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# GENERATION OF THE INTERNET THROUGH LIGHT FIDELITY (LIFI) TECHNOLOGY

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## ABSTRACT

In present era, the latest technologies are being developed in the area of internet and digital communications. The number of devices accessing a network is increasing fastly which most complicated traffic in network and reduction of bandwidth in WiFi. To overcome these problems a new technology called LiFi has been developed. The technology was invented by German physicist Harald Haas in 2011.LiFi is a technology for wireless communication between devices and light to transmit data using visible light source as a carrier. The principle of LiFi is any LED is considered to be a generation of LiFi technology along with some photodetector. The Light source is to provide a constant current in LED bulb that varies in intensity faster than human eye can flicker. LiFi can be generated by transmitting an overhead lamp fitted with an LED using a signal processing technology. The digital data embedded into a beam at ultrahigh speed to photodetector and then converted into the tiny changes in amplitude received by the dongle and forwarded into an electrical signal which is converted back into data steam and transmitted to a computer or mobile devices. LiFi is 10,000 times faster than WiFi. The data density of LiFi is higher as compared to WiFi and has a variety of application such as medical, airlines, power plant, underwater explorations and communication, traffic etc. In this paper the experimental setup will be stimulated and design in Matlab and output will be tested.

***Keywords:*** *LiFi, WiFi, LED, Photodetector.*

## I. INTRODUCTION

Today Internet is using all the people to perform their task through wireless or wired network. However the issue is speed of internet and everyone wanted a best speed of internet. But the crisis is network traffic due to lack of sufficient radio frequency mode [1]. It cannot support the growth in demand for high data rates and increasing no. of communication system due to limited bandwidth. The range of bandwidth lies between 300 KHz to 4GHz. The speed of WiFi is 150Mbps within standards of IEEE802.11n but it is not sufficient to fulfill the required users across the world. To overcome this problem of WiFi so the physicist discovered the LiFi [2].

LiFi is a technology for short range wireless communication system in which light is utilize like a carrier signal and it also used a LED to transmit the data. LiFi uses a bidirectional and the communication using light through wireless mode. The data rate of LiFi speedier than WiFi.

There are lots of problem facing WiFi such as manageability, service scalability, availability, efficiency, interoperability, cost effectiveness and security. The principle of LiFi transmits of data through the illumination distinctive LED bulb to find out the signal using a photodetector[4].

Alternatively of radio waves for transfer of data but LiFi uses visible light spectrum.

LiFi is the cheap and more effectively than WiFi. LiFi uses a part of electromagnetic spectrum but it totally depends on visible light communication. LiFi is a heart of technology which utilize a new generation of high brightness LEDs. It simply explains that if LED is on, you transmit 1.

If LED is off you transmit a digital 0 they can be on & off very fastly. LED flicker on and off to give different values of 1s and 0s which is possible to encode data in light varying rate [5].

***Fig: 1 Data Transmission via LED***

## II. WIFI V/S LIFI:

***Table: 1***

| | |
|---|---|
| Data Transmission in Wi-Fi takes place with the help of radio waves. | Data transmission in LiFi takes place with the help light. |
| The technology used in Wi-Fi is WLAN 802.11 a/b/g/n/ac/ad standard compliant devices. | The technology used in LiFi is the present IrDA compliant devices. |
| Wi-Fi can be used for internet browsing with the help of WiFi hotspots. | Li-Fi can be applied in airlines, explorations beneath the hospitals, offices, libraries for fast browsing and data communication. |
| Wi-Fi different technologies need to be implemented for further security. | Li-Fi, light gets obstructed due to any physical object so greater security can be achieved. |
| Wi-Fi transmits with the speed of 150 Mbps with WLAN and up to 2Gbps with WiGig/Giga_IR technology. | The data transfer speed of LiFi is about 1Gbps. |
| Wi-Fi works in a low data density environment due to high network traffic issues | LiFi can work in a environment where the density of data is high. |

| | |
|---|---|
| Wi-Fi has network coverage of 32 meters. | LiFi can cover up a distance of up to 10 meters. |
| The major components that makes up a Wi-Fi system are:<br>devices (laptop, desktop), router installation. | The major components to implement a LiFi system are:<br>Lamp driver, LED bulb and photo detector. |

