

A Review on Indoor Data Transmission and Software Application Controlling using Light fidelity

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Abstract—LI-FI is a new wireless technology implemented by the German physicist-Harald Haas in the year 2011. By over coming the drawback of WI-FI we are using LI-FI technology. The main aim of LI-FI is to transmit data using LED bulbs and intensity of light is so fast that it is invisible to human eye. This paper describes to control indoor data transmission to control software. In this paper instead of Radio waves we are using LED bulb as a medium to transmit data which provides better security and also it has higher bandwidth.

Keywords—Wi-Fi, Li -Fi, VLC, , amplification and processing, data utilization, server lamp driver, LED

I. INTRODUCTION

In today's world internet users are increasing day by day. And due to this the internet which we access are becoming slow. As the number of devices that access the internet increases, the fixed bandwidth available makes it more difficult to access high data rates and connect to a secure network[5]. In Wi-Fi we oftenly use radio wave which is slow and has fixed bandwidth and insecure to use . So to overcome all the drawbacks Harald Haas proposed a technology known as LI-FI.

In this paper we will not only transmit the data using LED bulb but also we will control the software application. Li-Fi range is very high as compared to Wi-Fi[2]. As concern to speed and security it also becomes major factor. There are vulnerable hackers which can easily hack data transmitting through radio waves because radio waves penetrates through wall easily. Due to all these issue in existing system Li-Fi came into existence and We can simply explain LI-FI as, if the LED is transmitting digital 1 then LED is ON; and when digital 0 is transmitted LED gets off and there will be no data transfer take place[10].

This Visible Light Communication can be used to produce data rates higher than 10 mbps which is more faster than our broadband connection. LI- FI can be used as a future technology where laptops, mobile phones can be accessed through light any where. Security would not be an issue because you are not allowed to access the data if you are not able to see the light[1] . As a result, it can be used in high security military areas also in nuclear plants where RF communication is not allowed to use.

II. LITERATURE SURVEY

Shubham Chatterjee [2], etc.al in there paper " Scope and challenges in light-fidelity technology in Wireless data communication" proposed that massive use of Li-Fi may solve some bottleneck of data transmission in Wi-Fi technology and tried to explore the future scope of this new technology.A

lot of research can be conducted in this field. Already, a lot of scientists are involved in extensive research in this field. This technology, pioneered by Harald Haas, can become one of the major technologies in the near future. If this technology can be used efficiently, we might soon have something of the kind of WI-FI hotspots wherever a light bulb is available

Dipali Bajaj[3], etc.al in paper " Towards an understanding of Li-Fi: Next generation Visible Light Communication Technology " in these paper gives an overview and working principle of the technology including its advantages, disadvantages and application. and also proposed that Li-Fi can not be a complete replacement to the existing RF technology, But it can be a well contributed gift to the Internet era.

Petr Chvojka[4], etc.al " Channel Characteristics of Visible Light Communication Within Dynamic Indoor Environment" presents both analytical and TV experimental results for a VLC system affected by movement of people for different indoor conditions. in there paper they considered random movement of people within the room, focusing on the impact of shadowing and blocking on mobility and link system performance by investigating changes in the channel characteristics.

Rahul R. Sharma[5],etc.al in there paper "Li-Fi technology : Transmission of data through light", propose that Li-Fi is ideal for high density wireless data coverage in confined area and for relieving radio interference issues. This concept promises to solve issues such as the shortage of radio-frequency bandwidth and boot out the disadvantages of Wi-Fi. Li-Fi is the upcoming and on growing technology acting as competent for various other developing and already invented technologies

Lubin Zeng[6] etc .al propes in there paper "High data rate Multiple Input Multiple Output Optical Wireless Communication Using Wight LED Lighting" that a room or coverage space would typically be illuminated by an array of LEDs there is the potential for parallel data transmission. in this paper they investigate non-imaging and imaging MIMO approaches.

Xiaodi You[7], etc.al in there paper " Efficient Data Transmission Using MPPM Dimming Control in indoor Visible Light Communication" propord that reducing the duty cycle will push up the receiver sensitivity requirement if the transmission eate is kept constant. in there they investigate a dimming control mechanism in indoor VLC to satisfy the receiver sensitivity requirement, which can achieve efficient data transmission while maintaining communication quality.

