

Light Fidelity at Some Inclined Angle

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Abstract: Nowadays people prefer wireless network to wired network, though the network speed is not constant they use wireless network because they provides us many benefits like portability and flexibility. We have Wi-Fi hotspots at home, coffee shops, airports, hotels and even cities. Due to this, Radio spectrum is getting clogged day by day and demand for wireless network is increasing drastically every year. An emerging technology using Visible Light Communications (VLC) for high speed wireless communications is Light Fidelity commonly known as Li-Fi. Li-Fi uses light as a carrier signal instead of radio frequency as in Wi-Fi. Li-Fi is a technology that uses LED's to transmit data without wire. LED is the key component in this data transmission as LED has the capacity of fast switching ON and OFF. The major problem faced in Li-Fi technology is, if the receiver or the photo detector is inclined at some angle then it doesn't have the capacity to receive the particular light signal that consist of the data that is being transmitted by the Li-Fi LED bulbs. The main objective of this paper is to implement the absorption concept i.e. using high sensitive photo detector when it is inclined to some angle it must start absorbing the light that is being transmitted by the LED bulb.

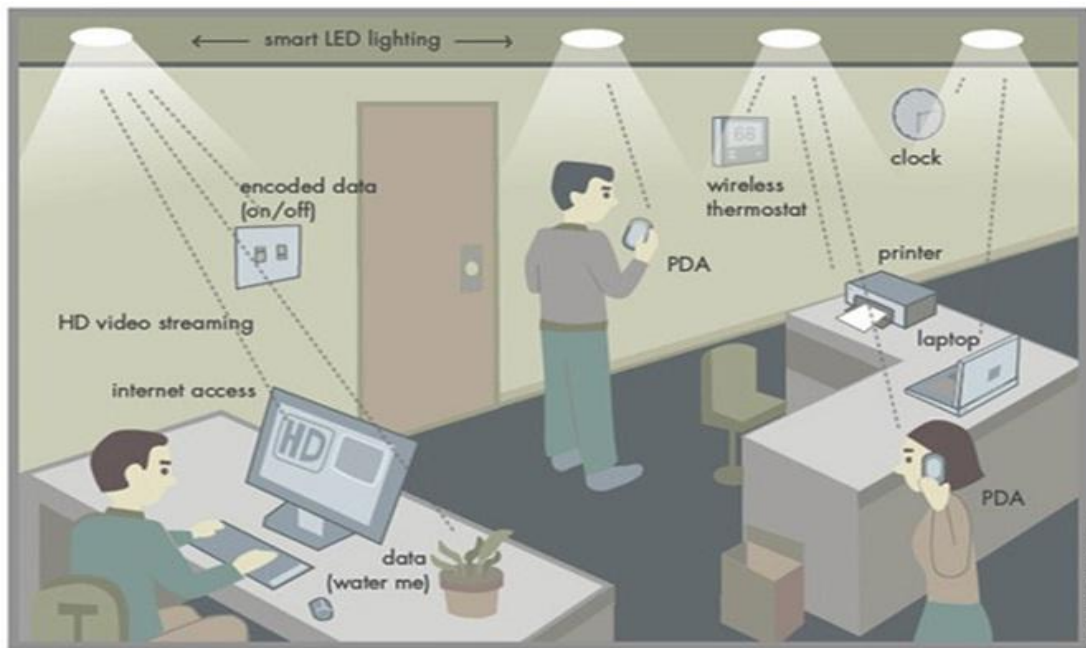
Keywords: LED bulb, Visible Light Communications (VLC), Light Fidelity at Some Inclined Angle.

I. INTRODUCTION

Demand of wireless data transmission is rising day by day which is escalating the clogging in radio spectrum. In this age of wireless tech, the total no of devices accessing the internet is raising by second. That too if a Wi-Fi router is getting connected by numerous devices at a time then there commences a big problem of multiple users sharing the same resource at the same time causes slow data transfer. Dr.Harald Haas invented this to overcome that slow internet issue and believes that his invention 'D-light' can produce the data rates faster than 10Mbps and even it can also shared by numerous users. Here he uses a smart LED's. Li-Fi bulbs are outfitted with a chip that modulates the light imperceptibly for optical data transmission. Wi-Fi is data transmission through illumination by removing the fiber out of fiber optics by transmitting data through a LED light bulb that vary in intensity quicker than human eye can follow A company in Mexico named Sisoft has achieved data transfer up to 10Gbps with the help of Li-Fi. Visible light communication (VLC) is sometimes called as 5G.

