

Voice Controlled Personal Assistive Bot with Object Detection

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ABSTRACT- Currently innovation has made our lives simpler for individuals. Be that as it may, from this innovation, certain gatherings of individuals need more assistance and backing for old or handicap individuals. This innovation can make a method of having a typical life. Thus, we zeroed in on the idea of an individual colleague robot. The fundamental object is to supply help to debilitated people. This Personal assistive Bot help to decrease the manual endeavors being put by people in their everyday errands. The intention is to execute a specialized work that is voice controlling one which can act as a PA that can perform various errands or administrations for a person. This is uncommonly intended for this group of people as its primary reason for existing is to supply help to relate senior or debilitated individual. The human voice order is given to the mechanical right hand distantly, by utilizing a voice order. The automaton will perform different movements: Forward, Backward, Right, Left and start/stop activities. The robot can likewise peruse and perceive the letter sets and text and the words which are said by the person will check from the google dictionary and print as a text. The capability of the robot is to detect the objects and relocate them from one place to another and includes the face recognition. So, our main ideology is to create a personal assistance bot, which is capable of handling small objects. We are planning to make the bot consisting of four wheels and an arm placed on top. Using Raspberry Pi, we are communicating the sensors and motors through our voice commands. Smart assistants like Google for android, Siri for Apple, Cortona for Microsoft, these assistive gives us a platform to communicate to a bot. As we are programming on Python, a module name Pyaudio will help to communicate with a bot and having the extra feature like 'Speech to Text'. And we would like to add an extra feature like object and person detection. A Camera module will be installed for capturing video and recognize the Humans and objects carried out with Machine Learning Algorithm

Keywords: Face Recognition, Voice Recognition, Object Detection

1. INTRODUCTION

We are planning to make the bot consisting of four wheels and an arm placed on top. Using Raspberry Pi, we are communicating the sensors and motors through our voice commands. Smart assistants like Google for android, Siri for Apple, Cortona for Microsoft, these assistive gives us a platform to communicate to a bot. As we are programming on Python, a module name Pyaudio will help to communicate with a bot and having the extra feature like 'Text to Speech' and 'Speech to Text'. And we would like to count an extra feature like object and person detection. A Camera module will be installed for capturing video and recognize the Humans and objects carried out with Machine Learning Algorithm. The Components that we are used to construct a robot are Raspberry Pi 3 - Model B+ - 1.4Ghz 64Ghz Processor with 1 GB Ram [16], wheels, Motors-200/300 rpm, motor driver-L293D. We will use robotic arm to hold an object and the rotation of arm will be controlled by the servo motors. Generally, Robots are used nowadays to perform all the undertakings with better productivity. This makes the growth both in Industrial level and home level. This Personal assistive bot will be helpful in our daily life. Individual robot assists with diminishing the manual effects of people in their everyday undertakings. The assistive

robot which obeyed the voice requests and act based on the requests. The voice communication with robots is achieved through blue tooth devices [2]. The robots which are designed here is four wheeled Robots which includes a camera and robotized arm. The camera is used for Face Recognition, area, object, space and distance assessment, and a mechanical arm to perform pick and spot exercises. It will be general before the most part used in various applications, for example, substance ventures, medical care for the debilitated and old populace.

1.1 Voice Recognition

This Voice Recognition makes a major role in this project with the help of voice commands the bot will move or take an object, Voice commands will give through microphone here the Bluetooth acts as a microphone as well as a speaker [7]. With the help of pyaudio module we will generate a code on python and communicate with a bot. It will take our audio as an input via microphone and the output as a text. It is very useful area having many applications in our daily life. Discourse acknowledgment empowers a PC to catch the words verbally expressed by a human with the help of microphone [3]. When we give our voice commands to the bot with the help of speech recognition module in the pyaudio and we need to install setup tools-wheels in the command prompt so that it won't get any errors while we run the code after completion of all process we will give voice commands [14] and voice commands which we given will search from google dictionary and the words will be print as a text, and with the voice commands which was given by us to the bot with that voice commands there is a noise w.r.t the voice that noise will be removed by the ambient noise this will help to remove the unnecessary noise [7].

1.2 Face Recognition

Facial recognition is the best new technologies in the world. The technology that is most effective is recognizing an individual. Humans have different ways to identify a person. A technology is developing with the present era to make it more convenient. In this project the facial recognition process done with Machine learning algorithm. At first it will take pictures of a people with the help of camera. It will take video feed of people save as a folder at that folder the pictures that are taken as a video feed will be stored it is capable to take nearly 100 pictures and it can store. To find the picture of the person at folder it will take Grayscale pictures or value and it will save on the memory card and then this all will train by the LBPH Algorithm where LBPH-Local Binary Pattern Histograms. LBPH algorithm must be used for human face recognition in real time. This algorithm which has characteristics like low level resolution etc [9].

