

An Overview on Light Fidelity Technology¹Gopesh Sharma, ²Monika Tanwani, ³Bhawani Shankar

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Abstract

When we use a public Wi-Fi or sharing it with a friend or someone nearby we might possibly get irritated because of the slow speed of the internet connection in our devices. This is a major issue when we are performing anything important so in order to counter this problem, a physicist from Germany herald has invented an all new way of data transmission known as “DATA THROUGH THE ILLUMINATION” in which the data is transmitted from LED lights which have faster intensities than the human eye. Herald has stated that this technology is based upon the light emitting diode’s potential and intensity. The papers below describe the working and construction of the light fidelity-based system and compare it with present data transmission technologies.

Keywords: Wi-Fi, Li-Fi, LED, Data, Diodes.**Introduction**

When considering the today’s world scenario, one can’t even imagine a life without an internet connection. On the internet we share a huge amount of data either it can be an audio files, video files or any form of data so in order to transfer this huge amount of data a good internet connection speed is required which can give a good sharing capacity.

In the year 2011, prof. from Edinburgh University in the UK prof. Harold has introduced a new form of data transmission technique which is named as “data through transmission”. With the help of this technology we can transmit the data even with living rooms lights Prof Herald used fiber optics to transfer the data although this is not a newly introduced concept. In the light fidelity we can link the technology with an LED beam in a limited range.

In a light fidelity technology, the lights act as a high speed source of communication which is as same as Wi-Fi technology. The LI-FI technology is also considered as a secure way of data transmission as the light cannot be passed through the walls. Visible lights are used in this technology rather than the radio waves for the data transmission which is used in wireless fidelity. LI-FI is considered as an affordable way of data transmission technology as the light medium does not cost as much as any other technology and can also conserve more electricity.

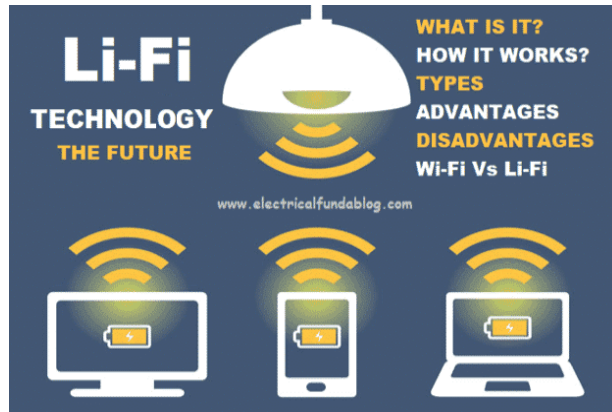


Fig. 1: Li-Fi Technology Overview

How This Technology Works

Light fidelity technology is one of the high speed and economical form of transmitting the data and this technology is depends upon the VLC (visible light communication).

The major components of this system are: -

- 1) An LED light which can behaves as a source of data transmission.
- 2) A “Silicon Photo-diode” which can give a reaction to the wavelengths of receiving elements.

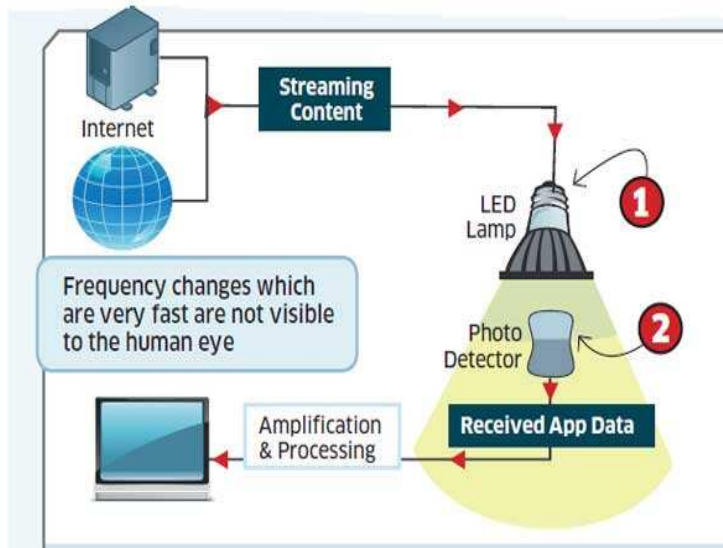


Fig.2: Working of Li-Fi

Flow chart of light-Fidelity

The flow chart of light fidelity contains mainly two-part transmitter receiver. The input which is provide at transmitter side isregulated with a specific amount of time and after this it sendthe data with the help oflight emitting diode (LED) bulbs in the form of zero’s and one’s and light emitting diode (LED) blubs are flashes with zero’s and one’s. and it receive signal and produce output at receiver side with the help of Photo-Diode.

