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THIRD EYE FOR BLIND

Burhanali Irfan Mastan[1], Sehreen Mohd Shafi Kazi[2], Muskan Zakir Gavandi[3], Salina Mohammed Aslam Budye[4]

[1-4]*Students, Department of Electronics and Telecommunication Engineering, Finolex Academy of Management and Technology Ratnagiri, Maharashtra, India*

Abstract - *The Third eye for the blind is an innovation with the assistance of multidiscipline subjects like computing, electronics engineering, and health science which helps blind people to navigate with speed and confidence by detecting the nearby obstacles using the assistance of ultrasonic waves and notifying them with a pre-recorded voice alerts. The objective of this project is to design a product that is very much beneficial to those people who are visually impaired and those who often have to rely on others. There are approximately 37 million people across the world who are blind consistent with the World Health Organization. The proposed device is predicated upon the target finding using ultrasonic sound. The camera in the device helps to identify the person and to recall from the programmed memory when the objects re-appear before him. Even today blind people use a stick to find out obstacles present in front of them. But this traditional stick is inefficient in various aspects and the person using it has to face many problems. So we are designing this gadget with innovative technology.*

***Key Words*: Arduino Uno, Pixy Camera, Voice Module, Ultrasonic Sensors, LDR.**

1. INTRODUCTION

We know still today, in computerized era, the blind person use a stick as a navigational tool, but in addition to it we are designing a gadget which is efficient in various aspects and the person using this particular gadget will be able to overcome many of the problems occurring during moving around to fulfill their basic day to day needs. The Third Eye for Blind is way more advanced than the traditional walking stick. In this project, we will be using a Pixy camera with Arduino UNO Board. The main idea of using a Pixy Camera with Arduino UNO is to identify objects and send the data to Arduino so that it can recall the objects from the programmed memory. The Pixy camera recognizes seven distinct objects based upon their shape and color. Each of those objects is assigned a singular "signature".

In this project, we will discuss how this gadget is built and how it will help blind people.

2. LITERATURE SURVEY

The aim of this paper is to provide an obstacle identifier to blind persons so that they can be able to overcome the problems in addition to a walking stick. If the speed of sound in the medium is known and the time taken for the sound waves to travel the distance from the source to the subject and back to the source is measured, the space from the source to the topic are often computed accurately. Here the middling for the sound waves is air, and the sound waves used are ultrasonic and it is out of earshot to humans. [1] The ultrasonic sensor used here is a transceiver. The ultrasonic waves are emitted by the transmitter when the objects are detected. Both the transmitter and receiver are present inside the ultrasonic sensor. We can calculate the time interval between the transmitted and received signal. The distance between the object and sensor is calculated using this. When we increase the distance between the object and the sensor the coverage angle will decrease. The sensor has a coverage of 60 degrees. Thus, the objective is to cover a wide-angle to detect the obstacles with the help of ultrasonic sensors to help the blind and make it easy for them to move around easily without any hassle. [2]Ultrasonic sensors work on the principle of echo, studying its reflection on different obstacles is very important. The measurement cycle starts with the microcontroller transmitting the high-level pulse to the sensor trigger pin to start ranging, then the sensor will send out an ultrasonic signal and then wait to capture the rising edge output by echo port, depending on the measured distance. In case of no obstacle i.e. (no signal reflected), it waits for some time before it restarts transmission. Ultrasonic distance sensor uses the time of flight (TOF) to detect obstacles - the output is a digital pulse, whereas length is the time taken for the sound to reach the target and return before the beep is heard. [3]This research paper explains how the user controls electronic components like LED not in a standard way but using text by speech. This system is flexible with a variety of devices that can be controlled and is of low cost. Text by speech is achieved without using any external modules. The system comprises two segments, first, one to process signals which are received by a microphone, and the second segment is to interpret the processed signal. The system recognizes voice commands and converts them to desired data coordination and data transmission via a microcontroller (Arduino Uno). This research work has presented a model of a voice-recognized system for electronic devices. This solution is provided without using any external voice recognition modules. [4]Researchers used voice commands in the form of voice recognition with the hope that the smart home prototype being developed can have a better level of security. This is because voice recognition identifies the user's voice-based on intonation, accent, or speech style consistent with the stored voice. They focused more on developing research on the success of the

