



IJIRCCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Issue 5, May 2023

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 8.379

 9940 572 462

 6381 907 438

 ijircce@gmail.com

 www.ijircce.com

Communication Using Li-Fi Technology

Ajit Kumar Sinha¹, Mrunali Adsare², Prof. P.A.More (Guide)

Department of Electronics and Telecommunication, Zeal College of Engineering and Research, Pune, India

ABSTRACT: These days, there's broad progressing inquire about movement relating to communications and sensor systems. On one hand, the foremost examine lines are based on extending the partitioned and exchange speed, and, on the other hand, the endeavor to decrease the imperativeness utilization of contraptions, with the point of growing the organize lifetime. The proposed communication framework utilizing Li-Fi innovation which gives security in numerous healing center applications. Li-Fi (Light Constancy) is an developing innovation which employments the unmistakable light range for communication. This project centers on the security in which the headlights, which comprise of LEDs acting as transmitters, communicate with photo sensors acting as collectors. White LEDs utilized within the head and tail lights can successfully be utilized for brief run communication with the photo detectors. The application is fetched compelling as LEDs are cheap and basic algorithms are proposed for signal generation and transmission.

KEYWORDS: Communication, Li-Fi, Photo detector.

I. INTRODUCTION

Over the past few a long time there has been a quick development within the utilization of the RF region of the electromagnetic range. This can be because of the tremendous development within the number of mobile phone subscriptions in recent times. This has been causing a quick reduction in free spectrum for future devices. Light-fidelity (Li-Fi) works within the visible light range of the electromagnetic range i.e. it employments obvious light as a medium of transmission instead of the conventional radio waves.

Li-Fi stands for Light-Fidelity. Li-Fi is transmission of information utilizing obvious light by sending information through an Driven light bulb that shifts in escalated quicker than the human eye can take after. In case the Driven is on, the photo locator registers a parallel one; something else it's a double zero. The thought of Li-Fi was presented by a German physicist, Harald Hass, which he moreover alluded to as "Data Through Illumination". The term Li-Fi was to begin with utilized by Haas in his TED Worldwide conversation on Obvious Light Communication. Agreeing to Hass, the light, which he alluded to as "DLight", can be utilized to deliver information rates higher than 1 Gigabits per moment which is much speedier than our average broadband connection.

The tall speed accomplishment of Li-Fi can be clarified utilizing the recurrence range of Electromagnetic Radiations. From the electromagnetic range we will see that the recurrence Band of the obvious light is in between 430THz to 770 THz which of Radio Recurrence Band is in between 1Hz to 3THz, Subsequently the Recurrence Transfer speed of the unmistakable light is almost 400 Times more noteworthy than the Radio Recurrence Transmission capacity. So more bits can be exchanged through this Transfer speed than within the radio recurrence transfer speed. Subsequently Information rate will be higher within the Li-Fi and higher speed can be accomplished.

Using Li-Fi, information that can be exchanged utilizing ordinary Wi-Fi organize can transmit any systems. That can be Pictures, Sound, Video, Web network, etc. But the points of interest over the Wi-Fi Arrange are Tall Speed, Expanded Security, More Number of Associated Gadgets, and Less fetched. Within the coming a long time a number of gadgets that bolster Li-Fi will hit the Advertise. It is evaluated that the compound yearly development of the Li-Fi showcase will be 82% from 2015 to 2018 and to be worth over \$6 billion per year by 2018.

II. WORKING

LiFi makes use of visible light through overhead lighting for the transmission of data. This can be possible through the use of a Visible Light Communications (VLC) system for data transmission. A VLC system has two qualifying components:

1. At least one device containing a photo diode in order to get light signals; and
2. A light source equipped with a signal processing unit for the transmission of signals.

The VLC light source can be within the form of a fluorescent bulb or a light emitting diode (Led). Led light bulbs are the most optimum VLC light source, however, since a strong LiFi system requires extremely high rates of light output. Fluorescent bulbs emit light in a much wider band of wavelengths, which makes it a relatively less efficient light source than Led. Led, on the other hand, could be a light source that radiates light in a very narrow band of wavelengths, making it a more effective light source.