The transmitter section of li-Fi contains input, timer circuit and a LEDblub. The input feed at transmitter side is any type of data (for example:Text, Voice)

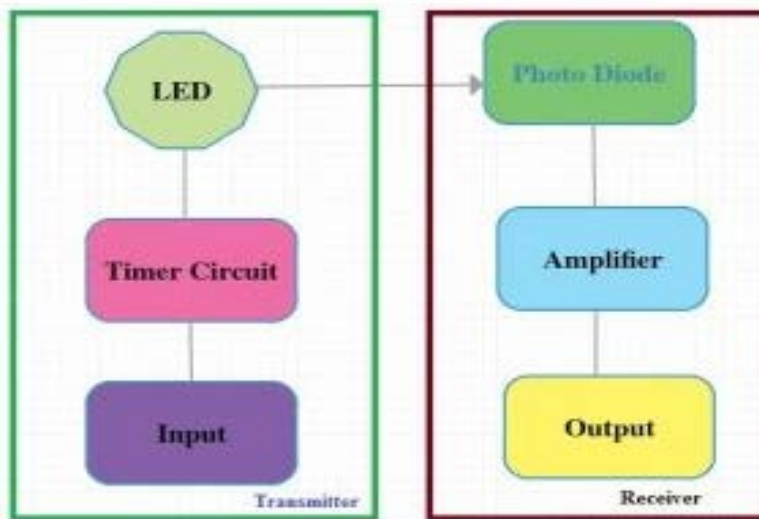


Fig.3: Flow chart of Li-Fi

Application of Light-fidelity system

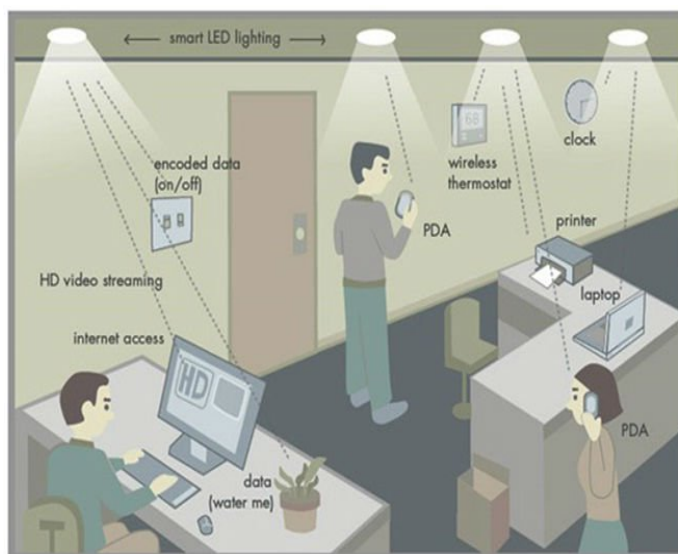


Fig. 4: Applications of Li-Fi

- Transportations
- Industrial areas
- Road safety and Traffic Management
- Medical Applications
- Aviation
- Under water communication
- Location based services
- RF spectrum
- Mobile connectivity
- Smart light

Benefits of Light Fidelity

There is various advantage of Li-Fi Technology some of them given below →

- Risk free--The Li-Fi system work on light waves which is not harmful for humans that's why the Li-Fi system is free from risk. The Li-Fi technology works or operates on optic bands which are harmless.
- Consistent—The Li-Fi system is protected during transfer data.
- Security—The Li-Fi system is protected and in Li-Fi system there is zero possibility of hacking because the Light-Fidelity system does not be operated through the partition.
- Speed--If we talk about speed of Light-Fidelity system is much higher as compare to Wireless-Fidelity system so uses of Li-Fi can watch videos or download big data without buffering.
- Power consumption—the consumption of power in Light-Fidelity System is low that's why it is used in IoT applications.
- Installation—the installation process of Li-Fi technology is easy.



Fig.5: Advantages of LI-FI

Disadvantage of Light-Fidelity System

The light fidelity system consists various disadvantage some of them given below

- Dim light--The Light-Fidelity system not able to work in dim light areas.
- Light cannot pass through objects.
- The major disadvantage of Light-Fidelity system is Light-Fidelity system require Line-of-sight.
- Coverage- The coverage area of Light-Fidelity technology is limited because light can't pass through wall.
- Li-Fi system is also affected by weather.
- The installation cost of VLC systems is high

Difference between Light-Fidelity and Wireless-Fidelity

- The Wi-Fi technology has lesser bandwidth but in case of Light-Fidelity technology it has exceptional bandwidth.
- The Wi-Fi working on low data density while the Li-Fi technology has high data density.
- The data transmission rate of Wireless-Fidelity system is 150 Mbps and for Li-Fi it is >10 Gbps.
- The security is provided by Wi-Fi system is medium but Li-Fi provide excellent or amazing security.

- The network topologies are point to point for both Li-Fi and Wi-Fi technologies.
- The light-Fidelity cost is more affordable than the cost of wireless-Fidelity system.

Conclusion

Based on a research the LI-FI technology has shown many benefits such as power consumption and majorly the transmission of the data at a very high speed. If this technology is implemented in real world, then every light source can work as a source of data transmission or like an internet hotspot which can also result in a more economical and a bright tomorrow.

The Light-Fidelity is latest or new concept to the younger generation and it getting a lot of attention from the youngsters as it gives us many benefits over a traditional radio based wireless fidelity. As we all know that the number of devices a single person use are gradually increasing such as wearable's which are needed to be connected to a good speed of internet all the time so light-fidelity technology can use to solve this difficulty to get a high speed connectivity.

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