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## Light-Fidelity (LiFi) - Innovative Technology to Transform Healthcare Industry

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### Introduction

In the rapidly advancing digital world, technology is revolutionizing the healthcare industry. Light-Fidelity (LiFi) is emerging as the next-generation communication technology with several benefits including high data rates. LiFi is a high-speed communication technology that can transmit data at the speed of light. LiFi is a cutting edge wireless networking that uses infrared and visible light spectrum data exchange. The concept of visible light communication is used to achieve secure, bi-directional and fully networked wireless communications. It is a fundamental 5G technology [1]. Unlike other technologies like ethernet, there is no intrinsic capacity limit for LiFi. It can provide point-to-point communication at very high data rates.

To provide reliable coverage, LiFi can be integrated with wireless fidelity (WiFi) forming a hybrid system [2]. For indoor wireless services, a promising approach is to combine LiFi and WiFi technologies into a hybrid LiFi and WiFi network. The benefits of the hybrid network include LiFi's ability for high-speed data transmission and wide coverage offered by WiFi [3].

LiFi technology can ensure high-speed internet broadband services using light-emitting diodes. The bandwidth for LiFi transmission is much greater than the whole radiofrequency (RF) spectrum. WiFi usually works at 2.4 GHz and 5 GHz, whereas visible light spectrum ranges from 400 THz to 800 THz. Hence, the spectrum is 10,000 times broader than the total RF spectrum [4]. LiFi offers extra security and low-latency transmission free of interference [5]. The data transmission rate for LiFi is 100 times faster than that of WiFi [6]. LiFi is a highly efficient, eco-friendly, mobile wireless technology for transmitting and receiving data [7].

### Advantages of LiFi in Patient Care

With high-speed data network, LiFi increases the connectivity and communication, which is essential for rapid access to critical patient information and better patient outcomes. LiFi technology provides significantly higher speeds compared to WiFi networks and it will enable transfer of large files as well as high resolution images. Real-time patient monitoring is crucial for early detection of health issues and prompt intervention. LiFi technology play crucial role in real-time patient monitoring by integrating LiFi-enabled sensors into medical devices. Li-Fi network can be used in hospitals for monitoring the

temperature, blood pressure, electrocardiogram, blood glucose level and respiratory parameters of patients using respective sensors [8]. LiFi can provide connectivity infrastructure to enhance patient care. LiFi system in telemedicine is reliable, flexible to deploy, secure and safe [9].

### **Benefits of using LiFi for Data Communication in Hospitals**

Li-Fi is better than WiFi in hospitals, for monitoring patient's conditions without frequency interference with human body. Li-Fi networks can be used as fully automated system and various patient parameters can be recorded [8]. If WiFi is used at the same place with medical equipment, electromagnetic interference may occur, and this can lead to malfunctioning of medical equipment [6]. By using LiFi technology, potential malfunctioning on medical equipment due to the interference from the radio frequency by Wi-Fi communication can be avoided.

### **LiFi-powered augmented reality (AR) applications**

LiFi technology facilitates integration of augmented reality (AR) applications in the healthcare industry. LiFi-powered AR applications can be used effectively for medical training.

### **Role of LiFi in Medical Research**

LiFi technology can revolutionize medical research. Due to high-speed and secure connectivity, LiFi enables rapid transfer of research information. Researchers will be able to easily access and analyze big datasets.

### **Enhanced Data Security**

Data security has paramount importance in healthcare industry. LiFi technology provides more data protection compared to traditional WiFi networks. LiFi uses light waves that cannot penetrate walls. Hence sensitive medical data will remain in secure environments. This will significantly reduce the risk of unauthorized access. By implementing LiFi in healthcare industry, data security can be strengthened.

### **Optimizing Healthcare Operations**

Efficient workflow is necessary for healthcare organizations to deliver quality care. There are several benefits of LiFi in healthcare operations. LiFi-enabled asset tracking systems can be used to track the position of a wheelchair or a portable medical device. This application is very important in hospitals. It can locate medical equipment fast and thus increase workflow efficiency. Moreover, LiFi-enabled communication devices can lead to enhanced collaboration among healthcare professionals for quick decision-making in healthcare operations.

### **Conclusion**

The speed and efficiency provided by LiFi technology can contribute to the development of innovative healthcare solutions. Li-Fi network can be used as a high-speed and secure data communication for real-time monitoring of various health parameters of patients which makes diagnosis and interventions faster. LiFi will contribute to enhanced data protection and it can empower augmented reality applications. LiFi technology offer unparalleled opportunities to transform the healthcare industry by revolutionizing patient care, medical research and healthcare workflows.

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