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## Light Fidelity Data Transfer

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**Abstract--** Li-fi technology is the newest technology that has lots of scope to research on. We present the wireless communication system for data transfer using light fidelity. Transferring data is done through many methods. It transfers data in the form of light signals instead of radio signals. As simple as it sounds, it is also an efficient method. It was introduced in 2011 by Professor Harald Haas during his TED Global Talk where he introduced the idea of “wireless data from every light”. Since light fidelity transfers data in the form of light signals, it is also called as Visual light communication. This method overcomes errors during maximum transmission rate in existing system and it is more efficient. Our idea is to transfer data between two smart devices using Li-fi.

**Keywords--** Lifi(light fidelity); Wifi(wireless fidelity); visual light communication; wireless communication; radio signals; light signals.

### I. INTRODUCTION

Li-Fi (Light Fidelity) is a wireless communication which travels at great speed using visible light, hence the name visible light communication. It is characterized as optical wireless communication. Transmission of data takes place through LED bulbs which is varied by its intensity. The subtle changes in its brightness brings about the transmission of data. Light is a rich infrastructure for Lifi technology to use. Based on this variation in intensity, communication occurs digitally.

Harald Haas during his speech in 2011 Ted Talk introduced the new term ‘Li-fi’ and how it is going to revolutionize the world. He proved his theory by practically demonstrating by sending a video with a speed of 10Mbps. Scientists in Germany created a wireless network capable of transferring in a speed of 800 Mbps [2]. They used RGB (red, green and blue) and white lights in transmitter side. Other technologies are being compared with Light Fidelity communication to check its efficiency. To explaining it simply, light fidelity can be compared to Wi-fi but here data is transferred through light signals. The use of routers or modems are eliminated here as only light signals are sent.

In the transmitter side, there is an LED bulb which sends out data signals to the receiver side. Transmission is smooth unless an object is in front of it. The reason why an object obstructs the transmission of data is simply due to the fact that light rays are being blocked.

Harald has sent a video using a LED lamp which to a solar cell with the laptop acting as the receiver. The Wifi usage around the world is 4,156,932,140 which is 54% of the world’s population. Definitely lots of these people use Wifi inside their homes and rooms. So what if we replace it with the more efficient and cheaper Lifi. It will save a lot of power around the world and work towards a greener environment. There are still around 4.3 billion people without internet. It is also estimated that 50 billion devices will be connected by the internet by 2020. Such an extension of internet can only work if it is neutral. This means that we must use existing infrastructure as much as possible. This is where the LED lamp and solar cell come in.

The light fidelity also has its own disadvantages. For instance, if the light source is blocked by an object, transmission is cut. If the LED lamp isn’t of higher power, the data can be lost along the way. The data if lost along the way may also cause an error in transmission. Sunlight is also a major factor in affecting the LED lamp. It overlaps with the light rays transmitting to the receiver module. So, it is advised that the Li-fi transmission be indoors.

### II. LITERATURE SURVEY

#### A. Data transfer using light fidelity technology

Lifi technology is the newest technology that has lots of scope to research on. We present the wireless communication system for data transfer using light fidelity. Transferring data is done through many methods. It transfers data in the form of light signals instead of radio signals. As simple as it sounds, it is also an efficient method. It was introduced in 2011 by Professor Harald Haas during his TED Global Talk where he introduced the idea of “wireless data from every light”. Since light fidelity transfers data in the form of light signals, it is also called as Visual light communication.



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This method overcomes errors during maximum transmission rate in existing system and it is more efficient. Our idea is to send a data through Lifi and compare it with other existing technologies like Wifi. The parameters used for comparison and analysis are the data rate in which the data is sent, time in which the data is sent, data sent in one hour, data efficiency and error rate.

*B. Implementation of Li-Fi for data transfer in Android devices*

This thesis deals with a design of a half-duplex communication system between two Android mobile phones using Li-Fi (Light-Fidelity) technology. We have identified that it is possible to use the VLC (Visible light communication) to establish a Near-field communication network for data transfer by using the existing infrastructure in a modern android device without any additional devices or modules. We also have successfully developed an android application for the same purpose.

