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 802.1 1n 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.*

Keywords: *Li-Fi (Light Fidelity),LED(Light Emitting Diode), Wi-Fi(Wireless Fidelity)*

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. 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.

Li-Fi enables wireless Internet access in certain environments (Hospitals, Airplanes, etc.) where Wi-Fi is not allowed due to interference or security reasons. It connects fiber to fiber and transmits data through an LED bulb whose intensity changes faster than the human eye can see.

2. Methodology

Proposed block diagram of Light Fidelity technology for data and voice transmission is shown in Fig.1. It consists of input from the source , LEDs ,Solar Panel ,amplifier and speaker, Output at the destination.

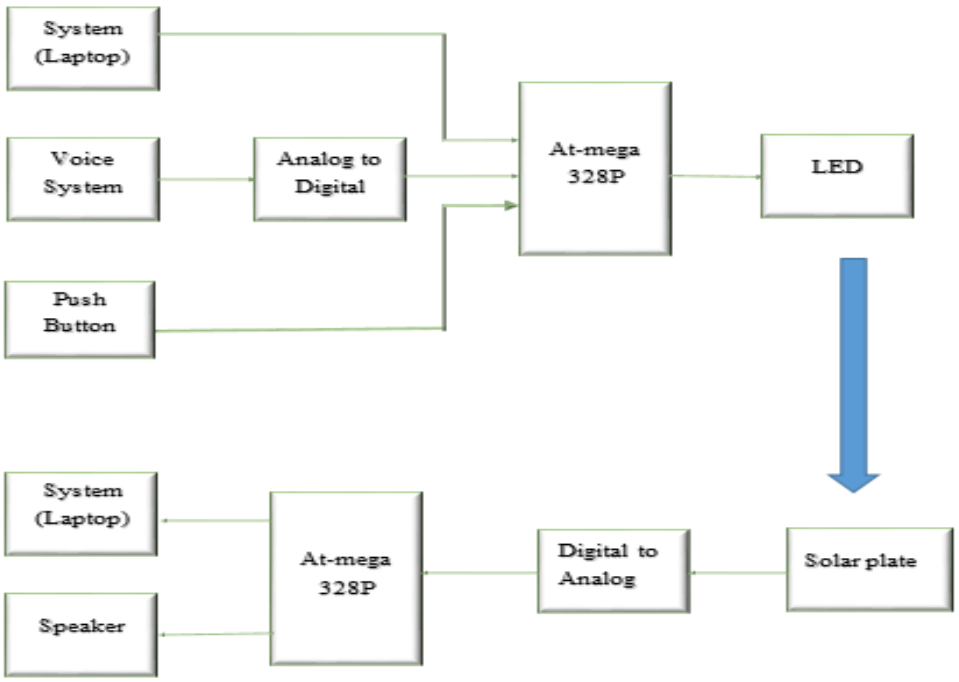

Fig.1 Block Diagram of the Li-Fi data and voice transmission

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 the's 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 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 's pulse signal, and the switching speed is faster, so it cannot be detected by the 's 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 Proteus software. Fig. 2 shows the modeled part in simulation window.

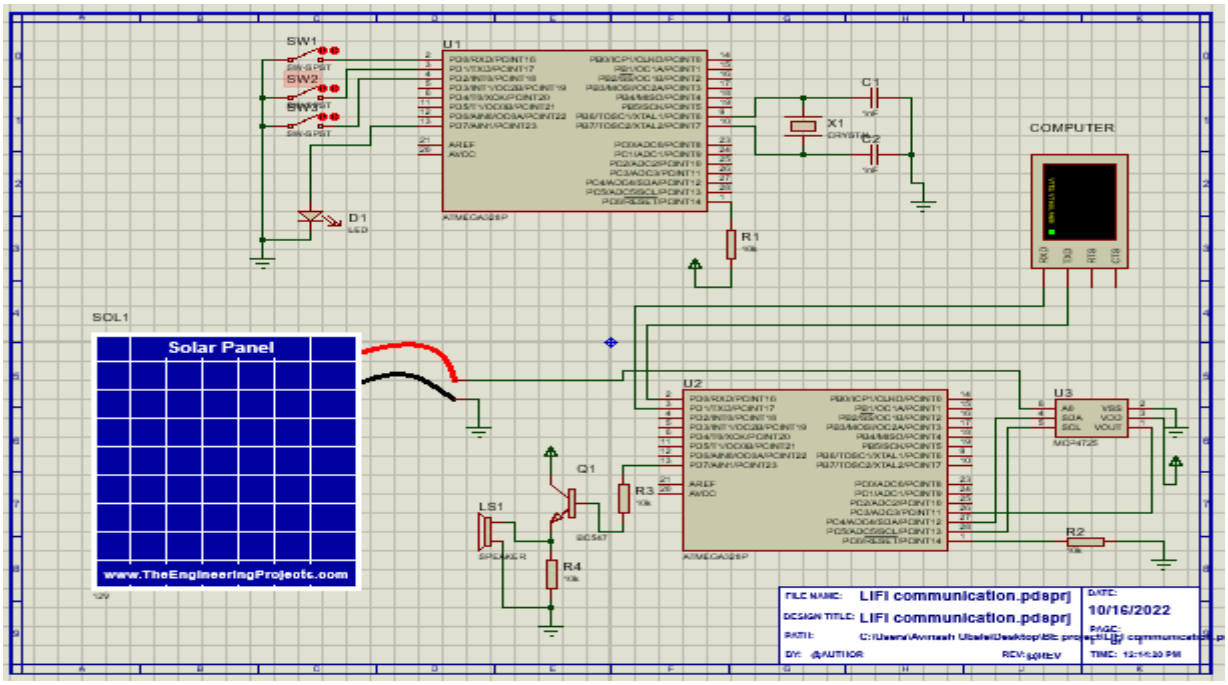

Fig. 2 Simulated model of Li-Fi

4. Conclusion

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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