IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 12, Issue 12, December 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.625

© 2024 IJIRCCE | Volume 12, Issue 12, December 2024| DOI: 10.15680/IJIRCCE.2024.1212079

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.625| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Third Eye for the Blind: Ultrasonic Vibrator Glove

Dr. Srinivasa A. H[1], Hritik Kaul[2], Rohit Singh[3], Sahil[4]

Associate Professor, Department of Computer Science and Engineering, Dr. Ambedkar Institute of Technology, Bangalore, Karnataka, India[1]

Students, Department of Computer Science and Engineering, Dr. Ambedkar Institute of Technology, Bangalore, Karnataka, India [2,3,4]

ABSTRACT: Third eye for Blind is the innovative project made especially looking at problems faced by blind while navigation. This project helps the blind people to navigate with speed and confidence by detecting the nearby obstacles using the help of ultrasonic waves and notify them with buzzer sound or vibration. They only need to wear this device in their hand as a band. The glove is integrated with ultrasonic sensor which sense the obstacle in front of blind, if any obstacle is detected it soon notifies the blind person giving various signals The project is based on ATmega 328 microcontroller. When ultrasonic sensor detects anything in front of it, it gives message to the controller then processes his data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to sound a buzzer. Sound changes depending on the distance of the obstacle if the obstacle is too close then buzzer will stay on continuously so as to alert the person. It also produces different vibration depending on the distance of the obstacle.

KEYWORDS: Visually impaired individuals, Obstacle Detection, IOT technology, ATmega 328P microcontroller

I. INTRODUCTION

The third eye for blind is a wearable gadget that can assist outwardly debilitated individuals with moving by themselves in an indoor environment. Visually impaired people to move from one spot to another independently. This gadget is useful particularly when the individual needs to move around a house or some indoor spots without anyone else. In this gadget, the distance of the snag is dictated by utilizing an Ultrasonic module and a Microcontroller. The snag distance is estimated and educated to the outwardly impeded individual as a ringer and vibrations. The individual can move in other bearings and stay away from crashes utilizing this. The end consequences of the work would be gloves with a wearable band joined to the gloves to which every one of the segments is associated on a PCB, which works with serious level of precision and unwavering quality.

II. RELATED WORK

Over the years, there has been an evolution of various techniques of guiding visually impaired persons, thus, toward attaining their self-independent by freely moving around their environment without guidance from others; some of these are:

Haptic shoe for the blind: A haptic device that can be installed in a shoe vibrating alert feature benefit for deafness. This device receives GPS information from a smartphone and provides vibration feedback at the right, left, front and back for the shoe in order to provide guidance to a destination. A proximity sensor in the front of the shoe can detect objects up to 3 metres and provide vibrational feedback.

Multi-dimensional walking aid by Olakanmi. O.Oladayo: This system uses ultrasonic detection technology and the voice module, the obstacle is detects by the ultrasonic sensor and the direction of the obstacle is communicate to the user through voice output.

3D ultrasonic stick for the blind by the Osama Bader Al-Barm (2014): The system uses ultrasonic sensor for detecting the obstacle in three directions (i.e, front, left and the right sides of the visually impaired), and the

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.625| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

vibration motor which vibrate with the intensity depending on the obstacle's distance.

Research has been conducted for new devices and technologies to design a good, reliable and efficient system for blind or visually impaired people to detect the obstacles and warn or alert them at dangerous places or obstacles. One sound for free for travel direction and the other for blocked, it was difficult for the person to differentiate the sounds. Another problem was the system would not know the user's momentary position. Time and again there have been innovations in wearable technologies for the blind. Another Visual Impairment Aid makes use of a similar concept. We have tried to build on this existing glove by making it less complex and easily constructible so as to be marketed on a large scale. The glove presented in this also happens to be much cheaper than the Visual Impairment Aid with little to no depreciation in its performance.

III. SYSTEM IMPLEMENTATION

A. Hardware Requirements:

ATmega 328P Microcontroller –

The high performance Microchip 8-bit AVR RISC-based microcontroller unites 32KB ISP flash memory with read while-write capabilities, 1KB EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three adjustable timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire sequential interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes.

Fig 1: ATmega Microcontroller

Ultrasonic Sensor –

The ultrasonic sensor consists of transmitter, receiver and transceiver. The transmitter converts electrical signal into sound waves. The receiver converts the sound waves into electrical signal again. The transceiver performs both the receiver and transmitter operations. It also has crystal oscillators in it. It will perform the stabilization operation in the ultrasonic sensor.