**Generation of Internet through LiFi:**

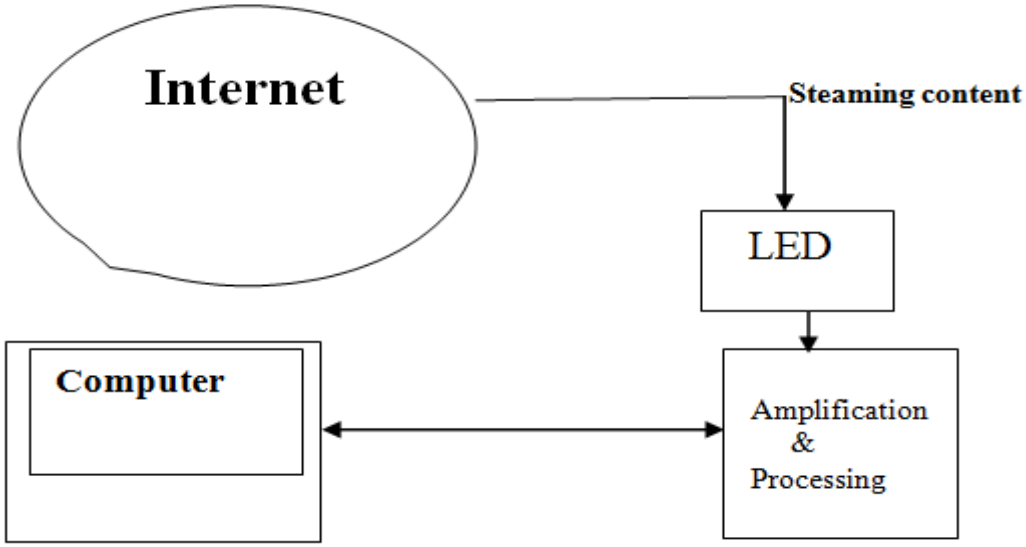


***Fig: 2 Architecture of Internet Generated LiFi***

All different types of connected devices from computer to laptop or tablet, to mobiles, T.V. or appliances are installed by few light receptors are needed. It is clear that pulses of light are insensible to human eye without any loss or causing harm of any kind. If you are dealing with data rates limitation between hundred or megabits per sec and it is provide by blink of LED to form binary code if on is 1 or off is 0. LiFi is a technology for short range wireless communication system in which light is utilize like a carrier signal and it also used a LED to transmit the data. LiFi uses a bidirectional and the communication using light through wireless mode. The data rate of LiFi speedier than WiFi. LiFi has many advantages such as security, low power consumption, data transmission speed is high [6]. LiFi has used to make smart home which is helpful for old people. Smart home technology could be an alternative to minimize danger resulting from old aging or disabilities persons provide old people independence and activity. In our purposed system camera hubs will most likely recognize and control older people activity and collect other information of older people like as walking speed, posture and balance and send gathered information to repository in the base station which will be stored in the cloud[7].

## III. ADVANTAGES OF LIFI

- The speed of LiFi is 100 times faster than WiFi
- The LiFi data rate transfer for higher internet application.
- LiFi used IoT based application and it consumes low power consumption.
- LiFi is not harmful for RF spectrum which operates only optical bands.
- LiFi has high amount of security as line of sight (Data communication)[8].

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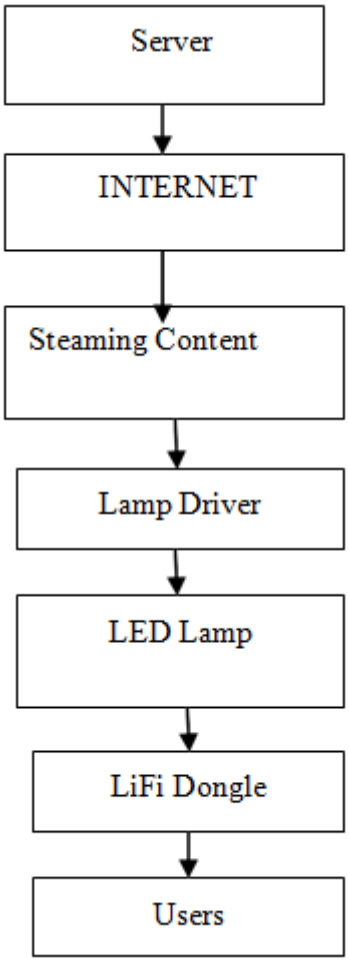
## IV. DISADVANTAGES OF LIFI:

- LiFi can be benefited just in nearness of direct light source since visible light acts as a data carrier here. There should not between the sender and the receiver.
- Light originating from different sources other than the expected light source will disrupt the signal. Indeed, even sun beams originating from outside will influence the communication.
- LiFi can be utilized in point to point since a high frequency (400-800 THz) is being utilized here in short distance coverage[9].

## V.RESULT

**Flow chart of Internet Generated through LiFi:**




The working of LiFi generated internet utilizing overhead light fitted with a LED with signal handling technology with stream information embedded beam at ultra high speed .A receiver dongle converts the tiny changes in amplitude into an electrical signal , which is converted back into a data stream and transmitted to a PC or cell phones.

## VI. CONCLUSION

Despite the fact that essential propagation mechanism of WiFi signal has been all around examined by wireless communication scientists, yet, because of the complicated signal reflection, multipath and interference with indoor obstacles. To overcome the interference of signal we generated LiFi through internet. LiFi uses a bidirectional and the communication using light through wireless mode. The data rate of LiFi speedier than WiFi. LiFi has many advantages such as security, low power consumption, data transmission speed is high. The combinations of LiFi lighting system into indoor Wi-Fi based positioning expand the location accuracy by 80% with no system implementation overhead.

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