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Visible Light Communication Using Android Mobile for Office

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ABSTRACT

LED lights are becoming widely used for homes and offices for their luminous efficiency improvement. Visible light communication (VLC) is a new way of wireless communication using visible light. Typical transmitters used for visible light communication are visible light LEDs and receivers are photodiodes and image sensors. We present new applications which will be made possible by visible light communication technology. Location-based services are considered to be especially suitable for visible light communication applications.

Keywords : VLC, LEDs, Wireless communication, Bluetooth Receiver.

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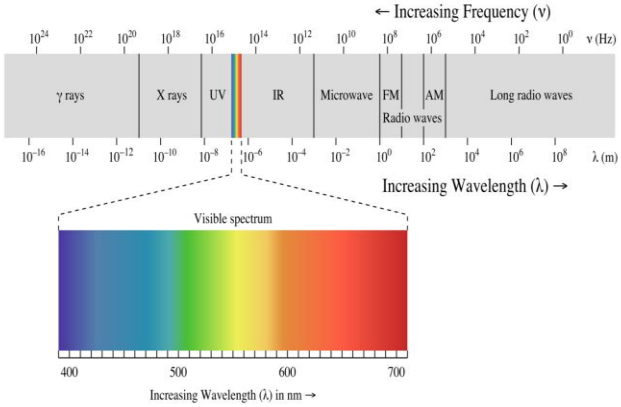
I. INTRODUCTION

The visible light communication (VLC) refers to the communication technology which utilizes the visible light source as a signal transmitter, the air as transmission medium, and the appropriate photodiode as a signal receiving component. Visible light is only a small portion of the electromagnetic spectrum.



Visible light is the form in which electromagnetic radiation with wavelengths in a particular range is interpreted by the human brain. Visible light is thus by definition comprised of visually-perceivable electromagnetic waves. The visible spectrum covers wave lengths from 380 nm to 750nm. Visible light communication (VLC) is a data communications medium which uses visible light between 400 and 800 THz (780–375 nm). VLC is a subset of optical wireless communications technologies.

The technology uses fluorescent lamps (ordinary lamps, not special communications devices) to transmit signals at 10 Kbit/s, or LEDs for up to 500 Mbit/s. Low rate data transmissions at 1 and 2 kilometers (0.6 and 1.2 mi) were demonstrated.

II. LITRATURE SURVEY

1. S. Rajagopal, R. D. Roberts "visible light communication: modulation schemes and dimming support,". Visible light communication refers to short- range optical wireless communication using visible light spectrum from 380 to 780 nm. Enabled by recent advances in LED technology, IEEE 802.15.7 supports high-data-rate visible light communication up to 96 Mb/s by fast modulation of optical light sources which may be dimmed during their operation. IEEE 802.15.7 provides dimming adaptable mechanisms for flicker-free high-data-rate visible light communication.

2. M. B. Rahaim, A. M. Vegni, and T. D. Little, "A hybrid radio frequency and broadcast visible light communication system." In recent years, visible light communication (VLC) has emerged as a complementary technique to overcome limitations of the crowded radio frequency (RF) spectrum. Its superior characteristics include unlicensed wide bandwidth, high security and dual-use nature. Nevertheless, mobile devices are not equipped with illuminating components, which are utilized as transmitters in downlink

data transmission. Targeting a high quality and robust uplink channel, high power light sources turn to be unsuitable for mobile devices with limited battery life. Furthermore, VLC uplink requires a directional optical transmission beam that can lead to significant deterioration of throughput given the potential rotation and/or movement of devices. With the above-mentioned design challenges, the uplink mechanism becomes a fundamental problem for bidirectionalVLC. In order to alleviate congestion in the RF shared medium as well as resolve the back-channel issue of VLC networking, we propose a real-time indoor hybrid WiFi and VLC system for realizing Internet surfing. In this hybrid system, downstream data flow is transmitted by light emitting diodes (LED), whereas the upstream data flow is forwarded through WiFi connectivity. Our designed system utilizes flexible software defined VLC (SDVLC) to implement the unidirectional optical wireless channel. Experimental results reveal that the integrated system outperforms conventional WiFi for crowded environments in term of throughput.

