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Advanced Diploma in IT,
Networking and Cloud computing
SESSION 2022-2024

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TOPIC : LI-FI



TECHNOLOGY

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INTRODUCTION

In this project describe about LI-FI .LI-FI (Light fidelity) is a bidirectional wireless system that transmits data in via LED Or infrared light .it was fir unveiled in 2011 and unlike Wi-Fi technology only needs a light source with a chip to transmit an internet signal through light waves .the device has a receiver to pick up light signals and a transmitted to send light signals back to the lamp using infrared light.

LI-FI used in airlines, undersea explorations, operation theaters for data transfer and internet browsing. It works in high density environments. it does not have any interference issue similar to radio frequency waves. LI-FI transmitted data using light sources presently LED bulbs.

WHAT IS LI-FI?

LI-FI is a visible light communication system transmitting wireless internet communications at very high speeds. The technology makes LED light bulb emit pulses of light that are undetectable to the human eye within those emitted pulse, data can travel to and from receivers. Then the receivers collect information and interpret similar to decoding Morse code but at a much faster rate-millions of time a second .LI-FI transmission speed can go over 100Gbps ,14 times faster than WiGig also known as the world's fastest WI-FI .The main advantages of LI-FI is less interference can pass through salty sea water, works in dense region .



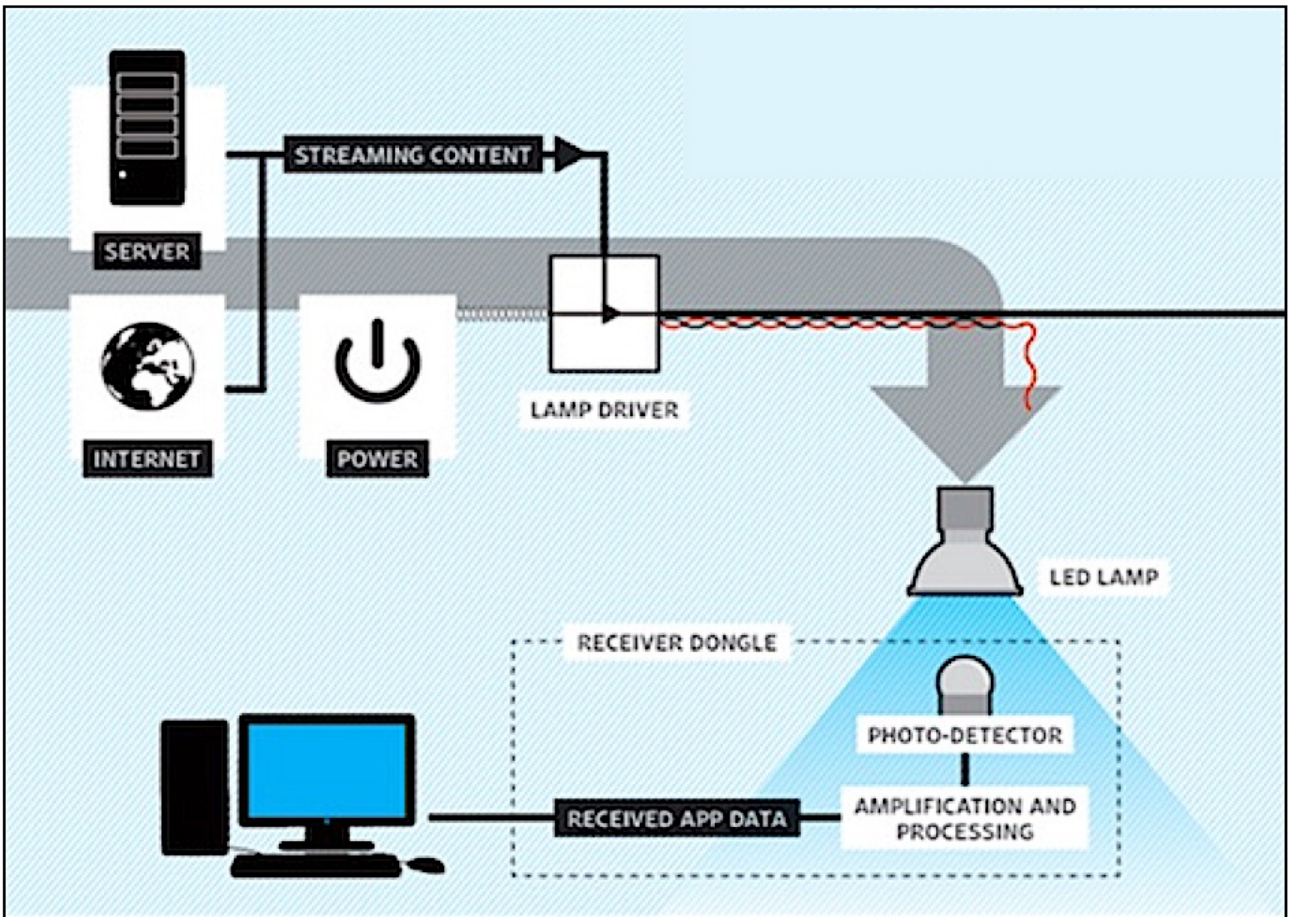
HOW LI-FI WORK?

