

ISSN: 0976-3031

*International Journal of Recent Scientific
Research*

Impact factor: 5.114

**INVESTIGATION OF DATA TRANSMISSION USING
INTENSITY OF LIGHT**



Srikumar Chaladi and SnehaLella

Volume: 6

Issue: 10

**THE PUBLICATION OF
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH**

<http://www.recentscientific.com>

E-mail: recentscientific@gmail.com



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

International Journal of Recent Scientific Research
Vol. 6, Issue, 10, pp. 6584-6586, October, 2015

**International Journal
of Recent Scientific
Research**

RESEARCH ARTICLE

INVESTIGATION OF DATA TRANSMISSION USING INTENSITY OF LIGHT

Srikumar Chaladi* and SnehaLella

Department of Ece, Gitam University, Visakhapatnam Andhra Pradesh, India

ARTICLE INFO

Article History:

Received 16th July, 2015
Received in revised form
24th August, 2015
Accepted 23rd September, 2015
Published online 16st
October, 2015

Key words:

Li-Fi, OWC, VLC
Li-Fi: Light Fidelity, OWC:
Optical wired Communication,
VLC: Visible light
Communication

ABSTRACT

The phenomena of transmitting information which includes a formalized form by symbols or Analog signals is predominantly known as Data transmission or Data communications which deals with the branch of telecommunications; the information either is intended for machine processing (for example, by computers) or has already undergone machine processing. The term "data transmission" is also applied to the actual process of transmitting the information. Such information is called data. Data transmission frequently requires greater reliability, rate, and accuracy of transmission because of the greater importance of the information being transmitted and the impossibility of logical monitoring by human beings during the transmitting and receiving processes. Together with computer technology, data transmission serves as the technical base for information and computing systems, including automatic control systems of various levels of complexity. The use of data transmission facilities speeds up the collection and dissemination of information and permits subscribers with inexpensive terminal equipment to enjoy the services of large computer centres.

Copyright © Srikumar Chaladi and SnehaLella. 2015, This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Li-Fi is a source of Wireless Communication which is done with the help of light. It can also be considered as a substitute for Optical Wireless Communication (OWC). OWC is a kind of Optical Communication done with the help of visible, infrared, ultraviolet signals used to carry information. OWC generally works in the bandwidth of visible region (390-790 nm). Therefore, it can also be referred to as Visible Light Communication (VLC). In physics, intensity is the power transferred per unit area, which is transmitted through an imagined surface perpendicular to the propagation direction. In the SI system, it has unit's watts per square meter (W/m^2). It is used most frequently with waves (e.g. sound or light), in which case the average power transfer over one period of the wave is used. So this phenomenon of intensity of light can be used in the process of Data transmission.

Implementation

The phenomenon of transmission of data using intensity of light primarily requires the collection of data in Analog form from different information sources. The information which is collected from different sources is then sent to the signal conditioning circuit which includes the process of Amplification, Filtering, Converting, Range matching,

Isolation and other processes which are required to make the sensor output suitable for processing after conditioning.

Op-amps, which are generally designed on large geometric processes to withstand the higher internal voltages, are generally employed in this Signal Conditioning Circuit. The Analog form of data which is collected from the Signal Conditioning circuit is thereby sent to the Analog to Digital converter in order to transform the Analog form of data into Digital form of information.

We can take 'n' outputs from the Analog to Digital Converter. Here we take the value of $n=4$. Here 'n' indirectly specifies the number of users. These outputs from ADC are thereby connected to Time Division Multiplexer. The Time Division Multiplexer which is primarily used for transfer of information in the form of bit streams appearing simultaneously as sub channels in one communication channel. The information from the 4 inputs from ADC is transferred through a single channel.

The time domain is divided into several recurrent time slots of fixed length, one for each sub-channel. A sample byte of data block of sub-channel 1 is transmitted during time slot 1, sub-channel 2 during time slot 2, etc. In the similar way information is transferred to optical device. Optical device which is present as shown in the fig1.0 is used in order to collect the information from the TDM which is present in the

*Corresponding author: **Srikumar Chaladi**

Department of Ece, Gitam University, Visakhapatnam Andhra Pradesh, India

electronic signal form into light. As a result the optical device which is present acts as a transducer in converting one form of the energy into other form of energy.

Here we use 3 LED's in the optical device according to the phenomena of data transmission using intensity of light. We previously know that the information is transferred in binary form using 0's and 1's. So we can transfer the information using the glow of the LED's. If the LED glows, the bit of information can be considered as '1' and in the same way if the bulb doesn't glow the bit of information can be considered as '0' according to some of the earlier models.

We know that the LED circuit mainly composes of a Voltage supply, a Resistor and a LED bulb. So as we are using a same voltage supply of 12V for all the three LED circuits as mentioned above, we can change the value of resistors in the LED circuit in order to produce three different current values, thereby three different intensities of the LED light for the same voltage.

