



Li-Fi Based Vehicle To Vehicle Communication and Obstacle Detection

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Abstract— Vehicle to Vehicle communication is the communication methodology which implies the network-based topology. This proposed method meets and ensures the comfort and safety for the vehicles by preventing major accidents. This proposed project makes use of various sensors namely accelerometer, ultra sonic sensor speed sensor and transfers the data collected from these sensors between vehicles Services such as warning about an accident and messages about a rescue vehicle which is approaching Moreover the main key part in this proposed system is the use of Light Fidelity (Li-Fi) to transmit the data. The use of Li-Fi ensures and guarantees the speed of the communication and also go green to the environment.

I INTRODUCTION

LIFI is a fresh out of the box new way of correspondence which makes utilizes light as a vehicle of transmission. LIFI alludes to light consistency. It is in like manner a faster and amazing way of verbal trade than a WI-FI. Light devotion works through method of method for the utilization of gentle transmitting diode for realities transmission. In this paper a spic and span design of information transmission basically dependent on gentle consistency is shown. LIFI utilizes seen gentle as a medium thusly it might becalled as an optical model of WI-FI. This time has realities speed on the expense of terabits which is significantly faster when contrasted with WI-FI. Spread range technique is utilized as a car to vehicle correspondence already. The essential disadvantage of this strategy is it requires driver's premium for control of speed. Yet, in the proposed machine the engine identified with the Controller detects the rate among the vehicles and mechanically stops the car.

Robotization might be done as the space among the engines diminishes then the regulator responds and the engine speed is decreased. Savvy dispatching machine (ITS) the utilization of seen light correspondence with a transmitter and a beneficiary is surrendered. However, the pace of this machine is restricted. The proposed strategy methods of activity, its ideas are provided exhaustively. An inserted machine is a pc machine with a serious trademark inside a greater mechanical or electric machine, habitually with continuous processing limitations. It is installed as a piece of a whole apparatus much of the time like equipment and mechanical parts. Installed structures control numerous contraptions in not surprising spot use today. 98 level of all chip are engineered as added substances of implanted



constructions. Instances of homes typical of implanted PC frameworks while as contrasted and general-rationale inverse numbers are low strength admission, little size, tough working reaches, and espresso per-unit cost. This comes on the pace of controlled handling resources, which lead them to impressively more noteworthy hard to programming and to interface with. Be that as it may, through method of method for building knowledge instruments at the apex of the equipment, taking increase of achievable current sensors and the ways of life of a local area of implanted units, one could each ideally control to be had resources on the unit and local

II LITERATURE SURVEY

1. "Li-Fi-Based Vehicle-to-Vehicle Communication and Obstacle Detection Using Deep Learning" by Y. Li et al. (2020): This paper proposes a Li-Fi-based V2V communication and obstacle detection system that uses deep learning algorithms for accurate and real-time obstacle detection. The system uses a convolutional neural network (CNN) to process Li-Fi signals and a radar sensor to provide additional sensing data.

2. "Li-Fi Communication for V2V and V2I Applications in Intelligent Transportation Systems" by M. A. Khan et al. (2019): This paper presents a Li-Fi-based communication system for V2V and V2I applications in intelligent transportation systems (ITS). The system uses a visible light communication (VLC) approach to achieve high-speed and low-latency communication between vehicles and infrastructure, and a LiDAR sensor for obstacle detection.

II EXISTING METHOD

All the present available systems in vehicles have a very attractive and innovative feature which helps the user to make the driving easy. These systems work efficiently and engineered very well by the different sources available. But the problem with available systems is that they do not provide any way to communicate with other vehicles. There are certain conditions or situations in which we feel the need to communicate with other vehicles that can be to tell about the unlocked door, leakage of oil from vehicle, overtaking signal and many more operations similar to these the only system to warn or to communicate with other vehicles. The only system available to warn some one present in existing system is the distance measuring and braking system for which the message is displayed on the receivers LCD display.

LIMITATIONS OF EXISTING METHOD

- Accidents may occur due to over speed/drink and drive etc.
- Slow Process.
- Less Automation.
- Security level is low



III PROPOSED METHOD

Our proposed system over comes the draw backs of the existing system. It has advance facilities to make it more user- friendly. It provides an interactive way for communication between two vehicles. The drawback in the existing system was that it was only able to tell the vehicle user about the distance of the car and apply the brakes if the speed was very fast but in our proposed system we are designing the system in such a way that it will be able to provide users with the interface to communicate with each other in the emergency situation or if they want to inform other vehicle users about the oil leakage, door open or even if we want to make the way for the ambulance, this all will be possible after implementing this system. The Propose system will be using LED light for transmitting signal and for receiving the signal photodiode will be used.

Advantages:

- Interactive communication between vehicles.
- Traffic Control.
- Avoiding accidents.
- Faster Data Transmission.

SYSTEM REQUIREMENT:

1. Hardware Requirements:

1. Microcontroller
2. Power Supply (+5V)
3. LCD Display
4. Li-Fi Transmitter
5. Li-Fi Receiver
6. Ultrasonic Sensor
7. Buzzer
8. Motor Driver.
9. DC Motor.
10. Relay.
11. Photo Diode.
12. LED.