*C. Li-Fi based interactive intelligent shopping system with auto payment using Android*

In this paper we describe is at the time of shopping, it is hard to manage the selection of product and the budget of overall purchasing. Time management and waiting in the queue is another problem.

In this paper, displaying all the offers of the day and for comparing the chosen products with the similar products in term of price per unit is achieved. Our implementation. Android Application is deployed on the Consumer Phone which is attached with Li-Fi Hardware via OTG. Every Product is attached with Li-Fi. User will have to show the product in front of the Mobile so that corresponding product info is automatically updated. This includes Product ID & Cost. Li-Fi Module is also connected with Trolley. Android user can pay the bill via mobile phone and the details are updated to the shop server. Shop server communicates to the Gate hardware, where another Li-Fi is connected. Trolley communicates with the Gate section so that the products are packed safely without standing in the queue. Normal mobile users can place the order via cash is paid on COD mode.

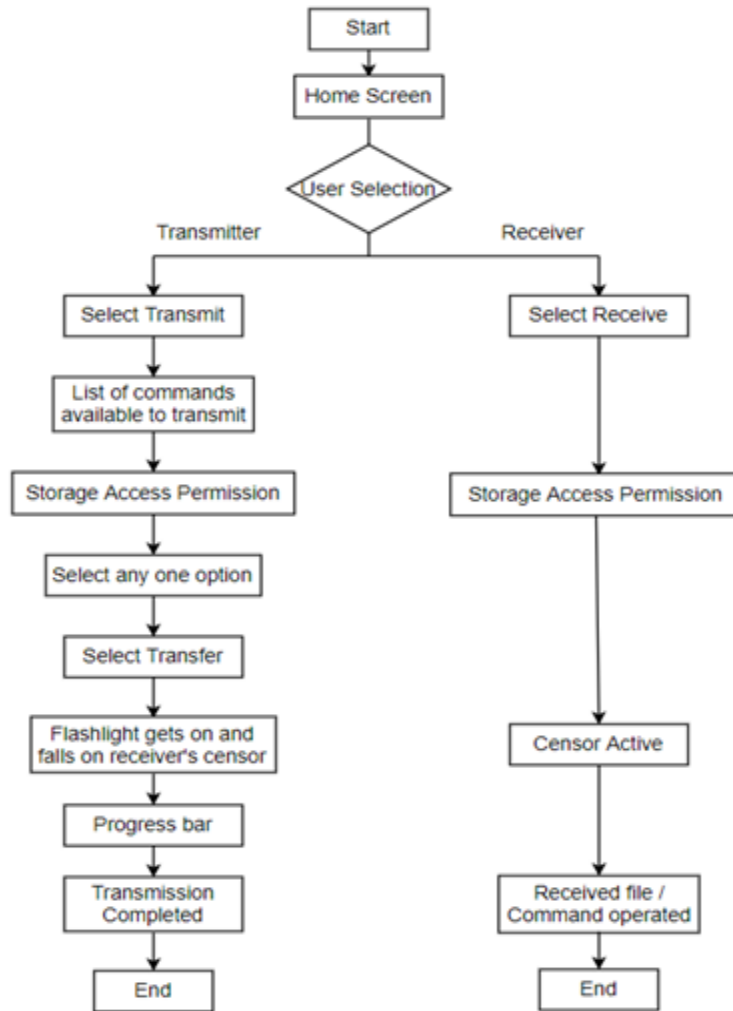
*Outcome of Literature Survey*

From the above study we observed the following observations:

- They all does not transfer data from one mobile phone to other.
- They all doesn't transfer any file or command to other device.
- They all have external hardware connected to it.