1.3 Object Detection

At the end, the cons of the existing object detection models are included. The existing models are unfit for smart cities and the current data sets. At the same it can't cover all classes of smart cities with best solution [1]. The framework utilizes ultrasonic sensors for limit detecting and works as needed, Object identification is a PC vision method in which a product framework can identify and follow the item from a given picture or video or objects around surrounding. The unique property about item identification is that it recognizes the class of article and their area explicit directions [15]. The area is brought up by drawing a box around the object. The capacity to find the item inside a picture characterizes the exhibition of the calculation utilized for identification. Face identification is one of the instances of object recognition after the object recognition the object will be detected through the ultrasonic sensor. This will help to detect the objects.

1.4 Robotic Arm

The Robotic arm is designed by of seven metal segments which are joined by six joints, the computer controls the robot. These robots use motion sensors. This type of robot has six degrees of freedom, the arms job is to move hand from one place to another place. Most industrial robots work with auto assembly lines. It takes the incredibly precise hand in a tiny microchip. The industrial robotic arm, it is made of steel or cast iron. In this step motor is used and it was connected to each joint, robotic arms are used to lift big item there are 7 kinds of automated arms, Cartesian robot, Cylindrical robot, Spherical robot, alarm robot, Articulated robot, Parallel robot, Anthropomorphic robot. The voice inputs are given in a microphone to the voice recognition [13]. The output is in voice command is given to the microcontroller will generate the control signals to operate the four motors of the robotic arm, the structure and they can fluctuate from various plans. This will allow the computer to move the arm, repeating exact the same movement repeatedly. The robot use motion sensors. The Android phone and robotic arm are with Bluetooth module. The hand movements are used with servo motors which is at specific rotations and positions. The three modules of robot are as follows: speech command recognition module, object classifier module and robotic gripper arm module, It is very easy to control the robot by using voice commands. Accurately can control the robot by Voices. First Robot grabs the object by taking the voice command and find the object using the object classifier module. And at the end, it holds and replaces the object using the robotic gripper arm module.

2. LITERATURE REVIEW

Ayesha Shafiq, Humera Tariq, Fareed Alvi and Usman Amjad (2019) et.al introduced voice recognition model. They designed the model by using MEL frequency Cepstrum coefficient. To recognize the voice, they followed Hidden Markov model.

Piyush Vashistha (2019) had introduced the voice controlled personal assistive bot with different methods those are voice control, character control, virtual control. The Voice controlled PA is acquired by the Raspberry Pi board. Raspberry Pi board is used here for Voice controlling personal assistant. PA can be controlled intelligently and artificially by the directed pre voices. We need to install OS in it so that it will communicate with sensors.

Aftab Ahmed, Jiandong Guo, Fayaz Ali (2018) had designed the Facial recognition is the best new technologies in the world. The technology that is most effective is recognizing an individual. Humans have different ways to identify a person. A technology is developing with the present era to make it more convenient. In this project the facial recognition process done with Machine learning algorithm.

Jishnu UK, Indu V, KJ Anandakrishnan (2019) had introduced the personal assistive bot is constrained by voice orders to pick articles and Voice correspondence from the robot to android cell phone and vice versa is done through Microphone. The proposed four wheeled robot comprises of a camera and mechanical arm.

Anurag Mishra, (2020) has introduced the controlling of voice commands and communication with robot using Bluetooth and it acts as a microcontroller and with the help of control logic the robotic arm control, robotic body control, robotic hand control will be done. This paper portrays the plan and advancement of an individual colleague robot, which is constrained by voice orders to pick long/short distance objects. Voice transmission activity can be carried out by use of microphone between Robot and devices. The proposed four wheeled robot comprises of a camera and automated arm.

3. HARDWARE DESIGN

- Raspberry Pi 3-Model B+- 1.4Ghz 64Ghz Processor with 1GB Ram
- Wheels-4
- Motors-4-200/300rpm
- Motor Driver (L293D)
- Servo Motor-4
- Connecting Wires
- Web Camera
- Microphone

Raspberry Pi

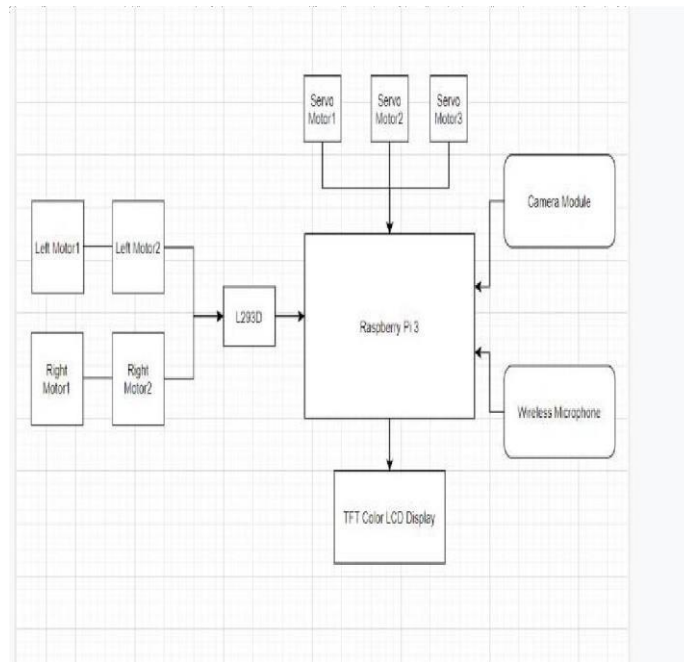
This Raspberry Pi mainly includes the below features and it has GPIO (general purpose input/output) pins which controls the electronic component for computing physically and for IoT. It has single USB connector; it has 40 pins. With the help of 1 GB SDRAM the raspberry pi model was designed.

