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Light Fidelity Trident

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ABSTRACT

All around the world, the internet continues to transform how we connect with others, organize the flow of things, and share information. With its growing influence on individual consumers and large economies alike, the internet has become an increasingly vital part of our day-to-day lives. In the era of Iot (internet of things) security, speed and cost are the major problems that are to be solved in the world. The current wireless networks that connect us to the Internet are very slow when multiple devices are connected. Also with the increase in the number of devices which access the Internet, the availability of fixed bandwidth makes it much more difficult to enjoy high data transfer rates and to connect a secure network. The solution to this problem is the light fidelity trident technology which ensures high security, speed and a much broader spectrum for transmission compared to the existing technology. The IoT devices can be made compatible and in-sync with Light fidelity trident, for a more enhanced functioning. Light fidelity trident can conveniently accommodate multiple access points, as it is required by IoT connectivity, by using simple light bulbs as terminals. Light fidelity trident concept is similar to Light fidelity but uses the concept of RGB multiplexing scheme to produce white light spectrum. Each color carries different data, so the speed is ten times better than conventional Light fidelity. Light fidelity trident is not only faster than the existing light fidelity but also thrice more secure. Light fidelity trident is the future of data communication.

Keywords: Internet, Iot (internet of things), Bandwidth, Light Fidelity Trident, Light Fidelity, RGB(red, green, blue), Light Spectrum, Data Communication.

1. INTRODUCTION

What if the internet working stopped for a day? Simple devices like watches, Smart phones, TVs and even refrigerators which are connected to the Internet would go down. So, on a lower Level you might lose all the connectivity to social sites and no online activity. The Internet of things is also becoming prominent these days, so all the devices that depend on the internet to gather data may misbehave. But these are just problems that are too small. Every second there are hundreds of

millions worth of transactions that are floating as data in the digital form on the Internet, just imagine what would happen if those got lost. There will be unimaginable economic losses, which may lead to a total economic meltdown(just imagine billions of worth transaction that are going on right this very second as you are reading).Internet is very precisions medium of communication in the modern society .The main concern is the data security ,which the present technology lacks to serve .Due to the lack of data protection The global cost of cybercrime increased this year(2020) ,which is estimated to be around \$945 billion, which is more than 1% of the global gross domestic product (GDP).Light fidelity which uses visible light spectrum solves the problem regarding data security. Visible light does not penetrate through the walls which makes it more secure .Light fidelity trident is more secure than the existing light fidelity because it uses the three different colours of light which improve it's capability by three times and can improve the physical layer security in communication this makes hackers impossible to hack the data from outside the walls It should be understood that the existing security protocols for encryption and authentication can be leveraged in Light fidelity trident systems to provide even more secure wireless systems. This paper proposes a high-speed transmission technique through RGB lasers, which is called light fidelity trident. The common scenario uses a visible light source for bearing the data. Visible light can be produced by RGB(red, green, blue) colors; it is meant to say that each spectrum can carry different data. The flickering of led light is not visible to human eyes because it flickers more than 3000 times per second due to which we can obtain very high speed internet.[1]The actual need for Light fidelity can be confirmed from Cisco's Visual Network Index which suggests that user demand is increasing faster than gains in spectral efficiency. By 2015,traffic from wireless devices is expected to exceed that from wired devices. Such increases in network traffic require significant changes in how we think of wireless communication and Light Fidelity trident may be the change that we need.

2. FUNCTIONING OF LIGHT FIDELITY

Trident

The light fidelity trident technology working is similar to that of light fidelity, but light fidelity technology uses phosphor coated blue light emitting diodes or GaN micro light emitting

diodes but the trident technology uses the RGB lasers to produce high speed data making it 10 times faster. Visible light can be reversed into RGB. Each colour is packed with different data. Perfect ratio of RGB mix is achieved through heed current. Red and green spectrums convey the test sequence and it is generated by an astable multivibrator with 50% duty cycle. Blue spectrum can carry computer generated binary data in it. The data input to the LED transmitter is then encoded into the light (technically referred to as Visible Light Communication) by varying the flickering rate at which the RGB laser LEDs flicker 3000 times per seconds ‘on’ and ‘off’ to generate different strings of 1s and 0s. The on off activity of the LED transmitter which seems to be invisible (The LED intensity is modulated so rapid that human eye cannot notice, so the light of the LED appears constant to humans), enables data transmission in light form in accordance with the incoming binary codes: switching ON a LED is a logical ‘1’, switching it OFF is a logical ‘0’. By varying the rate at which the LEDs flicker on and off, information can be encoded in the light to different combinations of 1s and 0s. This operation does not deal with any kind of modulation technique. Greater attainments are feasible with modulation schemes such as orthogonal frequency division multiplexing (ODFM).The transmitter RGB laser LEDs is then connected to the data network (Internet through the modem) and the receiver (photo detector/light sensor) on the receiving end receives the data as light signal and decodes the information, which is then displayed on the device connected to the receiver. The receiver (photo detector) registers a binary ‘1’ when the transmitter LED is ON and a binary ‘0’ when the transmitter (LED) is OFF. Thus flashing the LED numerous times or using an array of

LEDs (perhaps of a few different colours) will eventually provide data rates in the range of thousands of Mbps. All one has to do is to vary the rate at which the LEDs flicker depending upon the data input to LEDs. Further data rate enhancements can be made in this method, by using an array of the 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.[2] Data is transmitted in the binary form of light pulses and it also relies on the OWC (optical Wireless technology), because if we use optical cables in light fidelity then we will be able to transmit data over large distances.

