

Eye for Blind People

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Abstract

This project eye for blind people is a creation with the help of electronics engineering, which is used to help the blind people to detect the obstacles while walking by ultrasonic wave notify with buzzer sound. Many people are physically disabled with blindness worldwide. Blindness, the state of lacking visual perception due to physiological and neurological factor. They suffer a lot in the daily life. Our technology which is handy and affordable. The ultrasonic sensor is equipped with Arduino Nano , which can be worn like wearable device. Using the sensor ,visually impaired can detect the objects the around them. when the sensor detect any object it will notify the user by beep on buzzer. It is an automated device. which helps them to travel in different places.

Keywords – *Arduino nano, buzzer, ultra sonic sensor, visually impaired.*

I.INTRODUCTION

Improvising the living standard of blind people, who are facing a lot of struggles in their routine life. They faced apathetic situation and abnormal behavior from the normal peoples. They always depend on others help for their daily life. Eye are superior sense organ incapability of visualizing the outside environment. Therefore, going around to places in such situation is a very big challenges because the visually challenged cannot sense with their own eyes and thus face many difficulties.

The objective of this project The Eye for the blind is to create a product which should be useful to people who are visually challenged. Eye for blind project is a creation which is very useful for visually challenged people to move one place to another with confidence and by knowing the obstacle nearby using the ultrasonic waves which notify them using the buzzer. They just need to wear this device as a band on their hand.

According to WHO the World Health Organization, 39 million people are living as blind worldwide. They have been using the white cane for many years and another way is having a pets such as dog s, but still has a lot of disadvantages. Thus aim of the project Eye for the blind people is to create an affordable and efficient way to help the blind people to direct them with greater comfort and confidence.

At present, there are so many technologies and smart devices for the blind people for guiding direction, but most of the devices have drawbacks and those things need lot of training. Best part of this project is the cost being less than Rs.1400. There are no other products available in the market having such low cost and simplicity. with this device, having improvements made to the prototype, it will have tremendous benefit to the community of the blind people. The walking cane is simple and purely mechanical device to detect static or the constant obstacle on the ground, uneven surfaces, holes. this device is weightless, portable and it is not used for instant sensing of obstacles .

Operation of the device same as the operation of Radar and the system of the device uses the ultrasonic waves to identify the height of, the distant object, direction of movement and speed of the objects as well as the user.

II.LITERATURE SURVEY

Over the last few years, the research has been conducted for a new devices to design a better and efficient system for visually impaired people to sense the obstacles and alert them at that instance.

Shovel^[1] developed a Navbelt, an obstacle avoidance wearable portable computer which can be used for indoor navigation. Navbelt has two modes, the first one in which information was translated into audio in different sounds and the another one for travel direction. It is hard to differentiate the sounds. The system couldn't find the user moving position.

D.Yuvan^[2] the white cane sensing device (stick). this device that can measure distance at a rate of 15 m/s This device can sense discontinuities on the surface, such as the foot of a wall, a staircases.

Benjamin^[3] establish a laser cane. This laser cane sense the obstacles in three define directions. It is like 45° to the ground and other for sharp deepness. it has the drawback that it is used as normal stick or cane.

Sabarish^[4] have described the system which is based on the microcontroller like Arduino with synthetic speech output.

M.A Ungar^[5] has proposed methods for the blind people in the urban cities. but they didn't considered about the people who afford costly equipment and devices.

Ms.Pooja Sharma has discussed that the obstacles can be detected, but it has limitations on the angles and the distance. the sensor will detect wide range.

III.SYSTEM ARCHITECTURE

The device or the wearable band is circuited with the Arduino. The LEDs and the buzzer are connected to the Arduino board. The soldering is done according in the Arduino and the connections are established.

IV.EXISTIN SYSTEM

The existing system consists of the devices or the supports like white cane, pet dogs, smart devices to detect the obstacles and travel to places. but there are limitation and problems in the existing system like in the white cane, it may easily breaker crack. Whereas the pet dogs cost is huge and a lot of training.

V.PROPOSED SYSTEM

The model is a wearable device based on the Arduino board which can be worn like a band. This device is equipped with a ultrasonic sensors. This module replace the white cane, and by wearing it the blind can sense the obstacles. when the ultrasonic sensor senses the obstacle, the device will notify the user through the buzzer. The rate of buzzer sound increases when there is a decrease in distance and this process is a fully automated by the device.

The features of the Eye for blind will help the visually impaired people in many ways. By using this devices they can avoid using white cane completely and other devices. This device will help the blind people to navigate without a stick or another person’s help. And with little training to use it, it is quite simple,easy to operate and wear.

