Impact Factor (SJIF): 3.632

International Journal of Advance Research in Engineering, Science & Technology

e-ISSN: 2393-9877, p-ISSN: 2394-2444

(Special Issue for ITECE 2016)

Evolution of Wifi Towards Lifi

Dhara Patoliya,

Hemali Depani

CSE, SLTIET

Abstract *— Li-Fi stands for Light-Fidelity,For the fast increasing gadgets and to improve more effective use of lights a new technology is developed which is called- LIFI. Lifi is a modern technology which is used in progression with WIFI technology. LIFI uses LED lights which helps in faster and flexible data transfer transmitted through Wi-Fi. Li-Fi can provide wireless indoor communication. The data transfer through LIFI is in bits and is much faster than Wifi. Li-Fi is the transfer of data through light by taking fiber out of fiber optics and sending data through LED light.*

Keywords*- Li-Fi, Wi-Fi, LED Lights, Wireless, VLC, Bits and Fiber optics.*

INTRODUCTION

The most important day-to-day activities in this fast world are the transfer of data and information. As the world is becoming faster the need of fast data transmission is also increasing.

Fig 1:Li-Fi Bulb.

Li-Fi provides better bandwidth, efficiency, availability and security than Wi-Fi and thus increases the data transfer speed. Li-Fi technology provides transmission of data through illumination by taking the fibre out of fibre optics by sending data through an LED light bulb that varies in intensity faster than the human eye can follow. Lifi uses visible light instead of Gigahertz radio waves for data transfer which makes it fast and cheap mode of wireless communication.

The idea of Li-Fi was introduced by a German physicist, Harald Hass, which he also referred to as ―data through illumination. According to Hass, the light, which he referred to as D-Light, can be used to produce data rates higher than 10 megabits per second which is much faster than our average broadband connection.

I. WORKING OF LI-FI

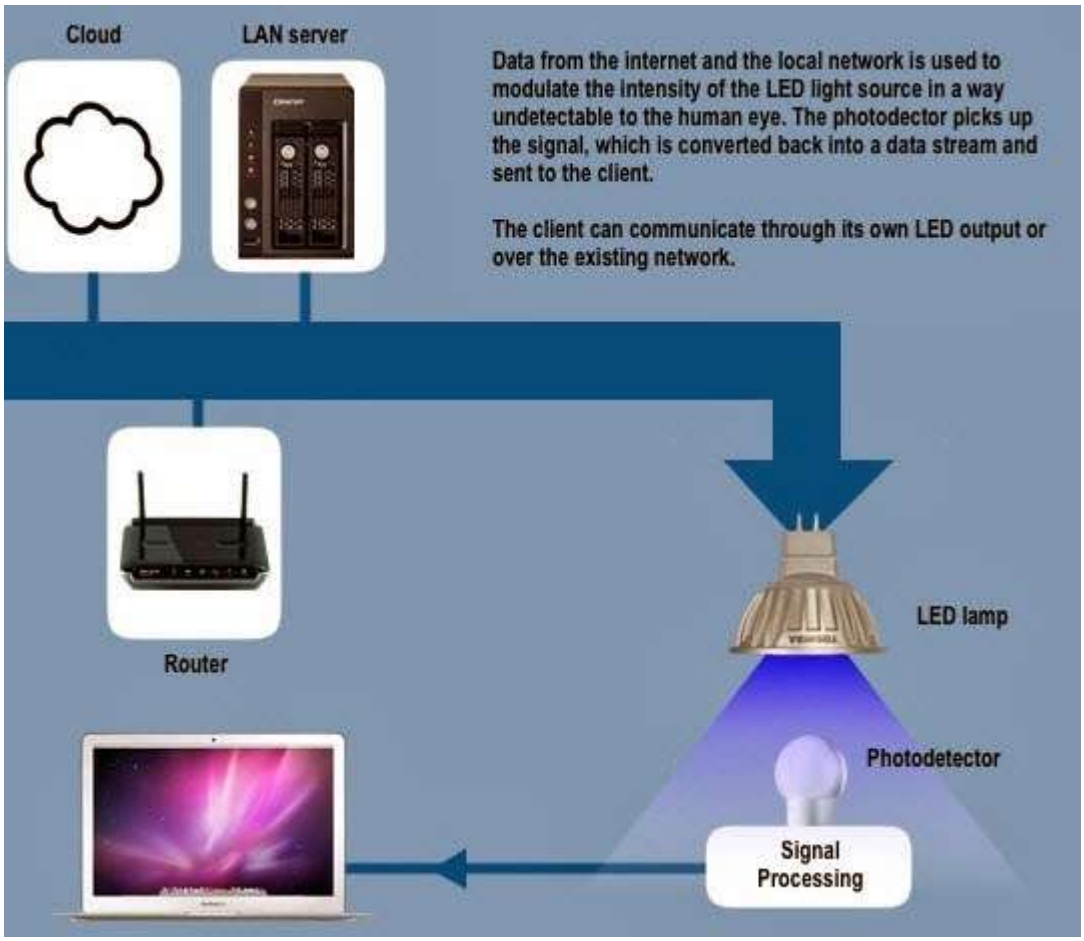

Fig 2:Block Diagram of Li-Fi system.

A new era of large brightness light-emitting diodes forms the core part of lifi technology. The logic is so simple as follows-If the LED light is on, a digital 1 is transmitted. If the LED light is off, a digital 0 is transmitted. These large brightness LEDs lights can be switched on and off very quickly which gives us a very nice chance for transmitting data through light.

