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Vehicle To Vehicle Communication Using LiFi Technology

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Abstract: *The goal of the project is to reduce the consequences of accidents in our daily lives and to prevent automobile collisions. There are a variety of reasons for such a bad situation that leads to death or disability. This involves a driver's rapid lack of concentration, braking failure, and loss of stability. Li-Fi is an advanced technology. This project is focused on vehicle-to-vehicle communication in order to prevent traffic accidents. We use ultrasonic sensor, vibration sensor, LCD display, Li-Fi transmitter and receiver. In case of an abnormal condition in the front vehicle, the vehicle at the back will be intimated and will slow the speed on the second vehicle. Many automakers are currently focusing on developing automobiles with IoT capabilities, including health care,accident prevention, vehicle safety, driver safety, driver and passenger comfort, vehicle monitoring, etc. In this project we focused on developments in driver's drowsiness and comfort monitoring. If driver is not alert for obstacles or in front of vehicles then the speed of engine will decreased through LIFI technology and the engine speed will slowdown to stop condition and the project having alert system such as buzzer to intimate through sound. This project would be giving in- depth knowledge on recent developments in the field of automotive.*

Keywords: Li-Fi,Led, Bridge rectifier, Motor driver

I. INTRODUCTION

With over 5 billion cell phones, there are around 1.4 million cell pole radio waves base stations installed. Cell phones continuously transfer over 600TB of data on a regular basis. Nowadays, radio waves are used for remote communication. However, radio waves have issues with efficiency, accessibility, security, and range. Range is significant necessity for remote correspondence With headway in innovation and increment in number of clients, existing radio wave range neglects to address the issue and consequently, the limit issue. To solve all of the problems, we revised the concept of remotely transferring data via light using LEDs, which we call Li-Fi. The concept of vehicle to vehicle communication is done with Li-Fi technology. Li-Fi, on the other hand, requires a Line of Sight (LOS), does not penetrate barriers, and thus provides greater security. The main component of Li-Fi communication is the high speed LED which provides a data rate of greater than 100Mbps .Li-Fi has made notable progress in each field of communication As it provides a faster rate of transmission greater security and lesser interference because of which a huge limit of remote information can be possible.By Monitoring the obstacle avoidance then the collision will avoided by alerting the driver. In many places of the world, wireless technology is crucial for communication,reaching even the most remote locations. Wi-Fi, or Wireless Fidelity, is becoming increasingly popular as a means of text and multimedia communication. When three Wi-Fi antennae are employed, a transmission speed of 450 Mbps is attained, but resources such as bandwidth, security, maintenance, and network switching are sacrificed. With the advancement of technology, we are slowly switching towards a new technology called Li-Fi. Li-Fi or Light-Fidelity uses visible light to communicate.. Li-Fi has made significant development in every aspect of communication because it enables a faster rate of transmission, more security, and less interference, allowing for an enormous amount of remote data transmission.

The utilisation of the visible light section of the electromagnetic spectrum to transfer data at extremely high speeds is known as LiFi. Through contrast, classical radio frequency (RF) waves are used to transport data in established types of wireless communication such as Wi-Fi.

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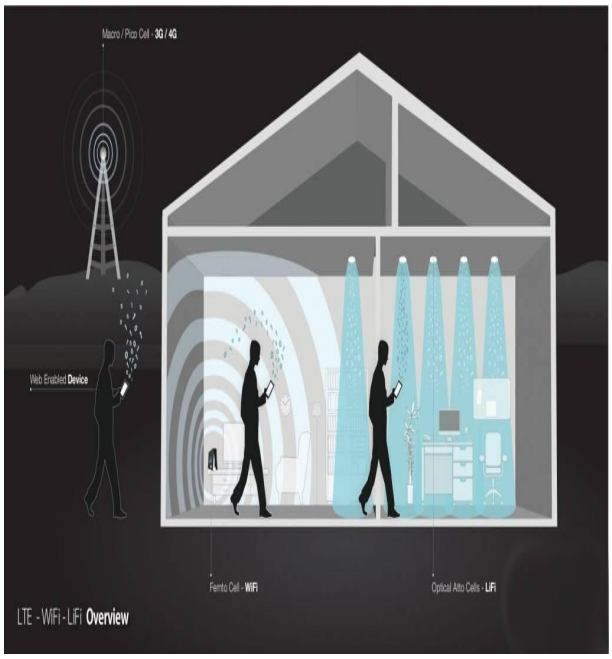

