iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** IV **Month of publication:** April 2024

DOI: https://doi.org/10.22214/ijraset.2024.60263

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue IV Apr 2024- Available at www.ijraset.com

Implementation of Third Eye for Blind People Using Ultrasonic Vibrator Glove

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Abstract: ***The "Third Eye for Blind People Using Ultrasonic Vibrator Glove", is designed to help the blind to overcome the lack of visual sense, by using other senses like sound and touch. It uses audio and vibration signals to notify the user about upcoming hurdle. As the distance between glove and obstacle decreases, frequency of both audio and vibration signals increases, Thus the system helps to ease the navigation process for the needy.***
The system uses Atmega-328 microcontroller, which is a high performance 8-bit AVR RISC-based microcontroller. It has 32KB of ISP flash memory with read-while-write capabilities, as well as 1KB EEPROM, 2KB SRAM. It also has features like, 23 general purpose I/O lines, 32 general purpose working registers and three adjustable timer/counters with compare modes. For sensing the distance. the system uses a HC-SR04, a Ultrasonic Range Finder Distance Sensor Module. The sensor module is designed to measure the distance using the principle of SONAR or RADAR, of using ultrasonic wave to determine the distance of an object.

I. INTRODUCTION

Blindness can significantly impact a person's ability to navigate and interact with the world around them. However, recent technological advancements have made it possible to develop devices that can help people with visual impairments to regain some degree of independence. One such device is a third eye for the blind, which uses ultrasonic vibrations to provide sensory information about the surrounding environment. The third eye for the blind consists of a glove with ultrasonic vibrators attached to the fingertips. The vibrators are controlled by a microcontroller, which receives input from an ultrasonic sensor mounted on the back of the glove. The sensor emits ultrasonic waves that bounce off objects in the surrounding environment and are detected by the sensor. The microcontroller then converts this information into vibrations that are transmitted to the fingertips of the glove. 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. They undergo rigorous, apathetic and indifferent behavior towards them for being physically disabled. They become dependent on other people in a way for their day-to-day routine chores. Blind and impaired persons always depend on other people for their locomotion. Eye are prime sense of organ in perceiving the outside environment function of such prime sense organ severely effects the knowledge perceiving capability of the outside environment. Therefore, going around to places in such environment is a very big challenge because the blind people cannot depend on their own eyes and thus face many difficulties The objective of this project The Third Eye for the Blind is to design a product which is very much useful to those people who are visually impaired and those who often have to rely on others. Third eye for Blind project is an innovation which helps the visually impaired people to move around and go from one place to another with speed and confidence by knowing the nearby obstacles using the help of the wearable band which produces the ultrasonic waves which notify them with buzz sound or vibrations. It allows the user those who are visually impaired to walk freely by detecting obstacles.

They only need to wear this device as a band or cloth on their body. Accordings to WHO or the World Health Organization, 39 million people are estimated as blinds worldwide. They are suffering from lots of hardship in their daily life. still has a lot of disadvantages and limitations. Another way is, having a pet animal such as a dog, but it is expensive. Thus, the aim of the project Third eye for the Blind is to develop a cheap, affordable and more efficient way to help the blind people to navigate with greater comfort, speed and confidence. This is the wearable technology for the blinds which helps resolve all the problems of the existing technologies. Now a days there are so many technologies, things and smart devices for the visually impaired people for the navigation, but most of them have certain problems for the blind people and the major drawbacks are that those things need a lot of training and efforts to use. One of the main perticularity of this innovation is, it is affordable for everyone, the total cost being less than S25 or ~1500 INR. There are no such devices available in the market that can be worn like a cloth and having such a low cost and simplicity.