II. PRINCIPLE

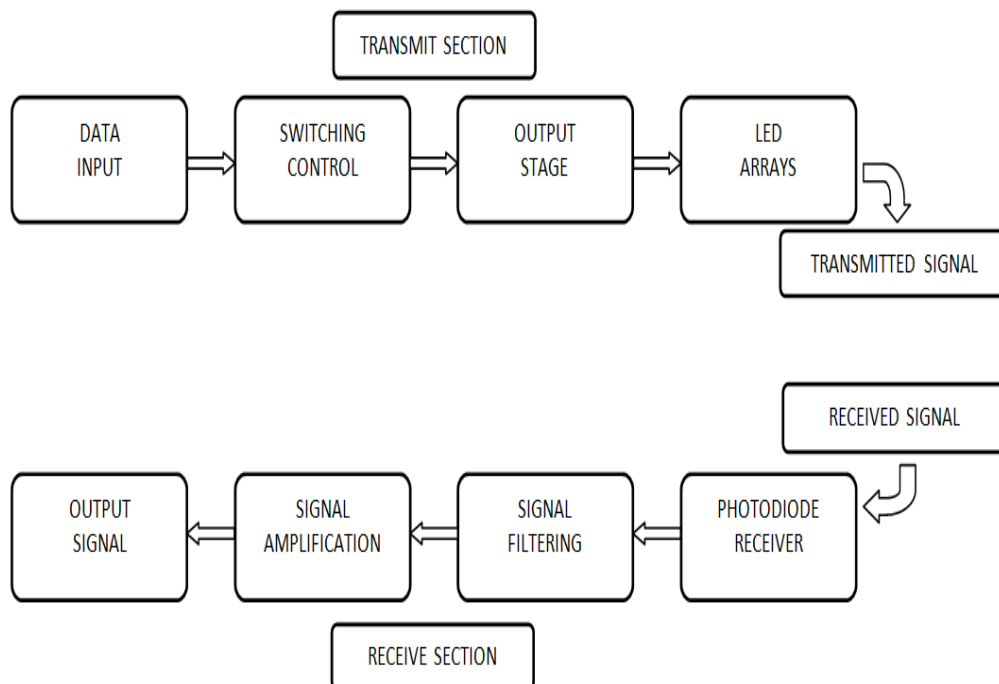
Light is an electromagnetic wave like radio waves. Only the LED has the capacity of Fast switchover. It operates at a speed of 1 μ s, that capacity gives the data transferring opportunity. That fast on and off of the LED is not visible to a human eye. In that fast Switching the data is transmitted in the form of binary codes with the help of a small chip which is placed behind the LED. Those Binary codes are sent through the medium of visible light, so it is called Visible Light Communication (VLC). At the other end the transmitted binary codes is received by the photo detector and then it converts the binary codes into the original data that is transmitted at the other end.



By Dr. Harald Haas's invention the data can be received by the photo detector. Here we introduce a material that attracts light so that even if the photo detector is minutely inclined at some angle it will receive the light signal that is being transmitted by the LED.

III. CONSTRUCTION AND WORKING

In the transmitter section the data input is given to the LED bulb which has a chip mounted in it. That chip has the capacity of fast switching ON and OFF and data gets transmitted through the light in the form of binary codes with the help of switching which is made by the chip. LED light used cannot be a single LED here we use LED array i.e. Matrix of LED bulbs. On the other hand the transmitted binary codes are received by a photo detector and there the binary codes are converted into data. Here we introduce a glass frame around the photo detector that has the capacity of diffraction. Then the diffracted ray is made to fall on the photo detector.



BLOCK DIAGRAM



IV. ADVANTAGE

- It can be used in hospitals and aircrafts where radio waves are strictly prohibited, since they are harmful.
- 10000 times larger than the frequency spectrum of radio waves.
- Prevents piggybacking i.e. Wi-Fi Squatting
- Eliminates neighboring network interface
- High speed data transfer when compared to Wi-Fi

V. COMPARISON BETWEEN LI-FI AND WI-FI

S. No	Parameters	Wireless Technology	
		Light Fidelity	Wireless Fidelity
1	Medium through which data transfer occurs	Uses Light as a Carrier	Uses Radio Spectrum
2	Spectrum Range	Visible light spectrum has 10,000 time broad spectrum in comparison to radio frequency	Radio Frequency spectrum range is less than visible light Spectrum
3	Network Topology	Point to point	Point to point
4	Cost	Expensive	Cheap
5	Speed for data transfer	Fast transfer (More than 1Gbps)	Moderate transfer (150 Mbps)
6	Operating Frequency	Hundreds of Tera Hertz	2.4 Giga Hertz

VI. CONCLUSION

The technology field is the one which does not stops growing. When it comes to connectivity, Li-Fi has great potential in the field of wireless data transfer. It is the best alternative for radio waves, because Radio waves are harmful. It takes 5 years or even more than that to be used all over the world. The number of people using wireless internet increasing day by day the airways are getting clogged day by day.

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