III. METHODOLOGY

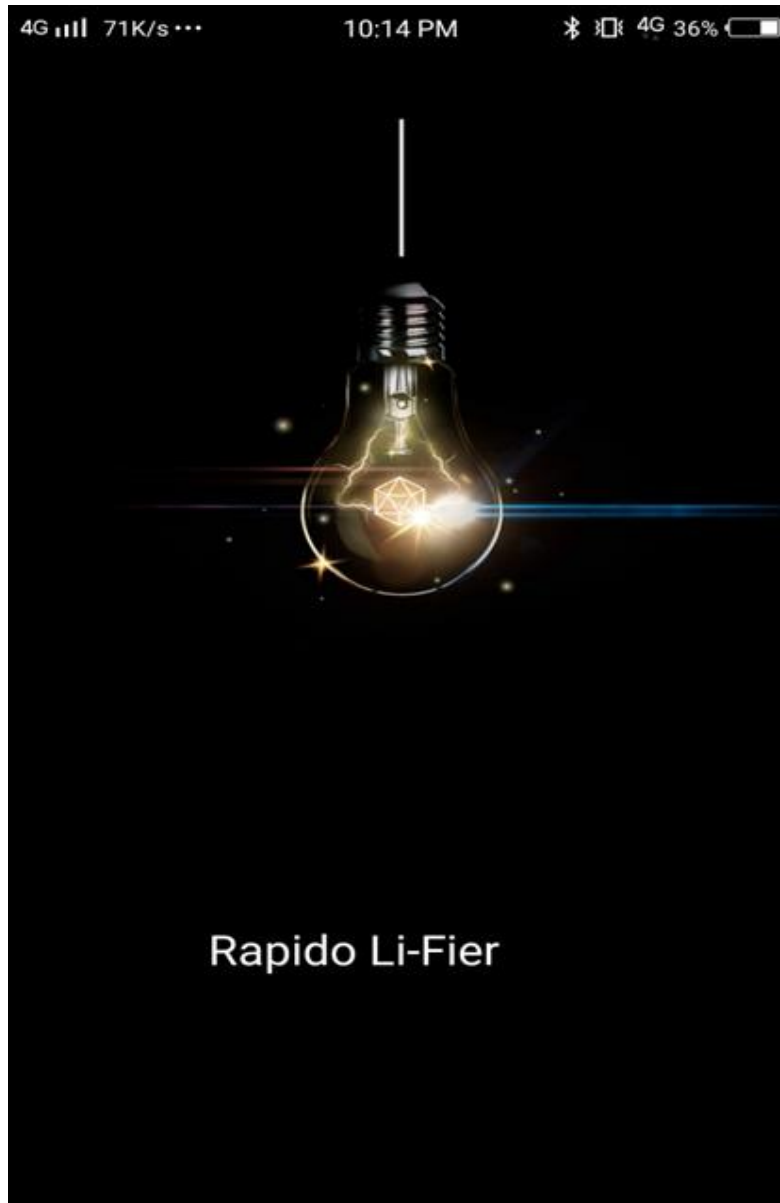
Below is the representation of workflow which might occur at various stages.





