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Indoor Direction System for Eyeless Person Using Li-Fi Technology

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ABSTRACT:

The latest disorder in this Era is about a technology name as light fidelity or other generally called as LI-FI. LI-FI introduce the visible light communication (VLC) technology that work as a light in such a way to carry high-speed communication in a manner to similar that Wi-Fi. The Wi-Fi is effective for general wireless coverage within building while LI-FI is perfect for high-speed thick wireless data coverage in restricted areas where there is no hurdles. This uses visible light as a create of communication. LI-FI is current advancement which is resourceful. In this technology, LED's are used to carry the data in the visible light spectrum. That changes intensity faster than human eye can be followed. Li-Fi operates in the visible light spectrum of the electromagnetic spectrum i.e. it applicable to the visible light as a path of transmission sooner than the traditional radio waves. Li-FI is used to give the area alert to blind people and particularly to voice guidance of the walkway. Headphone is used to alert the blind people. We prefer. such a navigation system for blind person. The LED light emits the visible light with locality data and an embedded system with an visible light accept the data from receiver. The embedded systems evaluate the optimal path to a identified and speak to the blind person through headphone. The suitability of the system for indoor navigation has been confirmed by means of useful prototype through a trial with a blind person.

KEYWORDS: Light Fidelity (LI-FI), Visible Light Communication (VLC), ARDUINO, Light Emitting Diode (LED), Optical Wireless Communication (OWC)

INTRODUCTION:

Light-fidelity is a bidirectional, high speed and fully networked wireless communication technology similar to Wi-Fi. Vision is the primary sensory modality that provides knowledge about the surrounding environment. Total blindness or low vision is a condition that affects many people across the globe causing them a major challenge to lead a normal life. 285 million people are estimated to be visually impaired where 39 million people are totally blind and 246 million have low vision. While India accounts for 20% of it and majority of them come under low income status

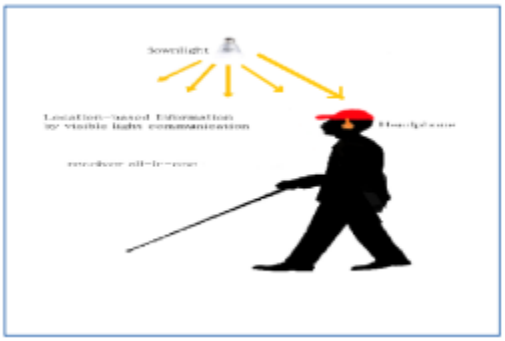

Fig.1: Indoor Direction System For Eyeless Person Using LI-FI Technology

The visually challenged people need an assistive tool to perform their day to day activities for their easy mobilization. The widely used assistive

tools are long white cane, that serves as a low maintenance tool but it cannot detect head level obstacles and provides no information about the size, distance and speed of an object. Guide dogs were trained to obey hand and voice signals, but it remained expensive and many are not comfortable with dogs. The technical evolution helped researchers to design different electronic travel aids (ETA) that can detect obstacles in their pathway and intimate the user through acoustic and haptic signals for their easy navigation . Few devices were designed to know about their actual position in an indoor and outdoor environment that helps them to reach their desired destination.

METHODOLOGY:

Designing and method to meet the object of project which are to develop LI-FI navigation system. by ATmega328,IDE programming ,driver, LED, photodiode ,power supply, APR kit and display. Generally this project is divided into three phases. Phase first is a software development using ATMEGA 328. For software programming on embedded C language will use to construct the command in order to get best result. Assembly language can be used to specify the exact instructions where the central processing unit (CPU) will follow and one can control exactly the time and memory used for each step of the program. Phase Second is uploaded the programming code into ATmega328 and all variables that want to use is write down on it. The programming interprets and sends to the PIC in phase II. The input and output is declared. After the process has complete, the program will analyze and run in the ARDUINO IDE to identify and detect if there have any failure in programming before loading to ATmega328. The next step is to upload via universal serial bus (USB). The USB-to-serial adapter chip or cable is implemented through USB interface. After send command via USB to Atmega328, the programming will analyze again to the electronic component to works Phase Third is fabrication of the system. The components that used to build hardware are driver board, proximity sensor (metal), conveyor, motor, transformer, ARDUINO board and trigger system. The driver board is the main of the part of the system. The function of driver board as a transmitter which is acting as control the other components when the signal from the programming will verify. ARDUINO Uno board is a microcontroller board based on the ATmega328. It has 14 digital input/output pins. 6 analog inputs, a USB connection, power jack, an in-circuit serial programming (ICSP) header and reset button. It is simply connect to a computer with a USB cable or power it with alternating current (AC)-to- direct current (DC) adapter or battery to get started. This technology works by sending the data over light for this purpose a LED light bulb, anyone at all can be flicked on and off in order to be able to generate signals. A proper light accepter is made for receiving the LED signals. The LED bulb will hold a micro-chip that will do the job of processing the data. The light intensity can be manipulated to send data by tiny change in amplitude. The technology is focusing on making sure that the light bulb is flickered up of billions of time a seconds. At a time human eye cannot notice the light being flickered on and off. If the LED is ON, user can transmit a string of 0. It can be shift ON and OFF very quickly, which gives instant opportunity for transmitting data.

