

Intelligent Traffic Monitoring System by Using ZIGBEE and VANET Technology

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Abstract— The main objective of this proposal is to reduce the road accidents due to high speed of moving vehicles in traffic. In the current system the speed limiting boards are monitored by static in nature, due to which on any given day when there is high vehicular traffic moving with high speed there is a need of necessity to decrease the speed of vehicles below the permissible speed shown on the display board. The proposed system introduces the concept of Intelligent Traffic Monitoring System by using ZIGBEE technology along with VANET. According to the system, speed limit boards are erected to the current poles lying on the roads which will display the speed limit. Every area is designated with the set speed limit. When the vehicle passes by that area and there is a speed mismatch of the vehicle with the display board, speed will be recorded and further monitored at the next point and if it is still not decreased then a necessary action will be taken which may also lead to the cancellation of the license of the driver.

Keywords— ZIGBEE, VANET, TRAFFIC MONITORING

I. INTRODUCTION

A) MOTIVATION

In the recent days fatal accidents on the road are a major concern [1] in the developed world. These accidents are occurring because of the high vehicular speed driving. Vehicle driving at high congestion areas have become an issue in the recent days. It is utmost important to reduce the accidents. Intelligent speed adaptation utilizes the information about the road on which the vehicle travels to make decisions about what the correct speed should be. This information can be obtained through taking roadway co-ordinates through general speed zoning information for a given geographical area (e.g., an urban area has a set speed limit according to vehicular density and similarly school zone has a speed limit), or through feature recognition technology that detects and interprets speed limit signage.

B) RESEARCH CONTRIBUTIONS

This paper presents a design and implementation of Intelligent Traffic Monitoring System, along with this network the system uses ZIGBEE and VANET Technology. An initial phase of work has been initiated in the lines of Intelligent Traffic Monitoring System featuring the technology of erecting the speed limit boards in the current poles lying on the roads and displaying the speed limit.

C) LITERATURE SURVEY

The speed limit digital boards are erected to the electric poles which are there on the either side of the roads. this

boards makes the driver cautious while driving. The speed limit set on the digital boards will vary on a day to day basis. The purpose of the Zigbee, VANET technology is to assist the driver in abiding the traffic laws and adhering to traffic limits so as to reduce accidents.

How ZIGBEE works at vehicle side:

- 1). As soon as the vehicle starts at its source location the ZigBee is started. Whenever we pass by on the roads the ZigBee installed at the pole captures the speed of the vehicles. It checks whether the speed of the vehicle is within the prescribed set speed limit of that area.
- 2) If the vehicle is exceeding the limit, then this recorded information will be passed to the slave at the next pole. Again, at this pole the speed is checked to see whether it is below or above the set limit.
- 3) If the rider is not controlling the speed then a challan will be issued else if speed is controlled then no action will be taken. If the rider is ignoring the vehicle limit then the license will be cancelled. with this technology the speed limit of the vehicles are controlled.

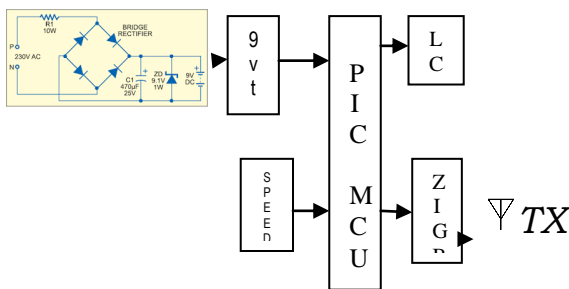
II. PROPOSED WORK

HOW THE PROPOSED SYSTEM WORKS: The ZIGBEE works on the VANET technology. VANET technology transmits data between the master and slaves through its IP data packets. It uses the concept of master – slaves technology. The Master is primarily erected at the main junction and the Slaves are erected at the remaining poles.

