Li-Fi Transmission Technology

The Bright Future of Light...

Subject:- 2CS304- Data Communications.

Name:- Kushal K. Rajput (19BCE521)

LIFI-TECHNOLOGY

❖ What is Li-Fi?

- Li-Fi stands for Light- Fidelity.
- Li-Fi is transmission of data through illumination, sending data through a LED that varies intensity faster than human eye can follow.

❖ Components Used:-

- LED Light -5V
- Battery
- Wires and AUX Cable Pins
- Solar Panel 6W
- 220 Ohm Resistor
- Speaker

❖ Implementation Process:-

First of all, arrange the required Components as mentioned above.

Step-1). Take a wire of Handset or an AUX cable remove the outer covering of the wire and you will see 4 colour wires – Red(Audio), Green(Left Speaker), Blue (Right Speaker) and Green(Ground). Remove Red wire. Now rest of to connect it with Solar Panel respectively.

Step-2). Now Again do same procedure as of Step-1 and connect it with the Battery.

Step-3). Connect the Transistor with the Positive terminal of the LED and Connect the Red Wire with the Negative Terminal of the LED.

Step-4). Join all the wires correctly used Soldering to connect the wire. Be careful while soldering of wires!!

Step-5). Now, Connect your Mobile Phone and Play some Music and bring Solar Panel closer to the LED. Enjoy the LI-FI!!

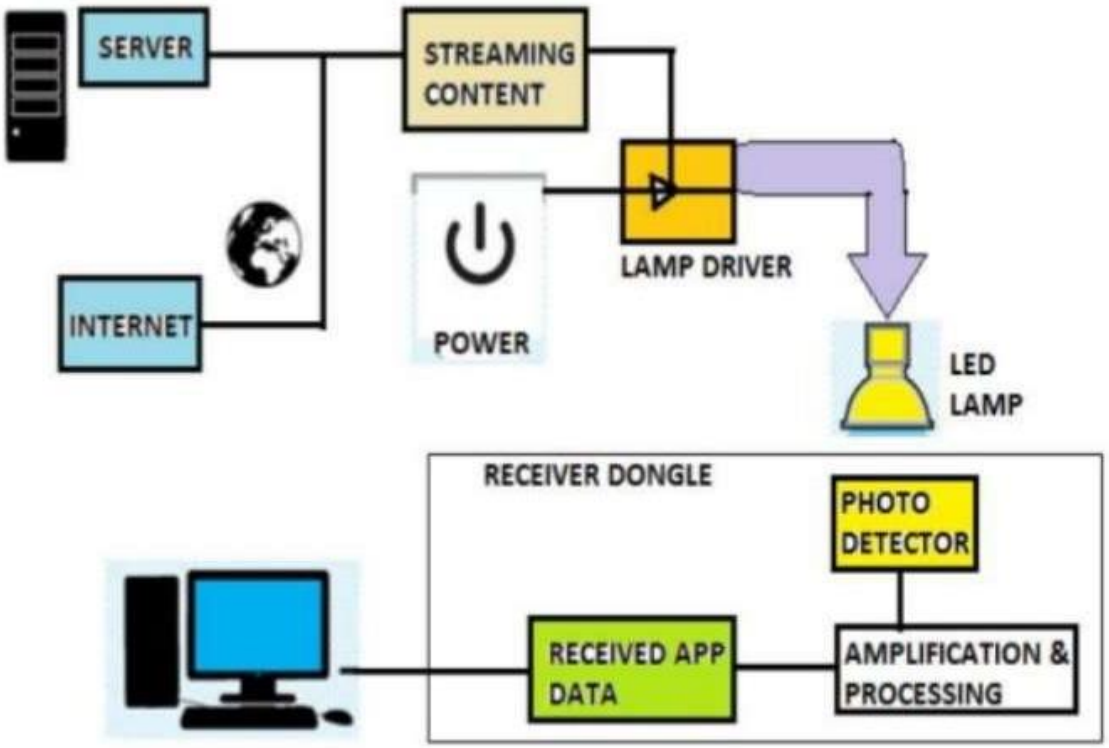
❖ History of Li-Fi:-

- The Technology truly began during the1990's countries like Germany, Korea and Japan where they discovered LED's could be retrofitted to send information.

❖ Working Process:-

- Operational procedure is very simple. if the led is on. you transmit a digital 1, if its off you transmit a 0. The LEDS can be switched on and off very quickly, which gives nice opportunities for transmitting data. Hence all that us required is some LEDS and a controller that code data into those LED'S. We have to just vary the rate at which the LED'S.
- Flicker depending upon the data we want to encode
- Thus every light source will works as a hub for data transmission

❖ How LI-FI Works?



- On one end all the data on the internet will be streamed to a lamp driver when the LED is turned on the microchip converts the digital data in form of light.

- A light sensitive device (photo detector) receives the signal and converts it back into original data. This method of using rapid pulses of light to transmit information wirelessly is technically referred as Visible Light Communication.

❖ LI-FI VS WI-FI:-

Feature / Parameter	Li-Fi	Wi-Fi
Technology	IrDA compliant devices	WLAN 802.11a/b/g/n/ac/ad standard
Operating Frequecny	10,000 times frquency spectrum of radio	2.4 GHz , 4.9 GHz and 5 GHz
Coverage	Around 10 meters	Around 32 meters and varies on power /antennae type
Data Density	Works in high dense environment	Works in less dense environment
Privacy	Light is blocked by walls , hence more secured.	RF signal cant be blocked by walls , hence less secured
Data Tranfer Speed	Faster transfer speed (>1 Gbps)	Slower transfer speed (150 Mbps)
Midium of Data Tranfer	Light as the carrier	Radio spectrum is carrier
Spectrum Range	Light has spectrum 10000 times broader than radio frequency	Radio frequency spectrum is much less than light spectrum
Cost	Cheaper than Wifi due to – 1 – No license required for light band 2 – Lower installation cost	Cheaper than Wifi due to – 1 – License required for radio band 2 – Higher installation cost
Ecological impact	Low	Medium
Market Maturity	Low	High
System components	Lamp driver, LED bulb (lamp) and photo detector will make up complete LiFi system.	requires routers to be installed, subscriber devices(laptops ,PDAs,desktops) are referred as stations
Applications	Used in airlines, undersea explorations, operation theaters in the hospitals, office and home premises for data transfer and internet browsing	Used for internet browsing with the help of wifi kiosks or wifi hotspots
Merits(advantages)	Interference is less, can pass through salty sea water, works in densy region	Interference is more, can not pass through sea water, works in less densy region

❖ Application Area:-

I. Traffic Lights.
II. Intrinsically Safe Environment.
III. Hospitals.
IV. Airlines.
V. Underwater communication. ...
VI. As transmitter for Data Communication.

❖ Limitations or Challenges:-

- Light can't pass through objects. Interferences from external light sources like sun light, normal bulbs, and opaque materials in the path of transmission will cause interruption in the communication.
- Li-Fi requires line of sight
- A major challenge facing Li-Fi is how the receiving device will transmit back to transmitters

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