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VANET based wireless sensor network using zigbee technology

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Abstract - *In this project we focus on the problems related to a particular scenario and try to find out the solutions using Zigbee module. We present a generalize flow for combining various aspects into a single solutions and making future developments in this field. On the other hand reducing contention and maximizing the total network throughput is the most important aspects to be focused on in accident prone areas Zigbee is the latest technology which can be used to establish a temporary network for communication between the vehicles. We can also apply the intra communication system among the vehicles using Zigbee Technology. It is well known that the security of our vehicle plays a vital role in vehicle to vehicle adhoc network. Zigbee is the most flourishing wireless communication technology which supports low cost , low power, short range and low maintenance wireless communication. Due to drastically changing environment, various schemes are required which allow adhoc networking of predetermined devices*

Key Words: *VANET, Zigbee, WSN*

1. INTRODUCTION

Vehicular adhoc network- (VANETs) have become a prominent technology for improving the standard of the safety levels in transportation schemes. VANETs consist of roadside units vehicle to vehicle communication nodes that respectively allow vehicles to transmit signals via establishing a temporary network in emergency cases like road accidents, landslides etc. Due to wireless communication it is possible for vehicles to communicate to zigbee so that large range of area can be covered as per requirements. Here, spontaneous message generation through ultra sonic sensor, message authentication and message integrity is also maintained throughout the communication process. Ultra Sonic sensors are implanted on the vehicles through which the message transmission becomes serially aligned. Hence VANETs cannot totally depend on short life time strategies ,as a malicious vehicle can harm other vehicles until its strategic life time expires .Thus efficient coordination becomes the most important parameter in message generation and transmission in that particular order. For a practical demonstration method it is required that the allocation of misbehaving vehicles should take place as early as possible to prevent this vehicles from accidents. According to vehicular ad hoc network, it will completely rely on the public key maintenance as a perfect method to achieve these security requirements. A central authority issues and authentic certificate for each node used in communication through Zigbee. Following are the most important situations which come into picture through (V2V) communication using

Zigbee :-

1) If obstacle is detected in front of our ultrasonic sensor-It will detect the obstacle upto(6ft/180cms) and if distance is less than 50cm even if input is given to the transmitter remote the car will not start.

2) If there is collision ahead on the highway-This information will be received by our car and our car will automatically stop.

1.1 Congestion of Vehicles

As the number of vehicles will increases on the road with the current constant speed then that day is near when foot passenger will reach their target soon compare to vehicle holder. When many numbers of vehicle are gather at signal or any jam (due to any accident or any other reason) then the congestion occur. But the question is how this number of vehicle gathers at the place and increases the capacity of congestion. The answer is " when the accident occur there are very few numbers of vehicle but the other vehicle holder who have no information about the condition are choose that way and increases the gathering of vehicles on road & this all process take the result " Congestion of vehicles"

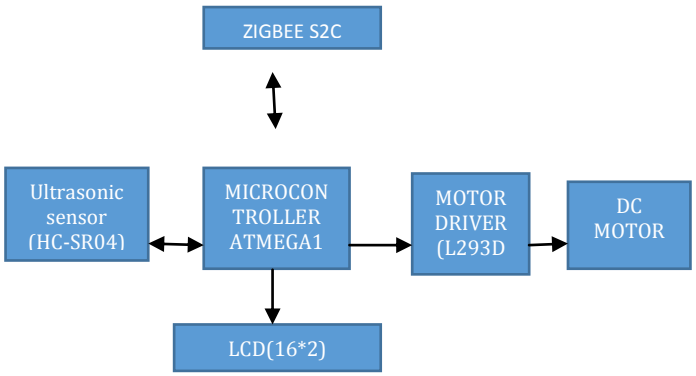
For this reason, nowadays the automotive industry and governments invest many resources to increase road safety and traffic efficiency, as well as to reduce the impact of transportation on the environment. One of the most promising areas of research is the study of the communications among vehicles and road-side units, or more specifically the Vehicular Ad-hoc Networks (VANETs).

2. LITERATURE SURVEY

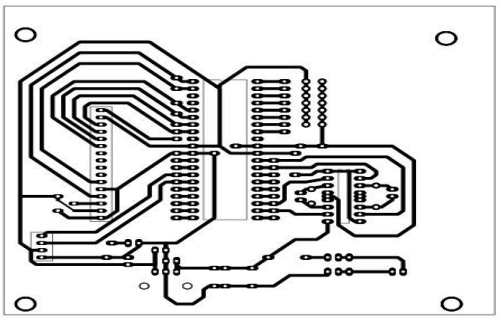
VANET is an autonomous & completely self-organizing wireless communication network. In this network the cars are called dynamic nodes and Infrastructure is called Static node which involve themselves as servers and/or clients for exchanging & sharing information.

Various researchers are working on VANET to find the solution for current traffic congestion problem. Many methods are used to reduce the traffic congestions detection and management using VANET.

