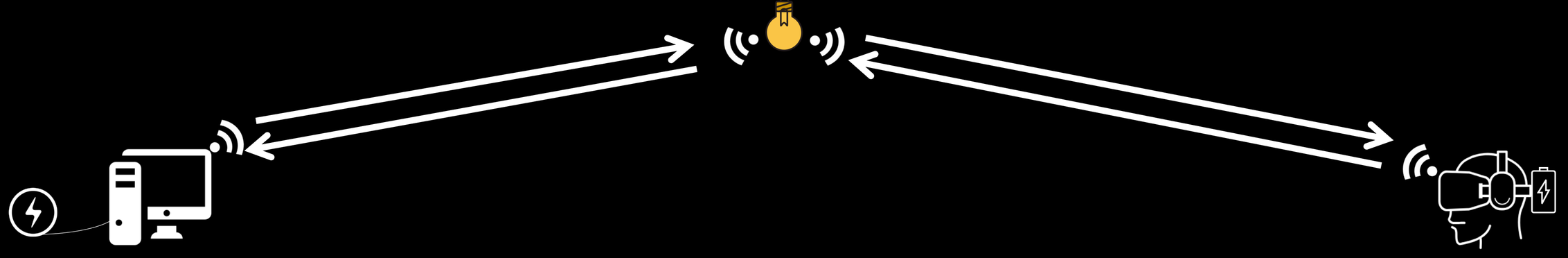
WIRELESS VIRTUAL REALITY HELMET BY Li-Fi Technology A Simple Lamp Bulb

intel

VIVE PRO

Light becomes data
pureLiFi



Problem

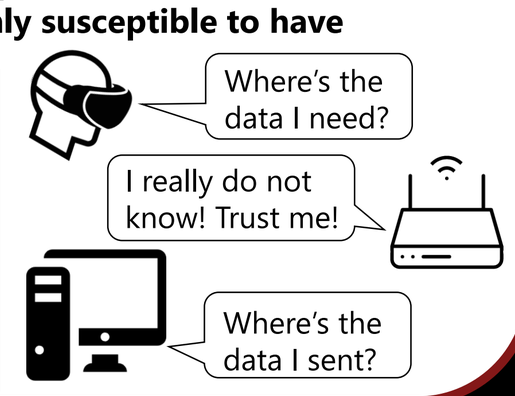
Virtual reality headset has great potential for benefiting human beings in a variety of different fields, including education, entertainment, and healthcare. However, it brings some serious problems while bringing benefits.

- **User might fail over the cables while using the HMD(Helmet-Mounted Displays) which will blocks sights.**
- **HMD's low frame rate may cause users to generate 3D vertigo symptoms, and the reason for the low frame rate is that the cable cannot satisfy huge data and take times to dispose.**
- **Since there are too many routers now, using Wi-Fi to transmit data is highly susceptible to have interfered.**

A big trouble coming right now

VR 1440P 100Hz	11.96 Gbit/s
VR 2160P 120Hz	32.27 Gbit/s
HDMI 2.0-2.0b	14.40 Gbit/s
HDMI 2.1	42.60 Gbit/s

2160P
120Hz

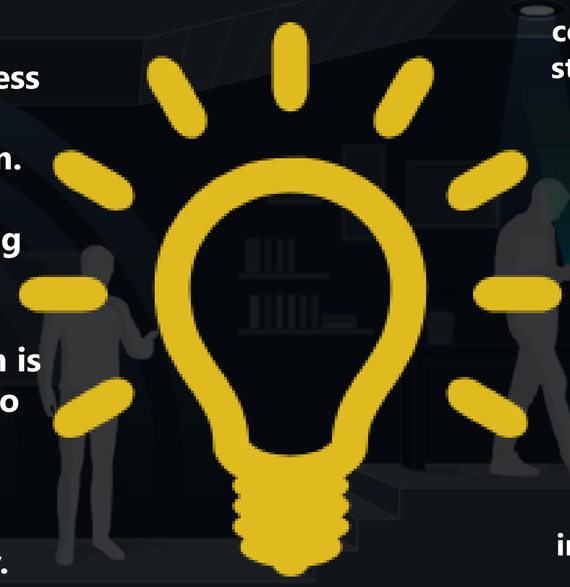


Background

LiFi is high speed bi-directional networked and mobile communication of data using light. LiFi comprises of multiple light bulbs that form a wireless network, offering a substantially similar user experience to Wi-Fi except using the light spectrum.

LiFi allows for data to be transmitted by modulating the intensity of light, which is then received by a photo-sensitive detector. The light signal is then demodulated into electronic form. This modulation is performed in such a way that it is not perceptible to the human eye.

LiFi can work indoors, outdoors, with the lights dimmed and is not strictly line-of-sight technology.

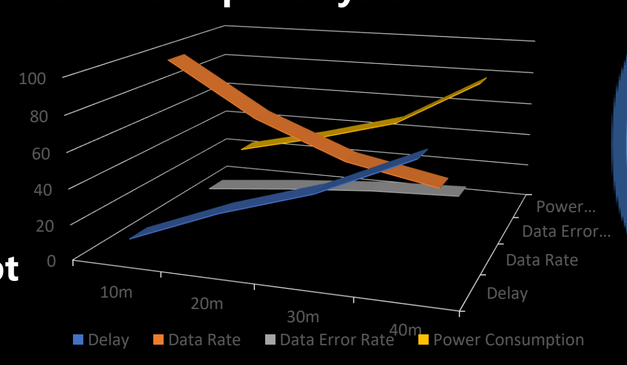


The way LiFi works is simple but powerful. When a constant current is applied to an LED light bulb, a constant stream of photons are emitted from the bulb which is seen as illumination. LED bulbs are semiconductor devices, which means the current, and therefore the illumination can be modulated at extremely high speeds which can be detected by the photo-detector. Using this technique allows for high-speed information can be transmitted from an LED light bulb.

Radio frequency communication requires radio circuits, antennas and complex receivers, whereas LiFi is much simpler and uses direct modulation methods similar to those used in low-cost infrared communications devices such as remote control units. LED light bulbs have high intensities and therefore can achieve very large data rates.

Solution

Use MATLAB to build a simulation, which will be able to simulate the transfer of data between PC and HMD via Li-Fi. The aim is trying to find exactly related data, such as: Bit rate, Bit error rate, Delay, and some Quadratic function graph to find a perfect situation to setup the system. And then compare the data with transferring data by Wi-Fi and HDMI to check the different.



Randomly generate 1,0,1,1,1,0,0,1,1… → **Data Generator**

→ **Sender** (**Encrypt** (Optional))

→ **Propagation** (**Loss with distance**)

→ **Receiver** (**Decrypt** (Optional))

→ **Data**

Check the data rate and data error rate