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II. LITERATURE SURVEY

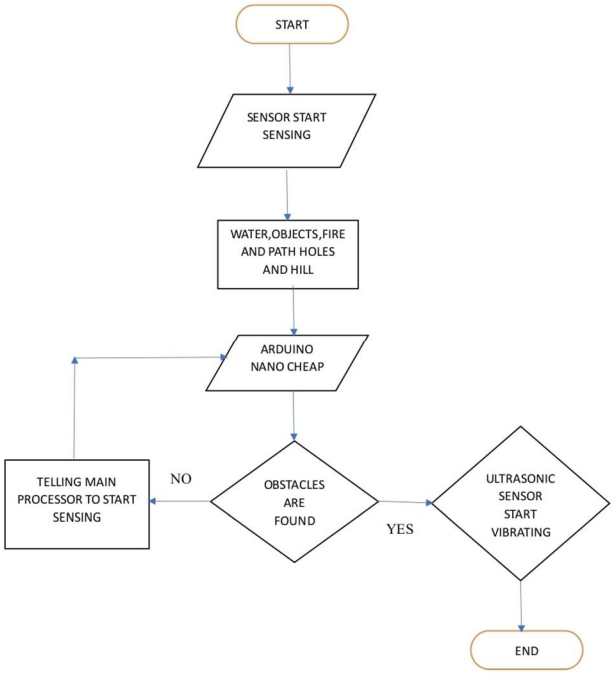
Dr.Rambabu. S. Navya, M. Sahithi Vyas, A.Dishendra Sekhar Published a paper in which determined value for third eye for bliend people .in drawback of their project is that they did not include any digital equipment to send the proper direction of the blind people. (janfeb2023) Dr. V.Rama Krisha sharma, Akash Reddy published a paper in which distance majored analog value between the user and the abtacles. They published on March 2022 International Journal Of Mdenization Of Engineering Technology Science.

III. SMART GLOVE FOR BLIND PEOPLE

In order to help visually challenged people. A study that helps those people to walk more confidently is proposed. The study hypothesizes smart walking gloves that alert visually impaired people over obstacles, pits thus this device could help them in walking with less accident. It outlines a better navigational tool for the visually impaired. It consists of a simple walking equipped with sensors to give information about the environment. GPS technology is integrated with overcoming their difficulties in daily life. Now a days, technology and human life cannot be separated as it has become the phenomenon of the world. But how the technology can help people that are visually impaired? Blind people usually can estimate the obstacle in front of them without knowing the actual distance of the obstacle from them. Mobility for the blind people can be defined as mobility to move with safety and ease through environment without rely on other. Most commonly mobility aid used by the blind are cane and guide dogs to facilitate their movement. But there are problems with this navigation support.

IV. PROPOSED IDENTYFICATION

The existing system consists of the devices or the supports like white cane for helping them to detect the obstacles and travel to places, pet dogs, smart devices like vision a torch for blinds. But there were many limitations and problems in this existing system like in the white cane, it may easily break or crack. The white cane may get stuck at the pavement cracks of the different objects. Whereas the pet- dogs cost is huge and need a lot of training According to Mazo and Rodriguez the blind Cane is one of the assisting tools for the visually impaired and it Is really important. According to Herman. one of the main problems of the visually-impaired, is that most of these people have lost their physical integrity. Also, they do not have confidence in themselves. This statement has been proven by Bouvrei in which an experiment name —Project Prakash! Has been carried out. It was intended at testing the visually impaired to utilize their brain to identify set of objects. According to Chang and Songs, this can also be applied to different situation. When the visually-impaired walk into a new environment, they will find it difficult to memorize the locations of the object or obstacles. These examples demonstrate the difficulties of visually impaired people.



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The Guide Cane is designed to help the visually-impaired users navigate safely and quickly among obstacles and other hazards. Guide Cane is used like the widely used white cane, where the user holds the Guide Cane in front of the user while walking. Smart Cane has been designed by students from Central Mition (RFID) Radio Frequency Identifying University where this invention uses RFID is used to detect objects or obstacles in front of the user and detects the RFID tag that has been placed in several areas to navigate the users. 'This invention is just like a normal stick but is equipped with a bag, worn by the user.

A. Modules

1) Software

There are two main software used in developing this project which are Arduino software and Fritzing software. Arduino software used to write the program using C language and Arduino language. It is used to compile and install the program into the microcontroller. It also has the function to monitor the distance between obstacle and ultrasonic sensor. It will display the value of distance and make the project easier to be tested.