LED is additionally a semiconductor, which implies that it can intensify light intensity and switch quickly. This can be an important quality to look for in a VLC light source since LiFi depends on the steady stream of photons radiated as visible light for the transfer of data. When the current connected to the light source is varied gradually, the light source diminishes up and down, which makes it unsuitable as a source of light, not for the LiFi framework, but as a device for household light. To strike a balance between VLC light source and household light, this current as well as the optical output is modulated at extremely high speeds, making it detectable by the photo diode device and converted back into electrical current, but unperceived by the human eye. Once these signals are received and demodulated, they can now be converted into a continuous stream of binary information that contain recordings, pictures, sound, content, or applications that are readily-consumable on any internet-enabled device.

Because LiFi technology is still in its relative earliest stages, there's still much room for developing advancement. One proposed development to the existing innovation incorporates making a bidirectional communication system comparable to conventional broadband and Wi-Fi. This will be done by interchanging visible light and infrared light from a photodetector, allowing connected mobile gadgets to send back information to the light source for an uplink. Another proposed innovation is the re-engineering of the multicolored RGB LEDs to send and get information on a wider range of signals than the single-colored phosphor-coated white LEDs.

III. DOES LIFI STAND TO ELIMINATE WI-FI?

LiFi is considered a viable way to reduce or remove any limitations that Wi-Fi imposes on data connections. Many people even claim that LiFi is the future of internet connectivity. But is this true? Should I turn off Wi-Fi completely? To understand the benefits of LiFi and whether it should replace Wi-Fi, you need to compare some of the two technologies to see how they complement each other.

1. Data transfer rate

LiFi pioneer Prof. Roland Haas introduced LiFi to create speeds of over 100 Gbps. Some tests even show that it can transmit data at up to 224 Gbps. These speeds are significantly ahead of those generated by WiFi currently at over 100 Mbps. This is because the visible light spectrum is 1000 times larger than the radio frequency spectrum, which is only around 300 GHz.

2. Energy Efficiency

Data transmission on WiFi requires two radio transmitters. These radios are in constant communication between a radio frequency transmitter in the radio and a baseband chip that uses a lot of energy to separate the data signal from noise from several other devices using the same radio frequency. In contrast, LiFi uses overhead LED lights as a medium for data transmission. Since it only needs a light bulb and a photodiode to decode the signal, the total power required for all data transmission and communication is minimal. In addition, LED lights are more efficient than other types of lighting.

3. Service

Because Wi-Fi uses a radio rather than a medium for data transmission, it has a greater range, because Wi-Fi signals can reach up to 32 meters over long distances (although the connection speed is usually slower). This is because radio waves cannot pass through walls. This is the biggest limitation of LiFi because light cannot pass through walls and limits the resistance to the room that installs the LED emitter.

4. Security

The limited capacity of the LiFi is also seen as a good thing as it improves network security. Again, external interference is limited as LiFi signals cannot pass through walls. This is also ideal for use in sensitive areas where

remote hacking and hacking is common. Therefore, it is suitable for areas of research and development, finance, defense and public transport.

