iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XI **Month of publication:** November 2022

DOI: https://doi.org/10.22214/ijraset.2022.47446

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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 10 Issue XI Nov 2022- Available at www.ijraset.com

Visual Assistant Using Raspberry Pi for Blind People

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Abstract: Blind people face the many problem's in there life. They can't walk without any support. Mostly they are depend on others for help. This will help the visually impaired person to manage day to day activities. Blind reader is an intelligent assistant based on raspberry pi using this device , it is easier for the visually impaired to detect the object .raspberry Pi is used to implement artificial vision using python language on the Open CV platform.This system makes a better life for blind people as it will work with the latest technology and it is meant to the product the visually impaired to live life without any difficulties.
Keywords: Raspberry Pi, Arduino UNO,GPS modem, ultrasonic sensor, camera, voice recognition kit, LCD display.

I. INTRODUCTION

Artificial intelligent and the internet of things gained large amount of data. it is possible to make these peoples life mush easy. there are many difficulties faced by blind people. virtual impairment may cause people difficulties with normal daily activities. this project is designed to help blind people in their world using the sense of hearing. an this is a visual based project consisting of main component such as camera , raspberry pi ,altrasonic sensor ,vibrators , arduino mounted together and additional working technologies of the internet interlinked. the input of the project will be an images/video ,the image captured and analyzed with the help of camera interfaced to the raspberry pi and ai technology. the object is detected and information is sent through audio and is a conveyed to the blind person through speaker.

II. LITERATURE SURVEY

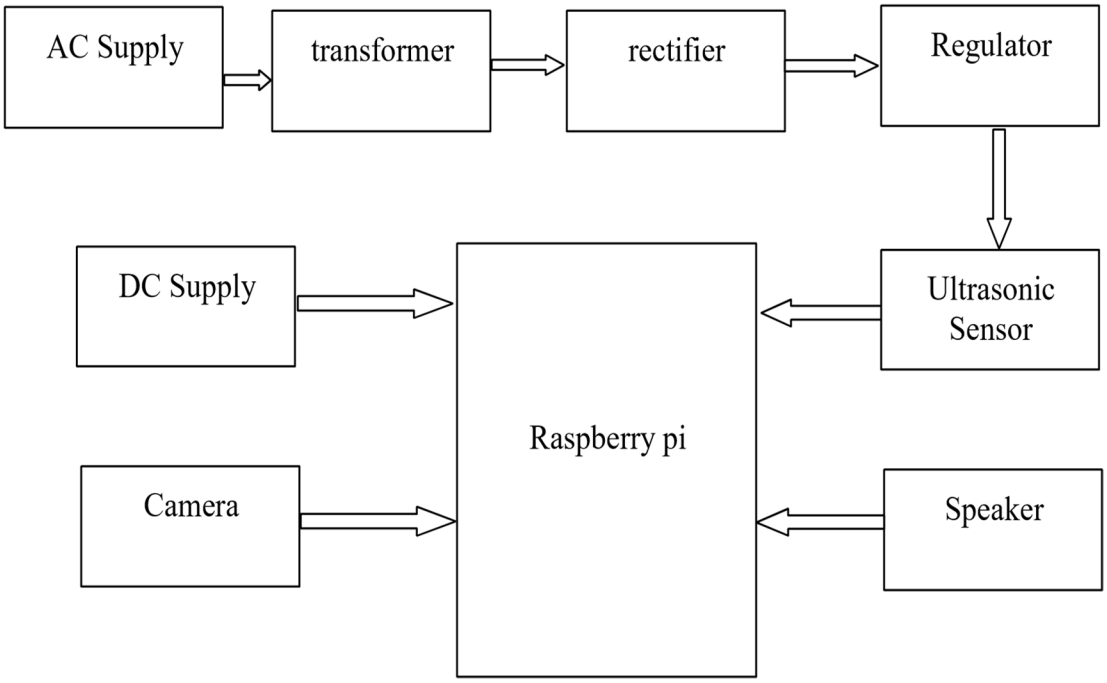
1) *Smart Stick For Blind People:* an ultrasonic sensor is employed for this system the instrument detects obstacales at a distance of four meter and infrared the instrument recognizes the complexities faced by blind people. By this way the receiver and transmitter help the user to find the smart stick by means of the buzzer. the vibration motor set on the stick activates and it creates vibrations. Arduino uno is used for system control. the system is capable of knowing all the problems faced by the user. the smart stick is very handy, easy to use, very responsive, power efficient, light weight and foldable by the user.
2) *Infrared Sensor-Based Smart Stick For Blind People:* in this paper, they have investigated a handy, user friendly, lightweight, very - responsive, and very power-efficient smart stick that takes infrared technology into the work. where an infrared sensor detect any obstacles in the way of the user. the device can detect obstacles up to two meters. the device offers good accuracy and this stick is able to detect all kinds of complications.
3) *Multiple Distance Sensor Based Smart Stick For Visually Impaired People:* this smart stick is able to detect obstacles of any height in front of person or slightly to the side the stick gives right information about distance and location of obstacles through vibrations and audio in the users ear. A wireless bluetooth connection is used between the earphones and the stick.
4) *Ultrasonic Sensor Based Smart Blind Stick:* Obstacle detection is done by ultrasonic sensor module and all the warnings are given buzzer.
5) *Assistive Stick For Visually Impaired Persons*: Obstacle detection is done by setting the ultrasonic sensor at a 30-degree angle on a suitable blind stick an it is sense if there are a hole, staircase in front of the blind person at about 30 cm distance to avoid a person from falling. the device is full of features and very useful.

