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LiFi Based Indoor Global Positioning Framework Utilizing IOT

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ABSTRACT: We propose an indoor navigation system that utilizes visible light communication technology which employs LED lights aimed at supporting people who travel indoors. The main component of this communication system is high brightness LED, which acts as a communication source and a LDR which shows good response to visible length region serving as a receiving element. Important factors we should consider while designing Li-Fi are presence of light and line of sight. LED can be switched ON and OFF to generate digital strings 1s and 0s. Data can be encoded in the lights to generate new data rate by varying flickering rate of LED. Although acquiring accurate positional information and travel direction can be obtaining by utilizing VLC technology with direction continuing advancements in computing communication technologies. Several commercial GPS tracking system were introduced to a consumer market. However, GPS has a major challenge when it comes to indoor positioning due to signal interference caused by walls, floors and other objects. All these challenges have shown architecture of using VLC for accurate indoor positioning and navigation.

KEYWORDS: VLC, Li-Fi, LDR, LED, Indoor global positioning system.

1. INTRODUCTION

In this time of remote innovation, the Wi-Fi is valuable for general remote inclusion inside structures while Li-Fi is perfect for high thickness remote information inclusion in restricted Regions where there are no obstacles. Since obvious light is present all over the place. Light fidelity is a bidirectional, rapid and completely arranged remote correspondence innovation like Wi-Fi. Li- Fi can be viewed as better than Wi-Fi on the grounds that there is some restriction in Wi-Fi. The Li-Fi innovation can exchange the information through LEDs. It is fast and minimal effort remote correspondence framework, contrasted with Wi-Fi. Indoor route is helpful to everybody and it is particularly vital for the outwardly impeded.

Li-Fi makes utilization of a free, unlicensed range also, isn't influenced by RF commotion. Indoor area would have an adequate measure of light source and give extra security since Li-Fi cannot infiltrate through divider. The Li-Fi technology helps the user to move within indoor environment. The main objective of the system is to provide, useful navigation information that enables a user to make appropriate and timely decisions on which route to follow in an indoor space. Whenever LED is ON use can transmit an advanced string of 1,if it's OFF at that point client can transmit a string of 0.it can be exchanged ON and OFF in all respects rapidly, which gives moment open door for transmitting information. Li-Fi require viewable pathway for correspondence. Light reliant resistoroffers limitless opposition in murkiness and offers not many ohms then there islight. Figure 1 represents led bulbs as wireless routers.

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Figure 1 Led Bulbs as Wireless Routers

Components of a Li-Fi System:

A Li-Fi system had two main components.

1: A transmitter (most likely a LED lamp)

2: A receiver (used to decode the received data)

II. LITERATURE SURVEY

1) It was July,2011 Dr. Harald Hass, Prof, mobile communication, university of Edinburgh, publicly demonstrated,li-fiforthefirsttime,amethodofvisiblelightcommunication (VLC) technology.

2) Further researcher at Heinrich Hertz Institute in Berlin,Germany have reached data rates of over

500mbps using astandard white light LED, DR. Harald Hass setup a spin of firm to sell a VLC

transmittereven more sophisticated an advancetechniquesareundergoingdevelopmentattheuniversity of oxford and the university of Edinburgh teamsfrom university of oxford an Edinburgh are focusing on parallel data transmission using arrays of LED, where eachLED transmit a different data streams while others groups are mixtures of red green and blue LEDs to alter the light frequency, with each frequency encoding a data channel.

3)Today Researchers working for its feasibility and designingthehardware equipmentrequiredfor

makingthetechnology robust and usable. Li-fi technology has higher potential .it is very much possible

to transmit the data via light by changing the flicker rate that provide different stringof 1s and 0 and its intensity is modulated to quickly that thehuman eye cannot notice .There are around 19 billion light emits worldwide. which in terms may be replaced by LED.