The working of Li-Fi is very easy as Wi-Fi . There is a light emitter on one corner, for example, an LED, and a photo detector (light sensor) on the other corner. The photo detector registers a binary one when the LED is on; and a binary zero if the LED is off same as microprocessor. To generate any message, flash the LED numerous times or use an array of LEDs of perhaps a few different colours, to obtain data rates in the range of hundreds of megabits per second.

Fig 3:Li-Fi system connecting devices in a room.

II. ADVANTAGES OF LI-FI

- **Capacity***:* Light itself has 10000 times wider bandwidth than radio waves. Due to which the transfer of data is more effectively possible. So lifi has better capacity.
- ***Efficiency****:* LED lights consume less energy and very efficient. As it uses less energy it is cheap and easy to use.
- **Availability**: As light is present everywhere, Lifi is available everywhere. But for more efficient use of lifi technology LED bulbs must be placed for proper transmission on data for proper transmission on data.
- **Security***:* Light waves cannot penetrate through walls. So they cannot be misused.
- **Bandwidth***:* The visible light is unlicensed and free to use and gives a very large bandwidth.
- **Data Density***:* Li-Fi can achieve about 1000 times the data density of Wifi because visible light can be well contained in the tight illumination area.
- **Low Cost***:* As it requires very few components the cost of it is comparatively low.

III. LIMITATION OF LI-FI

- As lifi technology uses light as transmission medium, so if the receiver is somehow blocked in a way then the signal will immediately will be cut out.
- While data transfer interference from external light sources such as sunlight, normal bulbs, and opaque materials can cause loss of reliability and network.
- As Lifi works in direct line of slight. Slight disturbance can cause to interruption.

IV. APPLICATIONS OF LI-FI

- **Education System**: Lifi is the latest technology that can provide fastest speed internet access. So it can replace the Wifi at Educational Institution and at companies so that they can use the same internet with more fast speed.
- **Underwater Applications***:* Lifi can work underwater where Wifi fails completely, thereby providing open endless opportunities for military operations.
- **Disaster Management**: Lifi can be powerful means of communication in times of earthquakes or hurricanes. Lifi bulbs could provide cheap high speed Web access to every street corner.
- **Applications in Sensitive Areas***:* wifi are bad for sensitive areas such as power plants. Lifi can provide much safer connectivity in such sensitive areas. Also Lifi can be used in petroleum or chemical plants where other transmission medium can be hazardous.
- **Traffic management***:* In traffic signals Lifi can be used which will communicate withthe Led lights of the car which can help in traffic management. Also LED car lights can alert drivers when other vehicles are too close thus reducing the chances of accidents.

XI. COMPARISON BETWEEN LI-FI/WI-FI

Parameters	**Li-fi**	**Wi-fi**
Speed	High	High
Range	Low	Medium
Data Density	High	Low
Security	High	Mdium
Reliability	Medium	Medium
Power Available	High	Low
Transmit/Receive Power	High	Medium
Ecological Impact	Low	Medium
Device-to-device Connectivity	High	High
Obstacle Interference	High	Low
Bill of Materials	High	Medium
Market Meturity	Low	Mdium

Fig 4: Table of Comparison between Li-Fi / Wi-Fi

X. DESIGN OF LI-FI

Important factors we should consider while designing Li-Fi as following:

- Presence of Light must be line-of-sight.
- Lamp driver where internet connection, switch andLED lamp connected.
- For better performance use LED bulbs.
- A photo detector received data.

X. FUTURE SCOPE

As light is every where and free to use possibities increases to a great extent of the use of Li-Fi technology. If this technology comes to practice each lifi bulb will be used as Wifi hotspot to transmit wireless data. As the lifi technology will be used which will lead to a cleaner,greener,safer and bright future and environment. Lifi is free to use without any license and faster means of data transfer. If it develops more faster people will more and more use this technology instead of wifi.

XII. CONCLUSION

With the growing technology and increasing use of the internet services, possibities are very high that use of Lifi technology will be soon in practice. Every bulb will be replaced by Lifi bulbs and might be used like a wifi hotspot for the transmission of data. Lifi technology will grant a cleaner, greener and brighter future and environment. greener and brighter future and environment. greener and brighter future and environment. greener and brighter future and environment.
greener and brighter future and environment compare to Wifi technology. The use of lifi technology gives a very golden opportunity to replace or to give alternative to the radio based wireless technologies. As the number of people and the access of internet is increasing on such a large scale , accessing internet through wifi will soon be insufficient as the usage is increasing but the bandwidth remains the same. Thus the use of Lifi will increase the speed(1 Gbps) of data transfer compare to Wifi and also it is accessible in many banned places ,Lifi provide more Data security compare to Wifi. thus it will be available for all.

.

REFERENCES

[1] seminarprojects.com/s/seminar-report-on-lifi
[2] http://en.wikipedia.org/wiki/Li-Fi
[3] http://teleinfobd.blogspot.in/2012/01/what-is-lifi.html
[4] technopits.blogspot.comtechnology.cgap.org/2012/01/ 11/a-lifi-world/
[5] www.lificonsortium.org/
[6] the-gadgeteer.com/2011/08/29/li-fi-internet-at-the- speed-of-light/
[7] en.wikipedia.org/wiki/Li-Fi
[10] 8. Will Li-Fi be the new Wi-Fi?, New Scientist, by Jamie Condliffe, dated 28 July 2011.
[12] 10."Visible-light communication: Tripping the light fantastic: A fast and cheap optical version of Wi-Fi is coming", Economist, dated 28Jan 2012