2. Software Requirements:

1. Arduino IDE.

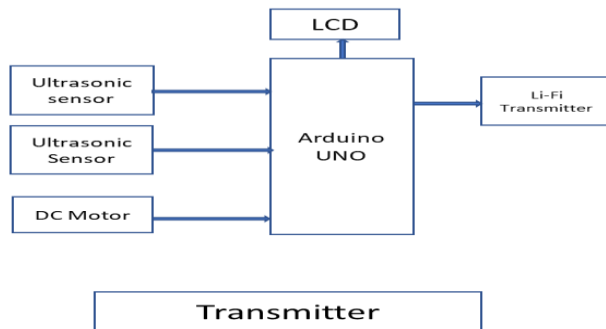
Objective:

Provide cooperative design to improve the safety of user. To reduce data transmission, power communication and provide wide range of bandwidth. Objective: The main objective of this project is to design/develop a

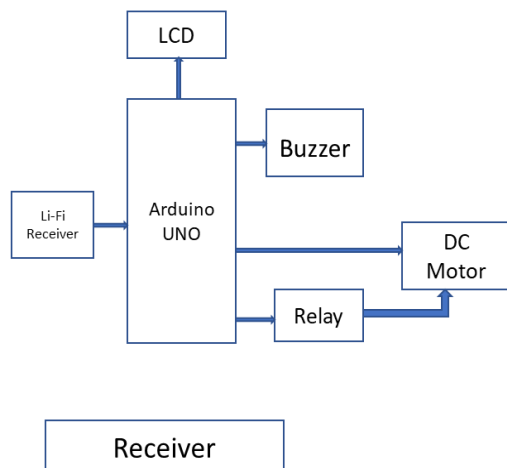
module for communication between two vehicles and to maintain safe distance between vehicles to avoid accidents. To ensure Efficient, low cost, secure, digitally controlled and fast data transfer technique of Li-fi as compare to Wi-Fi and Communication tool between vehicles with transfer of data at a faster rate over a wide spectrum.

BLOCK DIAGRAMS

TRANSMITTER



RECEIVER



Li-Fi TRANSMITTER

Receives the information from the controller and it modulates the data to light signal and transmits to the receiver section. The transmitter part modulates the input signal with the required time period and transmits the data in the form of 1s and 0s using a LED bulb. These 1s and 0s are nothing but the flashes of the bulb. Power supply DC +12V and Data UART (universal asynchronous receiver transmitter). Input (TTL) is the input specification for the transmitter section. 1s and 0s using a LED bulb. These 1s and 0s are nothing but the flashes of the bulb. In the receiver section, it receives the modulated information from the transmitter section and demodulates the signal in order to recover the original data.

Li-Fi RECEIVER

The receiver part catches these flashes using a photodiode and amplifies the signal and transmits to the controller so that the speed of the following vehicle can be reduced which will be indicated in the LCD display present in the receiver section. Receives the modulated information from the transmitter section and demodulates the signal in order to recover the original data. The receiver part catches these flashes using a photodiode and amplifies the signal and presents the output.

WORKING:

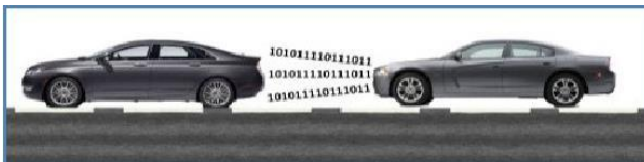
SCENARIO1:

When vehicle 1 is breaking the speed meter in the vehicle will be sensing that the current speed is lower than the previous speed. Thus, a message will be sent through the transmitter which is placed in the rear lights to vehicle 2. The message will be received by vehicle 2 using the photodiode which is placed at the front of vehicle 2. A notice of slowdown will be displayed in vehicle 2 using an LCD.

TRANSMITTER:



IV RESULT:



SCENARIO 2:

When vehicle 1 is in T-junction, it will keep sending its speed-information to vehicle 2 using LED at the headlights. The speed-information will be received by the photo diode in vehicle 2 and it compares its original speed and received speed. If vehicle 2 is about to cross the junction while vehicle 1 is moving with a high speed, the driver will be alerted to check the other vehicle which is around in the area.



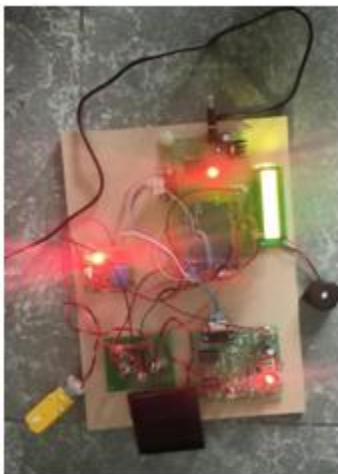
APPLICATIONS OF LI-FI:

Medical: Medical field do not allow usage of Wi-Fi due to radiation concerns because usage of Wi-Fi blocks the signals for monitoring equipment's. So, it may be dangerous to the patient's health. So we can use Li-Fi here.

Underwater communication: Radio waves are quickly absorbed in water, preventing underwater radio communications, but light can penetrate for large distances. Therefore, Li-Fi can enable communication from diver to diver, diver to mini-sub, diver to drilling rig, etc.

EMI sensitive environments on aircraft: Li-Fi enabled lighting will allow high data rate connectivity for each passenger. It will allow connectivity at all times, without creating electromagnetic interference (EMI) with sensitive radio equipment on the flight deck. The reduction in cabling requirement also means a lighter aircraft.

RECEIVER:



V CONCLUSION

In this paper, LiFi is introduced as a communication system with its modulation techniques and complete architecture



explained. The challenges and advantages of LiFi are outlined with its purpose to provide high speed data transmission being one of its biggest pros. The implementation of LiFi is introduced as an application V2V Communication the project performed in which the speed of two motors is controlled using LiFi. Data is transmitted from one control unit to the other and this controls the speed of the motor. The necessary analysis of the system with the block diagrams is also shown. It is hence concluded that LiFi is used as a communication tool and the control of two motor speeds is performed.

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