

VEHICLE TO VEHICLE COMMUNICATION USING Li-Fi TECHNOLOGY BY ANDROID SYSTEM

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Abstract-This paper presents a vibration based approach for automatic detection of potholes and speed breakers along with their co-ordinates. The communication between the vehicles is based on the Li-Fi technology. It is a wireless technology which uses the visible light to transmit data at high speeds which is 100 times faster than Wi-Fi. A message is sent via Li-Fi whenever the first car is slowed down. Thus received data is used for braking in highways through the activation of automatic braking system. The GPS is used for locking the pot holes on the road. Node MCU provides the Wi-Fi communication with the android devices.

Keywords-Li-Fi(Light- Fidelity), Wi-Fi(Wireless-Fidelity), Visible Light, Vehicle communication.

1.INTRODUCTION

The car communication system is not designed for a particular brand or vehicle. This can be used in every vehicle with a little modification. The system is designed considering the normal car user can also use

it. Speed and security is the major concern while transmitting data. Wi-Fi can be easily hacked as it penetrates through the walls. On the other hand Li-Fi requires a Line Of Sight (LOS), it does not penetrates through the walls and so provides more security. The key technical difference is that Wi-Fi uses radio frequency to transmit data but Li-Fi uses visible light. The main component of Li-Fi communication is the high speed LED which provides a data rate of greater than 100Mbps.

2.OBJECTIVES

To develop a smart system that can detect the pot holes and speed breakers present in the road.To establish a communication between vehicles using Li-Fi Technology for avoiding road accidents.To acquire enough knowledge about the position of the vehicle using the nearest android device.

3. EXISTING SYSTEM

The existing system requires a transmitter and a receiver in each vehicle in both rear and front sides of

the vehicle. Thus more scenarios will be applicable. For the time being, only two scenarios will be studied in this paper.

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 (Slow DOWN) will be displayed in vehicle 2 using an LCD display.

The information will be received by the photodiode in vehicle 2 and compared to vehicle 2 speeds. 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.

3.1 Drawback of Existing System:

All the details of the road conditions from the first vehicle can be known only when the user is inside the car.

The exact latitude & longitude parameters of the vehicle cannot be known. The challenges faced by Wi-Fi in today's time are

- ☐ Capacity
- ☐ Availability
- ☐ Efficiency
- ☐ Security

4. PROPOSED WORK:

The main idea of the above project is to combine the Li-Fi technology with the existing systems. The use of Li-Fi technology is suggested is here because it is more secure than the Wi-Fi

technology as they can penetrate through walls. The below Fig 4.1 indicates the Li-Fi car transmitter and Receiver kit.

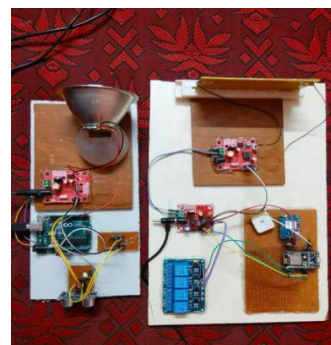


Fig 4.1

4.1 Vehicle to vehicle Communication:

Li-Fi is an emerging technology and has vast application. If this technology can be put into practical use, every bulb can be used like a wi-fi hotspot to transmit wireless data. This concept can be used to solve issues such as shortage of radio frequency bandwidth. Thus, this technology provides numerous benefits. By using this technology we can proceed towards a greener, safer and cleaner future. It is an advanced approach that will make our lives more technology driven in the near future.

4.2 Blynk App:

Blynk is a platform with ios and android apps to control arduino, Rasbeery pi and the likes over the internet.

It is a digital dashboard where you can build a graphical interface for your project by simply dragging and dropping widgets.

The main information that can be known from this application is that it shows the exact latitude and longitude parameters of the Li-Fi car along with the Satellite count as to how many satellites are connected to the GPS.

5. RESULTS & DISCUSSION:

Li-Fi technology may provide theoretically a speed of up to 10Gbps. Cost effective and more robust and useful than Wi-Fi. Li-Fi is not expected to completely replace Wi-Fi, but the two technologies could be used complementarily to create more efficient, green and future-proof access networks. Li-Fi is a wireless technology that makes use of visible light in place of radio waves to transmit data at terabits per second speeds more than 100 times the speed of Wi-Fi. Li-Fi technology has immense possibilities, from public internet access through street lamps to auto-piloted cars that communicate through their headlights.

5.1 Output Analysis:

When the distance between the road and the car varies the ultrasonic sensor senses the difference of the distance and transmits it to the second car through the light. The output is seen in the aurdino software. The fig 5.1 shows the output of the aurdino software.

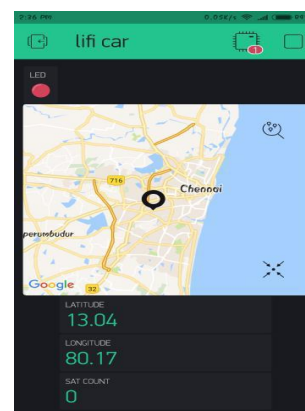
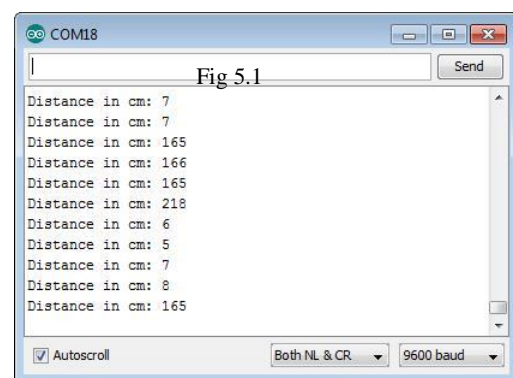


Fig 5.2

The fig 5.2 shows the blynk app output. It shows the exact latitude and longitude parameters of the li-fi car.

5.2 Drawbacks in the proposed work:

For the transmission of data it requires line of sight. We lose access to the internet, if the light

source malfunctions. For internet access we become dependent of light source. We have to deal with changing weather conditions, if the apparatus is set up outdoors. As visible light can't penetrate through brick walls so, it can be easily blocked by somebody simply walking in front of LED source. A major challenge is how the receiving device will transmit the data back to transmitter.

6. CONCLUSION:

The concept of Li-Fi has 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. The design of the system is clearly explained in this paper. The proof of concept has been illustrated in this paper by sending data through Li-Fi prototype model.

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