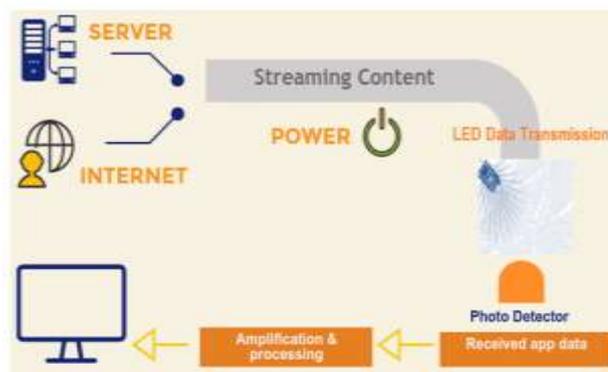


Fig 1-Working of light fidelity trident

3. COMPARING LIGHT FIDELITY TRIDENT OVER OTHER EXISTING TECHNOLOGIES

FEATURE	LIFI-TRI	LIFI	WIFI	Cell tech (5g)
Full name	Light fidelity trident	Light fidelity	Wireless fidelity	Cellular technology(5th generation)
operation	LiFi transmits data using light with the help of rgb lasers.	LiFi transmits data using light with the help of LED bulbs.	WiFi transmits data using radio waves with the help of a WiFi router.	5G devices will communicate with base stations by transmitting and receiving radio waves, or radio frequency (RF) electromagnetic fields (EMF).
interference	Do not have any interference issues similar to radio frequency waves	Do not have any interference issues similar to radio frequency waves	Will have interference issues from nearby access points(routers)	Due to the proximity of cellular and Wi-Fi channels in 2.4- and 5-GHz spectrums, utilizing both Wi-Fi and New Radio (NR) spectrums can cause interference during operation.
IOT support	yes	yes	yes	Yes
privacy	3 times stronger than lifi(very high)	high	weak	Medium
Data transfer speed(peak)	100 Gbits/sec	10 Gbits/sec	520Mbits/sec	10 Gbits/sec
Frequency of data operation	10 thousand times frequency spectrum of the radio	10 thousand times frequency spectrum of the radio	2.4GHz, 4.9GHz and 5GHz	about 28 GHz and 39GHz
Average data transfer speed	53 Gbits/sec	4 Gbits/sec	58 Mbits/sec	78 Mbits/sec

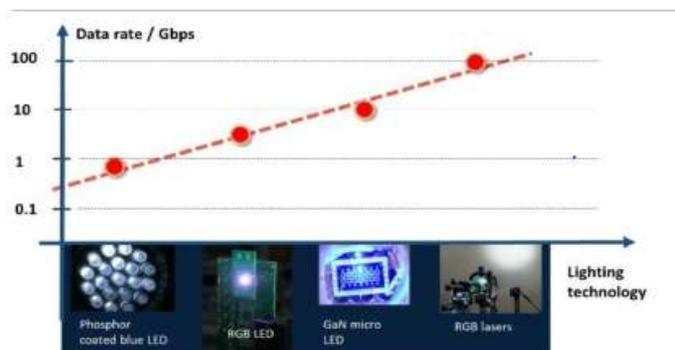


Fig 2- comparing different lighting technologies

4. APPLICATIONS OF LIGHT FIDELITY TRIDENT

1. Security - Unlike Wi-Fi, Li-Fi works by using a very unique system, and it cannot be hacked because light cannot penetrate opaque and solid structures. It is only available to users in a room, while remaining inaccessible to anyone outside the workstation. To make it more secure It should be understood that the existing security protocols for encryption and authentication can be leveraged in Light fidelity trident systems to provide even more secure wireless systems making it almost impossible to hack.
2. Interference – Light fidelity trident Interference free wireless communication - [2] The area of illumination is the area of Light Fidelity; it can simply avoid interference or act as interference free. In the RF hostile zones such as aero planes, power plants and hospitals Light fidelity performs better.
3. Underwater communication - radio waves are quickly absorbed in water, preventing underwater radio communications, but light can penetrate for large distances. Therefore, Light Fidelity can enable communication from diver to diver, diver to mini-sub, diver to drilling rig, etc. [3] Wireless Underwater Communications can be established by Light Fidelity technology along with the use of Buoys attached with antenna and photodiode These Buoys are linked to a satellite (in air) to pass a message.
4. Safety - Unlike infrared, there is no danger to the health from visible light in illumination conditions. Li-Fi illumination conditions meet the safety standards for the skin and eyes, making it safe to use in any environment or situation.
5. Dense urban environments-Dense urban environments by their nature tend to have complete artificial lighting coverage. This lighting infrastructure can provide always available high data rate access for users as they move through that environment. For example, along a hotel corridor or reception hall a number of users can receive high data rate downloads at any point. Moreover, high speed wireless communication would be available in every room since the light waves do not propagate through walls. This results in interference-free wireless communication, and spectrum does not have to be shared among a large number of users in the rooms.

5. CONCLUSION

Light fidelity trident will be the future technology in telecommunication. This is technology is the promising supporter of the internet of things (IoT) compared to other existing technologies. Full developed in this technology will help us get rid of frustrating slow internet. [4] Light fidelity also can be used in traffic control where data can be exchanged between cars and traffic lights to enhance road safety. [5] Optical cell networks based on Light Fidelity are the link between future energy efficient illumination and cellular communications. The very concept of Light fidelity trident promises to solve issues such as, shortage of radio-frequency bandwidth and eliminates the disadvantages of Radio communication technologies and to provide greater speed and security. Light Fidelity trident is the upcoming and growing technology acting as catalyst for various other developing and new inventions/technologies. Overall Light fidelity trident will act as the face to the 5th industrial revolution where humans and robots will work together for the betterment of the world.

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