LI-FI uses visible light as a medium for the transmission of data. As a type of VLC system, it requires two components: a photodiode and a light source. The photodiode acts as a transceiver that receives light signals and transmits them back. The light source transmits data using emitted light as the medium. In this case, light emitting diodes (LED) serve as the light source. They are outfitted with a chip that serves as the signal processing unit.

LED light bulbs are semiconductors. This means current supplied to the bulb can be modulated, which in turn, modulates the light they emit. This process occurs at extremely high speeds that are unperceivable to the human eye. Data is fed into the light bulb and sends the data at extremely high speeds to the photodiode. It converts the data received into a binary data stream perceivable by humans such as video and audio application.

Li-Fi makes use of visible light through overhead lighting for the transmission of data. This is possible through the use of a Visible Light Communications (VLC) system for data transmission. A VLC system has two qualifying components:

- At least one device containing a photodiode in order to receive light signals.
- A light source equipped with a signal processing unit for the transmission of signals.



LI-FI PRODUCTS



LI-FI XC

The LiFi-XC promises to provide uplink and downlink speeds of up to 42 Mbps. It comes conveniently packaged in a size three times smaller than its predecessor but will be more powerful in terms of its ability to provide secure, bi-directional, and fully-networked communication.

A LI-FI MAX system is a great addition to any home or office environment. LiFi can even be used in areas susceptible to electromagnetic interference, like hospitals, schools, and aircraft cabins. LiFi is much more secure, offers higher transmission speeds, and is much more reliable than technologies like Wi-Fi.



LI-FI MAX

LIFI USE CASES..

SMART BUILDINGS

The integration of LiFi into smart buildings can make them more efficient, especially in the delivery of useful building services for the occupants. This is done by improving the connectivity between appliances such as television sets, air conditioning units, refrigerators, and computers, among others, by delivering high speed, high capacity data connection for the internet of things. It also provides energy-efficient illumination for buildings in urban areas where sufficient natural illumination is difficult to achieve.

DENSE URBAN ENVIRONMENTS

Dense urban environments tend to have high degrees of competition for radio frequency signals for cellular and Wi-Fi connections. High levels of competition for RF signals can significantly decrease the data transmission capacity of access points. As a complementary technology, the installation of LiFi on lighting infrastructure within the building can help alleviate congestion in Wi-Fi systems and increase its data transmission capacity. This allows users to enjoy high rates of data access in areas with plenty of illumination. For instance, living rooms, hotel lobbies or corridors, or even reception halls can provide users with greater access to high amounts of data.

MOBILE CONNECTIVITY

In outside areas within an urban setting, LiFi-enabled street lamps can be used to provide access to the internet as they can function as access points. By employing LiFi-enabled street lamps, users are able to enjoy both efficient illumination at night and high-speed data communication. This can be done as an alternative to the deployment of multiple radio base stations in every city for maximum coverage, which could incur high costs for installation and land lease.

ABOUT LI-FI...

LIFI stands for Light Fidelity and it's a wireless optical networking technology that uses light-emitting diodes for data transmission. In other words, it's a light-based Wi-Fi which uses light instead of radio waves to transmit information.

When a constant current is applied to a LED light, tiny packets of energy called photons are released which we see as visible light. Since LEDs are semiconductor devices, the current and optical output can be modulated at very high speeds. This is then detected by a photo detector device that converts it back to electric current. This is how LiFi technology uses LED to transmit data. This is conceptually similar to decoding Morse code but in a much faster rate.

Prof. Herald Haas has been labeled the Father of LiFi for his efforts in development of this technology. It was during his TED Global talk in 2011 that he brought LiFi into the public spotlight where he used a table lamp with a LED bulb to play video of a blooming flower that was then projected onto a screen. According to this TED talk, light fidelity can be applied in traffic control systems using a car's headlights or in chemical manufacturing plants where radio frequency is too dangerous and could cause antenna sparks. LiFi will bring internet access in places that Wi-Fi's radio frequencies cannot reach.

"All we need to do is fit a small microchip to every potential illumination device and this would then combine two basic functionalities: illumination and wireless data transmission," Haas said. "In the future, we will not only have 14 billion light bulbs, we may have 14 billion Life's deployed worldwide for a cleaner, greener and even brighter future."

REFERENCE...

<https://lifi.co/what-is-lifi/>

<https://lifi.co/>

