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Dark Vision

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ABSTRACT:

This paper gives an insight of most of the hurdles faced by visually challenged people. It aims to eventually guide them to face the difficulties they encounter. This paper introduces some of the concepts related to overcome these challenges and develop an idea to implement all the concepts as a single module. This module will be as guidance to the visually challenged people to do their daily essential tasks and to lead a life like a normal human being.

Keywords: Image processing, object detection, voice assistant, braille scale methodologies

INTRODUCTION:

One of the most important sensory organs is the eyes for any living being. Just a glimpse around will make us realize how much information we can gather in this environment through our vision is most of the information in our environment. Some of the Visual types of information we come across in everyday life are timetables in train stations, signs indicating the right way or potential danger, a billboard advertising a new product in the market. Most of these information is inaccessible by the visually impaired, curbing their independence, since access to these type of information indicates the right of a person to control their own affairs. Thus in this paper has come up with an novel way to solve this problem by providing a guide, a self- automated voice assistant module enabled device named DARK VISION. This has an inclusion of Image processing, Voice assistant, Travel Guide, remainder setting and various other features.

USE OF IMAGE PROCESSING IN DARK VISION.

Image processing is the technique that is used here to identify the person accessing the dark vision. Face is detected for this purpose and Face detection or otherwise known as face recognition is the most important factor that can be taken into consideration making it one of the most promising applications in the field of analyzing an image. A large amount of face recognition operations is done by the face detection. Based on its strength, it mainly

focuses the computational resources on the section of an image that clearly detects the face. Because of different variants that are present across human faces such as pose, expression, position and orientation, skin colour, the presence of glasses or facial hair, differences in camera gain, lighting conditions, and image resolution, This method of face detection in pictures is more complicated. Thus Object detection along with the image processing and computer vision is used to interact with detecting instances of an object such as human faces, building, tree, car, etc using a face detection algorithms to determine whether there is any face available in an image or not

VOICE ASSISTANT ENABLED:

Voice Assistant is an innovative System for visually challenged people acting as a assistant for them through voice. This is used to help the visually impaired to have access to the most substantial criteria of the phone thereby enhancing the quality by using different custom layouts and converting the speech to text. It also has customized messaging feature with all important features as inbox and sent items, call log and dialer, notes and battery level checking and also reminder as and when needed. The system performs and speaks out all the actions performed by the user thereby helping the user to know his current situation. The System also helps the user to read the contents of the message along with the sender and the date and time. The user can also note few things with its custom notepad. It also speaks out the dialer number pressed and called notification also. Though effective there are few drawbacks in this system

- There are no Credentials to make it very easy and reliable.
- Since everything is spoken out and anything the user wants to listen from the system, it cannot be reliedupon.
- A lot of data might be required and stored in the phonememory

OBJECT DETECTION:

The next technique that is being used is the Object detection. It refers to the capability of computer and software systems to not only locate objects in an image/scene but also identify each object. Object detection has been widely used for face detection, vehicle detection, pedestrian counting, web images, security systems and driverless cars. Like many other computer technology, object detection is used in a variant range of creative uses that will be handy due to the efforts of computer programmers and software developers. Object Detection sensors help the visually challenged people to identify their things where they left. First and foremost, each and every object must be recognized by the device. There are certain cases where the physical contact between the person and object can be dangerous, and even deadly. This project, a transformation from the visual world into the audio world is targeted with the aim to inform blind people the objects as well as

their spatial locations they tend to encounter. The various Objects that are detected from the scene are identified by their names and converted to speech. At the same instant, a video is captured with a camera device on the client-side and is streamed to the server for real-time image recognition with the YOLO object detection model which uses pre-trained data sets such as the COCO data set to find the pre-trained objects.

