Lifi

Viability Research

Tomasz Olejarczuk

Fontys

14-12-2023

Contents

Lifi

What is LiFi:

LiFi, or Light Fidelity, is a wireless communication technology that uses visible light, infrared, and ultraviolet spectrums to transmit data. It is an emerging alternative to traditional radio frequency (RF) communication systems, such as Wi-Fi.

What are the pro's of LiFi:

- **High Data Speed:** LiFi can achieve data transfer speeds that are significantly faster than traditional Wi-Fi, potentially reaching gigabit per second (Gbps) rates.
- **Enhanced Security:** LiFi offers improved security as it is confined within a line-of-sight, reducing the risk of data interception. It is also immune to radio interference.
- **Spectrum Availability:** LiFi uses light spectrum, which is available almost everywhere, making it suitable for various applications.
- **Low Electromagnetic Interference:** Since LiFi does not use radio waves, it doesn't interfere with sensitive electronic equipment.

What are the cons of LiFi:

- **Line-of-Sight Requirement:** LiFi requires an unobstructed line of sight between the transmitter (LED light source) and the receiver (LiFi-enabled device).
- **Limited Range:** The range of LiFi is relatively short compared to Wi-Fi, typically a few meters, making it more suitable for specific use cases.
- **Interference from Ambient Light:** Bright ambient light sources can interfere with LiFi signals, potentially degrading performance.
- **Needs external dongle to connect:** No devices support LiFi natively.
- **Impractical:** Implementing LiFi is impractical for this project, it is still in development, not many resources are available.

How can we use LiFi:

- **Current implementation:** We have no data how it is implemented currently

- **Suggested implementation:** We would need to install transmitters on LED light sources and provide dongles for each device to connect to LiFi

- **Suspected implementation:** I suspect that current implementation uses IR receiver to receive signal from the light source (like TV remote)

What are the use cases:

- **Office Environments:** LiFi can offer high-speed internet access to employees while reducing electromagnetic interference in office spaces.

- **Healthcare:** LiFi can be used in hospitals to transmit sensitive patient data securely and without RF interference.

- **Aviation:** Aircraft cabins can benefit from LiFi for in-flight entertainment and communication systems.

- **Underwater Communication:** LiFi has applications in underwater communication where RF signals are ineffective.

Give it a good user experience:

To ensure a good user experience with LiFi, it's essential to have proper infrastructure in place, including compatible devices and well-designed lighting systems. Additionally, managing ambient light to minimize interference can enhance the user experience.

Give some references to existing projects that implement it:

1. PureLiFi: A company pioneering LiFi technology and providing LiFi solutions for various applications.

2. Velmenni: Another company actively working on LiFi technology and its implementation in real-world scenarios.

3. Oledcomm: A company that specializes in LiFi technology and offers LiFi-enabled products for different use cases.