Li Fi Audio and Data Transmission via Lights

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Abstract: *Generally peoples are using wireless internet in a public places, when one of the particular student is try to find it from the other destination, then it require sufficient bandwidth at a conference, if you don't have a sufficient bandwidth or speed then you will frustrated at the moment and you face when more than one device is tapped into the network. As more and more people and their many devices access wireless internet, clogged airwaves are going to make it increasingly difficult to latch onto a reliable signal. But radio waves are just one part of the spectrum that can carry our data. It's the same idea behind infrared remote controls, but far more powerful. In this technology, which is based on D-Light, can produce data rates which is high and faster than 10 megabits per second, which is speedier than your average broadband connection. When we visualize a future where data for laptops, smart phones, and tablets is transmitted through the light in a room. In the application of protection, security would be a snap—if you can't see the light, you can't access the data. Li-Fi is a VLC, visible light communication, technology. Li-Fi is now part of the Visible Light Communications (VLC). "Li-Fi is typically implemented using white LED light bulbs. These devices are normally used for illumination by applying a constant current through the LED.*

Keywords: Li-Fi

I. INTRODUCTION

In simple terms, Li-Fi is a process or it can be thought of as a light-based Wi-Fi. That is, it uses light instead of radio waves as a transmission media to transmit data information from source to destination i.e. load. And instead of Wi-Fi modems, Li-Fi would use transceiver fitted LED lamps are able to that can light a room as well as transmit and receive information. Since simple light bulbs are used, there can technically be prototype in quantity or any number of access points. This technology employs a some part of the electromagnetic frequency spectrum that is still not greatly utilized in the visible Spectrum. Light is a easily available in a great source in fact very much part of our lives for millions and millions of years and does not have any major ill effect. Moreover there is 10,000 times more space available in this spectrum and just counting on the bulbs in use, it also multiplies to 10,000 times more availability as an infrastructure, globally. It is possible to encode data in the light by varying the rate at which the LEDs flicker on and off to give different strings of 1s and 0s as a binary information. The LED intensity is modulated or changed so rapidly that human eyes cannot notice due to persistent of vision, so the output appears constant. More sophisticated techniques could dramatically increase VLC data rates. Teams at the University of Oxford and the University of Edinburgh are focusing on parallel data transmission using arrays of LEDs, where each LED transmits a different data stream. Other groups are using mixtures of red, green and blue LEDs to alter the light's frequency, with each frequency encoding a different data channel.

In this proposed system, it used a LED bulb to transmit a video of certain object that was then projected onto a load which display the parameter on liquid crystal display. During the event we periodically blocked the light from lamp to prove that the lamp was indeed the source of incoming data.

II. LITERATURE SURVEY

Rekha R1, Priyadarshini implemented a Li-Fi based Data and Audio Communication system. In the system the signals detected by the LDR are fed to the comparator where the received voltage are compared with the reference voltage. If the received voltage is higher than the reference voltage, it is considered as binary high. If the received voltage is lower than the reference voltage, it is considered as binary low. The data input is given from Hex Keypad or through serial communication. This signal is transmitted to the Micro controller which converts the signal to Binary 0's or1's, this binary data is fed to LED driver for switching ON and OFF the LED. These light signals consist of input data. These signals are transmitted towards the receiver. Input data is also displayed on the LCD Display for verification.

Catur Budi Waluyo Benedictus Mardwianta has developed a design of Audio Data Transmission using Visible Light Communication. The design in this research consists of the transmitter and receiver. The components used in the design of the transmitter include 2 resistors, 2 capacitors, and a LED. While the components on the receiver include: photodiode, 3 capacitors, 6 resistors, and 2 transistors. Based on the LED color type test, the green colour produced the highest output voltage of 1.32 volts. While the white LED produced the smallest output voltage. The limit of the tilt angle that can be detected by the photodiode, which was at the angle of 70° with a measured voltage of 100mV and the resulting sound intensity of -32.541dB.

A. Gayathri, S. Mohanapriya has developed a Design and Implementation of MPVLC Li-Fi Model for End-To-End Wireless Data Transmission. The transmission process consists two way of computing codes needed to implement the model. One way is shell script to communicate via the hardware system of MPVLC Li-Fi model. Another way is used to send and receive the multimedia data as a 0's and 1's bit of information. The shell script method is implemented for the MCU system using so that it take the responsibility of transmission progress between source and destination port line. The MATLAB tool is used develop the code to read in information from the MCU device by using receiver end port point, and then perform related frequency analysis process, the data encrypted data is converted into an original information at the receiver end point.