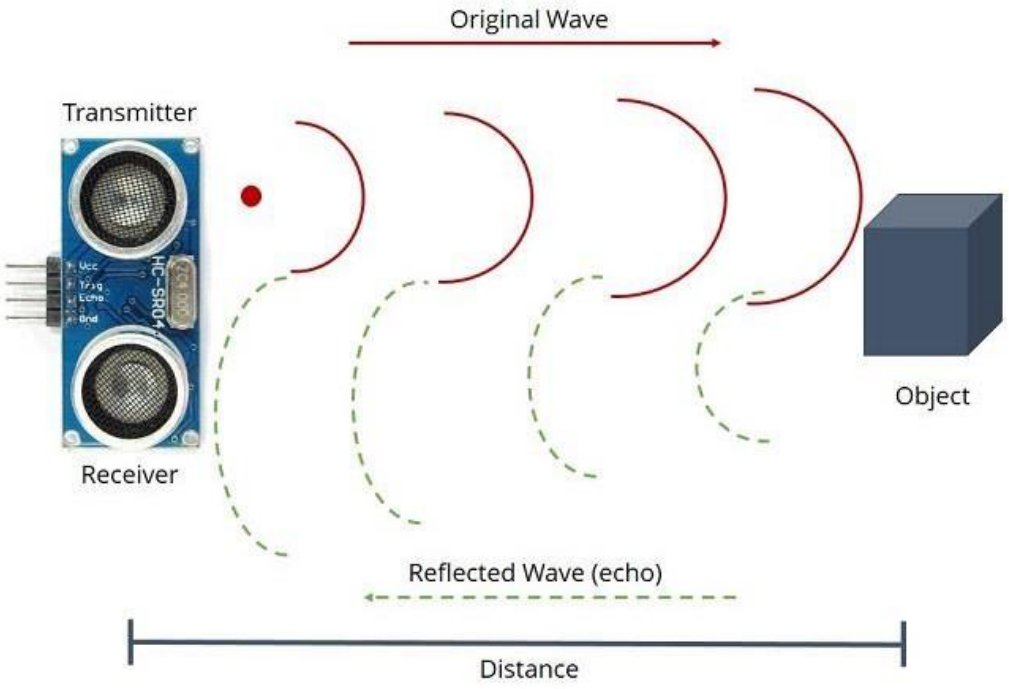

Figure : Ultrasonic Distance Sensor working

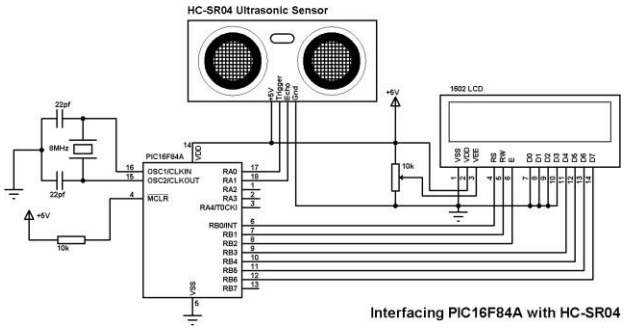

Figure : Circuit for Ultrasonic distance sensor

PROCEDURE:

1. Enter the Machine Learning Based Object Recognition System for blind help.
2. Activate the system by saying the keyword "Hey Find O". The webcam and the ultrasonic sensors connected to the Raspberry PI are activated.
3. The system asks the user to tell him the object that the user needs. When the user communicates the object, it is processed and if the object named by the user is on the trained list in the camera area, then a frame around the objects. The distance of the object which is asked by the user is calculated with the help ofan ultrasonic distance sensor and Google API.
4. The answer to the location of the object is given to the user.

SYSTEM REQUIREMENTS

Hardware Requirements

- Raspberry Pi4
- Power source for the Raspberry Pi can be a power bank, in which the power input for the Raspberry Pi 4 is 5V.
- Headphone
- Webcam
- Ultrasonic distance sensor
- Servo motors

Software
Requirements

- Python modules-Snowboy, GPIO Module
- Tensor Flow Lite
- Open CV
- COCO Object Detection Model

MODULES

This project consists of three modules:

1. Hot word Detection & Audio Feedback Module

- Hotword Detection
- Audio Feedback

2. Object Detection Module

- Image Acquisition Open CV& Detecting Object using Tensorflow Lite
- Object Detection based oncolour

3. Object Localization Module

- Finding Position of the Object
- Positioning the servo and finding the distance to the object

CONCLUSION

Through this paper, there is a strong belief that this idea can not only be commercially revolutionary but can change the lives of many visually challenged people. This paper aims to provide the most complex and useful platforms for the people of the society at very low cost. Technology is all about updates. So, we believe that this idea will receive positive responses. Let's make India proud and create a responsible society to make our world better.

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