INTERNATIONAL JOURNAL OF RECENT TRENDS IN ENGINEERING & RESEARCH
Impact Factor 4.101 ISSN -2455-1457
RECENT ADVANCES IN ELECTRONICS & COMMUNICATION ENGINEERING (RAECE-2K17)

Implementation of Experimental setup for navigation and Prototype analysis for enabled shoes

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***Abstract*- In this paper, we have presented the methodology of navigation for visually impaired using GPS and IR sensors entombed into the shoes. There are**

285 million visually impaired people worldwide, out of which India has the maximum percentage of visually impaired. Around 80% of the visually impaired population in India live in low income settings. They don't have reliable resources to travel around for their daily needs. This project aims at providing them self-reliant and independent source for navigation. A dedicated android application will be used to input the destination. This app will be connected to the GPS modules on each pair of the shoe which will also house vibrating motors. The shoes will vibrate whenever there is a turn. The IR Sensors will be used to protect the wearer from any object in the path

***Index Terms*- GPS Module,Navigation,IR Sensor.**

I. INTRODUCTION

As a blind or visually impaired it can get difficult to travel but not impossible. The purpose of this project is to provide the visually impaired with a reliable way for navigating. The project has two main parts i.e. Hardware and Software. The hardware includes the IR sensors, vibrating motors and the microcontroller which all will be entombed into the shoe. The software part includes a mobile based application which will contain a predefined set of maps to for testing purpose. This application will be connected to the hardware on the shoe by Bluetooth modules. A location will be entered in the application. The number of left and right turns will be used as an input to the microcontroller. This parsed information will be used to vibrate the motors connected to each shoe. For instance- If the desired destination has one left followed by one right turn, then accordingly when the user will have to take the left turn then the parsed information from the application will be passed to microcontroller on the left shoe which will vibrate the left shoe and similarly for the right turn the right shoe motors will start to vibrate. Since visually impaired are more sensitive to motion, we have used vibrating motors to indicate that a turn is about to arrive. The whole hardware setup will be powered by 1000MaH Li-Ion battery.

II. EXPERIMENTAL SETUP ANDWORKING

The project would be divided into two parts:

1. The Hardwarepart:

- Arduino Mini Pro- The arduino Pro Mini is a microcontroller board based on the ATmega328. It has 14 computerized input/yield pins (of which 6 can be utilized as PWM yields), 6simples ourcesofinfo,anon-boardresonator, a reset button, and gaps for mounting pin headers. A six pin header can be connected to an FTDI cable for USB power and communication with the board. This board was designed and realized for those applications in which space is premium and implemented as permanent setups.

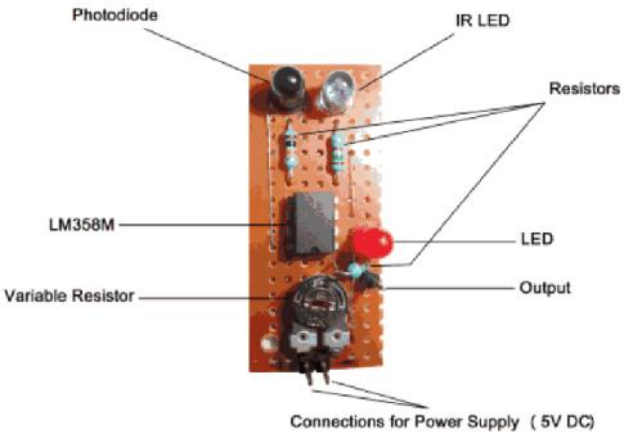

Fig 1.IR sensor circuit

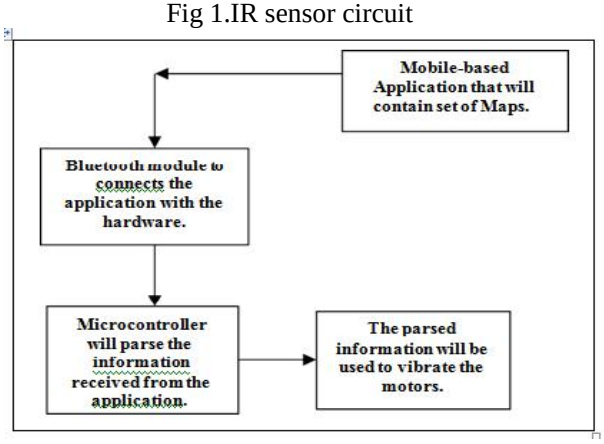

Fig2. Block Diagram of GPS & IR shoe system

- Vibrating Motors-Tow basic types of vibration motor

are eccentric rotating mass vibration motor (ERM) and linear resonant actuator(LRA).

- Cylinder Vibrator Motor- We will use 12mm brushless BLDC cylinder motor is intended for long-life massaging, and reliable and long life vibration

be having an active IR sensor which would radiate detect any obstruction.