III. PROPOSED METHODOLOGY

Li-Fi Is Typically Implemented Using White Led Light Bulbs At The Downlink Transmitter Which Is Able To Transmit Data From Source. These Devices Are Normally Used For Illumination Only By Applying A Constant Current. However, By Fast And Substantial Variations Amount Of The Current, The Optically Produced Output Can Be Made To Vary At Extremely High Speeds. This Very Property Of Optical Current Is Used In Li-Fi Setup. The Input Data Can Be Either Applied From Switches Or Audio Data From Microphone. The Audio Data Is Converted To Binary Using Python And Applied To Led Driver. In This, Transistor Bc547 Is Used As A Led Driver To Which Square Waveform Is Applied To It. The Operational Procedure Is Very Simple- If The Led Is On, You Transmit A Digital 1 I.E. High, If It's Off You Transmit A 0 I.E. Low. When The Led Light Is Continuously Operated Then A String Of Binary Information Is Transmitted From Source To Destination Through Wireless Media.
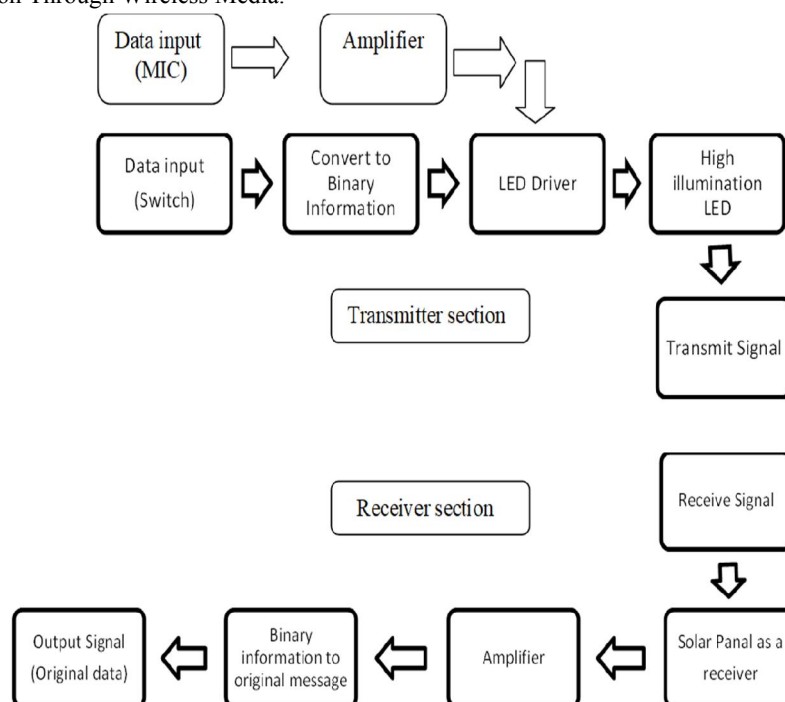

Figure 1. Block diagram of a proposed system

The leds can be switched on and off very quickly, which gives nice opportunities for transmitting data. hence all that is required is some leds and a controller that code data into those leds. all one has to do is to vary the rate at which the led's flicker depending upon the data we want to encode. further enhancements can be made in this method, like using an array of leds for parallel data transmission, or using mixtures of red, green and blue leds to alter the light's frequency with each frequency encoding a different data channel.

Figure 2: Practical setup of Li-Fi Audio and Data Transmission Via Light

IV. RESULTS AND METHOD OF SYSTEM

In this project we use Light as a travelling medium for information signal and this signal and light is transmitted through same source hence same source is used for light and data transmission. For that two parts are used one is transmitter section and other is receiver section. In that modulated light signal is send from transmitter source and again decoded at the receiving end and information is displayed on it or sound come through speaker.

In this project we use two type information source one is sound signal and another is digital signal which is applied from bank of switches i.e. SPST toggle switch. If sound signal is used as a data then it directly send to led driver Circuit (based on MOSFET) through audio amplifier circuit having gain of 10 to amplified the low power sound signal in to high power strong signal. If we need to send data in digital form then using Microcontroller we send it to the led driver circuit in the form of binary information which is a combination of zeros and once. When microcontroller need to send zero then MOSFET is off and light source becomes off and if microcontroller need to send logic one then MOSFET is on hence light is allowed to glow and light coming through light source. In proposed system we use LED bulb as a light source. At receiver side we use photo detector circuit like solar panel to read the LI-FI signal which is send in light. Hence using solar panel we can convert it into electrical form. This signal is very weak hence using amplifier we need to amplified it 10 times and then we process it. If the signal is in digital form then using microcontroller we can convert it into digital data which is received in the form of zero and one and after decoding display it on 16X2 LCD display for user monitoring. Otherwise we send it to speaker as it is to produce audio to leaser for user.

V. CONCLUSION

The possibilities to implement the same system are diverse in nature and can be elaborated further. If this technology can be use into practical use, every LED lamp can be used something like a Wi-Fi hotspot to transmit wireless data and we will proceed toward the cleaner, greener, safer and brighter future. In this proposed system, if multiple data is applied through multiple switches or microphone with the help of binary information from transmitter to receiver through wireless channel. At the receiver side the indistinguishable data is convenient. The concept of Li-Fi 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 enlarge number

of human beings and their many require devices access wireless internet, the airwaves are becoming increasingly obstructed, making it more and more difficult to get a reliable, high-speed signal.

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