

# Enlightenment through Light – A Heuristic Approach to Data Transmission

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**ABSTRACT:** Data transfer is kind of process to transfer the data between two objects. Data transfer is done by various methods from ancient by paper and pen as technology develops, transmission are done through wire and further wireless. This technique causes lot of problem like data losing, hacking of data further cause health hazards to the children by emission of waves in wireless communication. The objective is to produce lesser data lose and an eco-friendly system. German physicist, Harald Haas has given a solution “data through illumination” by sending data through an LED light bulb that varies in intensity faster than the human eye can follow the transmission. Transmission through light can produce data rates faster than 10 megabits per second, which is speedier than the average broadband connection. This method reduces the data loss by transmitting data through light.

**KEYWORDS:** LAN, Electroluminescence, LI-FI.

## I. INTRODUCTION

Now a day's data transmission is done by LAN and also by wireless. Using this technique lot of problem arise like data hacking and data loss. Many confidential file are loss in wireless due hacker, the problem are stopped the main problem is wireless data transmission is causing health hazards to children like brain tumour, brain fever from the statistical data. Our main objective is to hover the above problem in eco-friendly way. It is decided to transmit data through light. In this project, data transmission is done through LED; the receiver is connected to MP3 player through serial communication. In the receiving side solar panel is used to receive the data sent by LED in form of voltage, from solar panel was connected to amplifier where the voltage is amplified then amplified voltage is given to speaker output is produced. The main objective of this project is to transmit the data in safe and eco-friendly method. To get a data in safe mode, the process involved is 2 steps. The cost of this device is low when compared to the previous methods.

## II. METHODS

### A. Existing System

In data transmission through wireless many problem like radiation effect, data lose, and hacking of data. The cost of product is high, speed is low. As compare to wired network, wireless loss high data. In Wireless technology hacker are easy to access the signal and hack the data. It is able to transmit limit data rate, it can't send huge data. In wireless generate some radiation which is effects on human health.

### B. Proposed Working Model

The main component of this communication system is a high brightness white LED, Which acts as a communication source and a silicon photodiode which shows good response to visible wavelength region. LED can be switched on and off to generate digital strings of 1s and 0s. Data can be encoded in the light to generate a new data stream by varying the flickering rate of the LED (as shown in Fig. 1). This system works on switching LED on and off within nanoseconds which could transmits data

70Mbps (approx.). It is used in areas where electromagnet is sensitive like aircraft cabins, hospitals and nuclear power plant without electromagnetic interference. The wireless and li-fi transmits data over electromagnetic spectrum, but li-fi use visible light and no limitation on capacity. The VL (visible light) is 10,000 times larger than radio frequency. LI-Fi replace gigahertz radio waves with visible light.

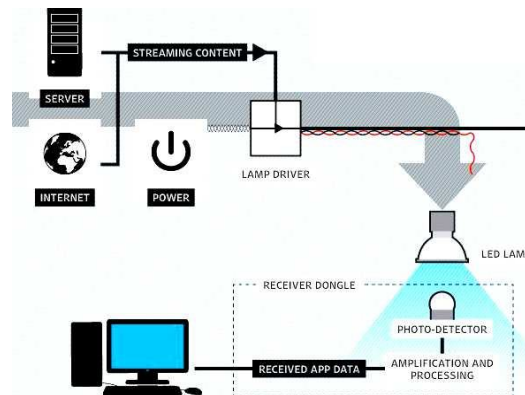


Fig. 1 Data transmission using Light

The kind of data to be transmission is connected to LED through serial connection. In the receiving side solar panel is to receive the data in kind of voltage. Example: let take audio as input data which transmits through LED, in receiving side solar panel receive data in voltage with amplified output is connection to speaker where the data is received completely.



Fig. 2 Example for proposed system

The components are 9-V LED, Solar Panel, Amplifier, Speaker, and MP3 player (as shown in Fig. 2).