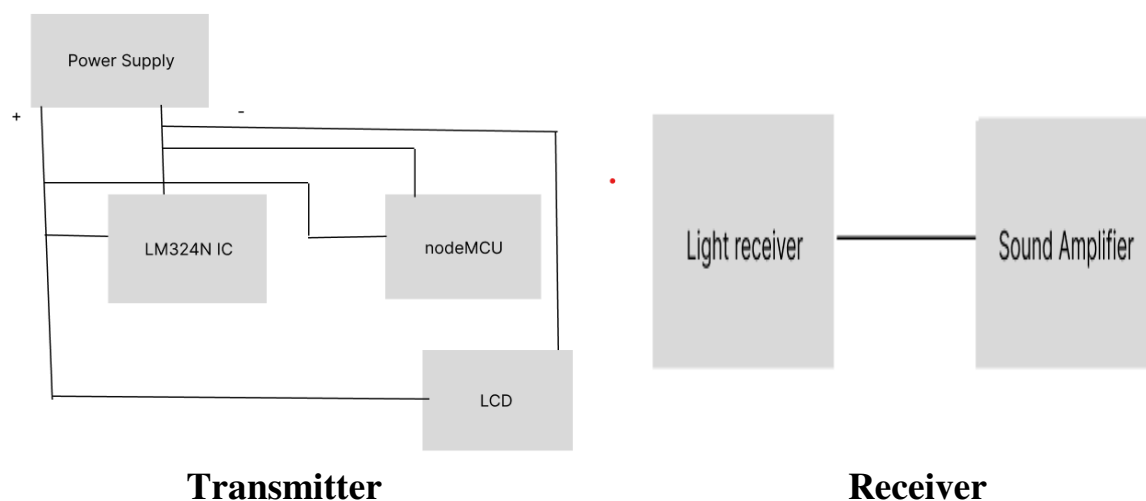
5. Data Density

One of the biggest limitations of WiFi is that it has interference in densely populated areas. In a high user volume area, data transfer will be slower than in a low user volume area. LiFi, on the other hand, is not subject to the same limitations and actually works very well in busy environments. Especially in areas with lots of lights, LiFi can still generate high speed because all VLC lights can provide the same speed even with lots of users.

IV. BLOCK DIAGRAM

Li-Fi system usually consists of two parts: a transmitter and a receiver. The input signal in the output section can be adjusted for a certain time and then data is sent in the form of 0s and 1s using the LED light. Here flashing of LED lights is represented by 0 and 1. On the receiver side, the photodiode is used to receive the LED flashes, support the signal and output.

The block diagram of the Li-Fi system is as shown in the figure below. There are input, timer circuit and LED light at the output. Input to the transmitter, text, audio, etc. can be any data form. The electronic timer in this section is used to provide the appropriate time for each bit and send it to the receiver as a flashing LED. Here, the photodiode receives the light from the LED and converts the light into an electrical signal. Finally, an amplifier takes the signal from the photodiode and amplifies it to an output.



VI. CONCLUSION

The benefits you can derive from LiFi are enormous. Considering that Wi-Fi is widely used to improve quality of life, this is not surprising as it helps pave the way for faster communication and improves even the most basic social functions. But he still succumbs to many different factors that affect his work. These factors include congestion, limited usage due to interference with other activities, and bandwidth saturation, which clearly demonstrates the inadequacy of current technologies. Of course, due to infrastructure constraints, it's almost impossible for WiFi to completely replace LiFi. However, it offers a suitable option that can be used as an alternative, especially in areas sensitive to popular technologies.

REFERENCES

- [1] " W.-L. Jin, "SPIVC: A Smartphone- based inter-vehicle communication system," Proceedings of Transportation Research Board Annual Meeting, 2012. `1
- [2] A. Boukerche et al., "Vehicular Ad Hoc Networks: a new challenge for localization- based systems," Computer Communications, Science Direct, 2008, pp. 1-12.



- [3] N. M. Husain Fidvi, “Car to Car Communication System,” source: car communication system.
- [4] <http://en.wikipedia.org/wiki/Li-Fi>
- [5] www.YouTube.com – TED Talk by Harald Hass on Li-Fi
- [6] “Li-Fi(Light Fidelity)-The future technology In Wireless communication?”by JyotiRani.“Journal from International Journal of Applied Engineering Research” (IJAER);ISSN 0973-4562 Vol.7 No.11 (2012)
- [7] www.lificonsortium.org/
- [8] Priyanka Dixit and Kunal Lala – Li-Fi the Latest Technology in Wireless; ISBN



SJIF Scientific Journal Impact Factor

Impact Factor: 8.379



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

 9940 572 462  6381 907 438  ijircce@gmail.com



www.ijircce.com

Scan to save the contact details