WORKING

Transmitter

The function of transmitter is to change the digital data into visible light. An LED was a

suitable component because of its relatively linear relation between current and light intensity .The conventional idea is to modulate the light intensity of the LED i.e. the intensity of the light corresponds to the data transmitted. The ARDUINO ports are not capable of delivering the right amount of current to make the light intensity strong and fast enough. To get around this problem a transistor is used as a switch, which made it possible to switch a larger current faster.

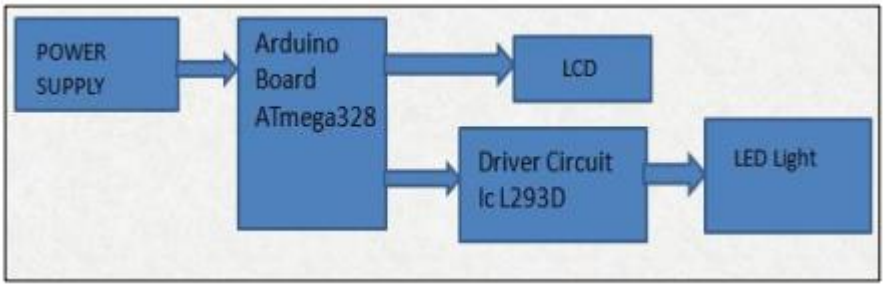

Fig.2. Transmitter Section

Receiver:

The receiver change the incoming light into current using a photodiode. For a digital signal, the ARDUINO do not receive a voltage above 5V. Therefore, the receiver circuit between the photodiode and the ARDUINO needs to process the pulse signal so, it can be interpreted correctly. The receiver need to change the current to voltage in system to amplify and compare it. Distance between the transmitter and the receiver can be varied, but in order to avoid too small or too high signal, an automatic gain controller (AGC) can be designed, instead a variable resistor is used here. This component amplifies or reduces the input voltage to a selected output voltage.

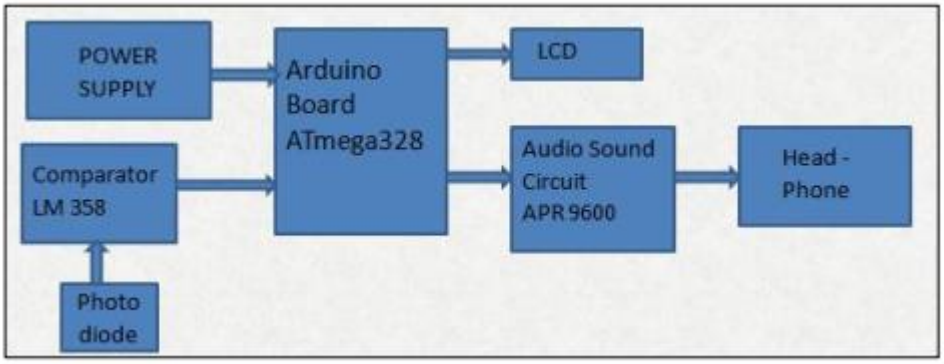

Fig.3. Receiver Section

Result:

In addition to the uses of LI-FI, it also satisfies the requirement of providing indoor navigation and also helps the visually impaired people to avoid obstacles and will also let them know about their current location. This technology will not only allow a user with visual disabilities to ambulate into an indoor environment. In the future we will not only have 14 billion light bulbs, we may have 14 billion LI-FI's deployed worldwide for a cleaner, greener and even a brighter future.