III. EXISTING METHODOLOGY

INDOOR POSITIONING FRAMEWORK USING BLE BEACONS:

Bluetooth offers low-cost, energy-efficient and easy to deploy indoor positioning and tracking technology. This helps to easily locate or track items and people, find directions and other important information within buildings and facilities such as airports, shopping malls, and others.

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Typical deployments to assist visitors navigate their way inside buildings involve adding Bluetooth beacons to the areas of interest.

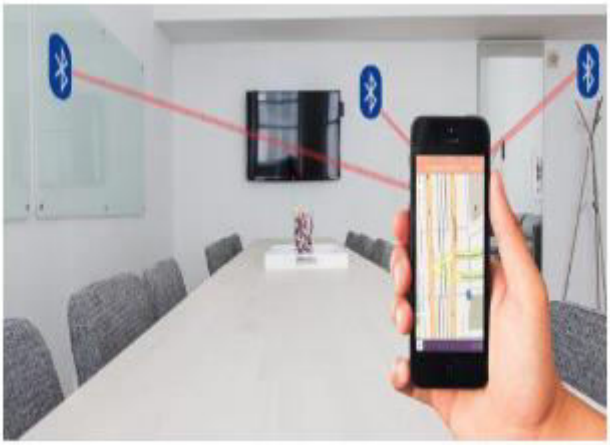

Figure 2 Bluetooth Indoor Positioning Image

INDOOR TRACKING USING WIFI

Wi-Fi positioning can be applied for indoor navigation (client-based solution) as well as for tracking solutions (server-based approach). The accuracy of Wi-Fi for indoor positioning is typically 5-15 meters because access points are usually used whose position has been optimized for data communication. This precision depends on the shielding through walls, ceilings and people, as well as the number of access points. The use of smartphone sensors can improve the results and the determination of the floor level is also possible.

Advantages of this technology are that the existing infrastructure can be used in some cases and that enabled Wi-Fi is sufficientwhen devices are located, a login is not required. The weaknesses are a lower positioning accuracy compared to Bluetooth Low Energy and the fact that iOS devices are excluded from client-based positioning. Moreover, Wi-Fi Tags are more expensive and less energy-efficient compared to beacons.

IV. PROPOSED METHODOLOGY

We propose LIFI based indoor global positioning framework utilizing Iot.The working of Li-Fi is very simple. There is a light emitter onone end i.e. an LED transmitter, and a photo diode (light sensor) on the other end. The data input to the LED transmitter is encoded in to the light (technically referred to as Visible Light Communication) by varying the flickering rate at which the LEDs flicker „on‟ and „off‟ to generate different strings of 1s and 0 The on off activity of the LED transmitter which seems to be invisible (the LED intensity is modulated so rapidly that human eye cannot notice, so the light of the LED appears constant to humans), enables data transmission in light form in accordance with the incoming binary codes: switching ON a LED is a logically „1‟, switching it OFF is a logically „0‟. By varying the rate at which the LEDs flicker on and off, information can be encoded in the light to different combination of 1s and 0s. Some of the major limitations of Li- Fi are:

· Internet cannot be accessed without a light source. This could limit the location and situations in which Li- Fi could be used.
· It requires a near or perfect line-of- sight to transmit the data. · Opaque obstacles on pathways can affect data transmission.
· Natural light, sunlight, and normal electric light can affect the data transmission speed.

V. RESULT AND DISCUSION

The mobile application called “BLYNK IOT”; Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things. Blynk App -allows to

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you create amazing interfaces for your projects using various widgets we provide. Blynk Server - responsible for all the communications between the smartphone and hardware. You can use our Blynk Cloud or run your private Blynk server locally. It's open-source, could easily handle thousands of devices and can even be launched on a Raspberry Pi. Blynk Libraries - for all the popular hardware platforms - enable communication with the server and process all the incoming and outcoming commands. In our mobile application there are 4 locations "CAFETERIA", "EMERGENCY ROOM", BALANCED LEARNING", and "SPORTS ARENA"where these 4 locations are taken as 'A', 'B', 'C', 'D', respectively for the reference. When the user in the location 'A' then the app shows the user current location . whereas the user is in the location 'B' the app shows the location . The same procedure is followed for all the location.The below figures represents the locations.

