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Safer Vehicle Transport in Traffic through Vehicle to Vehicle Communication

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ABSTRACT: Here we concentrate mainly on transportation infrastructure problems, which can be solved using information and communication technologies (IOT) we design an intelligent transport systems(ITS) considering a potential connection of vehicles to form vehicular networks that communicate with each at an IP-base and level. It exchanges information with each other than this the driver's health condition it is also monitored and communicated ,so that in emergency conditions, the concern driver may get immediate help in avoiding accidents and also medical assistance. Here, were introducing a new concept of Internet of vehicles (IOV) and the research challengers that arise from them.

I. INTRODUCTION

Traffic accidents have been taking thousands of lives each year, outnumbering any deadly diseases or natural disasters. 60% roadway collisions could be avoided if the operator of the vehicle was provided warning at least one-half second prior to a collision. Human drivers suffer from perception limitations on roadway emergency events, resulting in large delay in propagating emergency warnings, as the following simplified example illustrates. In

Figure 1, three vehicles, namely A,B and C travel in the same lane. When A suddenly brakes abruptly, both vehicles B and C are endangered, and being further away from A does not make vehicle C any safer than B due to the following two reasons:

Line-of-sight limitation of brake light: Typically, a driver can only see the brake light from the vehicle directly in front. Thus, very likely vehicle C will not know the emergency at A until B brakes.

Large processing/forwarding delay for emergency events: Driver reaction time, i.e., from seeing the brake light of A to stepping on the brake for the driver of vehicle B, typically ranges from 0.7 seconds to 1.5 seconds, which results in large delay in propagating the emergency warning. V2V helps to improve road safety Emerging wireless communication technologies are promising to significantly reduce the delay in propagating emergency warnings. The Dedicated Short Range Communications (DSRC) consortium is defining short to medium range communication services that support public safety in vehicle- to -vehicle (V2V) communication environment



Figure 1. V2V helps to improve road safety

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Emerging wireless communication technologies are promising to significantly reduce the delay in propagating emergency warnings. The Dedicated Short Range Communications (DSRC) consortium is defining short to medium range communication services that support public safety in vehicle-to-vehicle (V2V) communication environment

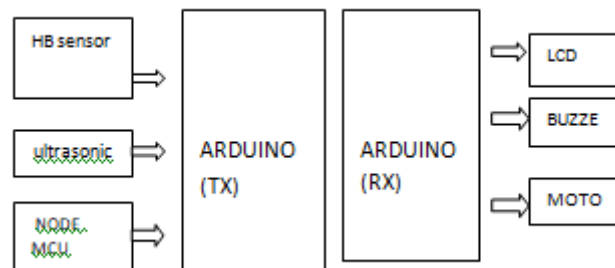


Fig.2: V2V communication

Using V2V communication, in our previous example, vehicle A can send warning messages once an emergency event happens. If vehicles B and C can receive these messages with little delay, the drivers can be alerted immediately. In such cases, C has a good chance of avoiding the accident via prompt reactions, and B benefits from such warnings when visibility is poor or when the driver is not paying enough attention to the surroundings. Thus, the vehicle-to-vehicle communication enables the cooperative collision warning among vehicles, A, B and C. Even though V2V communication may be beneficial, wireless communication is typically unreliable. Many factors, for example, channel fading, packet collisions, and communication obstacles, can prevent messages from being correctly delivered in time. In addition, ad hoc networks formed by nearby vehicles are quite different from traditional ad hoc networks due to high mobility of vehicles. A Vehicular Collision Warning Communication (VCWC) protocol is discussed in this paper. Major contributions of this paper include:

- Identifying application requirements for vehicular cooperative collision warning.
- Achieving congestion control for emergency warning messages based on the application requirements.

II. BLOCK DIAGRAM



Arduino:

We will be using the Arduino Uno board. This combines a micro-controller along with all of the extras to make it easy for you to build and debug your projects. The Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. Arduino is an open-source platform used for building electronics projects. Arduino consists of both a

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physical programmable circuit board (often referred to as a **microcontroller**) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

It is a single-card microcontroller which is designed to make the process by use of electronics in multidisciplinary projects more accessible. hardware consists of a simple open source hardware card designed around an 8-bit Atmel AVR microcontroller, although a new model was designed around a 32-bit ARM Atmel. The software consists of a standard programming language compiler and a boot manager that runs on the microcontroller.

