ZKG INTERNATIONAL ISSN: 2366-1313

PROTOTYPE AND WORKING MODEL OF HAZARD DETECTOR FOR BLIND PERSON USING UV PROXY SENSOR,WATERDROP SENSOR AND ARDUINO BOARD.

SYED MOHSIN AHMED[1], SHAIK MOHAMMED ADIL[2*], ABDUL AHAD SHAHZEB[3], M D BAHAUDDIN [4*]

[1,2,3*]Final Year Student From Department of Mechanical Engineering, ISL Engineering College, Bandla Guda, Hyderabad, Telengana

[4*]Assistant Professor From Department of Mechanical Engineering, ISL Engineering College, Bandla Guda, Hyderabad, Telengana

ABSTRACT

Third eye for the blind is an innovation with the help of the multidiscipline subjects like computer science, electronics engineering and health science which 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 a buzzer sound or vibration. According to WHO 39 million people are estimated as blinds worldwide. They are suffering a lot of hardships in their daily life. The affected ones have been using the tradition white cane for many years which although being effective, still has a lot of disadvantages. This will be a wearable technology for the blinds. One of the main peculiarities of this device is that it will be affordable. The Arduino Pro Mini 328- 15/16 MHz board is worn like a device. This will be equipped with ultrasonic sensors, consisting of module. Using the sensor, visually impaired can detect the objects around them and can travel easily. When the sensor detects any object, it will notify the user by beep or vibration. Thus, this is an automated device. Thus, this device will be of a great use for the blinds and help them travel different places.

Keyword: ***blind, ultrasonic sensor, sound, vibration*****Introduction**

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 behaviour towards them for being physically disabled. They become dependent on other people in a way for their daily routine chores. Blind and impaired persons always depend on other people for their locomotion. Eyes are prime sense of organ in perceiving the outside environment; dysfunction 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 to help those people who are visually impaired and those who often must 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 them to walk freely by detecting the obstacles.

Problem Statement

According to WHO 39 million peoples are estimated as blind worldwide. They are suffering a lot of hardship in their daily life. The affected ones have been using the traditional white cane for many years which although being effective, still has a lot of disadvantages. Another way is, having a pet animal such as a dog, but it is really expensive. So the aim of the project is to develop a cheap and more efficient way to help visually impaired to navigate with greater comfort, speed and confidence.

The existing systems:

- White cane
- Pet dog
- Smart devices (eg : Vision a torch for blinds)

ISSN: 2366-1313

Literature Review

This chapter extend the literature reviews that cater the information in accordance with the objectives of this project. The relevant information and other extra feature.

Obstacles detector for blind people

Since the running of daily life of blind people is very difficult. This project helps them to run their life as usual. They can make this project as a gadget or a device in their hands which detects the obstacle. This project is more efficient than the existing system with cheaper and accurate one. Here we are using arduino UNO board to perform this operation. To make the life to be as a normal one for the blind peoples this may be very helpful project for them. By making this as a gadget or a device in their hand they can easily judge an object by their own by knowing the buzzer sound. The system uses ultrasonic sensor as a wide range of field to detect an object with its higher detection range. Based on this project we take survey in our institution.

Shovel proposed a method for the blind people. He proposed two different types of sounds. The major drawback of his work is to identification of the sound. The blind people cannot differentiate the sounds. Yuan introduced concept of active triangulation that was used in his proposed device. It will detect the object. The main disadvantage of this work is, it can only detect the object at the rate of 15 measurement/ second and also faces a surface discontinuity. JM. Benjamin proposed a three-direction detectable laser cane. The direction is 45 degrees over and parallel to the ground and with sharp deepness. It is basically a hit and trial method it is used only in indoor systems. The main disadvantage in his system is it is not suitable for outdoor activities.

S. Sabarish proposed a system which is like our project nearly, but he has some vibrators in his device. It is not successful, but he keeps on working on it. MA. Espinosa & S. Ungar introduced an idea, that was costlier than the normal one. He did not consider the poor peoples who cannot afford. Pooja Sharma created a device for blind people. In that case the object has been detected but within a certain range. only within that range the object can be identified.

This was the major limitation in this paper. All the above existing system cannot satisfy the exact needs of the blind peoples. They use a white cane and pet dogs which is very costlier and difficult to maintain. To overcome those limitations this project will help. Nowadays there is a lot of technologies available for the visually challenged but our project is cheaper among them.

