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Interactive Voice & IOT Based Route Navigation System For Visually Impaired People Using Lifi

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ABSTRACT

In existing system to guide the visually impaired people they need neighbors help for navigation and guidance. In proposed system, LED is deployed in buildings. In this method, colored LEDs are used to help the image sensor to distinguish between different light sources. Zigbee technology can be combined with VLC to realize long distance positioning. MODIFICATION PROCESS, The blind person module consists of a mobile connected through LiFi, a vibrator, and an ultrasonic sensor. Ultrasonic sensor will monitor obstacles in the path. LiFi is used to give the zone alert to the blind people and particularly to give the voice guidance of the path. Vibrator is used for sudden alert to the people.

Keywords : Internet of Things, LED, GPS, RF, VLC, PD, IRDA RX, FOV, OFDM, OOK

I. INTRODUCTION

Location based services (LBS) have become a popular research topic for several years which provide users with current locations and related services. For outdoor environment, Global Positioning System (GPS) provides satisfactory services such as localization, navigation and displaying surrounding traffic conditions. For indoor environments, GPS technology is not applicable since a satellite signal suffers from severe attenuation when passing though solid walls. In recent decades, several methods have been proposed to realize indoor positioning with the help of technologies such as ultra-wide band, wireless local area network, Radio-frequency (RF) identification (ID), Bluetooth and cellular system. Light-emitting-diode (LED) technology has been developing very rapidly in recent decades. It not only provides people with economical and efficient illumination and a long service time, but also paves the way for smart lighting and visible light communication (VLC) . As a strong candidate for high-speed wireless networks of the next generation, VLC exhibits many advantages over conventional RF communication. First, visible light, together with infrared and ultraviolet spectral band, provides unregulated and unlimited bandwidth as a practical solution to the current spectrum crunch issue. Second, considering that light waves are unable to penetrate through solid walls and are confined in an individual room, the band reuse among different rooms is accomplished and physical layer security for the communication system is guaranteed. Third, VLC can be widely applied in many RF sensitive environments such as mines, power plants and hospitals due to the fact that light waves never generate any electromagnetic interference. Fourth, so long as illumination infrastructure exists, VLC is applicable so that the hardware cost is decreased. The application of VLC technology for the indoor positioning has been extensively studied as an available solution for the LBS. LED light sources act as transmitter and receiver is a photo-diode (PD) or an image sensor collocated with a user. Several approaches have been proposed to realize visible light positioning.In one approach, an image sensor is used to obtain angle-of-arrival information to calculate the receiver position based on angulations algorithm and rotation matrix. In this method, colored LEDs are used to help the image sensor to distinguish between different light sources. Scene analysis is another approach to obtain the receiver position. Features of each location are collected as the fingerprints in the offline stage. In the online stage, the features of current location are measured and by matching those with offline fingerprints, location of receiver is estimated. In this paper, we employ a commonly used algorithm where

the RSS information is first detected by a PD, and then distance between transmitter and receiver is calculated. The late ration algorithm is finally applied to estimate receiver coordinates . In addition to the above methods, other technologies are introduced in VLC system to improve the positioning performance. Zigbee technology can be combined with VLC to realize long distance positioning. In, with the assistance of a six axes sensor (geomagnetic sensor and gravity acceleration sensor),a switching estimated receiver positioning system is proposed to achieve higher accuracy. Hybridizing accelerometer was proposed in to realize three dimensional positioning without knowledge of receiver height. Gaussian mixture sigma point particle filter can be further employed to achieve high positioning accuracy and prevention of large deviations. In the literature, line-of-sight (LOS) channels have been considered without taking account of multipath reflections in analysis of positioning performance. However, transmitted signal introduces multipath reflections as it bounces off walls, ceiling and floor where the transmitter is a wide-beam LED source, and the receiver having a finite field-of-view (FOV) captures reflected photons from room surfaces. In this paper, the effect of multipath-induced distortion on positioning accuracy of indoor VLC positioning systems is investigated.