III. PROPOSED SYSTEM

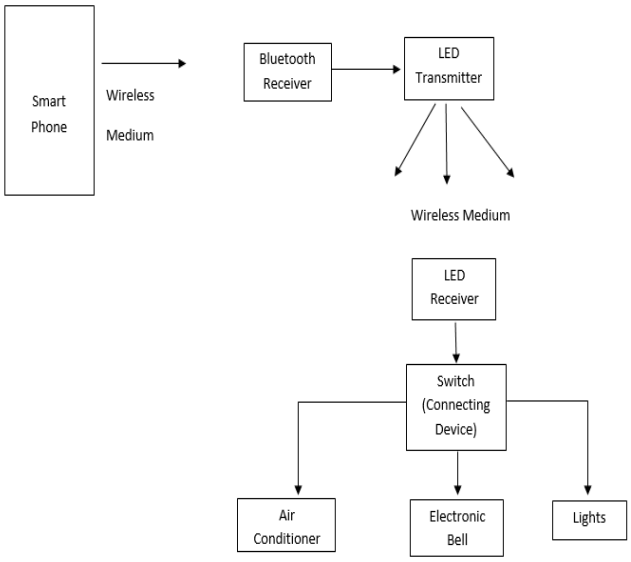


Fig 1. Block Diagram

The above block diagram shows how the appliances in office can be controlled using Visible Light Technology using a simple android phone. The android phone has software that sends signal to the LED transmitter via wireless communication i.e., using Bluetooth. The LED transmitter gets the input through the Bluetooth receiver connected to it and then broadcasts the message. The transmitting medium is Visible Light. The message is received by the LED receiver and sends it to the switch. The switch then sends the received data to the specific appliance via LAN.

Challenges:

Connectivity while moving:
Users need to be connected when they move inside the indoor environment.
Multiuser support:
In large areas is vital, many users need to have access to the network at the same time.

Dimming:
Is an important feature in VLC when communications is integrated with lighting.

Shadowing:
Happens when the direct paths from user to all sources are blocked.

IV. ADVANTAGES AND APPLICATION

Advantages:

- Visible light spectrum is available for communication because the frequency above 3THz is not currently regulated by the Radio Regulation Law.
- Visible light does not penetrate thick materials such as walls and partitions, which can be a security advantage.
- Visible light usually poses no health hazards to human body and eyes.
- Visible light can be literally visible so that human notices where the data is transmitted from.
- In addition, since LED lighting has recently become part of a building infrastructure, making visible light communication infrastructure is fairly easy by adding communication function to LED lighting.

Applications:

- SMART LIGHTING

Smart buildings require smart lighting. Smart lighting with VLC provides the infrastructure for illumination, control and communications and will greatly reduce wiring and energy consumption within a building.

- MOBILE CONNECTIVITY

By pointing a visible light at another device you can create a very high speed data link with inherent security. This overcomes the problems of having to pair or connect and provides a much higher data rate than Bluetooth or Wi-Fi.

- VEHICLE & TRANSPORTATION

Many cars already LED lamps. Traffic signage, traffic lights, and street lamps are adopting the LED technology so there are massive applications opportunities here.

- DEFENCE & SECURITY

The ability to send data quickly and in a secure way is the key to many applications. The fact that the visible light cannot be detected on the other side of a wall had great security advantages.

- UNDERWATER COMMUNICATIONS

RF does not work underwater but visible light can support high speed data transmission over short distances in this environment. This could enable divers and underwater vehicles to talk to each other.

V. CONCLUSION

We have to finally produce and implemented Visible Light Communication Using Android Mobile for Office".LED lights are becoming widely used for homes and offices for their luminous efficiency improvement. Visible light communication (VLC) is a new way of wireless communication using visible light. Typical transmitters used for visible light communication are visible light LEDs and receivers are photodiodes and image sensors. We present new applications which will be made possible by visible light communication technology. Location-based services are considered to be especially suitable for visible light communication applications.

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