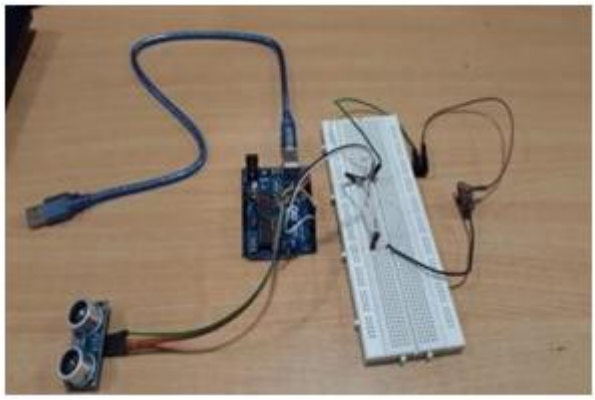


Figure 2.1: Obstacle detector for blind people

Third Eye for Blind Person

In this modern era of technology, Smartphone devices have become one of the most common consumer devices. A Smartphone plays a very important role in human life. Smartphone's make life easier with its various functionality like – communicating with others through voice calls, emails, messages, browsing the internet, taking photos, etc. With the help of Smartphone's, these all have become a matter of seconds. For example, you just have to dial the person's

ISSN: 2366-1313

contact number from your phone and wait till he/she responds. But this pleasure is only for those people who do not have any disability. Blind people can live a normal life and do things according to their lifestyle but, they must face a lot of difficulties as compared to the normal people without any disabilities.
One of the biggest problems for visually impaired person, especially the one who is totally visually impaired, or blind is that they cannot use a smart mobile phone. There are no such gadgets accessible in the market that can be worn like a material and having such a minimal effort and straightforwardness. With the utilization of this extemporized gadget in a huge scale, with changes in the model, it will profit the network of the outwardly debilitated or the visually impaired individuals. The target of this task The Third Eye for the Blind is to plan an item which can overcome the problem of individuals who are outwardly debilitated and the individuals who frequently need to depend on others.

Third eye for Blind task is a development which helps the outwardly debilitated individuals to move around and move between different places with speed and certainty by knowing the adjacent hindrances utilizing the assistance of the wearable band which delivers the ultrasonic waves which inform them with the inbuilt voice assistant. In this system we are developing the navigation system for the blind persons. This is very easy to use and work as a navigator to the blind people to easily navigate. In this system the ultrasonic or sensor will detect the object and gives sound (object 'beep sound') and camera scan the object using object detection technique and predict the object and by using speech recognize the object name is convert into sound and client can know the object by the help of headset. The object and person name and data are store in the module and if the data is not present it will simply say no data image present give a beep sound.

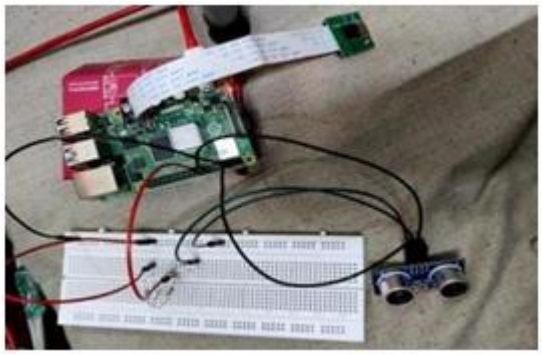


Figure 2.2: Third eye for blind person

Navigation System for Blind - Third Eye

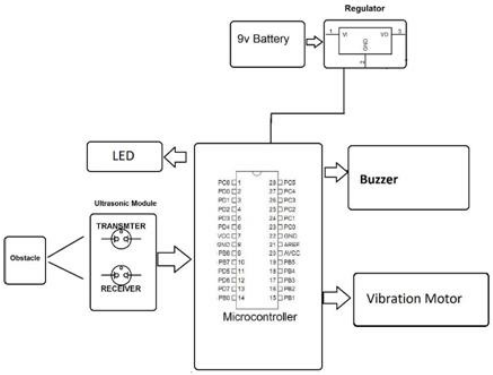
This project proposes the design of portable AI based ―guidance system for blind –Third Eye‖, which benefits the visually impaired community and helps in their day-to-day mobility. Third eye provides the visually impaired community a new way to visualize the world by explaining them about their surroundings. The whole system is controlled by Raspberry Pi microcontroller. Third eye harnesses the maximum capabilities of Raspberry Pi microcontroller which has enough potential to uphold the system with one advantage being the inbuilt graphic card.