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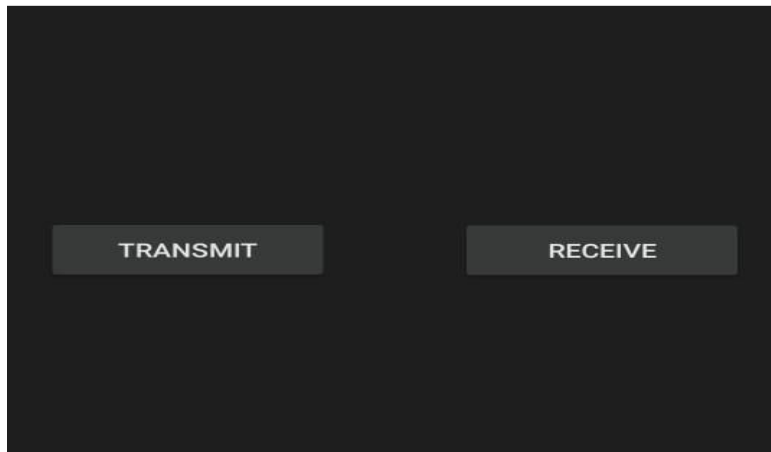
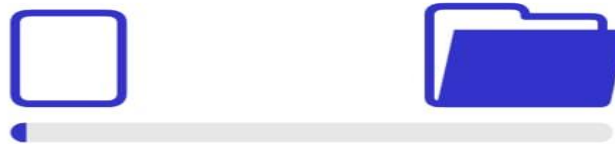
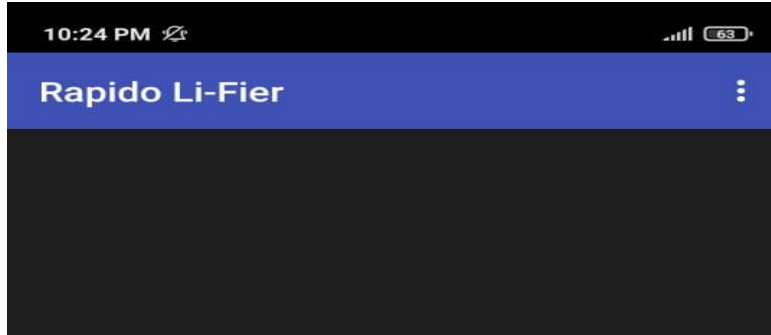
#### IV. IMPLEMENTATION



**Figure 1** Splash Screen



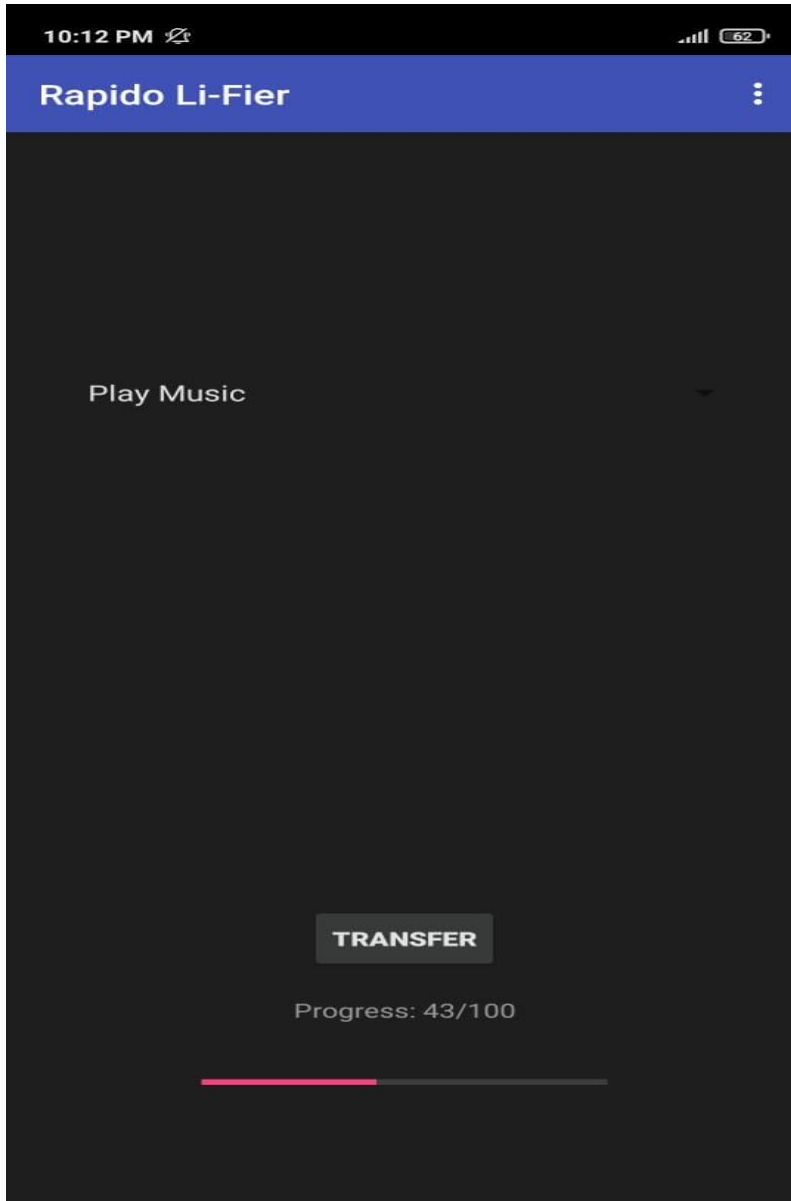
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**Figure 2 Home Screen**