Nitin Vijaykumar Swami[8], etc.al in there paper "Li-Fi- the changing scenario of wireless communication" gives a brief focus in Li-Fi technology, it's working principle, some misconceptions about Li-Fi and related reearches like Nobel Prize Winning Blue Light emittind daiod, Optoelectronic integrated circuit receiver , etc.

Madhuri P. Patil[9], etc.al in there paper "A Wire Less Communication Through Light" gives the research paper presents a novel Light Fidelity System Which Uses Visible Light for the transmission process. Simple low cost components like LED, photo detector are used uhn the design of the system. Different modulation schemes are employed for long transmission of data.

Vitthal S. Saptasagare[10], etc.al propose in there paper "Next of Wi-Fi an Future Technology in Wiress Networking LI-Fi using Led Over Internet of Things" that the data through illumination-taking the fiber out of fiber optic by sending data through ab. LED light bulb that varies in intensity faster than the human eye can follow. its the same idea behind infrared remote controls but far more powerful. it is called D-LIGHT, can produce data rates faster than 10mbps , which is speedier than your average broadband connection.

J. Rufo[11] etc.al in there paper" Experimental Evaluation of Video Transmission Through LED Illumination Device" they describes the implementation of a prototype of an optical wireless system based on. visible light LED lamps, which allows a video broadcasting to reach a bit rate of 2 mbps.

III. PROPOSED SYSTEM

Aim:

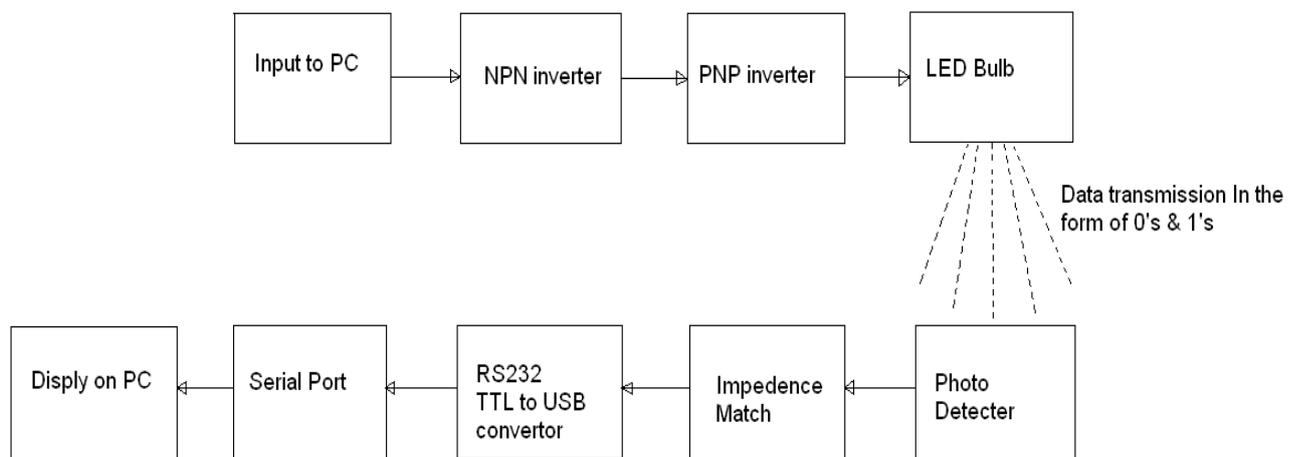
Here we are focusing on the security of transmit the data from one place to another place and we are also going to control software application by using LED bulb.

Objectives:

- To provide the security while transmitting data.
- And control the software application when data is transmitted

Relevance and Requirements:

- LED light.
- Computer system.
- NPN Inverter
- PNP Inverter.
- Photo detector.



- RS 232 TTI to USB convertor.
- Serial port

Figure. (a) System Block Diagram

LI-FI is very fast, more secure and cheap wireless system technology for transmitting data. The simple logic of this system is led is on you are transmit the data it means you transmit digital 1, and if led is off then you transmit digital 0 or no data transfer as shown in fig.(a).

The speed is so high that human high that human eye cannot detect and LEDS appear to have a constant intensity [6].