III. METHODOLOGY

The DC supply provide pure 12 V DC voltage to the raspberry pi. Ultra sonic sensor transfer sound waves and analyze. the echo which is received from the sensor. The sensor measure the time interval between transmitted and received echoes so that the distance to the target is known. Camera capture images and videos transfer from raspberry pi then raspberry pi matches image and video with stored videos and images. Sound gives audio message or vibration on fist.

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IV. HARDWARE DESCRIPTION

A. *Raspberry pi*

The frame work of the project is the raspberry pi board. The raspberry pi 3 is single board computer which has processor quad A53 64-bit SOC. The raspberry pi features 1 GB of RAM. The power is given to the USB connector for 5.1 V/2.5 A DC. It has CSI camera port through which camera is connected.it has USB port through which microphone is connected.

B. *Camera*

The 2.86 MP camera can be used to take high-definition video, as well as stills photographs. It's a leap forward in image quality, colour, fidelity and low-light performance. It supports 1080p30 images, as well as still capture.

C. *Ultrasonic Sensor*

Ultrasonic sensor has two sections which are the transmitter and receiver. These sections is closely placed so that the sound travel in a straight line from the transmitter to the target and travels back to the receiver. making sure to have minimum distance between transmitter and receiver section delivers minimum errors while calculating.

D. *Power Supply*

The unit is powered via the USB, only power pin is connected. It can provide 12 volts DC at 7AH supply. Check your power supply's rating carefully.

E. *Cables*

1) *Camera Cable:*15cm ribbon cable to the CSI port on the raspberry pi
2) *Audio Cable:* it can connect ethernet or LAN on raspberry pi 3 B+ only.

V. EXISTING SYSTEM

the system solves the problem of object identification for a blind person. object detection algorithm can identify the category of object and object name also. accuracy of object detection is a minor issue faced in this methodology and can be overcome with the training of models with different data sets. The problem of interaction with system for a blind person is solved with the help of voice kit. the user simply gives voice commands to search the required object and can be navigated to the object with the use of voice kit and vibration on the fist. The efficiency of voice kit depends on pronunciation of words as well as API used for voice kit.

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VI. FLOW OF PROCESS

A. *Image Capture and Match Object*

Videos and images are captured using the pi-camera. Images and videos is already captured on the raspberry pi and then a message are transfer to the speaker and vibrator when the image and video match the captured ones.

B. *Detect Object*

The target distance is calculated using an ultrasonic distance sensor and the output form the sensor is provided to the signal conditioning section and then is processed using an arduino microcontroller. The result from the microcontroller is fed to the LCD display.

C. *LCD Display and Audio Output*

If an object is matched, the raspberry pi sends the message “Object are present” or “Object are not present” to the LCD display. An ultrasonic sensor transmits sound waves and analyze the echo received from the sensor. If the object is present in front, you should move from the left side or move from the right side.

VII. ADVANTAGES

1) The any obstacles can detect with the help of ultrasonic sensor.
2) Simple to use.
3) Project can support blind people in any situation.
4) There will be fewer accidents with blind peoples.
5) It can many features like detection of light intensity, tracking the location of the lost stick.
6) It functionality addresses the identification of object and signboards.

VIII. APPLICATION

1) This system used for blind people
2) The proposed system aims to create a wearable visual aid for visually impaired people.
3) It can be used by blind people as well as visual impaired people.
4) It can be helpful for blind people to reach their destination.
5) Help to blind people to walk easily.
6) Help blind people to avoid obstacle.