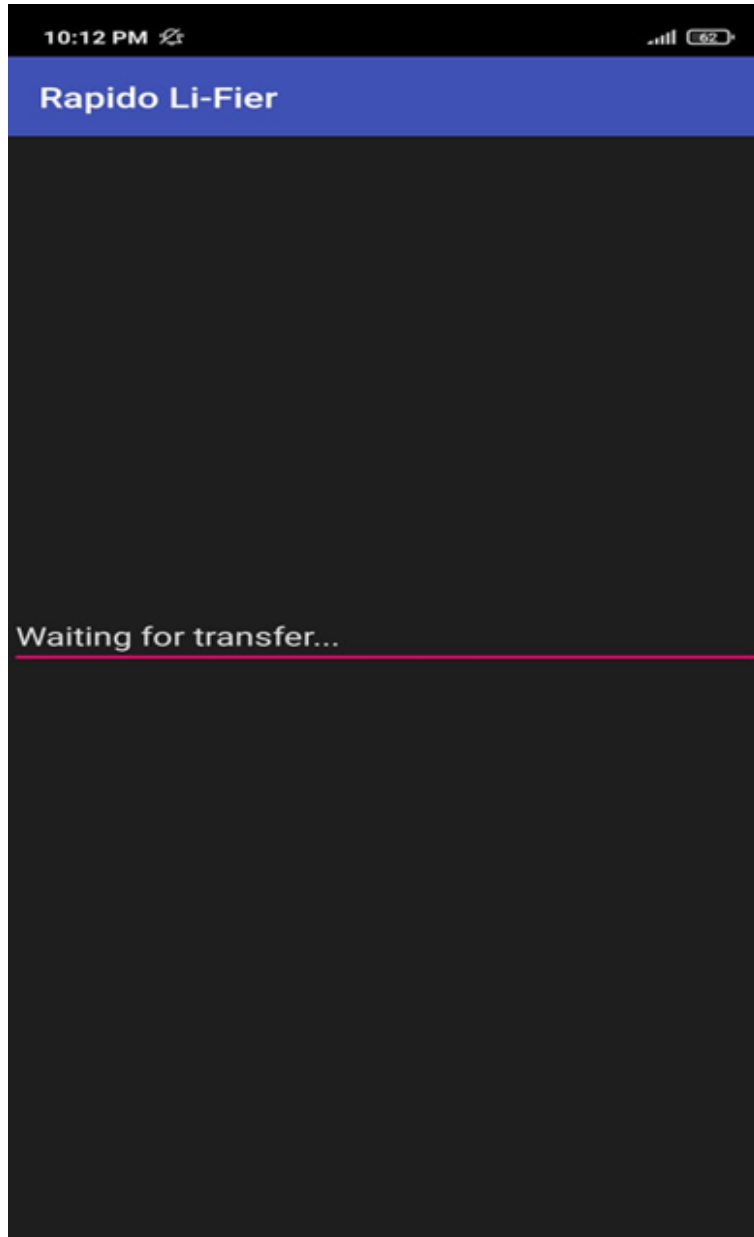
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**Figure 3 Transfer Process**



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**Figure 4 Receiver's Screen**

#### V. CONCLUSION AND FUTURE WORK

We were able to transfer structured data though we are working on doing same for the unstructured data. We have transferred command by using Li-Fi.

In future we are looking ahead to transfer unstructured data, i.e images, videos, PDFs, etc. using the same Li-Fi technology.



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