II. METHODS AND MATERIAL

Literature Survey

1. VISIBLE LIGHT COMMUNICATION
Rajan Sagotra, Reena Aggarwal et al.

With the invention of LED (Light Emitting Diode), the idea of victimisation light-weight as a communication medium has started once more. VLC uses white Light Emitting Diodes (LED), which send knowledge by flashing light-weight at speeds undetectable to the human eye. One major advantage of VLC is that we will U.S.A.e the infrastructure around us while not having to create any changes thereto. LEDs' ability to transfer information signals over light-weight (light-weight that is between 400THz to 800THz of frequency and whose wavelength is between 400nm to 700nm) makes it a terribly sensible communication medium. Now the light-weight we tend to use in our way of life can't solely be used for providing light-weight however conjointly for communication. Upon detailed investigation of VLC analysis, it was found that not lots of research has been done to develop this technology for commercial use. But as a result of analysis into VLC is comparatively new, the possibilities ar wide open. A lot of analysis is being done to create this technology out there for business use in varied fields, including web access and vehicle-to-road communication victimisation traffic signal lights. From our review of the literature, it became evident that work should be done to appear into the chance of planning a replacement model that would work the current infrastructure for indoor applications.

2. Survey of Wireless Based Indoor Localization Technologies
Junjie Liu et al.

The market of localization based service (LBS) is increasing. The acquisition of physical location is the fundamental basis for LBS. GPS, the de facto commonplace for out of doors localization, does not work well in indoor setting because of the block of signals by walls and ceiling. To acquire high accurate localization in indoor setting, many techniques have been developed. The vision based localization involves camera and portable computer vision technologies that increase the value. Accelerometer primarily based mostly localization will accumulate the error created by each localization prediction. Firstly, we compare the wireless technologies that have been used for localization in recent literature. The wireless technologies are divided by the distance of coverage. They vary in frequency band and recognition which make sure their distinctive characteristics once used for indoor localization. After that, we justify the mathematical techniques sq. live utilized in wireless based localization. Proximity primarily based technique can alone offer approximate location supported link or connect information. Triangulation can be accustomed make sure angle or distance information retrieve from the received signals from three or further beacon stations to urge user location. Fingerprint assumes the signal property in each purpose is whole completely different, the location are usually found by comparison with pre-built radio-maps. In the end of the paper, we have summarized four trends among the researches in wireless based indoor localization. Incorporating multiple mathematical methods can scale back the error and increase the accuracy. The advent of mobile

phones also provides a ideal device as user device for indoor localization.

3. On the Performance of Single- and Multi-carrier Modulation Schemes for Indoor Visible Light Communication Systems
Mohammadreza A.Kashani et al.

In this paper, we investigate and compare the performance of single- and multi-carrier modulation schemes for indoor visible light-weight communication (VLC). Particularly, the performances of single carrier frequency domain equalization (SCFDE), orthogonal frequency division multiplexing (OFDM) and on-off keying (OOK) with minimum mean square error exploit (MMSE) ar analyzed in order to mitigate the results of multipath distortion of the indoor optical channel wherever non-one imensionality distortion of sunshine emitting diode (LED) transfer operate is taken into thought. Our results indicate that SCFDE system, in contrast to OFDM system, does not suffer from high peak to average power magnitude relation (PAPR) and should beat OFDM and OOK systems. We any investigate the impact of semiconductor bias purpose on the performance of OFDM systems and show that biasing junction rectifier with the optimum price willconsiderably enhance the performance of the system. Bit-interleaved coded modulation (BICM) is also thought of for OFDM and SCFDE systems to any compensate signal degradation as a results of lay to rest image interference (ISI) and semiconductor nonlinearity.

4. Multipath Reflections Analysis on Indoor Visible Light Positioning System
Wenjun Gu et al.

Visible light communication (VLC) has become a promising analysis topic in recent years, and finds its wide applications in indoor environments. Particularly, for location based services (LBS), visible light conjointly provides a sensibleresolution for indoor positioning. Multipath-induced dispersion is one of the main concerns for advanced indoor environments. It affects not only the communication performance however conjointly the positioning accuracy. In this paper, we investigate the impact of multipath reflections on the positioning accuracy of indoor VLC positioning systems. Combined Deterministic and changed three-card monte Carlo (CDMMC) approach is applied to estimate the channel impulse response considering multipath reflections. Since the received signal strength (RSS) information is used for the positioning formula, the power distribution from one transmitter during a typical room configuration is 1st calculated. Then, the positioning accuracy in terms of root mean square error is obtained and analyzed.

5. Analysis of Infrared Wireless Links Employing Multibeam Transmitters and Imaging Diversity Receivers
Pouyan Djahani et al.