Fritzing software is used to design the circuit connection of all the hardware. Since all the hardware will have their own library. Fritzing software is a suitable software to be used in this project as it will help in showing the circuit connection and the schematic of the system. Besides that, SolidWorks also used to design structure of frame which is used to hold the position of ultrasonic sensors.

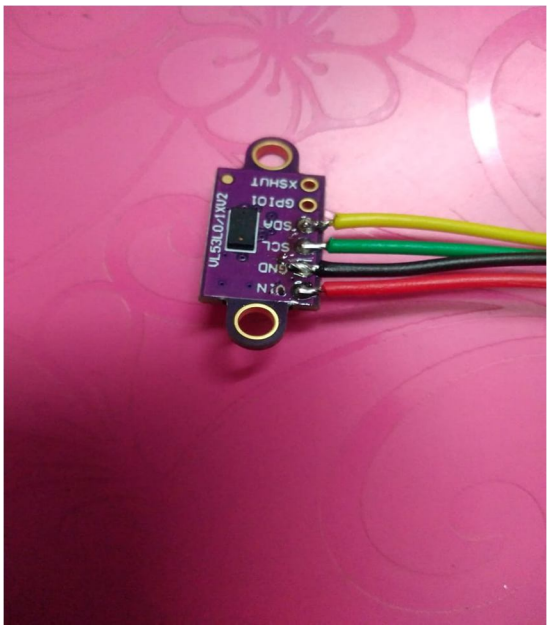
2) Hardware

There are six main hardware in this project.

a) Ultrasonic Sensor.
b) Sensor Position
c) Arduino UNO
d) Switch
e) USB to TTL Converter Adapter
f) Servo Vibrator Motor
g) Jumper Wires
h) Buzzer
i) Vibrator

V. SNAPSHOTS/OUTCOMES

Outcome 1: VL53L0 Laser Distance sensor



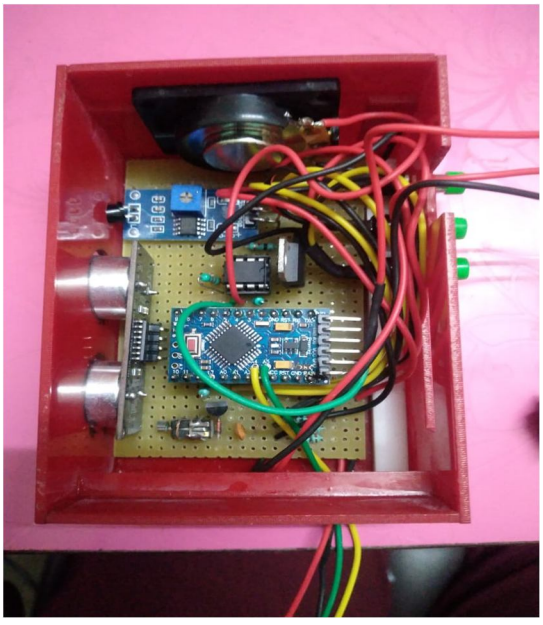
Outcome 2: HC-SR04 Laser Distance Sensor



Outcome 3: Project Incloser Box



Outcome 4: Complent Controller Board



VI. CONCLUSION

Thus, this project proposed the design and architecture of a new concept of Arduino based Virtual Eye for the blind people. A simple, cheap, efficient, easy to carry, configurable, easy to handle electronic guidance system with many more amazing properties and advantages is proposed to provide constructive assistant and support for the blind and visually impaired persons.

The system will be efficient and unique in its capability in specifying the source and distance of the objects that may encounter the blind. It is able to scan and detect the obstacles in the areas like left, right, and in front of the blind person regardless of its height or depth. With the proposed architecture, if constructed with at most accuracy, the blind will be able to move frome one place to another without other help.

