Vehicle To Vehicle Communication Using li-Fi Technology

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Abstract- Inter-vehicular communication system provides early warning signals to reduce road accidents and simultaneously provide safe driving. For this purpose we use co-operative driving which enables vehicles to communicate accident related messages to each other. Two modules consist of a transmitter and receiver. In transmitter there is ultrasonic sensors and a LED bulb which is responsible for transmitting data. The receiver module consists of photo diode which is responsible for receiving signals. This static system provides safety of drivers and reduces road accidents using co-operative driving. It also provides safety of neighborhood.

Key Words: arduino UNO, Li-Fi transmitter, Li-Fi receiver.

1) INTRODUCTION

In fundamental terms, Li-Fi can be thought of as a light-based Wi-Fi. Instead of radio waves light is used to transmit information. Since fundamental lights are used, there can in truth be any number of access centers. Li-Fi is a wireless technology which uses the band of visible light for transmission which is 10,000 times more than the band used in Wi Fi communication. It is fast, useful in secure communications as light cannot pierce the walls and cheap as LED lights are used for data transmission. The data is transferred by encoding it in the LEDs in digital form. The flickering of the LEDs give the output as 0 or l. Persistence of vision makes the flickering undetectable for the human eye. Different strings of 1's and 0's can be decoded to provide the transmitted data.

This advancement uses a bit of the electromagnetic range that is up 'til now not colossally utilized The Visible Spectrum. Light is in truth especially part of our lives for a long time and does not have any genuine wiped out effect. Also there is 10,000 times more space available in this range and just depending on the handles being utilized, it in like manner increments to 10,000 times more prominent availability as a structure, thoroughly. It is possible to encode data in the light by fluctuating the rate at which the LEDs streak on and off to give different arrangement of 0s. The LED control is changed so rapidly that human eyes can't see, so the yield appears to be consistent

Further developed frameworks could definitely assemble VLC data rates. Focusing on similar data broadcast using assortments of LEDs, where each LED sends another data stream. Diverse social affairs are using mixes of red, blue and green LEDs to change the light's repeat, with each repeat encoding another data channel.

2) LITERATURE SURVEY

Li-Fi remains for Light-Fidelity. Li-Fi is transmission of information utilizing noticeable light by sending information through a LED light that fluctuates in force quicker than the human eye can take after. On the off chance that the LED is on, the photograph finder enrolls a parallel one; generally its a parallel zero. This paper Rahul Prajapati, Prashant Jadhav, Sourabh Khaire "Vehicle to vehicle communication using Li-Fi technology" manages the usage of the most fundamental Li-Fi based framework to exchange information from one vehicle to another.

➤ In this paper comprises mainly light-emitting diode (LED) bulbs as means of connectivity by sending data through Visible light

➤ In this work, the concept of Li-Fi had been introduced along with existing techniques and classical trends used for vehicle to vehicle communications. The proposed system has a cost effective solution to reduce accidents.

➤ This paper focuses on LiFi as a feasible complement to the existing RF based communication. For this purposes, we thoroughly analyzed the difference between VLC and LiFi, the issues in RF based communication that can be addressed by LiFi, the working mechanism of LiFi, its pros and cons and finally we studied the application of LiFi.

➤ In this paper Li-Fi had been introduced along with existing techniques and classical trends used for vehicle to vehicle communications purpose. As this project aims to propose a cost effective solution to reduce accidents, the design guidelines and details of system components were thoroughly explored.

➤ This paper is determined to enhance the quality of Intelligent Transportation System (ITS) with the help of Visible light communication technology using a Li-Fi transmitter and receiver kit. The V2V communication system consisting of the Li-Fi

transmitters placed on a leading vehicle and the Li-Fi receiver is placed on a following vehicle.

➤ The design system is aim to ensure a highly-reliable communication between a commercial LED-based transaction light and a receiver

➤ . The aim of the paper is to design a module for communication between vehicles and to maintain safe distance between vehicles to prevent accidents.

➤ In Li-Fi technology for vehicle-to-Vehicle data transmission we use LED bulb. In this technology there is elimination protocols use so in Li-Fi technology complexity get reduce.

➤ In this article, we present an implementation of the new digital communication, technology that uses visible light, known as LIFI (Light Fidelity) or VLC(Visual Light Communication), and apply it for inter- vehicle communication.