Function

Segmenting code into functions allows a programmer to create modular pieces of code that perform a defined task and then return to the area of code from which the function was "called". The typical case for creating a function is when one needs to perform the same action multiple times in a program.



Fig. 2: Arduino

Ultrasonic sensor:

Ultrasonic sensors operate with a piezoelectric transducer as the sound emitter and receiver. A patented decoupling layer in special material is used to decouple the to the air - an acoustically thin medium ultrasonic

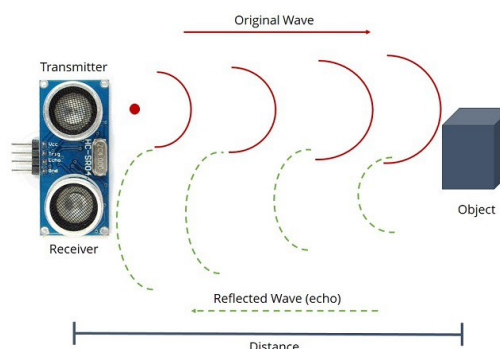


Fig.3: ultra sonic sensor

It is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns.

Ultrasonic sound vibrates at a frequency above the range of human hearing. Transducers are the microphones used to receive and send the ultrasonic sound. Our ultrasonic sensors, like many others, use a single transducer to send

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a pulse and to receive the echo. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

These compact sensors provide enhanced flexibility for areas with limited space and are excellent for standard packaging and assembly applications they are ideal for sensing target that are challenging for photoelectric sensors to detect including clear, shiny or non- reflective objects

The distance can be calculated with the following formula:

$$\text{Distance } L = \frac{1}{2} * t * c$$

Where L is the distance , T is the time between the emission and reception, and C is the sonic speed. (the value is multiplied by 1/2 because T is the time for go - and - return distance.)

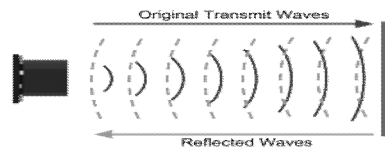


Fig.4:ultrasonic sensor

Heart beat sensor:

Heart Beat Sensor Heart beat sensor is designed to give digital output of heart beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heart beat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse. Features · Heat beat indication by LED · Instant output digital signal for directly connecting to microcontroller · Compact Size · Working Voltage +5V DC Applications · Digital Heart Rate monitor · Patient Monitoring System · Bio-Feedback control of robotics and applications

It is an electronic device that is used to measure the heart rate i.e. speed of the heartbeat. Monitoring body temperature, heart rate and blood pressure are the basic things that we do in order to keep us healthy.

In order to measure the body temperature, we use thermometers and a sphygmomanometer to monitor the Arterial Pressure or Blood Pressure.

III. WORKING

The sensor consists of a super bright red LED and light detector. The LED needs to be super bright as the maximum light must pass spread in finger and detected by detector. Now, when the heart pumps a pulse of blood through the blood vessels, the finger becomes slightly more opaque and so less light reached the detector. With each heart pulse the detector signal varies. This variation is converted to electrical pulse. This signal is amplified and triggered through an amplifier



Fig.5: Heart beat sensor

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Which outputs +5V logic level signal. The signal is also indicated by a LED which blinks on each heart beat.

Features

Heart beat indication by LED

- Instant output digital signal for connecting to microcontroller
- Compact Size
- Working Voltage +5V DC

Connect regulated DC power supply of 5 Volts. Black wire is Ground, Next middle wire is Brown which is output and Red wire is positive supply. These wires are also marked on PCB

Node mcu:

NodeMCU is an open source IoT platform. Which includes firmware which runs on the ESP8266 Wi-Fi Module from Espressif Systems, and hardware which is based on the ESP-12 module. The term “NodeMCU” by default refers to the firmware rather than the dev kits. NodeMCU firmware was developed so that AT commands can be replaced with Lua scripting making the life developers of in easier. So it would be redundant to use AT commands again NodeMCU.