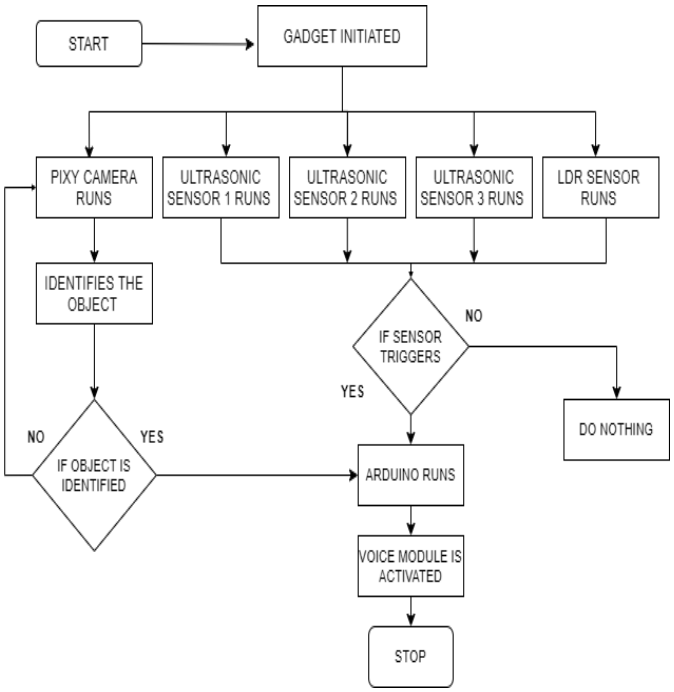
system in capturing words uttered by users due to each accent and sensitivity of the system to be better. [5]The speaker is that the output device that provides the specified speech when an obstacle is detected within the navigation path of the user of the walking stick or when help is required by the user of the cane. There are two types of speakers on this stick; the earphone that is constantly worn by the user, which gives the output when an obstacle is detected in the path of the user, and the loudspeaker which also gives the voice output when configured to do so but mainly used to give a voice output (alert) in case of emergency like when the walking stick falls down. [6]A person who can write can provide the input to the text to speech module using a keyboard and the module recites the written input provided by the person. This system changes normal text written into speech and allows the system to speak out the text in a human voice. [7]This article discusses the planning of a colored object follower robot. The colored object used features a simple shape. For the detection process, a wheeled robot that uses sensors supported digital images of Pixy 2. Pixy2 can learn to detect objects that you simply teach it, just by pressing a button. Additionally, Pixy2 has new algorithms that detect and track lines to be used with line-following robots. Pixy2 camera is able to recognize and track all objects whose color has been memorized. [8]This paper focuses on tracking systems based on image processing and is widely used in various fields. It aims at the matter of image blurring while photographing during a vibration environment. The project helps in stabilizing the video or image captured via a camera in a vibration environment using a color detection algorithm. This technique learns the environment then stabilizes the camera consistent with the vibration environment. [9]Color tracking technique is based on surface area of the target of interest and brightness from the background. The method used is via color tracking system using Pixy CMUcam5 sensor, Arduino MEGA microcontroller, ultrasonic sensors, servo motor, motor driver and transaxle motor. Pixy CMUcam5 sensor is used to perform color tracking on target of interest. [10]

3. LIMITATION OF THE EXISTING SYSTEM

The system which was developed before was a moderate budget navigational aid for visually impaired people. Following were the limitations of the project:-

- Requirement of power source.
- Bulky to carry.
- Does not protect from obstacles at torso and face level.
- Due to use of electronic components, any malfunction will be difficult for a blind person to identify or repair on the spot.
- It is not waterproof.
- Less mechanical strength.

4. PROPOSED SYSTEM



4.1 METHODOLOGY

The aim is to provide help for the blinds with the third type of aid. The Third Eye for Blind is integrated with ultrasonic sensors along with Voice Module and Pixy Camera. The proposed system will detect the upcoming obstacles in the path of blind person using ultrasonic waves. The system will also include voice module which will help the user with recorded voice alerts of the presence and direction of the obstacles. The camera which we will be using in this gadget is a pixy camera which will help to identify the objects and to recall them from the programmed memory. Our purpose to use this ultrasonic sensors, arduino, voice module, buzzer is because they are light in weight, user-friendly behaviour, easy to use and understand, flexible and cost reductive.

5. CONCLUSION

In general work can be classified on the basis of Ultrasonic Sensors for detecting the obstacles, Voice Module for pre-recorded voice alerts, Pixy Camera for training the objects which are to be identified. All the studies which had been reviewed show that, there are a number of techniques for designing this gadget for blind people. The literatures related to this topic were reviewed and analyzed. In future, further modifications to enhance the performance of the system can be added.

6. FUTURE SCOPE

The technologies behind the innovation of the visually impaired are upgrading day by day. And our model ensures one thing that is making the task of moving a blind person

easy and comfortable. The gadget will be very light and handy to carry. And the components or parts that we will use in this gadget will be also easily available and less in cost. The manufacturing cost of this model will be also quite low, that will make the gadget affordable for people of all class and age. Some of the techniques in which this gadget can be modified are given below:

- More sensors can be used for further applications.
- Image processing can be used for knowing about the volume of obstacles and object patterns.
- High range ultrasonic detector can be used.
- It can be further enhanced and improved by using VLSI technology to design the PCB unit. This makes the system furthermore compact.

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