➤ The proposed use of Li-Fi Technology in this paper comprises mainly of Light Emitting Diode(LED) bulbs as a means of connectivity by sending data through Visible light

3) Problem Statement

The major challenge with technologies is its low data transmission speed, high power consumption and limited bandwidth. This technology existing uses LED's for data transmission which ultimately increases the data transmission speed and reduces the power consumption and use the wide range of bandwidth. Visible light eliminates protocol (electromagnetic), reducing the complexity of system.

4)   METHODOLOGY

This project provide a communication between two vehicles as it reduces the accident . Our project works on the following method as it consist transmitter and receiver. Transmitter is used to send the message to receiver as a accident alert message

There are four message selected in transmitter they are

i.   Overtake
ii. Rash driving
iii. Lane change
iv. Fuel lekage

Our project is prototype we can add message according to our convinence by programming. if transmitter will come in contact of 25cm to receiver buzzer will on and it will alert the driver. transmitted and received message will display on LCD dispay. this communication is done using lifi module as a medium
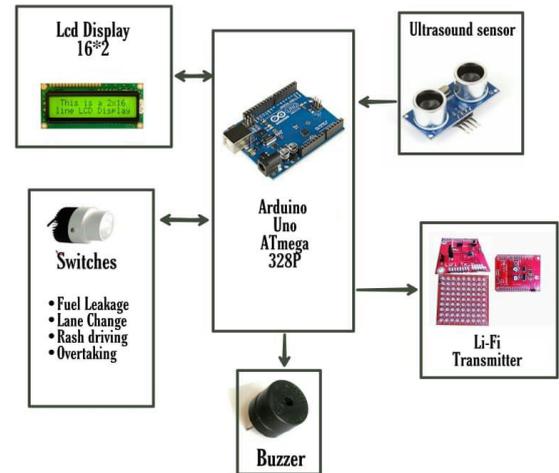
5) Block Diagram

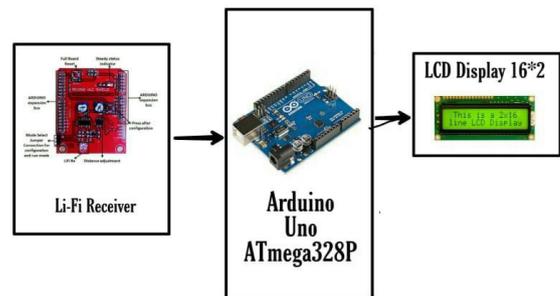**Fig (1). Block diagram of transmitter**

Fig.(2). Block diagram of receiver

➤ **Arduino UNO**- *Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.*

➤ **Li-Fi module**- *Li-Fi technology provides transmission of data through illumination by sending data through LED that varies in intensity faster than the human eye can follow. The product consisting of a transmitter which includes a light source and the receiver circuit which receives the data transmitted via light waves.*

➤ **16x2 LCD**- *An LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16×2 LCD display is a very basic module commonly used in DIYs and circuits. The 16×2 translates o a display 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5×7 pixel matrix*

➢ **Ultrasonic sensor**- *The ultrasonic sensor (or transducer) works on the same principles as a radar system. An ultrasonic sensor can convert electrical energy into acoustic waves and vice versa.*

➢ **Buzzer**- A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input

6) Programming arduino-

- Download the Arduino Uno Software.
- Install it in PC/Laptop.
- Practice some examples with sample programs.
- Develop the program for Home automation.
- Make an simulation on software, check no. of errors in codes.
- Debug the program.
- Burn it into hardware using connecting cables
- Now operate the function and check the working.
- Make proper web configuration.

7) Advantages

- **Speed-** Faster communication would result in better service quality and better communication.

- **Availability:** Due to the use of LED bulbs, LiFi can be made available everywhere by replacing traditional LED bulbs with LiFi compatible bulbs.

- **Efficiency:** LiFi is much more efficient when it comes to cost and power consumption.

8)Result-

as communication begin if transmitter will communicate using sending the message, output will display the message on the LCD

9) Conclusion-

In this work, we are trying to implement a system for communication between two cars using Li-Fi for safe driving and also to avoid accidents.
The proposed system has a cost effective solution to reduce accidents.
The design guidelines and details of system components were thoroughly explained in this paper.
The proof of concept has been illustrated in this paper by sending data through Li-Fi small-scale prototype model.
Finally the result has been measured between the vehicles to vehicle

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