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**ANALYTICAL RESEARCH OF MODERN HIGH TECHNOLOGIES:
«LI-FI» AS A POSSIBLE ALTERNATIVE TO «WI-FI»**

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The term «Li-Fi» stands for Light Fidelity or literally «rely on light», a term for the transmission of data through light or a means of communication capable of transmitting data only through light waves. In principle, Li-Fi is no different from Wi-Fi. Both technologies are based on a transmitter, a receiver and central conveyer.

The term «Li-Fi» came from German professor Harald Haas, who presented to the world in 2011 – during his participation in the TED conference – a model of new technology after years of relying on radio waves as a means of data transmission. In general, Li-Fi is based on light, infrared or ultraviolet radiation to load and transmit data at high speeds of up to 10 gigabytes per second [1]. This was in 2014, meaning that higher speeds may soon be on the way.

It's possible to form the simplest system to transmit data in light through the light (LED) and receiver of light only, but most of the existing products are also based on the same principle. The light works by electricity, a current of a certain frequency, but what we do not really know is that this light does not light 100% all the time, it alternates, that is why there are pulses in the electrical current that lead to pulses also in the lighting without being noticed in the short distances. It is clear when you look at night at the distant lights that look sparkling. Hence, these pulses can be considered the first seed to send data through light, just like in the computer, which sends data in binary in the form of electrical pulses of 0 and 1 only.

After loading the data, these pulses will pass in the vacuum through the rays of light that illuminate the dark places. As users, we will not notice any differences when using light to transmit data, but the presence of a receiver for these rays is necessary to convert the impulses to data and benefit. Sending a group of zeros or units is not understood by us as human beings and must be transformed into data and placed in the proper context for understanding them, and here comes the role of receiver (photodiode) responsible for the process.

Pros and cons of Li – Fi

We do not need to talk about the speed of light, which is about 300 kilometers per second, so the speed of data transfer will be very high, as it can theoretically reach 224 gigabits per second [2, 3]. Traditional Wi-Fi networks reach almost 7 gigabits per second [4].

But when lighting your own room, does the room next to you also glow when there is a wall separating the two rooms? This is completely a problem for Li-Fi, it is not able to penetrate the walls, this is nature optical wave, and therefore, the signal between the different rooms cannot be transmitted in the case of an insulating layer that leads to its bounce. This matter, at the same time very useful in the subject of privacy, the use of light to transfer data in the office only means the impossibility of a breakthrough from the office adjacent to this connection as long as the office is well isolated and prevents the outflow of light waves.

The need to make the lamps work permanently is also troublesome. It is true that turning on the lights sometimes only means that they are turned on for the infrared version, but the lamp circuit is working, so this may affect the life span.

Why Li-Fi if exists Wi-Fi?

The use of Li-Fi is useful in places where there are no electromagnetic fields, such as hospitals, for example, but the use of Li-Fi technology will certainly prevent interference with the rest of the devices, and therefore does not affect the health of patients. Some sources said that the development of light data transmission technology was mainly due to the inability to use Wi-Fi networks inside the aircraft. For a long time it was thought that the use of these networks caused interference with the communication waves and devices inside the cockpit. Thus, they had been prevented before scientists proved that. The allegations are completely void and Wi-Fi networks can be used inside the plane without problems now.

Real uses

Yes, there are real models and products in the market for the use of light in data transmission. In 2014, submitted Pure Li-Fi, founded by Haas himself, was introduced the first commercial model called «Li-1st». The company also launched «Li-Flame», a system connected to LEDs to send and receive data via light through the «Li-Flame Desktop», which is connected to the computer via a USB port to transfer data from one party to another.

In addition, in the UAE and specifically in Dubai, companies Zero1 and Du announced in April 2017 the use of official light transmission technology, where a special system was established to connect with streetlights using LEDs to load data and transmit it using light waves only.

From here to where?

The advent of Li-Fi may not have been very welcome. It came in one way or another to eliminate Li-Fi concerns in airplanes. Scientists say that there is no need to worry about wireless networks and radio waves, so some may feel the importance has diminished.

But the areas of data transmission through the light is very large, and in fact minor modifications in some of the devices we use will be sufficient and able to receive light or send it after the loading of data through it. Smart devices are a good example. They have a light sensor next to the headphone that senses the external lighting conditions to adjust the screen brightness, so adjusting the sensor and being able to receive data loaded through the light means that as users we will have the ability to use Wi-Fi and Li-Fi in smartphones without difficulties, without change in geometry or structures.

In terms of business, the Li-Fi market is growing at an annual rate of almost 82%, which is expected to continue until 2018, so that the value of the technology to six billion dollars then, which may encourage more than one company to go through this experiment because the profit model began to form in one form or another.

References

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