Fig 2: Ultrasonic Sensor

Piezo Buzzer –

The piezo buzzer is an electronic device which generates sound through it. The buzzer is used as an indication to the user. It is used in the car reversing system and braking system as an indication. It is based on the principle of piezoelectricity discovered in 1880.

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.625| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Fig 3: Buzzer

Vibration Motor –
There are two basic types of vibration motor. An eccentric rotating mass vibration motor (ERM) uses a small unbalanced mass on a DC motor, when it rotates it creates a force that translates to vibrations. A linear resonant actuator (LRA) contains a small internal mass attached to a spring, which creates a force when driven.

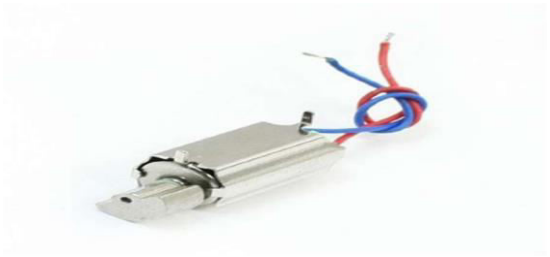

Fig 4: Vibration Motor

Crystal Oscillator –
A crystal oscillator is an electronic oscillator circuit that uses the mechanical resonance of a vibrating crystal of piezoelectric material to create an electrical signal with a precise frequency.

Fig 5: Crystal Oscillator

B. Software Requirements:
The project requires an operating system compatible with Windows 7/8/9/10/11. The coding language utilized is Embedded C++, which is commonly used in embedded systems programming. The Integrated Development Environment (IDE) chosen for programming and development tasks is Arduino IDE, known for its user-friendly interface and compatibility with various microcontrollers. These software requirements are crucial for the successful implementation and functioning of the smart assistance system for visually impaired individuals.

The implementation process involves several steps:

a) Hardware Selection and Integration: Choose suitable ultrasonic sensors. Integrate sensors and microcontroller onto the blind glove, considering size, weight, and power usage. Design a durable and ergonomic enclosure for user comfort.

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.625| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

b) Software Development: Develop firmware for sensor data management and communication. Implement algorithms for obstacle detection.
c) User Testing and Feedback: Conduct usability testing with visually impaired users to assess functionality and accessibility. Gather feedback to refine hardware and software components.
d) Documentation and Deployment: Document system architecture, hardware setup, software implementation, and user interface. Prepare user manuals and instructional materials for effective device operation. Deploy the blind stick to users and provide training and support.
e) Monitoring and Maintenance: Establish monitoring mechanisms for device performance and connectivity.
- Provide ongoing maintenance, updates, and technical support. Continuously optimize the system based on feedback and evolving needs.

