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Li-Fi Based Helping Stick

Ankush Kumar, Piyush Shinghal, Ms. Amrita Kaul

Abstract— **Li-Fi stands for Light Fidelity that is transmitting data through visible light. Li-Fi is a 5th Generation Communication system of Visible Light having a light-emitting diodes as a medium to high-speed communication as that in a Wi-Fi. In the days where internet has become a major demand, people are in a search for Wi-Fi hotspots. The main idea of the paper is to create internal navigation systems for the bigger areas to create automatic navigation for the visually impaired using Li-Fi technology, as visible light is present everywhere.**

Index Terms— **Light Fidelity; Light Communication; Wi-Fi; Bandwidth, Navigation.**

I. INTRODUCTION

Transferring data through LEDs is termed as Li-Fi technology. It provides high speed at a low cost in wireless communication system, compared to Wi-Fi in addition to high security and greater bandwidth.

Li-Fi uses common household LED (light emitting diodes) light bulbs to enable data transfer, boasting speeds of up to 224 gigabits per second.

Light Fidelity (Li-Fi) is a duplex having high speed and fully networked wireless communication technology.The term was coined by Harald Haas and is a form of visible light communication and a subset of opticalwireless communications (OWC) and could be a complement to RF communication (Wi-Fi or Cellular network), or even a replacement in contexts of data broadcasting. Li-Fi can be considered better than Wi-Fi because there are some limitations in Wi-Fi. Wi-Fi uses 2.4 – 5 GHz radio frequencies to deliver wireless internet access and its bandwidth is limited to 50-100 Mbps.

Indoor navigation is convenient to everyone and it is especially indispensable for the visually impaired. Li-Fi uses free spectrum which is not affected by RF noise. Moreover, most indoor locations would have a sufficient amount of light sources and provideadditional security since Li-Fi cannot penetrate through walls.

Ankush Kumar,ECE Department, Northern India Engineering College, New Delhi, India,

Piyush Shinghal, ECE Department, Northern India Engineering College, New Delhi, India

Ms. Amrita Kaul, ECE Department, Northern India Engineering College, New Delhi, India

II. SYSTEM IMPLEMENTATION OF LI-FI:

New generation of high-brightness light-emitting diode. When the LED is ON it transmits a HIGH-1 and when it's OFF a LOW-0 is transmitted Data transmission is very fast as it can be switched ON-OFF very quickly.

Data encoding is possible in the light by the rate at which the LEDs flicker ON and OFF to pass different strings of 1s and 0s. The data modulation is at a very high speed that it is not noticed by the human eye. More than 10 billion light bulbs need to be replaced with LEDs to transmit data across the world.

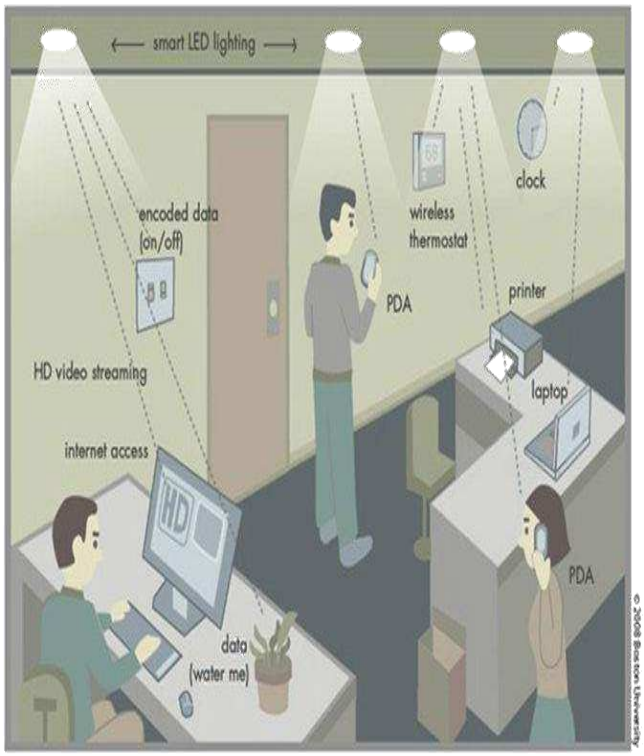

Fig 1. Working of Li-Fi

III. HARDWARE REQUIRED

The Mega 2560 is a microcontroller board based on the ATmega2560 having 54 digital input/output pins, 16 analog inputs, 4 UARTs (hardware serial ports) containing a crystal oscillator of 16 MHz

A USB connection with a power jack having an ICSP header, and a reset button is also present. It contains everything needed to support the microcontroller; simply connect it to a

computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

Fig 2. General Structure of Arduino ATMega2560 development board

IV. WORKING OF LI-FI STICK

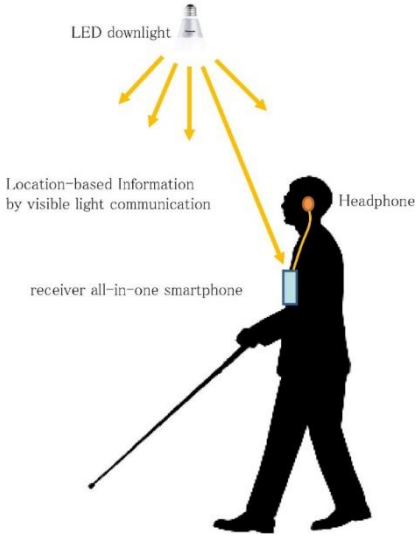

Fig 3. Demonstration of Li-Fi Based Stick

V. CONCLUSION

This paper will emerge as a promising technology in upcoming era by providing the navigation for visually impaired using LI-FI in a cleaner, greener and smarter environment.

VI. FUTURE SCOPE OF LI-FI

1] Creates a Greener and a Safer environment
2] Driving illumination grade LED at high speed.
3] Overcoming the line of sight.

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