IX. ACKNOWLEDGEMENT

We have great pleasure in presenting this report on “Visual Assistant using Raspberry Pi for Blind People” ,we would like to thank to s. b. patil college of engineering, HOD of E&TC prof. v. u. Bansude, our guide C. V. Nalawade, project coordinator prof. A. S. Shirkhande. We take this opportunity to thank all those who have contributed in successful completion of this project.

X. CONCLUSION

This paper presents a novel technique for assisting visually impaired people. The proposed system has as simple architecture and make user friendly Making the subject independent blind people home. The system also aims at helping the blind people to navigate in detecting obstacles , locate , read signboards and texts. The system is made user friendly by accepting speech as the input to access his basic necessitate.

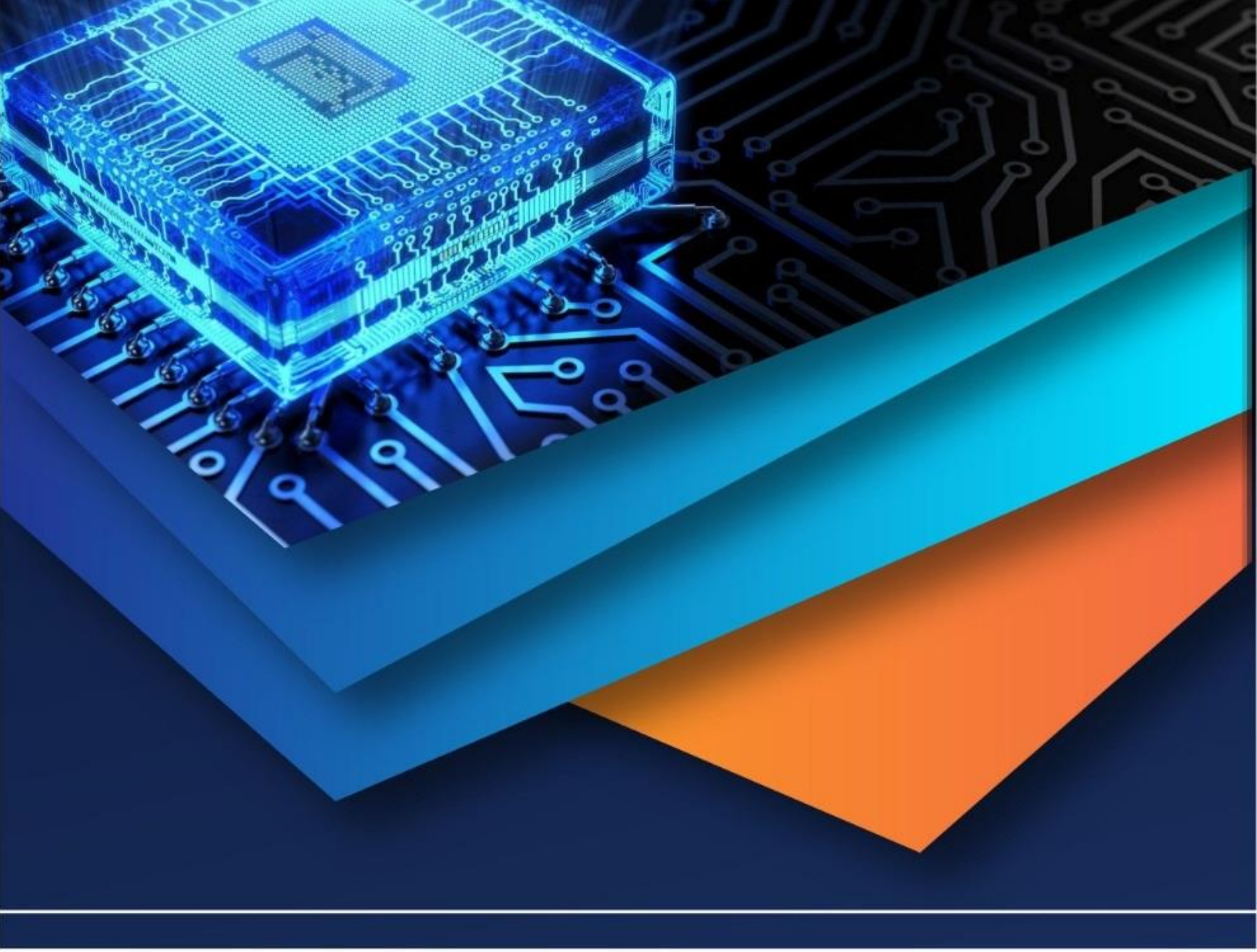
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