The prototype uses various sensors such as IR Sensors, Sonar Sensors and a Camera module which helps the system to gather the required data. Additionally, text to speech module is used to talk to the user. Python forms the heart of the system. It is used to program the whole system which helps the raspberry pi microcontroller to communicate with all the sensors. It then processes the collected data and converts it into information which is finally delivered to the end user. The IR sensor is used to map the object's shape and size while the sonar sensors get the data about the distance of the object at regular intervals. Camera module plays an important role as it takes the pictures which is then processed using image processing technique to properly visualize the object. All the information is processed and converted to text which is then fed into a text to speech module.

Methodology

Methodology is the method used to carry out the project, for this hand gripper for rehabilitation process device. In this chapter are showing the flow process how the device in the making. The method and development in this project are being done with consulting by supervisor. In this project methodology are consists of block diagram, project flowchart, product flowchart, design product, schematic diagram, component that being used and figures.

ISSN: 2366-1313



Block diagram

This block diagram is showing demonstrated the operational flow chart for the proposed third eye for blind.

Flow chart

a. Process of the project

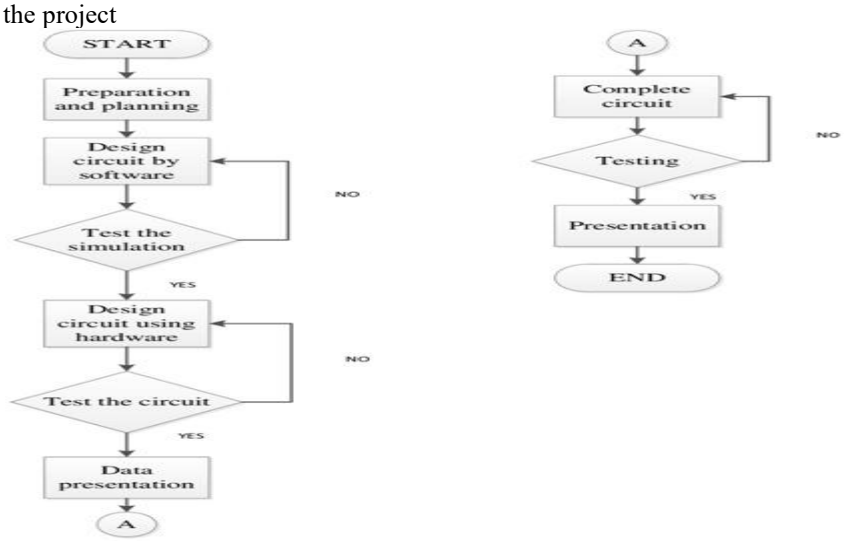


Figure 3.2: Flow chart of the process of project

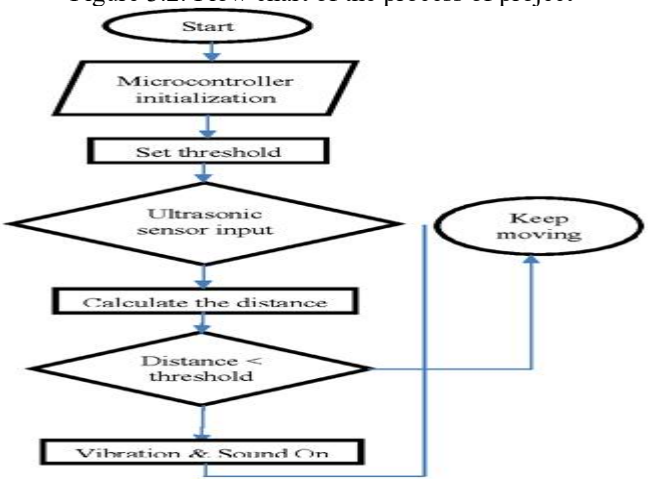


Figure 3.3 Flow chart of the Product Development

ISSN: 2366-1313

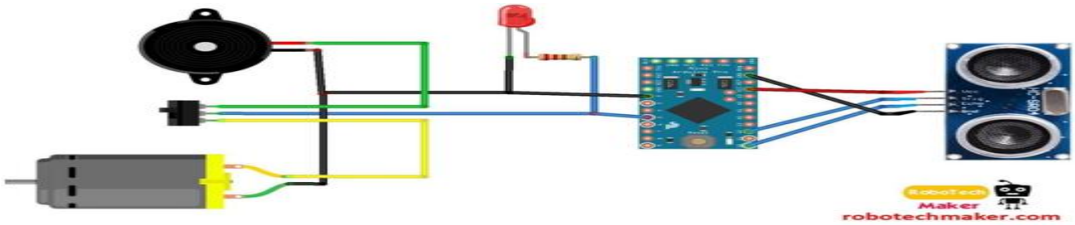


Figure 3.4: The design of project

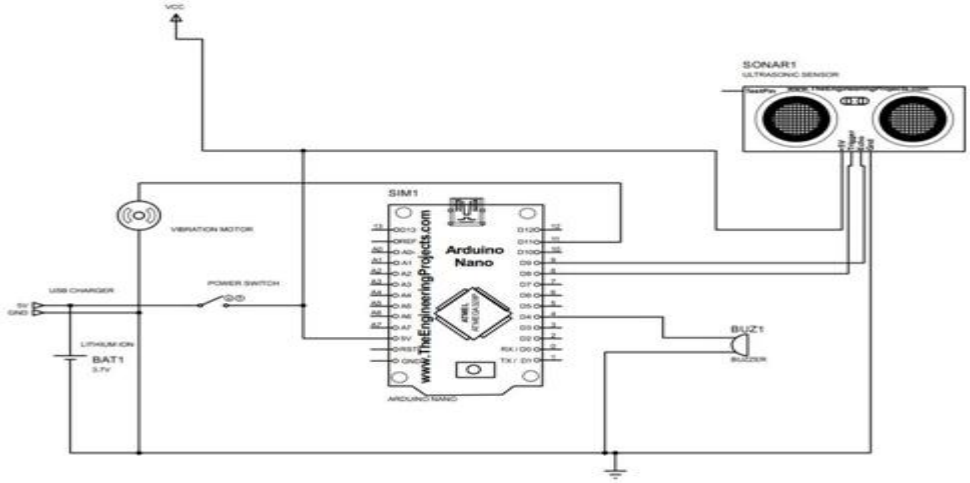


Figure 3.5: Schematic diagram 1

Components used

Hardware Products that are used consists of Arduino pro mini, ultrasonic sensor, buzzer,vibrating motor.