Specification

- Voltage: 3.3V
- Wi-Fi Direct (P2P), soft-AP
- Current consumption: 10uA~170mA
- Flash memory attachable: 16MB max (512K normal)
- Integrated TCP/IP protocol stack
- Processor: Ten silica L106 32-bit
- Processor speed: 80~160MHz
- RAM: 32K + 80K. • GPIOs: 17 (multiplexed with other functions)
- Analog to Digital: 1 input with 1024 step resolution
- +19.5dBm output power in 802.11b mode
- 802.11 support: b/g/n
- Maximum concurrent TCP connections: 5



Fig.6: node mcu

Advantages

- Low energy consumption
- Integrated support for WIFI network
- Reduced size of the board
- Low Cost

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LCD (liquid crystal display):

LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (**LED**) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (**CRT**) technology. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it.

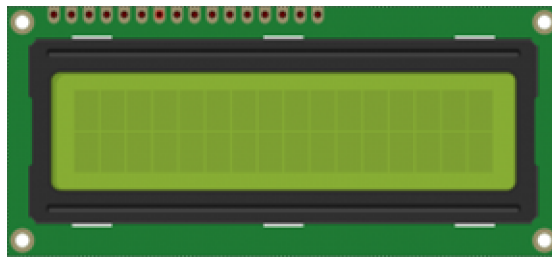


Fig.7: Lcd

IV. RESULT AND DISCUSSION

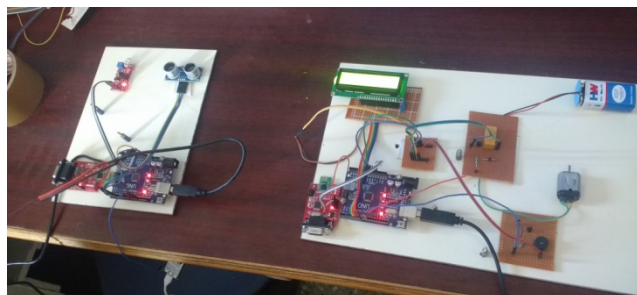


Fig.8: implemented on hardware

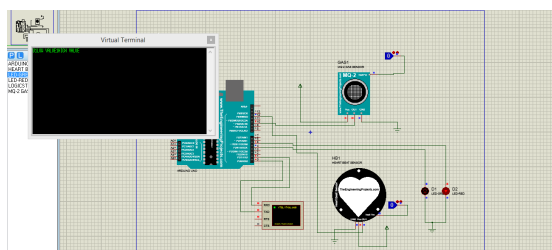


Fig.9: simulation output

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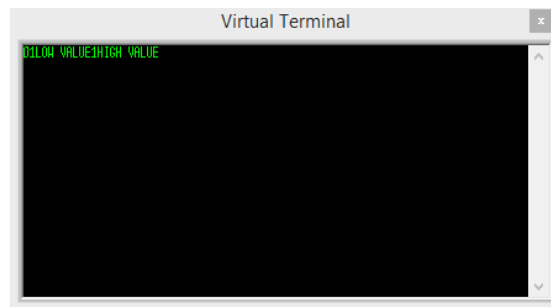


Fig.10: This picture shows about low heart beat value

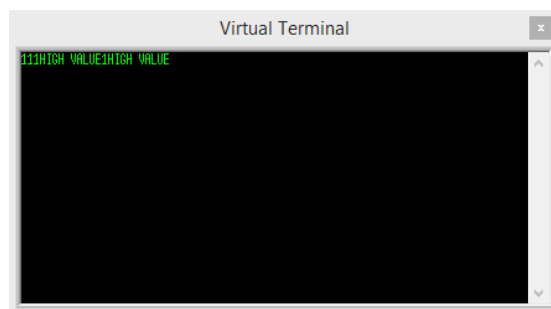


Fig.11: This picture shows about high heart beat value

V. CONCLUSION

Vehicle-to-Vehicle Communication is easy and simple to use. With the proposed system warning messages can be transmitted at faster rates that foster drivers to make strategic decision at faster rate which is vital in making strategic decision avoiding accidents and congestion. In future the project can be extended to communicate Vehicle-to-Infrastructure for smart city.

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