- Li-Ion Battery- Lithium-ion batteries are regular in home gadgets. They are a standout amongst the most prominent sorts of rechargeable batteries for versatile gadgets, with a high vitality thickness, small memory impact and low self discharge.

2. Android ApplicationPart:

- A navigation system will be developed, wherein the user will be able to select a starting point and an end point. Then with each passing turn, the application will give a signal corresponding to the turn. Bluetooth is considered as the best option up until this stage to transmit the corresponding turn data. Voice commands can also be added to the application to increase its usability by the visually impaired. This application would therefore control and navigate theshoes.
- There are two ways of appdevelopment-

· Using anemulator
· Writing a Jsoncode

Using an emulator would be a better option and would increase the productivity. By using an emulator the focus can be on the hardware part.

Fig3. Overview of the Prototype

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III. EXPERIMENTALRESULT

Alongside improvement of the GPS framework, one of vital execution parameters to assess a route framework is the manner by which to match GPS track with the street in electronic guide precisely. Presently numerous frameworks utilize the briefest separation calculation to coordinate withthe electronic guide. Be that as it may, GPS's blunder, city condition and street multifaceted nature frequently prompt to erroneous coordinating. To tackle this issue, a GPS-route framework based blend outline calculation that joins the most limited separation calculation and the right hand delineate calculation which based the experience of the GPS route framework.Atthatpointtherightnessofthecalculationistried by genuine running, it can make GPS track and the electronic

alertfunctionality.

- IR sensor- An infrared sensor is to sense some aspects of the surroundings. An IR sensor can measure the heat as wellasdetectsthemotionofanobject.Theshoeswould

guide to coordinate precisely and dependably. From numerous tests the typical GPS receiver will achieve an accuracy of 1-5 meters.

While testing the IR sensor we found that this product has high adaption to environment and low in weight. When it approaches an obstacle, infrared ray will reflect andcome back to the receiving tube, and after processing by of comparator circuit, green light of indicator is on, output is low level. Potentiometer can be rotated to adjust detection range (2~40cm). IR sensor is detecting large obstacle like walls, tables, chairs, boxetc.

Vibrating motor which is used is a 1.3V DC Vibrating Motor.Therewillbefourofthesemotorsineachshoe,enough tofeelthevibrations.Therearedifferentfeaturesofthismotor:

- Operation rating: 1.3VDC @0.08A
- Operating voltage range: 0.85 to1.6VDC
- Speed @ 1.3VDC: 8500RPM
- Lead length: 1.0inches
- Motor size: 0.23" diameter x 0.39"depth
- Shaft size: 0.10" diameter x 0.10"length

The vibrations from these motor would be enough to guide the user. Vibrations have been tested through a shoe.

IV. CONCLUSION

In this paper we have calculated the various methodologies for designing GPS with shoes. the experimental setup is. Discussed with all sub equipments.The result have been discussed in terms of outputvoltages.It additionally gives reliable and secure answer for the user using gps . when there is a threat situation like an obstacle infront ,then the shoes would vibrate vigorously and alert the user .As per thr user's safety concern an alert can be sent to their loved one's mobile.

REFERENCES

[1] OzkanBebek, Michael A. Suster, SrihariRajgopal, Michael J. Fu, Xuemei Huang, M. CenkCavusoglu, Darrin J. Young, MehranMehregany, Antonie J. (Ton) van den Bogert, and Carlos H. Mastrangelo. "Personal Navigation via Shoe Mounted Inertial Measurement Units," IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),2010.

[2] James Downey, JeyanandhParamesh, Daniel Stancil, Tamal Mukherjee, "A Stepped-Frequency Continuous Wave Ranger for Aiding Pedestrian Navigation," IEEE Topical Conference on Wireless Sensors and Sensor Networks (WiSNet),2013.

[3] Tamal Mukherjee, "Multi-sensor data integration for personal navigation," IEEE Sensors2013.

[4] Ilya A. Podshivalov, Pavel S. Marinushkin, "Micromechanical System for Pedestrian Attitude Estimation," Member, International Siberian Conference on Control and Communications (SIBCON),2013.

[5] Rupen Paul V, Adithi Reddy, Sujith PS, Aneesh M, "GPS and Bluetooth Based Object Tracking System,"

International Journal of Advanced Research in Computer and Communication Engineering, vol. 5, no. 1, pp. 233-235, 2016.

[6] MangeshKolaskar, AniketChalke, MadhuraBorkar, KedarNaik, Dr. B.K Lande& Prof VarshaSuralkar, "Real Time and Offline GPS Tracker UsingArduino," Imperial Journal of Interdisciplinary Research, vol. 2, no. 5, pp. 94-96, 2016.

[7] R. Ramani, S. Valarmathy, N. SuthanthiraVanitha S. Selvaraju, M. Thiruppathi, R. Thangam, "Vehicle Tracking and Locking System Based on GSM and GPS," Int. J. Intelligent Systems and Applications, vol. 9, pp. 86- 93, 2013.