### III. COMPONENTS USED

#### A. LED

A **light-emitting diode (LED)** is a two-lead semiconductor light source that resembles a basic PN-junction diode, except that an LED also emits light (as shown in Fig. 3). When a LED's anode lead has a voltage that is more positive than its cathode lead (by at least the LED's voltage drop), then the current flows. Electrons recombine with holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the colour of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor. LED is small in size. Earlier, LED has low intensity. But, today LED with intensity range from 100 m to 1Km is available.

There are many types like monochromic and polychromic light, depending upon voltage 5V, 9V, and 12V.



Fig. 3 LED(light-emitting diode)

#### B. Solar Panel

A **solar panel** is a set of solar photovoltaic modules electrically connected and mounted on a supporting structure (as shown in Fig. 4). A photovoltaic module is a packaged, connected assembly of solar cells. The solar panel can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions (STC), and typically ranges from 100 to 320 watts.



Fig. 4 Solar Panel

When light fall on plate it produce photons which voltage. Range of solar panel is vary also with voltage.

#### C. Amplifier

An **electronic amplifier, amplifier**, or (informally) **amp** is an electronic device that increases the power of a signal. It does this by taking energy from a power supply and controlling the output to match the input signal shape but with a larger amplitude. In this sense, an amplifier modulates the output of the power supply. There are four basic types of electronic amplifier: the voltage amplifier, the current amplifier, the Trans conductance amplifier, and the Trans resistance amplifier. In this project uses the built-in amplifier.

#### D. Speaker

A **speaker** is an electro acoustic transducer that produces sound in response to an electrical audio signal input. In other words, speakers convert electrical signals into audible signals. In speaker many type are based on watts output. In this project uses normally 2.1 channel computer speaker are

speaker. The dynamic speaker operates on the same basic principle as a dynamic microphone. When an ac current (i.e., electrical audio signal input) is applied through the voice coil that surrounds a magnet (or that is surrounded by a permanent magnet), the coil is forced back and forth due to Faraday's law, which causes the paper cone attached to the coil to respond with a back-and-forth motion that creates sound waves.



Fig. 5 Speaker

#### IV. REAL TIME IMPLEMENTATION AND FURTHER DEVELOPMENT

The operating and installation cost was less when compare to other type of system. This system is implemented in office (for example) it is easy to transfer the audio signal and by replace the normal bulb with LED, we can save the power also. In this project further we develop to transmit video signal, then Internet also.

#### V. RESULT

In future, data for laptops, smart phones & tablets can be transmitted through light in room by using Li-Fi. Researchers are developing micron sized LED which are able to flicker on & off around 1000 times quicker than larger LED. They offers faster data transfers and take up less space so we could save space or add more LED's to further boost the channel of communication. Also 1000 micron sized LED can fit into area required by 1sq. mm large single LED. A 1 sq.mm sized array of micron sized LED's could therefore communicate 1000×1000 (i.e. a million) times as much information as a single 1mm LED. Thus, the future for Light transmission is bright. Light transmission consortium believes it is possible to achieve more than 10Gbps, theoretically allowing a high definition film to be downloaded in 30 seconds.

The possibilities are numerous and can be explored further. If his technology can be put into practical use, every bulb can be used something like a Wireless transmission hot spot to transmit wireless data and we will proceed toward the cleaner, greener, safer and brighter future. The concept of Light transmission is currently attracting a great deal of interest, not least because it may offer a genuine and very efficient alternative to radio-based wireless. As a growing number of people and their many devices access wireless internet, the airwaves are becoming increasingly clogged, making it more and more difficult to get a reliable, high-speed signal. This will solve issues such as the shortage of radio-frequency bandwidth and also allow internet where traditional radio based wireless isn't allowed such as aircraft or hospitals. One of the shortcomings however is that it only work in direct line of sight.

#### VI. CONCLUSION

Thus the data transmission through light is possible. This is achieved by installing LEDs, solar panel, amplifier into a complete system. It reduce the data loss, data hacking and it provide secure data transmission. In this system it is possible to transmit the data up to 100Mbps, which takes the data transmission speed to next range. This is an eco-friendly product. In future this system plays a main role in data transmission.

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