Implementing Li-Fi protocols

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ABSTRACT

LI-FI is the latest technology in the Field of wireless communication. Nowadays many people are using the internet to fulfil most of their tasks through wired or wireless networks. As the number of users is increasing, the rate of data transmission in the wireless network automatically decreases. WI-FI provides us speeds near about 150mbps as per IEEE 802.11n but still, it is not able to fulfil the requirement of the user because of such reason we are introducing the LI-FI. According to the German physicist Harald Hass, LI-FI provides much higher data transmission speeds (10gbps and max up to 224gbps per second) by using visible light. In this condition, the LI-FI/WI-FI is analyzed. It's the same idea band behind infrared remote controls but is more powerful. Haas says his invention, which he calls D-LIGHT, can produce data rates faster than our average broadband connection. Nowadays, parking vehicles are one of the most tedious jobs. Hence, in order to solve this problem, a reliable system is proposed. Our system solves the current parking problems by offering guaranteed parking reservations with the lowest possible cost and searching time for drivers and the highest revenue and resource utilization for parking managers.

Keywords— Dynamic pricing, Dynamic Resource Allocation, Li-Fi, Smart car parking, VLC

1. INTRODUCTION

This guideline is used for International Journal of Scientific Research Engineering Technology (IJEERT). These are the manuscript preparation guidelines used as a standard template for all paper submissions of IJEERT. The author must follow these instructions while preparing/modifying these guidelines.

2. MOTIVATION

The potential usages of this development are invigorating as it were. Wi-Fi data transfer capacities are winding up amazingly soaked since a previous couple of decades, and they additionally meddle with delicate gear. These are one of the clear constraints for this upcoming VLC innovation. The proclaimed blend of the computerized world with the standard of light control to transmit data is, by all means, a characteristic development of remote interchanges. Li-Fi absolutely has the overflow for individuals who take frequent flights and we can truly observe Light Fidelity rising in parts like aircraft and wellbeing offices like healing centres like hospitals and so on. It will be interesting to see the future computer and smart phone design changes to take complete advantage of this technology.

2.1 Problem definition

Conversely, with past, the vast majority possess four-wheelers in brilliant urban communities, particularly amid pinnacle hours. The trouble courses from not knowing where the parking spots are accessible at the given time, and regardless of whether this is known, numerous vehicles may pursue few parking spots which thus prompts significant movement blockage. To avoid this situation, another brilliant stopping framework utilizing Li-Fi innovation that depends on clever asset allotment, reservation and evaluating is presented

2.2 Current research

It has been revealed after some market research that Li-Fi technology will hit a market value of 8500 Million USD within 2020 [10]. Many big organizations and agencies like Microsoft, NASA, and European Space Agency (ESA) have started working or experimenting with infrastructures operating with Li-Fi [11]. Even Apple is experimenting with Li-Fi for their future devices [12].
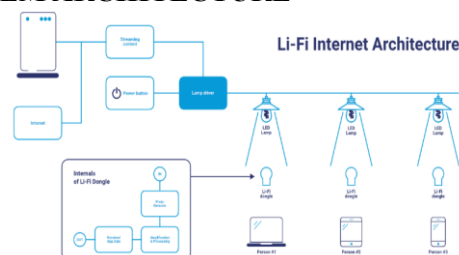
3. SYSTEM ARCHITECTURE

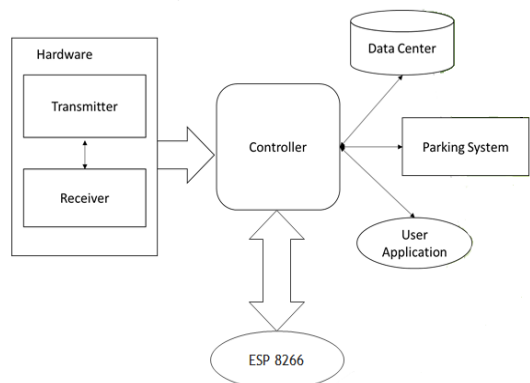**Fig. 1: Li Fi internet architecture**

Fig. 2: Proposed system architecture

3.1 Software and hardware requirements

Table 1: Software requirements

S no.	Software component	Details (Technical details with Purpose)
1	Operating System	Windows XP or above
2	Technology	Java version 7 and above
3	Tool	Android studio Java for development.
4	Server	Wamp server
5	Database	Mysql

Table 2: Hardware requirements

S. no.	Hardware Components	Details/Purpose
1	LIFI Transmitter	Used for transmitting data through light
2	LIFI Receiver	Used for receiving data sent through the transmitter
3	WIFI Module (EP8266)	Used for storing data in the database

4. ADVANTAGES
4.1 Increased efficiency
Li-fi operates utilizing visible light innovation. Since workplaces and houses as of now utilize LED lights, a similar source of light may be used so as to transmit data remotely. Despite the fact that the light should be on to transmit information, it's conceivable to set the li-fi knobs with the goal that the light is scarcely obvious to the human eye.