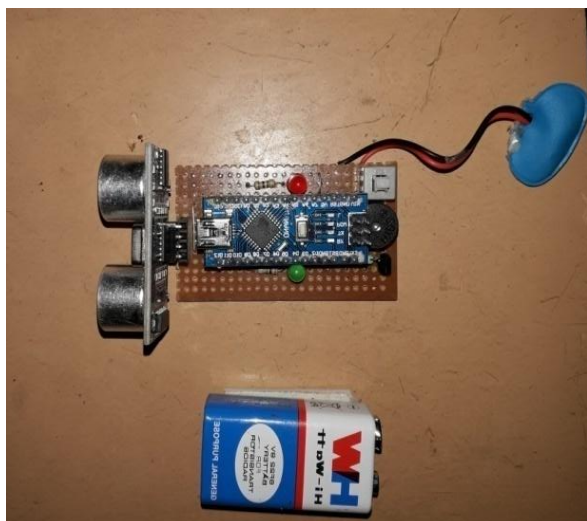


Fig 1 Our proposed system

VI.WORKING OPERATION

This system consists of components like Arduino Nano, ultrasonic sensor, dotted PCB board, buzzer for detecting the obstacles, Red and green LEDs, switches, 9v battery, male and female pins, and some elastic and stickers to make the device wearable as band for the user. The wiring of the prototype is done in a following manner. the ground of LEDs, buzzer are connected to the ground terminal of Arduino. The positive terminal of the LED and the middle terminal of switch is connected to the pin. The positive terminal of the buzzer is connected to the first terminal of the switch. the ultrasonic sensor is connected accordingly. The ultrasonic sensor pin VCC is connected to the Arduino pin VCC and same as both ground are connected each other.

The following block diagram (fig 1.2) denotes the existing system

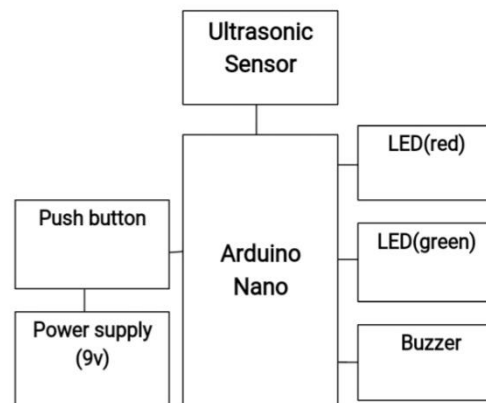


Fig 2 Block diagram of the system

We cut the dotted pref board in 5X3 cm dimension. then connection of LED is done. then connect the switch and connect Arduino and ultrasonic sensors connect all the 9v battery. At the end of all connection upload code into Arduino. The Ultrasonic sensor which acts as a transducer, and used in a pair to work as transceiver. The transmitter emits the Ultrasonic waves and if any objects are present, the time interval between the receiving and sending of the signals is calculated is to help the individual, the blind person to find the distance between the obstacles.

The equation of the distance calculated between the sensor and the object is

$$D = (HPTW * SV) / 2$$

Where, D=Distance in cm, sv=Sound velocity in cm/s, HPTW=High time of pulse width.

The sensor which is used the ultrasonic pulses must not be overlapped one with the other. sensor has field of coverage over 60 degree for 4 feet distance, as the

distance from the sensor increases, the coverage angle decreases. Thus, the objective is to cover wide angle to detect the obstacles around the blind people and make easy for them to move around. Hence the calculation of distance is by the sensor and further buzzer of the user is carried out. Thus ,this way Eye for blind people will be designed for the people who are suffering blindness and it will make it very easy and convenient as it will be wearable devices and the user can travel anywhere with the help of prototype and detecting the obstacles while walking very easily.

VII.RESULTS

The presented system is created and configured for the use of the visually disabled people. The devices responds to the user in all the circumstances which is faced by the blind people with the help of use of the ultrasonic sensors and the Arduino Board.

Table 1 Tested Result

Distance	LED(red)	LED(green)	Buzzer
Plane surface	Off	Off	Off
Damaged surface	Off	On	On (beep once)
On Impact	On	Off	On(beep multiple)

VIII.CONCLUSION

Hence, this project introduces the model and structure of a new concept of Adriano based Virtual Eye for the blind. A simple, cheap and efficient to use and also configurable. This electronic guidance system with many more amazing properties and advantages. It is proposed to provide a constructive assistant and a support for the visually impaired persons. The system is unique in its capability of specifying the user and distance of the obstacles that may hit the blind person .It is able to sense the obstacles. With the defined structure. It is built to find with more accuracy, the blind will able to move without the help others.

IX. FUTURE IMPROVEMENT

The project can be created in the form of band. By specifically the specialized Arduinoboard that are programed and also by using ultrasonic sensors makes and gives faster response that makes the model capable of working even in crowded places and thus this will be implemented in the future enhancement of this device. And also speech recognition kit for saying the directions to navigate.

REFERENCES

- [1] Shraga Shovel, Iwan Ulrich, Johann Borenstien. Nav Belt and the Guide Cane, IEEE Transactions on Robotics & Automation. 2003; 10(1):9-20.
- [2] Yuan D, Manduchi R. 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.
- [3] Benjamin JM, Ali NA, Schepis AF. A laser cane for the blind”, Proceedings of San Diego Medical Symposium, 1973, 443-450.
- [4] Sabarish S. Navigation Tool for Visually Challenged using Microcontroller, International Journal of Engineering and Advanced Technology (IJEAT), 2013; 2(4):139-143.
- [5] Espinosa MA, Ungar S, Ochaíta E. Blades comparing methods for Introducing Blind and Visually Impaired People to unfamiliar urban environments., Journal of Environmental psychology. 1998; 18:277-287.