Figure 3 Output Screen On Blynk App

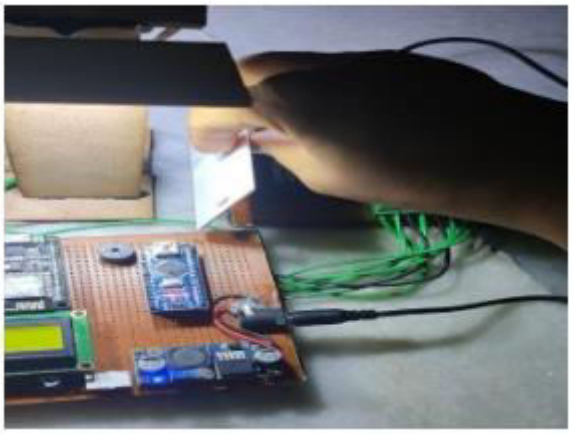

Figure 4 Rf Reader Detector

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Figure 5 Location A

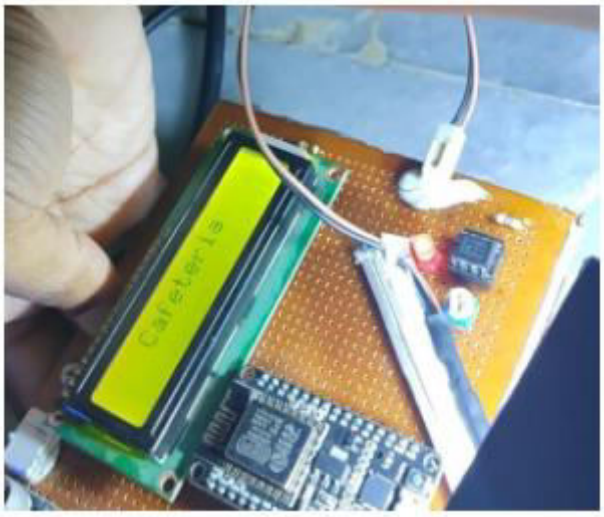

Figure 6 Location B

Figure 7 Location C

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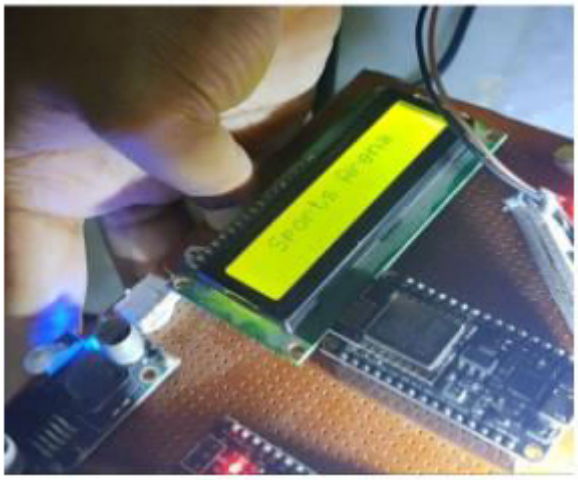

Figure 8 Location D

VI. CONCLUSION

The LI-FI based indoor global positioning framework system has been designed and implemented .The result obtained have proven the feasibility and effectiveness of the design location updates were obtained in the system instantaneously and with good accuracy. The project will emerge as a promising technology in upcoming era by providing the navigation forvisually impaired using li-fi. This consists of a Li-Fi based lighting fixture and a portable Li-Fi receiver module and shows how the system will work by establishing a communication link between the receiver and the light transmitters every time the receiver enters a transmitter's cone of light and communicates the unique identity of the location. It is suggested that this system be refined to enable navigation and guidance within an indoor space which would be very useful in aiding blind people in particular, and visitors in general, to move around in an unknown space. This system can be improved further to support data speeds and accuracy to meet IoT requirements indoor.

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