International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 05 Issue: 05 | May-2018 www.irjet.net p-ISSN: 2395-0072

LiFi Based Blind Indore Navigation System

Aboli Joshi[1], Santosh Autade[2], Yogita Bhanje[3], Prof. Mahesh Maindarkar[4]

[1,2,3]*Dept. of Electronics and Telecommunication, JSPM'S Imperial College of Engineering and Research Wagholi, Pune, Maharashtra 412207, India*

[4]*Assistant Professor, Dept. of Electronics and Telecommunication, JSPM'S Imperial College of Engineering & Research Wagholi, Pune, Maharashtra 412207, India.*

Abstract - *In this Project we have built a Li-Fi Based Indore Navigation System for visually impaired peoples. We see right now various technologies are there to solve the problems of those peoples like in some places there is brail language-based direction indicator and Voice narrator-based direction indicators are also available but those are not that much useful for them. As this system needs to press button every time to know the right now position. But in our solution, we have removed that problems and made this system is automatic as soon as the user enters in new premises he will get the alert message including the area name, Direction where the user is going and any obstacles nearby the users. and as this technology is using the Li-Fi communication the speed of information transfer is much more faster and easier it no longer need those microwaves based WiFi and Zigbee Devices.*

Key Words: **Encoder, Decoder, LDR, Li-Fi**

1. INTRODUCTION

Today we see most of the visually impaired peoples are uses the normal stick and checks the way by continuously moving this stick around the road they can judge the directions. With this some this they might go in wrong place too. Or some time could even can get the exact obstacle information like Electricity board, so this might be dangerous to them.to avoid this all problems we have designed the system that we can mount on our Normal stick and can avoid all such problems. [1]

In our system there are two modules one is Transmitter section module and another one is receiver section module. Both are needs at same time to work this system efficiently. In transmitter section there we have Saved the data of any Particular location where this transmitter module is going to fit like, Direction data, Obstacle information. etc and for this data we have given a code word for this location. [3] Using the Encode and data selector modules and this data we have given to the High current led drives which took that data and modulates this data in Visible Light. In this part the modulation in light domain means we are not changing the lights dimming with respect to intensity but we are just passing this code word through that light. Means with this light we can get the Light focus too in the wardrobe.

So, whenever the Receiver section comes under that light first it detects its intensity and codeword stored in this light with the help of those LDR arrays and then it compared with stored data in this microcontroller and then it plays the Voice Narrator message with the help of APR33A3 Voice Module. Also, if there is any obstacle then it gives alert message to user and can tell the intensity of obstacle harm ness with the Vibrator motors speed. If user want the specific direction from the present location, then he can can it with the help of direction showing Vibrator motors like if user want to go in forward direction then the forward motor starts vibration. [5] This way the user gets the benefits of this system. [2]

2. System Description

This Li-Fi Navigation system consists of various electronics, hardware and software components. As described in system block diagram shown in Fig-1. & in Fig -2.

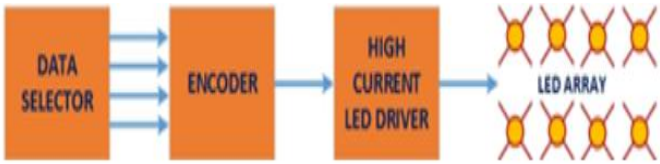

Fig -1: Block Diagram of Transmitter

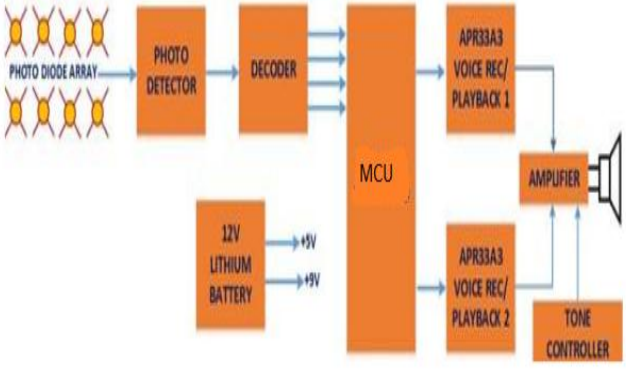

Fig -2: Block Diagram of Receiver

As shown in this system diagram of Transmitter section we have the data of that particular location that we can choose with this data selector block and then encode this data with

Encoder ICs. Then this encoded data we send to the LED driver to modulate this data in light amplification domain.

In receiver section we receives the light on LDR array this light consists of encoded code word then we with the help of decoder block we decode this message and send it to microcontroller then microcontroller decided the location and according to it tells the location to user with help of APR33A3 module. If the in present there are any obstacles then this obstacles user can feels with the Vibrator motors speed. If user wants to know the specific direction then microcontroller tells the direction by vibration directional Motors.

3. Hardware Design:

A. Microcontroller:

This System is Equipped with Atmel's Atmega 328 Microcontroller this is High Performance 8 Bit Microcontroller with RISC Architecture. It has 14 general purpose I/O Pins and various resources. We have chosen this microcontroller just because of it has sufficient GPIO pins to connect our various Sensors and it has 2 UARTS. In our System Major Sensors are based on Serial Communication Interface of information exchange this microcontroller best suits for this application.