So these 3 different values of current in the LED circuits tend to produce 3 different intensities of light depending on the current values. We here choose the values of resistors as 0.6 kilo-ohms, 12kilo-ohms and 60kilo-ohms respectively. So as a result the current generated in the 3 circuits are 20mA, 10mA and 2mA respectively.

Voltage (V)	Resistor (K ohms)	Current (mA)
12	0.6	20
12	12	10
12	60	0.2

So the On and Off position of the LED bulbs depends on the binary data it receives from the TDM. The glow of the 1st LED bulb is used to represent the value 0 (binary value: 00). The glow of the 2nd LED bulb can be used to represent the value 1 (binary value: 01). The glow of the 3rd LED bulb can be used to represent the value 2 (binary value: 10). So in this way we can use the intensity of light to represent the values and thereby bandwidth of the transmission system.

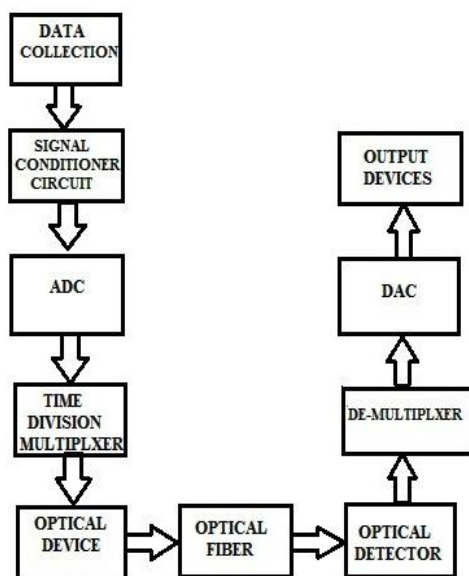


Fig 1 Flowchart representing dataflow

The data is then passed through the source to fibre interface and thereby through the optical fibres as optical fibres are efficient means for transferring information using light. So here in the optical fibre we allocate 3 separate channels for the 3 LED's respectively for the efficient transfer of information.

On the receiving end a fibre to light source interface is present. The LDR which is present in the receiving part of the optical detector is used to detect the optical form of information depending on the intensity of light. The value of the resistor in the LDR circuit changes depending on the amount of light striking its surface. Therefore the values are detected using the intensity of light.

The output from the optical detector which is converted back to the electronic form is thereby sent to the De-multiplexer. The information which the De-multiplexer gets is further divided into the user channels respectively. So here we can see that there is a division of a single channel of information back into the 'n' number of user channels with the help of the De-Multiplexer.

The information from the De-Multiplexer is further converted from Digital form into Analog form using the Digital to Analog convertor (DAC). Here the Analog information which is collected is thereby sent to its respective channels. As a result we can show the phenomena of Data Transmission using Intensity of Light.

Advantages

- It helps in transmission of data at improved amount of speeds.
- It leads to less time consumption for the transmission of data.
- It leads to improved amount of bandwidth for the transmission of bits of information.
- It also leads to transmission of data at a minimum amount of cost hence making it more economic.
- It helps in securing the data that is being transmitted and actions like hacking of information can be overcome.
- The loss of information could also be minimised due to the use optical fibres for transmission of data.

Acknowledgement

We have taken efforts in this project. However, it could not have been possible without the kind support of many individuals and organizations. We would like to extend our sincere thanks to all of them. We are highly indebted to department of Electronics and Communication Engineering, GITAM University and also the faculty for their guidance and constant supervision as well as for providing necessary information regarding the project and for the support in completing the project.

CONCLUSION

The transmission of data at increased amount of speeds and reduced amount of losses is the utmost thing which is important that needs to be kept in mind while designing a system for

transmission of data. Due to the growing needs of internet and other requirements in every nook and corner of the world, transmission of data through light would be more economical to a common man. Yet another striking feature of the proposed idea is that it has increased amount of Bandwidth which would open up a Pandora's Box of related issue. In the further investigations we can make this even more reliable to replace the present day Wi-Fi routers in terms of speed.

References

1. Svilen Dimitrov, Harald Hass, "Principles of LED communications: Towards networked Li-Fi", 1st edition, vol. 2, Cambridge University Press, 2015.

How to cite this article:

Srikumar Chaladi and SnehaLella.2015, Investigation of Data Transmission Using Intensity of Light. *Int J Recent Sci Res.* 6(10), pp. 6584-6586.

2. Jeff Duntenman's, "Wi-fi guide", 2nd edition, vol.2, Paraglyfh press, 2000
3. N. Bala Saraswati, I. Ravi kumar, "Optical Communications", 2nd edition, vol. 3, Laxmi Publications, 2007.
4. Gerd Keiser, "Optical Fibre Communications", 4th edition, vol. 4, McGRAW HILL Publications, 2007.
5. R.P.Khare, "Fibreoptics and Optoelectronics", 1st edition, vol. 3, Oxford University Press, 2004

*International Journal of Recent Scientific
Research*

ISSN 0976-3031



9 770576 303009