

## A Survey of Li-Fi System Desegregated in Streetlights

R.Shiny Jenita

Department of Computer Science & Engineering, Assistant Professor, Dr.APJ Abdul Kalam Centre for Research, Adhi College of Engineering & Technology, Chennai, India. Email-id: shinejen10@gmail.com

### Abstract

This paper attempts to desegregate the test bed of Li-Fi system in streetlights. The FPGAs is used to implement a functional Li-Fi real-time testbed. The transmitter is embedded on the streetlights. The mobile phone's camera is used as receiver. Simultaneously the hardware and software subsystem is used to achieving the goal of lighting and communicating. The goal is to implement the communication module in both the streetlight and the user equipment.

**Keywords-** Li-Fi (Light Fidelity), FPGA (Field-Programmable Gate Array).

## INTRODUCTION

Li-Fi Technology uses light to transmit data. So it can be thought of as a lightbased Wi-Fi. Li-Fi is the milestone of wireless communication. The light pulses cannot penetrate on walls.

To overcome this problem all the lights are replacing by the LED lamps. In the Li-Fi system the transceiver-fitted LED lamps. This Li-Fi system embedded LED lamp is used to light a room. In the same way it is used to transmitting and receiving the information, instead of Wi-Fi modems LED lamps used as transceiver. The LED lamp generates the data signal as well as it is also used for the lightening.

The LED is a semiconductor light source. It can enlarge light intensity. The LED cells can inflection thousands of signals never the human eye ever noticing that before. The light intensity changes from the LED light source are converted and interpreted as electrical current by receiving the photodiode device.

If the electronic signal is demodulated, it will be converted into a continuous stream of binary data. These datas are comprising of any method like audio, video, web and application information are consumed by any Internet-enabled device. The Li-Fi system function as a bidirectional communication system like a conventional broadband and Wi-Fi system technology. From a photo detector the visible light and the infrared light were interchanging, in the photo detector a mobile device was connected. This system can send data back for uplink to the light source.

Li-Fi technology is cheaper than the Wi-Fi and also much safer. This technology does not harm nuclear power plants. In the thermal power stations Wi-Fi cannot be used because usage of RF waves in such stations can be harmful and may result in unexpected accident.

## LI-FI TECHNOLOGY ARCHITECTURE

At the downlink transmitter the white LED light bulbs is used in Li-Fi technology. These types of devices are used for illumination only by applying a constant current. Due to the vary of the current, the optical output can also vary at extremely high speeds. The optical current is used in Li-Fi setup. If the LED is on, you transmit a digital 1, if it's off you transmit a 0. The operational procedure is very simple. For transmitting data the LEDs can be switched on and off very quickly. Though all that is required for LEDs and a controller. These code data into those LEDs. That code data is vary the rate in which the LED's flicker depending upon the data to encode. For parallel data transmission, using mixtures of the colors like red, green and blue LEDs or using an array of LEDs. This also used for further enhancements to alter the light's frequency. In this method, each frequency encoding a different data channel. The advancements promises are a theoretical speed of 10Gbps. So one can download a full high-definition film in just 30 seconds<sup>[2]</sup>. The figure 2 shows Architecture of Li-Fi System.

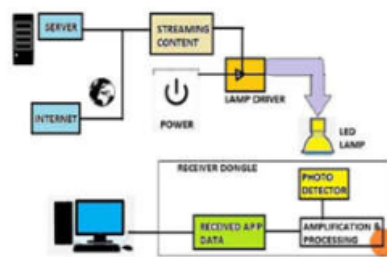


Figure 1: Architecture of Li-Fi System<sup>[6]</sup>