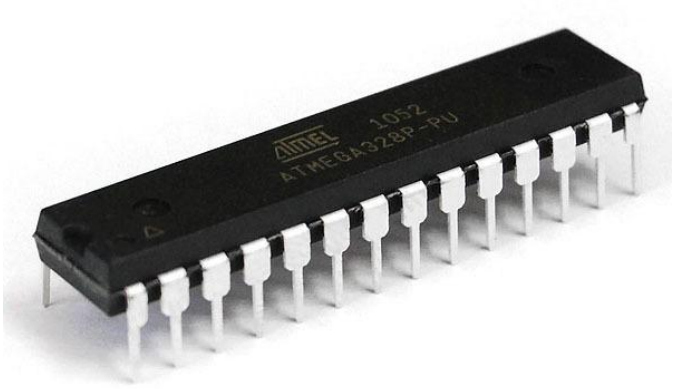

Fig -3: Atmega 328P

B. LDR Array:

LDR is a Light Dependent Resistor. Which means that the resistance of this is varies as we put the light on it. It comes in some specific fixed constant value at normal day light. So we can choose it according to our microcontrollers specification. By using the array of LDRs we can get average resistance across all LDRs. This will give the more accuracy.

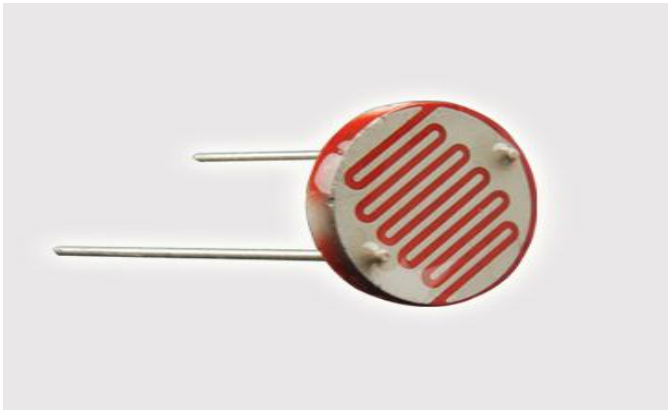

Fig -4: LDR

C. Vibrator Motor

For the direction showing purpose and for Obstacle alert notification purpose we have used the Vibrator motor by which we can get the vibrations on our stick, so we can judge the Direction or and Obstacles. [4] We have used three Vibration motors From, Left and right which shows he direction for particular way and by the intensity of vibrations we can sense the obstacle distance. this is a simple DC Motor with the Half-weighted shaft due to this we can experience the vibration attached to the stick.

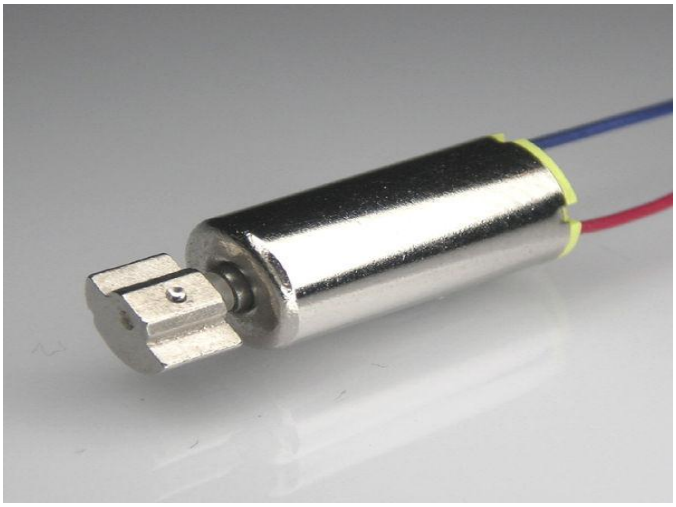

Fig -5: Vibrator Motor

4. Result & Discussion of Result:

The system with Receiver section mounted on the blind peoples stick. This system telling the voice-based narrator alert message to user about the present location where he is standing right now. Also, the System starts vibrating in specific direction when user wants to know the direction.

5. CONCLUSION

In addition to the uses of Li-Fi, it also satisfies the requirements 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 while avoiding obstacles, but it could also help them interact with the environment. In the future we will not only have 14 billion light bulbs, we may have 14 billion Li -Fi deployed worldwide for a cleaner, greener and even a brighter future.

REFERENCES

[1] Bradley, N.A.; Dunlop, M.D. An experimental investigation into wayfinding directions for visually impaired people. Pers. Ubiquitous Comput. 2005, 9, 395–403.

[2] Santofimia, M.J.; Fahlman, S.E.; Moya, F.; López, J.C. A Common-Sense Planning Strategy for Ambient Intelligence. In Proceedings of the 14th International Conference on Knowledge-Based and Intelligent Information and Engineering Systems, Cardiff, UK, 8–10 September 2010; LNCS 6277, pp. 193–202.

[3] Holland, S.; Morse, D.R.; Gedenryd, H. Audio GPS: Spatial Audio in a Minimal Attention Interface. In Proceedings of the 3rd International Workshop on Human Computer Interaction with Mobile Devices, Lille, France, 10 September 2001; pp. 28–33.

[4] Sanchez, J.; Oyarzun, C. Mobile Assistance Based on Audio for Blind People Using Bus Services. In New Ideas in Computer Science Education (In Spanish); Lom Ediciones: Santiago, Chile, 2007; pp. 377–396.

[5] Sanchez, J.; Saenz, M. Orientation and mobility in external spaces for blind apprentices using mobile devices. Mag. Ann. Metrop. Univ. 2008, 8, 47–66.

[6] Hub, A.; Diepstraten, J.; Ertl, T. Design and Development of an Indoor Navigation and Object Identification System for the Blind. In Proceedings of the ACM SIGACCESS Conference on Computers and Accessibility, Atlanta, GA, USA, 18–20 October 2004; pp. 147–152.