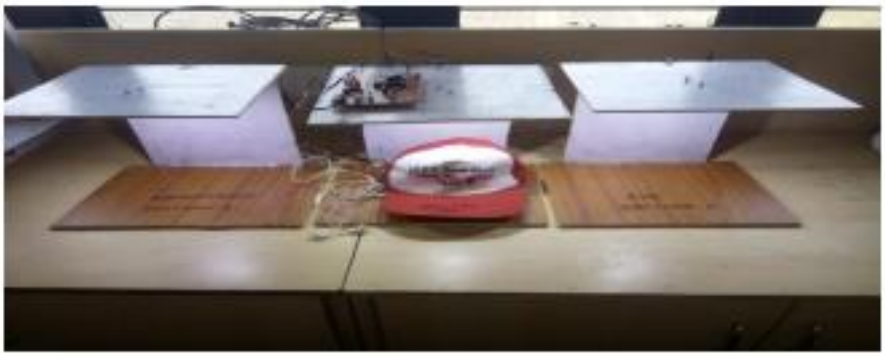

Fig.4.Proposed work

Conclusion:

We developed and tested an indoor navigation system for visually impaired people using visible light communication that makes use of LED. To support travel for visually impaired people, accurate guidance for the positional information and travel direction are needed and we have confirmed that the positional and directional accuracy improves through visible light communication. Therefore, we have concluded that our approach will be effectual system for the visually impaired people. An issue to consider in the future is the need to establish an azimuth accuracy detection method.

Acknowledgement:

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References:

1.D. Dakopoulos and N. G. Bourbakis —Wearable obstacle avoidance electronic travel aids for blind: A survey,‖ IEEE Trans. Syst., Man,Cybern., Part C: Appl, Rev., vol. 40, no. 1, pp. 25–35, 2010. [5]

2. R. Farcy, R. Leroux, A. Jucha, R. Damaschini, C. Grégoire, and A. Zogaghi, M. A. Hersh, Ed., —Electronic travel aids and electronic orientation aids for blind people: Technical, rehabilitation and everyday life points of view,‖ in Proc. 4th Conf.Workshop Assistive Technology Vis.Hear. Impairment, Kufstein, Austria, 2006, p. 18, Euro Assist VHI-4.

3. Dinesh Khandal, Sakshi Jain “Li-Fi (Light Fidelity): The Future Technology in Wireless Communication” International Journal of Information & Computation Technology. ISSN 0974- 2239 Volume 4, Number 16 (2014)

4. Ekta, RanjeetKaur Light "Fidelity (LI-FI)-A Comprehensive Study" International Journal of Computer Science and Mobile Computing Vol. 3, Issue. 4, April 2014, pg.475 – 481 ISSN 2320–088X

5.ShubhamChatterjee, ShalabhAgarwal, AsokeNath, "scope and Challenges in Light Fidelity(LiFi)Technology in Wireless Data Communication", International Journal of Innovative Research in Advanced Engineering(IJIRAE), Issue 6, Vol 2, Page 1-9,(June 2015). Mahin et al., International Journal of Emerging Research in Management &Technology ISSN: 2278-9359 (Volume-5, Issue-5) © 2016, IJERMT All Rights Reserved Page | 85

6. Savage, Neil (2014). Li-Fi Gets Ready to Compete with Wi-Fi http://spectrum.ieee.org/telecom/internet/lifigets-ready-to-compete-with-wifi

7. Quick, Darren (2014). 10 Gbps Li-Fi System Shows Wireless Data Transfer in New Light http://www.gizmag.com/li-fi-wireless-technology/32968/

8. Cuthbertson, Anthony (2015). LiFi Internet Breakthrough: 224 Gbps Connection Broadcast with an LED bulb http://www.ibtimes.co.uk/lifi-internetbreakthrough-224gbps-connectionbroadcast-led-bulb-1488204

9. https://www.eng.ed.ac.uk/postgraduate/research/projects/li-fi-wireless-communications-6-projects

10. Akshata m sonnad, Anjanagopan, Ailakshmi n r, Divya s, Ambika r. 2013. Recent advancements in lifi technology. International Journal of Electrical, Electronics and Data Communication, ISSN: 23202084, 1(10).