Data is communicated with LiFi by modulating the intensity of light, which is then detected by a photo-sensitive detector and demodulated into electronic form. This modulation is done in such a way that the human eye cannot detect it. LiFi is part of Optical Wireless Communications (OWC). OWC offers infrared and ultra-violet communications in addition to visible light. LiFi, on the other hand, is unique in that the visible light energy that is utilised for illumination may also be used for communication

II. Existing System

The majority of traffic accidents are caused by drowsiness. Because thousands of vehicles are on the road every day, manually tracking the drowsy driver is difficult. So we need a device that must be included in every automobile, and if it detects a tired driver, it must quickly slow down the vehicle. It also tracks the blink rate of the user's eyes driver and uses IR sensors to display it on the LCD. The eye blink and pressure measurements are crucial because they reveal the driver's level of sleepiness If a drowsy motorist is detected, a warning is issued with the help of these buzzer.

III. Proposed System

Our lives have been made easier due to the rapid advancement of technology and infrastructure. Because of the lack of emergency services, the advancement of technology has exacerbated traffic hazards and road accidents have become more common, resulting in significant loss of life and property. The goal of this project is to automatically prevent accidents, inform the driver, and reduce engine speed. The LI-FI signal was created to warn overtaking cars to keep their distance and avoid collisions.

IV. Working Of LiFi Module

Professor Harald Has coined the term Li-Fi to describe a light-based communications system that provides high-speed, bidirectional network, mobile communications in a similar way to Wi-Fi. Although Li-Fi can be used to offload data from current Wi-Fi networks, it can also be utilised to offer capacity for higher downlink demand, allowing existing wireless or wired network infrastructure to be used in tandem.

For information transmission, Li-Fi uses visible light from overhead illumination. For information transfer, a Visible Light Communications (VLC) framework could be used. Li-Fi communication is divided into two parts:

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4.1 Li-Fi Transmitter

First transmitter will be connected to the board. Then Arduino board will send the data to transmitter, the transmitter will convert the data into binary and make it ready to transfer the data, now the data will be transferred using LED bulb. If the binary number is 0, then the led will not blink if binary number is 1 the LED will blink. The LED bulb will turn on and off so fast that the human eye cannot see. This is one of the method to transfer the data using LiFi.

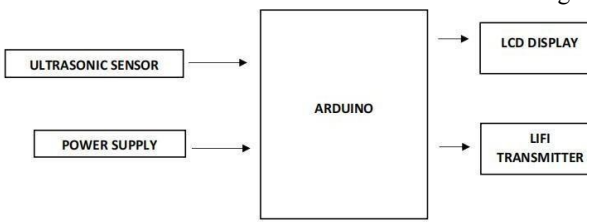

Figure (A): Transmitter section

4.2 Li-Fi Receiver

The Photovoltaic cell will receive the light from the LED then the photovoltaic cell will send that to the receiver .The receiver will convert that binary data into actual data then send that data to the arduino board.

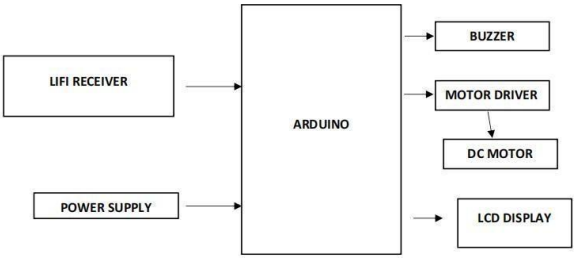

Figure (B): Receiver section

V. Hardware and Software Requirements

5.1 Hardware

- ARDUINO
- BUZZER
- DC MOTOR LIFI TRANSMITTER
- LCD DISPLAY
- TRASNFORMER
- BRIDGE RECTIFIER
- ULTRASONIC SENSOR
- LIFI RECEIVER
- DC MOTOR

5.2 Software

- ARDUINO IDE
- EMBEDDED C PROGRAMMING

VI. Conclusion

Vehicle-to-vehicle communication is simple and straightforward to use. With the proposed system, warning signals can be given at quicker rates, allowing drivers to make strategic decisions more quickly, which is crucial in preventing accidents and congestion. The project can be expanded in the future to transmit smart city infrastructure amongst vehicles. Visible light communication is a rapidly developing technology in the realm of wireless communications. There are many hurdles

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in this sector, but there are also equal or greater benefits. Many of our long-standing problems, such as power and environmental issues, could be remedied with the introduction and use of VLC. The VLC is still in its early stages, but with the quick advancements being made in this technology, it will soon be used in our daily lives. Despite the research issues, we believe that the VLC system will become one of the most promising and prominent wireless communication technologies for future generations.

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