4.2 Cost
Rather than running near a mile worth of link, the LED-fueled Li-Fi association could be utilized to shaft the data specifically to the goal. By making use of a point-to-point array, places of business can maintain an association with one another without the making use of the extra cables and links being laid with one passage to the next.

4.3 Availability
With li-fi innovation, anyplace there's light, there's an association.

4.4 Security
One of the essential focal points of li-fi is security. Since visible light can't penetrate through strong and obscure structures, li-fi tech is just accessible to the clients/users that are in an enclosed room and can't be interfered or caught upon by clients in different rooms or structures.

5. LIMITATIONS
5.1 Reliance on light sources
With Li-Fi, the light should be accessible every day i.e. whenever we need to use it. You can't switch off the light; you

can just dim it in the event that you need continuous transmission of information. This truly constrains the areas and circumstances in which Li-Fi might be utilized.

5.2 Limited range
The provided range of Light Fidelity is extremely limited as the visible light signals can't enter/penetrate walls. While this makes Li-Fi secure, the constrained range can be an irritation for a few people. There exists the issue of receiver transmitting back to the transmitter. In case that the mechanical assembly is set up outside, it would need to manage to change climate conditions. The kind of light source (extensive LED light, small LED lights, laser LEDs, and so on.) specifically affect the speed that can be accomplished by a Li-Fi arrangement.

6. APPLICATIONS
6.1 Underwater communications
Conventional Wi-Fi can't be utilized underwater as the radio waves get consumed by the water. Li-Fi, then again, utilizes light for information transmission. Visible light can enter profoundly into the water and in this way, it tends to be utilized for underwater correspondence conceivably changing the manner in which submerged vehicles and jumpers speak with one another

6.2 Security
In a gathering room condition, the entrance zone of each channel is the width of the light pool and can be accessed by different clients. Every client can get higher information rates than would be the situation for an identical Wi-Fi channel. In the Wi-Fi case, every client or gathering of clients straightforwardly vies for access to data transmission. The net outcome is that the more associations there are, the slower the download speeds are for all. By difference, on account of Li-Fi, with its more prominent number of accessible passages, each pool of light furnishes full channel information rates with less concurrent clients.

6.3 EMI sensitive environments
On airplane, Li-Fi empowered lighting will permit high information rate network for every traveller. It will permit availability consistently, without making electromagnetic obstruction (EMI) with touchy radio gear on the flight deck. The decrease in cabling necessity additionally implies a lighter flying machine.

6.4 Intelligent transportation systems
Auto headlights and tail lights are consistently being supplanted in LED forms. This offers the possibility of auto to-auto correspondence over Li-Fi, permitting improvement of hostile to impact frameworks and trade of data on driving conditions between vehicles. Activity lights as of now utilize LED lighting so that there is likewise the prospect offered of far-reaching movement administration frameworks. This would enable auto structures to download information from the framework and have consistent information on perfect courses to take, and invigorate the framework as for conditions starting late experienced by individual vehicles.

6.5 Connectivity
Our homes as of now have lighting generally introduced. The implementation of Light Fidelity empowered lighting will drastically alter the applications that can be visualized, and not just the interconnection of variously available gadgets, for example, Television, Personal-Computers and Hi-Fi, yet in addition associating accustomed various local apparatuses, for example, microwaves, ice chests, clothes washers and vacuums. The "web of everything"

7. CONCLUSION

There are ample of conceivable outcomes to be gouged upon in this field of innovation. In the upcoming days when this innovation proves to be reasonably promoted then every bulb can be utilized closely resembling a Wi-Fi hotspot to transmit information remotely. It has a brilliant opportunity to supplant the customary Wi-Fi in considering the fact that as a regularly expanding population is utilizing the internet, the wireless transmissions are ending up progressively stopped up, making it intricate to get a solid, fast flag. Li-Fi has ended up being a point of reference in correspondence framework. Being a convincing new standard for Indoor Wireless Communication it additionally gets some never envisioned applications in different fields of building and innovation along these lines combining itself as a Reliable, Secure, Fast and Robust Wireless Indoor Communication Standard.

7.1 Future work

- A transceiver can be developed which can be used for both that is, receiving and transmission
- Powerful LED's can be developed to withstand minor interference from other light sources.
- Li-Fi can be developed to work in very low lights instead of the bright lights in use today.

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