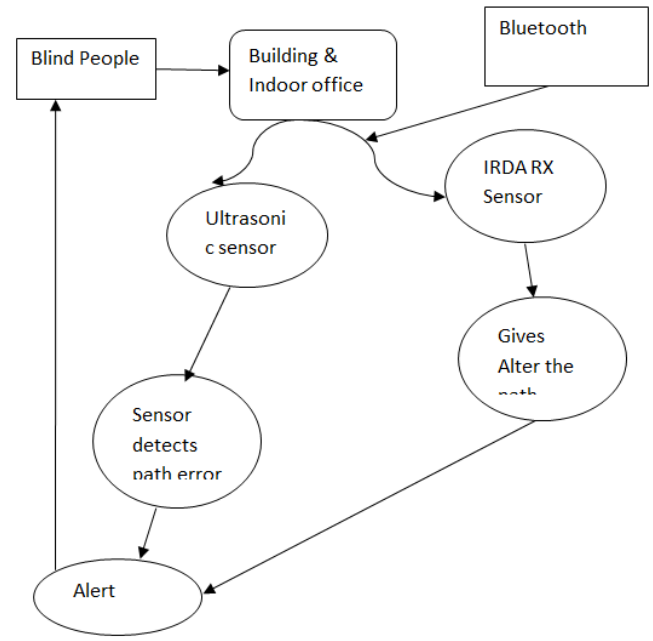
Analyze the enhancements obtained in wireless infrared (IR) communication links once one replaces ancient single-element receivers by imaging receivers and diffuse transmitters by multi beam (quasi-diffuse) transmitters. This paper had addressed both line-of-sight (LOS) and non line-of-sight (non-LOS) IR links. We quantify link performance in terms of the transmitter power needed to win to a small degree error rate (BER) not prodigious ten nine with ninety fifth chance. Our results indicate that in LOS links, imaging receivers can cut back the needed transmitter power by up to thirteen dB compared to single-element receivers. In non-LOS links, imaging receivers and multi beam transmitters can cut back the needed transmitter power by quite twenty dB. Furthermore, we discuss the use of multi beam transmitters and imaging receivers to implement space-division multiple access (SDMA). In a representative example with two users transmittal at a power comfortable to realize a BER not prodigious ten nine with ninety fifth chance within the absence of co channel interference, when SDMA is utilized, the system can win a BER not prodigious ten nine with a chance of regarding half of one mile.

III. RESULTS AND DISCUSSION

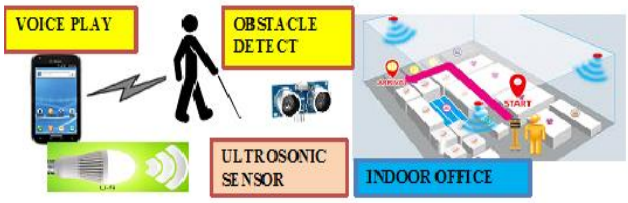
A. Proposed system

In proposed system, LED is deployed in buildings. In this method, colored LEDs are used to help the image sensor to distinguish between different light sources. Zigbee technology can be combined with VLC to realize long distance positioning.

B. Data flow diagram



C. Architecture Diagram



D. Modules

Android app

Mobile Client is an Android application which created and installed in the User's Android Mobile Phone. So that we can perform the activities.

Voice Recognization

Voice recognization aims at recognizing basic voice records. This system helps the blind person to navigate. The blind person will give the destination's name as the input to voice recognition. GPS continuously receives the latitude and longitude of the current location. GPS compares it with the destination's latitude and longitude. The blind person receives the pronounced directions which he needs to follow to reach his destination.

Embedded hardware fabrication

In this module, we can design and implementation of vibrator using ultrasonic sensor. The sensor systems emit ultrasonic or laser beams to the environment, which are reflected by the object; the system calculates the distance from the object according to the time difference between the emitted and received beam. Ultrasonic sensor will monitor obstacles in the path. High range IRDA RX is used to give the zone alert to the blind people.

Automatic path guidance Voice Based Navigation

In this define the automatic path guidance. High range IRDA RX is used to give the zone alert to the blind people and particularly to give the voice guidance of the path. Vibrator is used for sudden alert to the people.

IV.CONCLUSION

In this paper, an indoor visible light positioning system taking account of multipath reflections has been investigated for a typical room where the impulse response is obtained employing CDMMC approach. In this project we used ultrasonic sensor for detects the obstacles. Also voice based indoor navigation for blind people using LiFi.

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