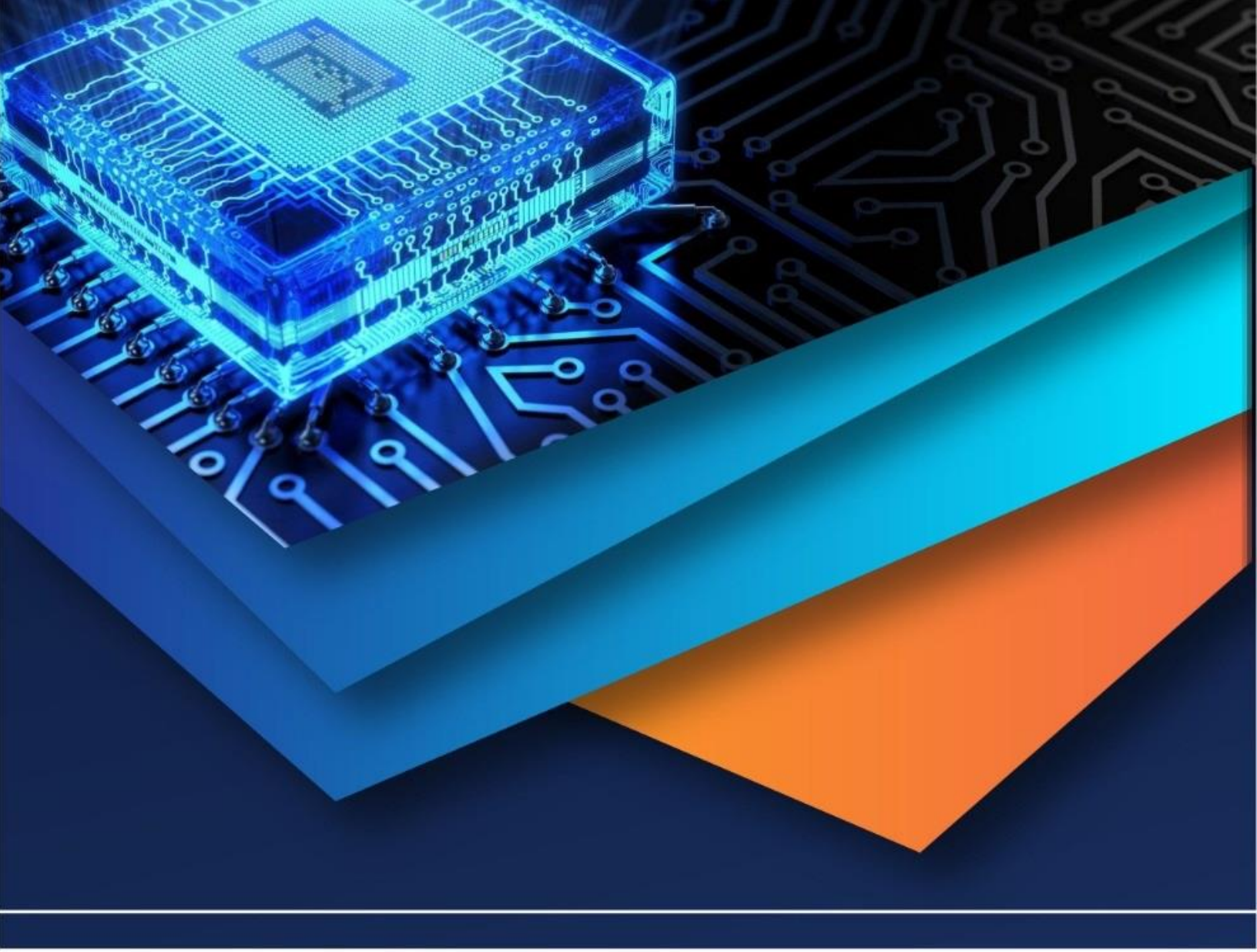
VII. ACKNOWLEDGEMENT

Author wishes to thanks the management of Nagpur Institute of Technology, Nagpur for their unwavering support and guidance throughout. Their valuable insights and mentorship have been instrumental for the successful completion.

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