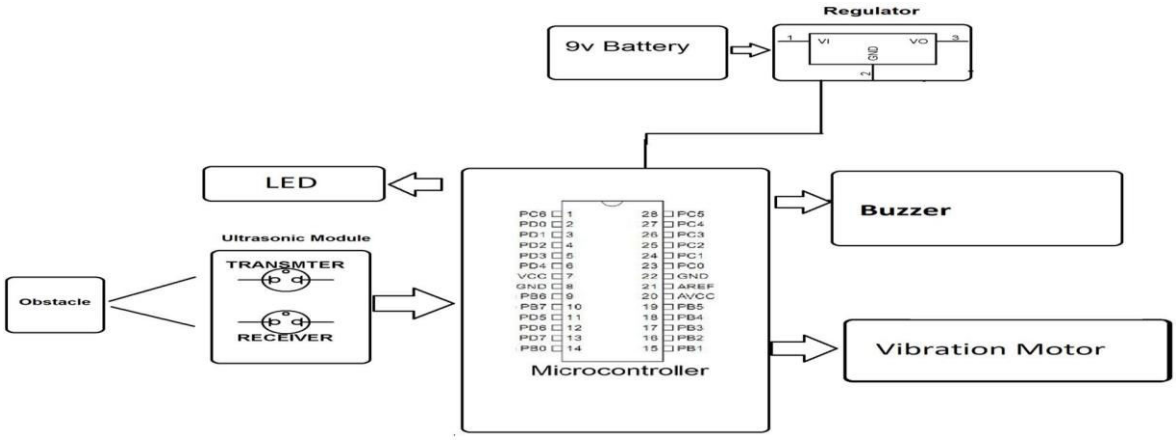

Fig 6: Block Diagram

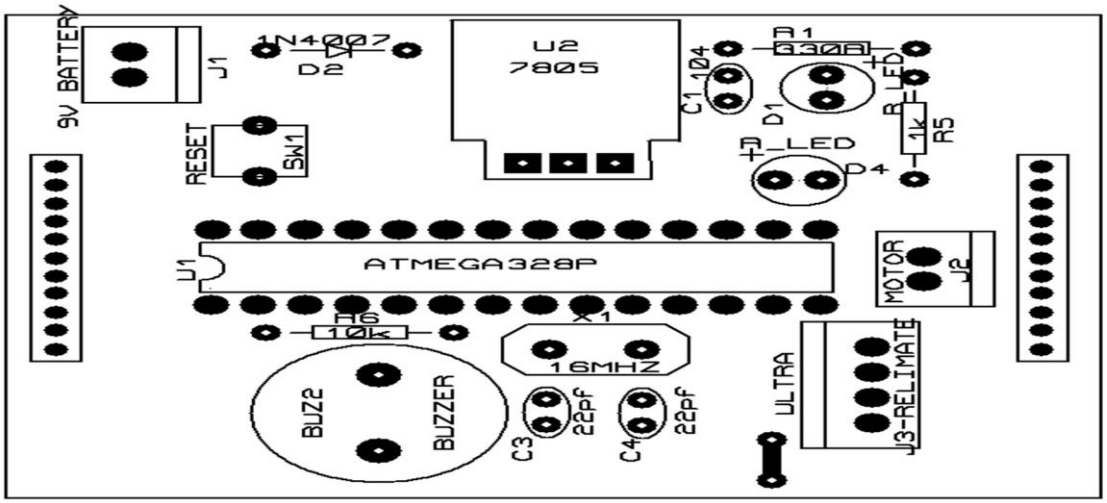

Fig 7: Circuit Layout

IV. RESULTS

With the improvement of the living standards of the people, we have become so materialistic that we have forgotten how the physically disabled people live a tough life. Eyes are responsible for observing and listen the

www.ijircce.com | e-ISSN: 2320-9801, p-ISSN: 2320-9798| Impact Factor: 8.625| ESTD Year: 2013|

International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

outside environment; dysfunction of such prime sense organ severely affects the knowledge perceiving capability of the outside environment. Therefore, going around to places in such an environment is a very big challenge because blind people cannot depend on their own eyes and thus face many difficulties. This project will help them to overcome their obstacles. Buzzer and Vibration motor are detecting obstacles clearly.

Fig 8 & 9: Working of Glove

V. CONCLUSION AND FUTURE WORK

People only need to wear this device as a band on their body. Thus, this project Arduino based obstacle detect or for blind people is a new method to resolve their problems. A less complex portable, cost efficient, easy to manage an effective system with many more amazing properties and advantages are proposed to provide support for the blind. The system will be very easy to find the distance between the objects and the sensor. As for the future enhancements, it can be added with advance sensing options, compact design, additional feedback options and battery optimization.

REFERENCES

1. Dr. C K Gomathy, Ms. Chitta Sonika, "The Smart Stick Assistant For Visually Challenged People Using AI Image Recognition". International Research journal of Engineering and Technology (IRJET) -2021.
2. Prof. Poonam Pawar, Rajeshwari Bhirud, Karan Shinde, Snehal Gawade, Reshma Gholpa, "Smart Blind Kit for Visually Impaired People": International Research journal of Engineering and Technology (IRJET) - 2020.
3. N.Loganathan, K.Lakshmi, N.Chandrasekaran, S.R.Cibisakaravarthi,"Smart Stick for Blind People": International Conference on Advanced Computing & Communication Systems(ICACCS)– 2020.
4. Priyanka Abhang, Shambhavi Rege, Shrishti Kaushik, Shriya Akella, Manish Parmar, "A Smart Voice-Enabled Blind Stick with An Emergency Trigger": (IEEE)- 2020.
5. Rajath V, Swetha Shekarappa G, Senbagavalli M, "GPS Based Smart Stick for the Blind and Visually Impaired People": International Research journal of Engineering and Technology (IRJET) – 2020.
6. T. S Aravinth, "Wi-Fi and Bluetooth based Smart Stick for Guiding Blind People": (IEEE)-2020.
7. Bhushan Chaudhari, Priyanka Dorugade, Hrushikesh Konde, Rehan Kondkari, Prof. Deepti Lawand, "Smart Stick Image Processing": International Research journal.
8. Akhlaqur Rahman,A.S.M Mehedi Hasan Shuvo,Kh. Fatema Nur Malia, Mahmudul Hasan Nahid,Md. Milan Mia,A.T.M. Manfat Zayeem, "An Efficient Smart Cane Based Navigation System for Visually Impaired People": IEEE 2019.

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INNO SPACE SJIF Scientific Journal Impact Factor

doi crossref

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details