

REVIEW PAPER ON LI-FI TECHNOLOGY

NIKITA AHUJA

M-TECH 1ST SEM (COMPUTER TECHNOLOGY)

ABSTRACT

With the use of light radiating diodes Li-Fi technology transfers data through wireless. Li-Fi is a new exemplar for photosensitive wireless technology to provide unprecedented connectivity within a localized data centric environment. There has been a complete shift in wireless technology due to increase demand for faster and more secure and protected data transmission. The new Li-Fi technology can be well managed very easily and it is pretty simple. At one corner you will be having a led which will be working as a light source and on the other corner a Light Sensor or a photo detector. Light Sensor detect light as soon as the LED light starts glowing and will give an output of either binary1 or binary0

INTRODUCTION

Li-Fi is a technology for [wireless communication](#) between devices using light to transmit data. In its present state only [LED lamps](#) can be used for the transmission of visible light. The term was first introduced by [Harald Haas](#) during a 2011 [TED Global](#) talk in [Edinburgh](#).^[1] In technical terms, Li-Fi is a [visible light communications](#) system that is capable of transmitting [data](#) at high speeds over the [visible light spectrum](#), [ultraviolet](#) and [infrared](#) radiation.

In terms of its [end use](#) the technology is similar to [Wi-Fi](#). The key technical difference is that Wi-Fi uses [radio frequency](#) to transmit data. Using light to transmit data allows Li-Fi to offer several advantages like working across higher [bandwidth](#), working in areas susceptible to electromagnetic interference (e.g. [aircraft cabins](#), hospitals) and offering higher transmission speeds.^[3] The technology is actively being developed by several organizations across the globe.

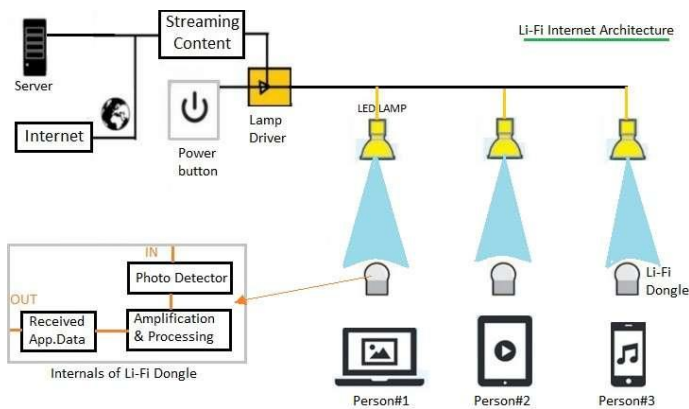
HOW LI-FI WORKS?

Li-Fi is a Visible Light Communications (VLC) system for data transmission. A simple VLC system has two qualifying components:

- 1) At least one device with a photodiode able to receive light signals and 2)
- 2) A light source equipped with a signal processing unit.

A VLC light source could comprise of a fluorescent or light emitting diode (LED) bulb. Since a robust Li-Fi system requires extremely high rates of light output, LED bulbs are most ideal for implementing Li-Fi. LED is a semiconductor light source, which implies that LED light bulbs can amplify light intensity and switch rapidly. Therefore, LED cells can modulate thousands of signals without the human eye ever noticing. In turn, the changes in light intensity from the LED light source are interpreted and converted as electrical current by the receiving photodiode device. Once the electronic signal is demodulated, it is converted into a continuous stream of binary data comprising of audio, video, web, and application information to be consumed by any Internet-enabled device.

There is ample room for growing innovation in Li-Fi technology. Like conventional broadband and Wi-Fi, Li-Fi can also function as a bidirectional communication system. By interchanging visible light and infrared light from a photo detector, a mobile device connected to that photo detector can send data back to the light source for uplink. Also, multi-colored RGB (Red/Green/Blue) LED's at retina size could be engineered to send and receive a wider range of signals than single-colored phosphor-coated white LED's.



APPLICATION OF LI-FI

- Complimentary data services transmission solutions to cellular and wi-fi.
- Ubiquitous wireless hotspot in dense urban area.
- Multimedia consumption.
- Charging mobile devices`
- Safer internet access for hospitals and sensitive places.
- Context aware, location based services real time traffic update
- Utilization of the entire visible light spectrum .

ADVANTAGES OF LI-FI

- It is possible to achieve more than 10 Gbps, Theoretically allowing a high definition film to be downloaded in 30 sec .
- Mostly powered by LEDs so it is cost efficient .
- Transmission of data is fast and easy .
- Its main advantage is its bandwidth is 10000 times than the radio waves .

DISADVANTAGES OF LI-FI

- Presence of light is essential .
- There should be a line of sight.
- Works better with fluorescent light and LEDs but with very low efficiency of bulb .
- Light can't pass through objects .
- High installation cost of VLC systems .

CONCLUSION

With the ongoing increase in the cellular networks, the newest technology of Li-Fi has proven to be a milestone in communication systems. It uses the visible spectrum of light which is far better than the RF as it is prone to interference. With the use of LEDs the information can be transmitted at very high rates with just the simple turning on and off of the LEDs. This technology is not only free to use but also provides a safe and secure access.

REFERENCES

- <http://www.axrtek.com/applications.html>
- WWW.YOUTUBE.COM
- <http://en.wikipedia.org/wiki/Li-Fi>
- WWW.LIFICONSTORIUM.ORG