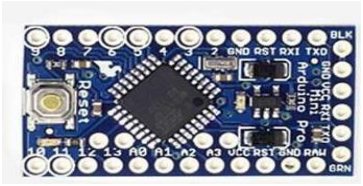


Figure 3.7: Arduino pro mini

The Arduino Pro Mini is a microcontroller board based on the ATmega328P.

It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, an on-board resonator, a reset button, and holes for mounting pin headers. A six-pin header can be connected to an FTDI cable or Sparkfun breakout board to provide USB power and communicationto the board.

Figure 3.8: Ultrasonic sensor

An ultrasonic sensor is an electronic device that measures the distance of a target object by emittingultrasonic sound waves and converts the reflected sound into an electrical signal.

ISSN: 2366-1313

Figure 3.9: Buzzer

The buzzer is a sounding device that can convert audio signals into sound signals. It is usually powered by DC voltage. It is mainly divided into piezoelectric buzzer and electromagnetic buzzer,represented by the letter "H" or "HA" in the circuit.

Figure 3.10: Vibration motor

Vibration motor is a coreless DC motor, and the size of this motor is compact. The main purpose of this motor is to alert the user from receiving the call by without sound/vibrating. The main feature of this motor is, it has magnetic properties, lightweight, and motor size is small.

Project development

All the components are electrically connected with wires by soldering.

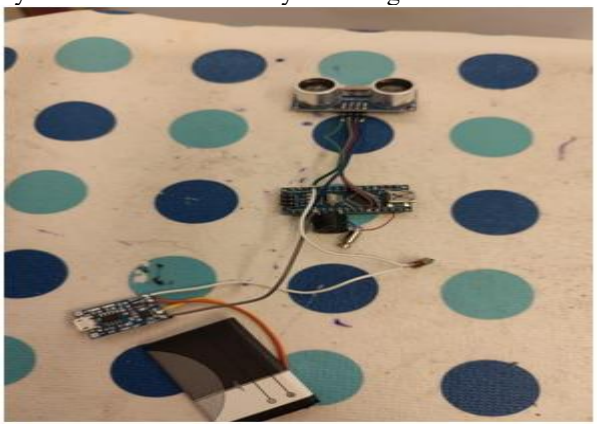


Figure 3.12: Circuit connection of project

Result

The ‘Third eye for blind project’ is a device that help blind people to overcome the problems theyface in their daily life due to their disability in vision. This device uses ultrasonic sensor to detectthe obstacles and will alert the user with buzzer and vibrating motor. With the ultrasonic sensor and two alerting system, this device secures the safety and efficiency of blind people even without the help of others or other equipment such as blind stick. This is a new technology that all blind people can rely on .