3. BLOCK DIAGRAM



3.1 pcb layout



4. COMPONENT USED

4.1 microcontroller atmega16

ATmega16 is an 8-bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. Atmega16 is based on enhanced RISC (Reduced Instruction Set Computing) architecture with 131 powerful instructions. Most of the instructions execute in one machine cycle. Atmega16 can work on a maximum frequency of 16MHz.

4.2 ultrasonic sensor (HC-SR04)

This is the HC-SR04 ultrasonic ranging sensor. This economical sensor provide 2cm to 400cm of non-contact measurement functionality with a ranging accuracy.

4.3 zigbee s2c

Low-Cost Low-Power 2.4 GHz RF Transceiver datasheet (Rev. C). The transceiver is integrated with a highly configurable baseband modem. It provides extensive hardware support packet handling, data buffering, burst transmission, clear channel assessment and link quality.

4.4 lcd (16*2)

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of application. A 16*2 LCD display is very basic module and is very commonly used in various devices and circuits.

4.5 motor driver(l293d)

Motor driver ICs act as an interface between microprocessors in robots and the motors in the robot. The most commonly used motor driver ICs are from the L293D.

4.6 dc motor

A DC motor is any of a class of rotary electrical machines that convert direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields.

5. HARDWARE REQUIREMENTS

1) Zigbee S2C
2) Microcontroller ATMega32
3) Ultrasonic Sensor
4) L293D Driver IC
5) Voltage Regulator
6) LCD (16x2)

6. SOFTWARE REQUIREMENTS

1) AVR Studio
2) PCB Artist
3) Win AVR

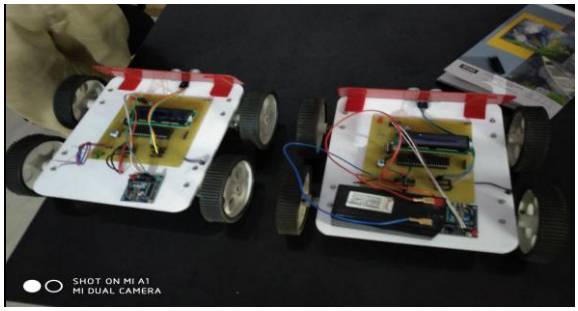
7. LANGUAGE USED

1) Embedded C

8. RESULT

In this project i am creating a three events. 1. accident is occure, 2. fuel is finish, 3. bypass signal. If the driver of vehicle 1 sees an accident is occure in front of him then he press the button of accident and then that massages is display on the lcd display of the other vehicle.

8.1 hardware part



8.2 input

fig: vehicle 1

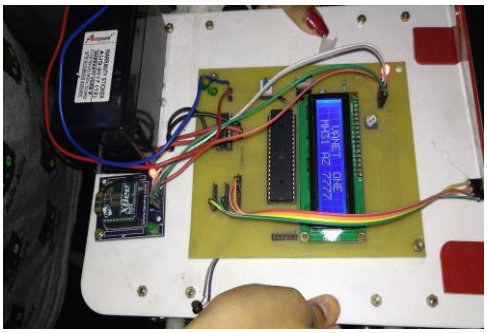
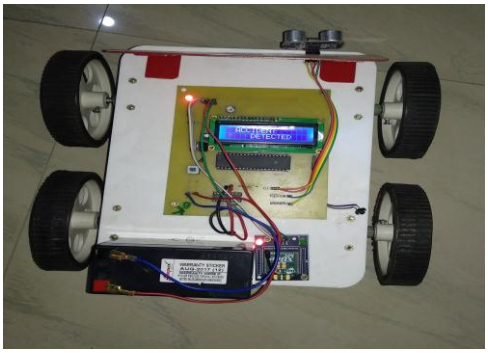


fig: vehicle 2

8.3 output



9. FUTURE IMPLIMENTATION

As mobiles are familiar and used by us in our day to day life, similarly the future of VANETs is undoubtedly secure. It has become the part of the government projects. In India, National Highways Authority of India (NHAI) is planning to replace manual toll collections at plazas with electronic toll collection (ETC) systems across the country. The ETC system will be based on radio frequency identification (RFID), which will be complemented by a wireless on-board unit (OBU) on a vehicle, as well as a stationery roadside unit (RSU) at the toll plaza. Australian police in New South Wales (NSW) and Victoria are considering the introduction of a new type of laser speed camera, which can catch drivers using mobile phones, as well as speeding motorists from half a mile away. The cameras, known as Concept II, have been manufactured by Tele-Traffic UK and are already in use by UK's Dorset police as the latest tool in their zero tolerance campaign against driving offenses. Similarly, various projects are running in various countries to employ VANETs in traffic safety and efficiency driver's behavior and reaction when additional information is provided through VANETs is also a challenge. The adoption of VANETs in the market is another challenge as there are many players in the game.

10. CONCLUSION

In this project, we first gave a description of architecture, standards & protocols of vehicular ad hoc networks, followed by the characteristics with various applications based on its classification. The implementation of

applications at present and in future in countries that are deploying VANETs in one way or the other. Although the works are numerous, there are still issues which may be untouched. However, we want to clarify that the list of applications identified here is not exhaustive.

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