

Vehicle to vehicle communication using zigbee

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Abstract-- In this Hi-Fi modernization world coping up with road safety and traffic congestion is the need of the hour. Many research works are proposed and undergoing in this particular thrust area. This paper proposes an Intelligent Transport System (ITS) that provides an effective Vehicle to Vehicle communication mechanism using Zigbee. Especially in Vehicle to vehicle communication Zigbee proves a vital role and it is the key protocol for wireless sensor network applications. The key features of Zigbee include long battery life, low-cost for installation and ease maintenance. These features in Zigbee enable uniform mesh networking, which effectively supports the wireless communication between many vehicles, routers and receivers. In this paper suggestions are proposed for periodic monitoring of vehicular movements, enhancing road safety and handling traffic congestion are dealt with. Since these two above mentioned issues are the core aspects in transportation industry and an important problem which the world faces today, this paper deals with effective inter communication of vehicles using Zigbee protocol.

1. Introduction

Various factors such as crest of a hill, heavy fog, blind corner, heavy rain, snowfall, icy roads, vehicle mechanical problems contribute to vehicle crashes are considered to be the leading cause of more than 92% of all accidents. It is due to the inability of drivers to react in such emergency situations. These problems can be avoided by taking certain precautions by the use of Vehicle to Vehicle Communication. In Vehicle to Vehicle communication, the vehicle

can communicate with the other vehicle in the specified range and share the information about the traffic jam, road accidents, direction speed, weather and ensure a safer and more comfortable drive.



Fig. Heavy Rain.



Fig. V2V Communication.

2. Existing System

The rapid growth in the vehicle ownership is one of the major for economic growth of the country. Explosion of the new trends and technologies requires fast transportation of all goods alike. The goal of each one is to reach the destination without wasting time and money. But the infrastructures provided by current resources are very limited. So the traffic management at road is essential to reduce waiting and travelling times, saves fuel and money. In current scenario the low and high traffic information is offered by only who are affected by that traffic problem for waiting long time to get signal to move other side. Thus there is wastage of fuel. If accident is occur shairing the information take much amount of time.



Fig. Heavy Traffic Flow.

3. Block Diagram

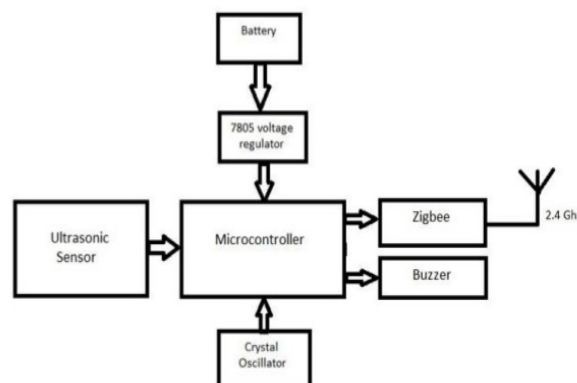


Fig:Block Diagram.

Micro controller :

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7 :

ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-crystal display (LCD) :

It is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

The design of entire system consisted of two part which are hardware and software. The hardware is designed by the rules of embedded system, and the steps of software consisted of three parts. The existing method by improving the security level by implantation of ETHERNET that will solve this problem. WIFI based wireless technology which consists of transmitter at the site location and receiver at control panel. Information received at the receiver will be send to the ETHERNET. So the people living at home with internet connection can see the received data. The system uses a compact circuitry built around LPC2148 (ARM7) microcontroller Programs are developed in Embedded C. Flash magicis used for loading programs into Microcontroller.

BOARD HARDWARE RESOURCES FEATURES - Wifi

VSD03 is the new third-generation embedded Uart Wifi modules studied by VSDTECH. Uart-Wif is an embedded module based on the Uart serial, according with the WiFi wireless WLAN standards, It accords with IEEE802.11 protocol stack and TCP / IP protocol stack, and it enables the data conversion between the user serial and the wireless network module. through the Uart-Wifi module, the traditional serial devices can easily access to the wireless network. The module supports quick networking by specifying channel number. In the usual course of wireless networking, devices would first scan automatically on the current channel, in order to search for the network (or Ad hoc) built by the target AP. This module provides working channel configuration, when the channel of the target network is known, users can specify the working channel directly, the networking time will be reduced from 2 seconds to about 300 milliseconds, then quick networking is achieved.

Zigbee :

Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this case is ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to 3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBee UART. The below table gives the pin description of transceiver. Data is presented to the X-Bee module through its DIN pin, and it must be in the asynchronous serial format, which consists of a start bit, 8 data bits, and a stop bit. Because the input data goes directly into the input of a UART within the X-Bee module, no bit inversions are necessary within the asynchronous serial data stream. All of the required timing and parity checking is automatically taken care of by the X-Bee's UART.

Features:-

- | | |
|-----------------|------------|
| 1. frequency | :- 2.4GHz. |
| 2. form factor | :- TH/SMT. |
| 3. protocol | :-ZigBee. |
| 4. multipoint | :-N/A. |
| 5. mesh | :-YES. |
| 6. Programmable | :-YES. |
| 7. gateway | :-YES. |
| 8. modem | :-YES. |

Ir sensor :

The TSOP21.. - series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter. The demodulated output signal can directly be decoded by a microprocessor. The main benefit is the operation with short burst transmission codes and high data rates. Photo detector and preamplifier in one package

- Internal filter for PCM frequency
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Output active low
- Low power consumption
- High immunity against ambient light

The circuit of the TSOP21.. is designed in that way that unexpected output pulses due to noise or disturbance signals are avoided. A bandpass filter, an integrator stage and an automatic gain control are used to suppress such disturbances. The distinguishing mark between data signal and disturbance signal are carrier frequency, burst length and duty cycle.

Smoke Sensor :

Smoke sensor is used to detect any leakage of smoke and any hazardous gases such that an alarm can be initiated to avoid any damages in the industries. These sensors are also used in many applications like corporate and in any office work areas these are linked to fire alarms and buzzers through the micro-controller. Ionization detectors have an ionization chamber and a source of ionizing radiation. The source of ionizing radiation is a minute quantity of americium-241 (perhaps 1/5000th of a gram), which is a source of alpha particles (helium nuclei). The ionization chamber consists of two plates separated by about a centimeter. The battery applies a voltage to the plates, charging one plate positive and the other plate negative. Alpha particles constantly released by the americium knock electrons off of the atoms in the air,

ionizing the oxygen and nitrogen atoms in the chamber. The positively-charged oxygen and nitrogen atoms are attracted to the negative plate and the electrons are attracted to the positive plate, generating a small, continuous electric current. When smoke enters the ionization chamber, the smoke particles attach to the ions and neutralize them, so they do not reach the plate. The drop in current between the plates triggers the alarm.

4. Advantages

The system we designed here does the following jobs

- The system measures the distance covered between the instant, the brakes are applied till the vehicle stops, moving at variable speeds.
- The time elapsed after applying the brakes till it stops.
- The zigbee sensor measures the distance between the vehicle in front of the car and will warn the vehicle in case there are any chances of collision.
- Easy traffic movement on the busy roads.
- Emergency Braking of vehicle moving in front.
- Reduces the number of accidents in case of emergency warnings delay.
- Supporting large number of vehicles on the road.
- Improve the work in the field of vehicle to vehicle Communication.



5. Conclusion

Hence usage of this system can highly increase safety and efficiency of transportation system. While improvements in this system can bring out the more reliability and safety in the vehicular communication filed.

6. References

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