ISSN: 2366-1313

Besides that, this is the first wearable technology for blind people which resolves all the problems of existing technologies. Now a days there are so many instruments and smart devices for visually impaired peoples for navigation but most of them have certain problems for carrying and the major drawbacks is those need a lot of training to use. The one of the main peculiarities of this innovation is, it is affordable for everyone, the total cost being less than RM200. There are no such devices available in the market that can be worn like a cloth and having such a low cost and simplicity. When used on a large scale, with improvements in the prototype, it will drastically benefit the community.

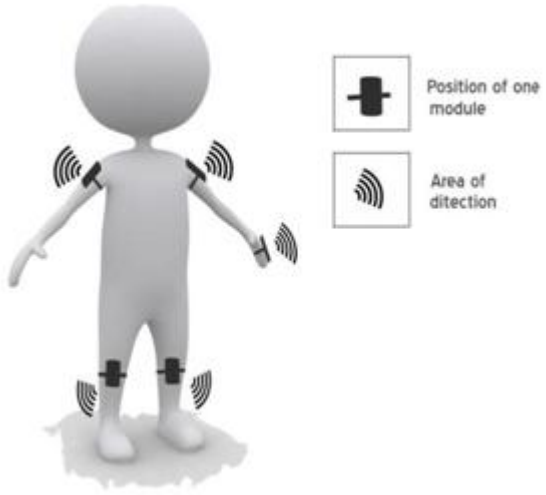


Figure 4.1 : Results

References

[1] D. Bolgiano, E. Meeks." A laser cane for the blind", IEEE Journal of Quantum Electronics. View at Google Scholar. 1967; 3(6):268.

[2]]S. Shovel, I Ulrich, J. Borenstien.Nav Belt and the Guide Cane, IEEE"Transactions on Robotics & Automation". 2003;10(1):9-20.

[3] THIRD EYE FOR BLIND PEOPLE USING ULTRASONIC VIBRATING GLOVES WITH IMAGE PROCESSING. Suprabha Potphode1, Sneha Kumbhar2, Prashant Mhargude3, Parvin Kinikae-ISSN: 2395-0056 Volume: 07 Issue: 03 | Mar 2020 www.irjet.net p-ISSN: 2395-0072.

[4] K. XIANGXIN, W. YUANLONG, L. MINCHEOL, Vision based guidedog robot system for visually impaired in urban system. 13th International Conference on Control, Automation and Systems (ICCAS), 2013.

[5] M. Maragatharajan, G. Jegadeeshwaran, R. Askash, K. Aniruth, A. Sarath, Obstacle Detector for Blind Peoples. International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-9 Issue-1S4, December 2019

[6] JM. Benjamin,NA. Ali, AF. Schepis. "A laser cane for the blind", Proceedings of San Diego Medical Symposium, 1973, 443-450

[7] S. Sabarish. "Navigation Tool for Visually Challenged using Microcontroller", International Journal of Engineering and Advanced Technology (IJEAT), 2013; 2(4):139-143.

[8] D. Yuan R. Manduchi. "Dynamic Environment Exploration Using a Virtual White Cane", Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR), University of California, Santa Cruz, 2005, 1-7.

ISSN: 2366-1313

[9] Samartha Koharwal, Samer Bani Awwad, Aparna Vyakaranam. Navigation System for Blind- Third Eye. International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-5 March, 2019

[10] Zhihong Zeng, et al., "A Survey of Affect Recognition Methods: Audio, Visual, and Spontaneous Expressions," IEEE Transactions on Pattern Analysis and Machine Intelligence, 1st ed., IEEE Computer Society, 2009, pp. 39 – 58.

[11] Laurence Devillers, Laurence Vidrascu, Lori Lamel, "Challenges in real–life emotion annotation and machine learning based detection," Neural Networks, 1st ed., Elsevier, 2005, pp. 407 – 422.

[12] Pooja Sharma,SL. Shimi,S. Chatterji. “A Review on Obstacle Detection and Vision”, International Journal of Science and Research Technology. 2015; 4(1):1-11.

[13] D. Bolgiano, E. Meeks.” A laser cane for the blind”, IEEE Journal of Quantum Electronics. View at Google Scholar. 1967; 3(6):268.

ISSN: 2366-1313