

LI-FI ‘LIGHT FIDELITY’ TECHNOLOGY FOR DATA AND VOICE TRANSMISSION

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Abstract - Nowadays, many people use the Internet to do their work over wired or wireless networks, and wireless network speeds decrease proportionally because neither user is getting an increase. Wi-Fi provides speeds of up to 150 Mbps according to the IEEE 802.11n standard, but this is not enough to accommodate users. To solve these limitations of Wireless Fidelity, we present the Li-Fi concept. The data, according to German physicist Harald Haas, uses lights to pluck fibers from the fiber and send the data through an LED bulb whose intensity changes faster than the human eye can track. A communication system that uses light as a carrier instead of traditional radio frequencies as in Wi-Fi. The advantage of Li-Fi is that it does not cause interference and can be used in sensitive areas such as aircraft and other vehicles. However, the light waves used cannot pass through walls. This is typically implemented using the downlink transmitter's white LED bulb

Key Words: Visible Light Communication; Data transmission; Li-Fi

1.INTRODUCTION

Li-Fi, as coined by Prof. Harald Haas during his TED global lecture[1] is a two-way, high-speed and fully connected wireless communication such as Wi-Fi. Li-Fi is a subset of optical wireless communication (OWC) and can be a supplement to RF communication (Wi-Fi or cellular network), or replacement in the context of data transmission. It is wireless and used communication in visible light or infrared and near ultraviolet (instead of high frequency waves) spectrum, a part of optical wireless communication technology that carries much more information and was proposed as a solution to the limitation of the RF-bandwidth. Complete the solution involves an industry-led standardization process.

Light Fidelity is a new wireless communication technology that enables wireless data transmission through LED light. Light Fidelity is based on the unique ability of solid-state lighting systems to produce a binary code of 1s and 0s with LED blinking that is invisible to the human eye. Data can be received by electronic devices with a solar panel in the field of light visibility. This means that wherever LEDs are used, bulbs can bring not only light, but wireless connectivity at the same time.

With increasing demand for wireless networking data, lack of radio spectrum and problems with dangerous electromagnetic pollution, light Fidelity appears to be the new greener, healthier and cheaper alternative to Wi-Fi.

2. Design Methodology

The body of the broadside consists of add up to sections that present the main outcomes. These sectors should be organized to best existent the material.

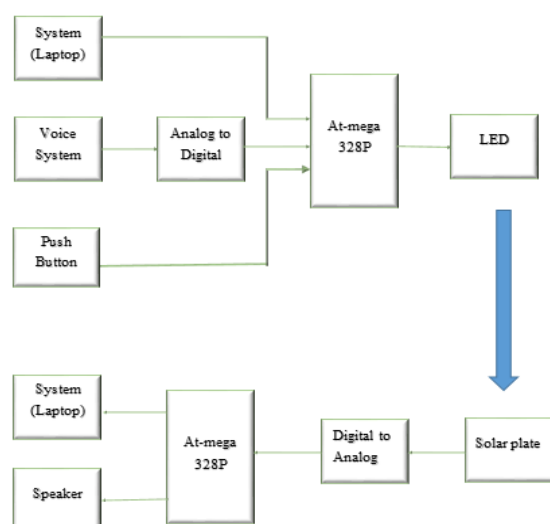


Fig.1 Block Diagram of the Li-Fi data and voice transmission

2.1 Input

The input usually consists of an analog signal taken from the audio output of a cell phone, laptop, or other instrument. The signal is not sufficient to drive an LED with its low voltage level, so the signal must be amplified with an amplifier to drive the LED.

2.2 LEDs

The most important requirement for a light source in Li-Fi transmission is the ability of the LED to be turned on and off repeatedly at very short intervals (in the ns range). Therefore, it uses LEDs with very short switching times. This LED turns on and off in nanoseconds according to the signal's pulse, and the switching speed is faster, so it cannot be detected by the naked eye. So even when flickering, it glows. Thus, the modulated signal is transmitted via visible light to the receiver.

2.3 Solar Panel

The characteristics of the receiver, such as the number and type of solar cells used, as well as the signal amplifier, depend on the type of data being transmitted, the speed at which it must be transmitted, and the transmission distance. delivery. will be sent. for example. If the distance between the solar cell and the light source is large, many solar cells are required. FIG. Figure 1 shows the solar panels used in the installation. The solar panels used in the receiver may also concurrently serve the purpose of generating power that may be used for signal regeneration by the amplifier or simply stored for future use

2.4 Amplifier and Speaker

The demodulated signal is in the low voltage range. So it is amplified to an arbitrary voltage level of the with an amplifier. This amplifier is the same type of amplifier I used on the transmitter side. This is because if a phase error occurs, it is reset at this stage. The speaker converts electrical signals into sound using electromagnets present in the speaker.

2.5 Output

The demodulated audio signal is transmitted from the speaker to its destination. To allow viewers to hear messages transmitted by the source

3. Hardware Design and Modeling

Proposed hardware is designed and modeled using diptrace software. Fig. 2 shows .

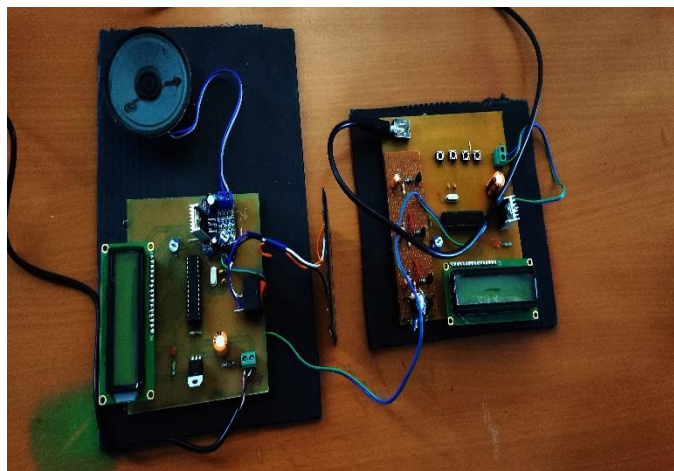


Fig2 :- Hardware board

3.Result and output

The Li-Fi system proposed in this paper is capable of transmitting data such as text, audio between two devices at the speed of a few kbps. The main requirement is line of sight between the sender and the receiver and hence it can be used to transmit data within a room.

AUDIO TRANSMISSION

Li-Fi based Audio transmission is the live transmission of Audio signals without any signal loss. The sound clarity is clear and loud and using a focusing led further enhances the output received.

DATA TRANSMISSION

Table -1

Decimal Number	Binary code (Input)			
	B ₃	B ₂	B ₁	B ₀
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

The process involved the transmission of 4-bit data from a transmitter to a receiver via Li-Fi technology. By pressing a button on the transmitter, binary bits are sent through the Li-Fi medium, and the receiver receives the data in decimal format, which is then displayed on a 16x2 LCD screen. The conversion of bits can be observed in the table presented above.

4. CONCLUSIONS

Li-Fi is a suitable technology for the future as it provides higher bandwidth, increased data rate, and more security as compared to Wi-Fi technology. The success of the experiment conducted above shows that setup of Li-Fi can be made with very basic material. Based on the experiment it can be concluded that the distance between the receiver and source, the relative angle of the receiving solar panel and the transmitting LED, and the area of the solar panel exposed to the solar panel to the light plays an important role in the transmission of data using the Li-Fi system. These factors are to be considered before implementing the system

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BIOGRAPHIES (Optional not mandatory)



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