This method of using pulses of light to transmit data is called Visible Light Communication (VLC). The photo detector registers a binary 1 digit when the LED is on; and a binary 0 digit if the LED is off.

To build up a message, number of LED's or an array of LEDs use of a few various colors, to obtain data rates in the range of hundreds of megabits per second[8]. Block diagram is as shown below System Block Diagram

IV. DESIGN AND SPECIFICATION

Let m be a light fidelity system such that

$$L = \{ O, S, P, N, M, L, R, X \mid \phi m \}$$

(1) Where D is inpute database

$$P = \{ i_1, i_2, i_3, \dots, i_n \}$$

i = input data

$$i \in D$$

(2) S is step sequence algorithm

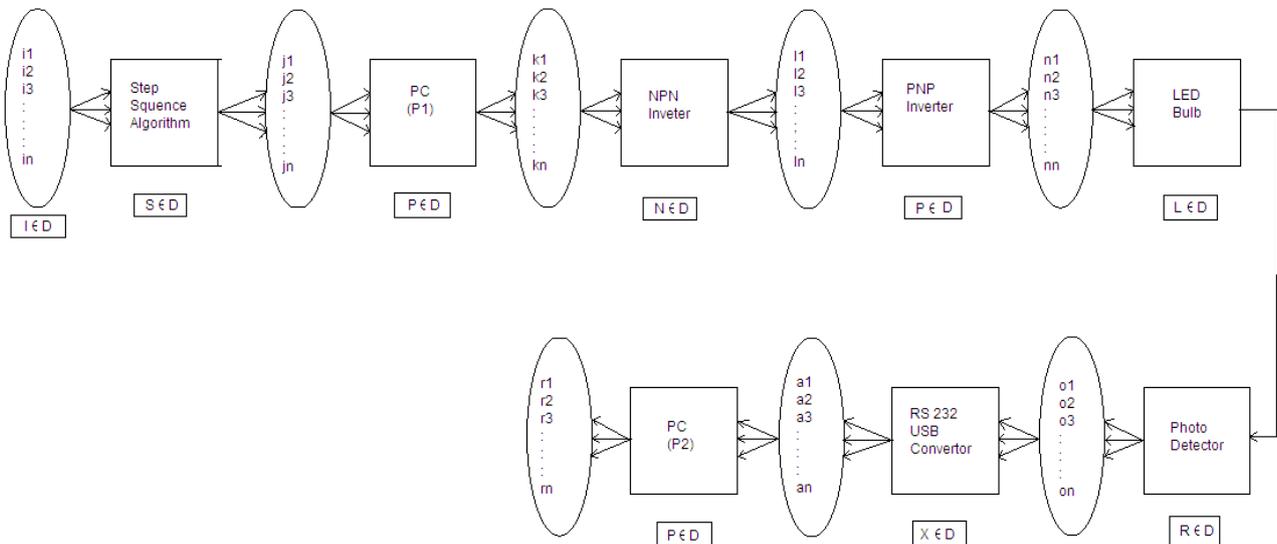
$$S = \{ j_1, j_2, j_3, \dots, j_n \}$$

where $s \leq m$

(3) P is PC

$$P = \{ k_1, k_2, k_3, \dots, k_n \}$$

k is output produced by pc.



Figure(b) Mathematical Model

(4) N = NPN Inverter

$$N = \{ l_1, l_2, l_3, \dots, l_n \}$$

l is output produced by NPN Inverter

(5) M = PNP Inverter

$$M = \{ n_1, n_2, n_3, \dots, n_n \}$$

n is output produced by PNP Inverter

(6) where L is LED Bulb
R is photo detector
 $R = \{o_1, o_2, o_3, \dots, o_n\}$
o is output of photodetector

(7) X is RS 232 / USB Converter
 $X = \{a_1, a_2, a_3, \dots, a_n\}$
a is output of RS 232 cable

(8) P is second PC System
 $p = \{r_1, r_2, r_3, \dots, r_n\}$
where r is output of 2nd PC

V. CONCLUSION

The possibly are numerous and can be explored further. If this technology is put into practical use, every bulb can be used something like a Wi-Fi hotspots to transmit wireless data.

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