expenses while using the highways

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