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A SURVEY ON LIGHT-FIDELITY(LI-FI) FOR SECURED DATA TRANSFER USING LIGHT EMITTING DIODES

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Abstract— This project is to enhance the secured data transfer through Light-Fidelity, this is contrast to established forms of wireless communication such as Wi-Fi which use traditional radio frequency signals to transmit data. Li-Fi uses visible light portion of the electromagnetic spectrum to transmit information at very high speeds. The technology uses florescent lamps to transmit signals at 10kbps, or LED up to 500mbps. This technology is used in order to provide secured data transfer by transmitting data through LEDs and photodiode receive signals from light source. In this paper we have discussed about how the data is transferred through light and data security during transfer of data. Related papers are taken survey and its advantage and disadvantages are discussed.

Keywords — *light-fidelity, electromagnetic spectrum, wireless communication*

I. INTRODUCTION

The main problem during the data transfer is security. In early days various data transferring techniques has been used like wired data transfer, wireless data transfer, satellite based data transfer and etc. But each techniques having various drawbacks like security, data transfer rate, data loss and etc. Also various researches have been still going on for secured data transfer. In case of high secured data transfer there are various limitations like, one to one communication or need one authorized person to validate the secured data. This makes more time for consuming too. In order to overcome these problems, in this project Light Fidelity (Li-Fi) has been introduced. It is a new technique to transfer secured data using lights. For light via data transfer LED (Light emitting diode) has been used in both transmitting and receiving end.

The data transfer rate speed is more sufficient to the humans to read a paragraph visibility. Li-Fi system consisting of an application for a mobile device, and a simple consumer product, like an IoT (Internet of Things) device, with color sensor, microcontroller, and embedded software. Light from the mobile device display communicates to the color sensor on the consumer product, which converts the light into digital information. Also upload speed is equal to the download speed, through this method data transfer rate will be more high.

For an example: In a meeting room environment, the access area of each channel is the width of the light pool, and can be accessed by multiple users. Each user can receive higher data rates than would be the case for an equivalent Wi-Fi channel. In the Wi-Fi case, each user or group of users directly competes for access to bandwidth. The net result is that the more connections there are, the download speed will be slow for all. By contrast, in the case of Li-Fi, with its greater number of available access points, each pool of light provides full channel data rates with fewer simultaneous users. The overall net benefit to each user is up to 1000 times greater speeds. In addition, and in contrast to radio waves, the light does not pass through the walls. Therefore, with minimal precautions to avoid leakage from windows, etc., security is fundamentally enhanced as compared with Wi-Fi.

This technology is mainly found for game consoles. An innovative idea would be to use sensors on a television in order to receive information from game consoles. This would allow the unit to be place literally anywhere within the room as long as there is a direct line of sight to the sensor.

While using light as a communication medium, the radio frequency spectrum crunch is avoided. It will be fastest and cheapest version of communication. Light cannot be hacked so the data transfer will be more secured than the wireless communication.

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II. VARIOUS LIGHT-FIDELITY AND SECURED DATA TRANSFER TECHNIQUES

S.NO	TITLE	DESCRIPTION
1.	Wireless myths, Realities, and futures: 3G/4G to Optical and Quantum wireless [1]	Exploring telecommunications solution operating arbitrarily close to the channel capacity VB flawlesstele presence with , zero error is available to anyone, anywhere, anytime across the globe.
2.	Wireless infrared Communications [2]	Explore the free-space propagation of light waves in the nearer infrared band as a transmission medium for communication between access Point and base station. The Availability of LEDs and silicon Photo diodes operating in the 800nm to 1000nm range is the primary reason for the use of this band.
3.	Fundamental analysis for visible-light communication system using LED Lights.[3]	Visible Light Communication uses white leds, which sends data by flashing light at speeds are undetectable to the human eye. The LED lighting system can achieve lower power consumption and has a longer life-time compared to the fluorescent lamp system
4.	Joint transmission in indoor visible light communication downlink cellular Networks.[4]	Deploying additional femto cells to address this challenge is cost-inefficient due to the backhaul challenge and system maintenance. Leveraging power line communication and indoor infrastructure, VLC can be utilized with smallone-time cost.
5.	Dynamic server allocation to parallel queues with randomly varying connectivity[5]	Scheduling a dynamic server over randomly varying wireless channels is important for practical applications. switchover delay is a widespread phenomenon used in satellite systems.
6.	Cooperative load balancing in hybrid visible light communications and Wi-Fi.[6]	Visible Light communication has wide unlicensed bandwidth, enables communication in radio frequency sensitive environments, realizes energy efficient data transmission. VLC remains a strong contender for the downlink channel because uplink need to use narrow beam widths.
7.	Resource allocation under delay-guarantee constraints for visible-light communication.[7]	Classic frequency-reuse concept borrowed from cellular networks relying on FR in VLC environments as well as on our ZF-based coordinated transmission scheme
8.	Analysis and design of colour shift keying aided visible light communication.[8]	Visible light communication (VLC) relies on abundant unlicensed bandwidth resources. Based on the EXIT characteristics of M-CSK, different signal labeling strategies for diverse color constellations are capable of achieving a improved bit-error-rate (BER) performance.
9.	Wireless in-house data communication via diffuse infrared radiation.[9]	The transmission medium is diffusively scattered infrared radiation at 950-nm wavelength. transmission is low-to-medium speed and the range up to 50 m.

III. CONCLUSION

In this paper, we have studied about various data transfer techniques and security in transferring the data . the main disadvantage of the system is that light will always blink due to that the data transfer rate is reduced. The future work includes to reduce the blinking of light and send secure data.

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