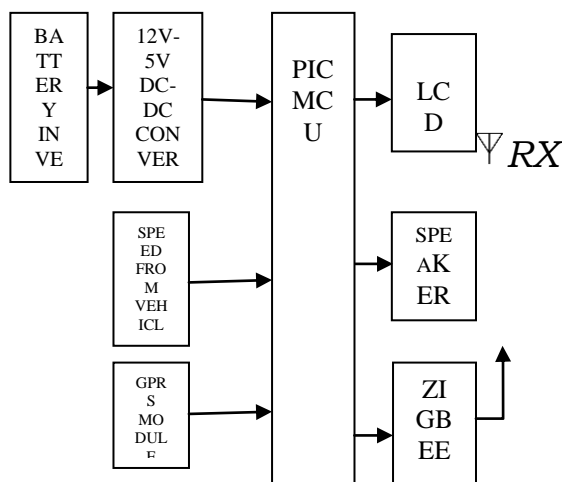
The master slave technology erected between the poles will check the speed of vehicles passing by that area. as there is Zigbee also installed in the vehicle, The vehicle speed limit is recorded and checked whether it is exceeding the limit or not, then this recorded information will be passed to the slave at the next pole. again, at this pole the speed is checked to see whether it is below or above the set limit. meanwhile the speed limit recorded at the previous pole will be passed to the controller of traffic. The controller then checks the speed status at the next pole, if the rider is not controlling the speed then a challan will be issued else if speed is controlled then no action will be taken. If the rider is ignoring the vehicle limit then the license will be cancelled. With this technology the speed limit of the vehicles is controlled. The entire technology between the master, slave and the vehicle are based on the VANET.

The implementation of VANET [2] decreases the rate of accidents. This is confined to particular area spanning over to fixed radius. Every area is implemented with the master slave technology.

Present implementation is done at the congestion areas and heavy traffic areas, future implementation will be at all the areas.



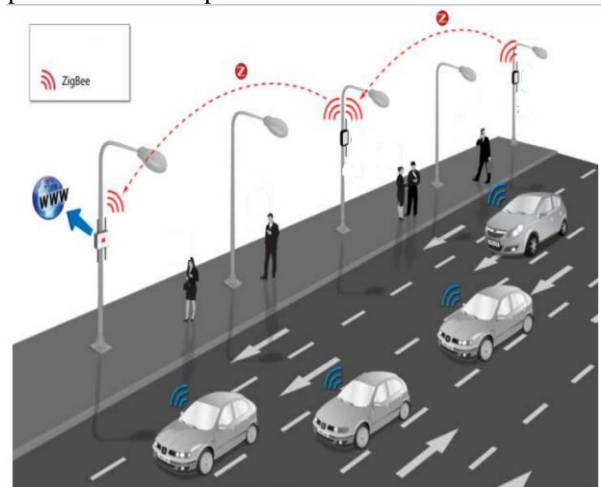
The above-mentioned diagram represents the working unit at the speed boards. This unit takes ac power and converts to dc by using rectifier circuit and after converting the dc we have to use dc-dc converter for suitable voltage for unit which is 5v. This unit receives the speed limits from the nearest traffic control unit and store it into the micro controller and display the speed on led display and same speed will produce to the vehicles using ZigBee module.



III. TECHNICAL DETAILS

Zigbee is built on top of the IEEE 802.15.4-2003 standard. it operates in the traffic, industrial, scientific, and medical (ism) radio bands; 868 MHz in Europe, 915 MHz in the us, and 2.4 GHz in most countries worldwide. the 2.4 GHz version of ZigBee has become the de-facto standard of ZigBee networks, and has been implemented in AmxZigbee product offerings. VANETs can use any wireless networking technology as their basis. The most prominent are short range radio technologies[like WLAN (either standard Wi-Fi or ZigBee). In addition, cellular technologies or LTE can be used for VANETs. The latest technology for this wireless networking is visible light communication [VLC] .

Graphical view of Proposed SYSTEM



IV. RESULTS AND DISCUSSION

RESULTS

This project [3] primarily focusses on the 3 important points:

- speed monitoring of vehicle
- alerting the driver through the e-challan at the times of over speeding
- reduce the vehicular speed

V. Future scope

1) As mobile technology [4] is prevailing predominantly and also become an essential part of our life. Similarly, VANET and Zigbee technology will predominantly rule and be a vital part in reducing accidents. Future implementation will start on highways at toll plaza with toll collections being automated and also the poles will be erected with the technology on the highways. If any vehicle violates the speed, the technology that is being implemented at poles will check the speed to find whether there is any violation of speed and if there is violation , the information will be captured through the GPS (location and pole number) and communicated to the traffic controller of the highways and an e-bill will be

generated when the vehicle passes the toll gate. This way accidents will reduce on the highways.

VI. CONCLUSION

In this paper we have discussed the importance of an efficient driver assistance system and how it will help us to improve safety standards on the road. The outcome will significantly reduce the road accidents if any body cross the speed limits automatically, fine chalan will generate and send it to the owner of the vehicle. This system also reduce the traffic police staff who are monitoring the speed of the vehicles and utilise these staff to any other important works. We are using Zigbee technology for communication between vehicle and speed boards along with Vanet technology for speed boards and nearest police station, GPRS technology in using for message sending Purpose. In future we can improve this system to reduce the traffic on the roads and improve the safety also.

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