Motor Driver

The L293D is a 16-pin Motor Driver IC is very simple. Single L293D IC can run two DC Motors at the same time. Left input pins will regulate across left side and right input pins will regulate across right-hand side.

4. BLOCKDIAGRAM

Fig.4.1 BLOCK DIAGRAM



5. WORKINGPRINCIPLE

A facial acknowledgment framework which uses the biometrics and the face identification and the characteristics are highlighted from the photos or videos. This framework contrasts the available data and discover the match from all the basic information's and are realized in the end. Basically, the facial acknowledgement which involves in the business applications too. This business applications provides everything from ground observation till marketing advertising. Fundamental rule of voice acknowledgment includes the way that discourse or words expressed by any individual reason vibrations in air, known as sound waves. These constant or simple waves are digitalized and handled and afterward decoded to fitting words and afterward proper sentences.

when coming to the second part of the project Face Recognition. The first step is to register the face of the person whose face should be detected and proceed to the next process. we will be adding a data set the (set of photos of that person) that will store in a folder and the system will train itself for the proper detection of the face. whenever the system is on and if it finds a face it will check for the face that is registered and it gives value that is called as confidence. The confidence level based on the similarity of the edges of the face basing on that if that is similar the value will be less than 100 and else it will be greater than 100. If the value of confidence is less than 100 percent than the face that is detected is the face that should be recognised, and it displays the name of the person that we have registered previously. If the value of the confidence is greater than 100 then the face is different, and it is ignored by the Robot. And the future scope of the project is to recognise an object that we want and process the work that we have given and the other is to recognise an object and to describe and show the information of that object.

6. PROPOSED ARCHITECTURE

Fig. 6.1 FACE RECOGNITION

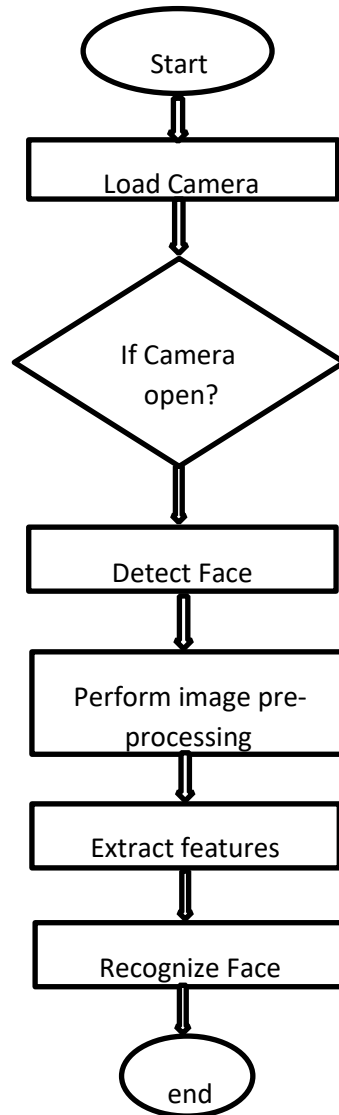
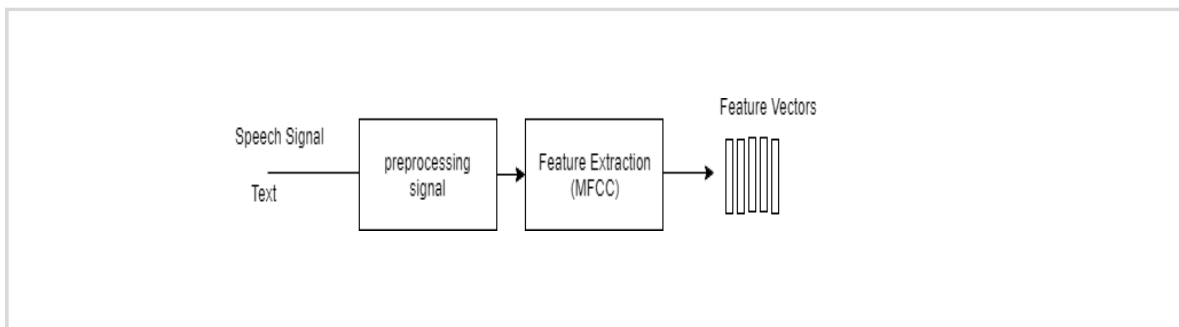


Fig. 6.2 VOICE RECOGNITION



7. SIMULATION RESULTS

Fig. 7.1 VOICE RECOGNITION

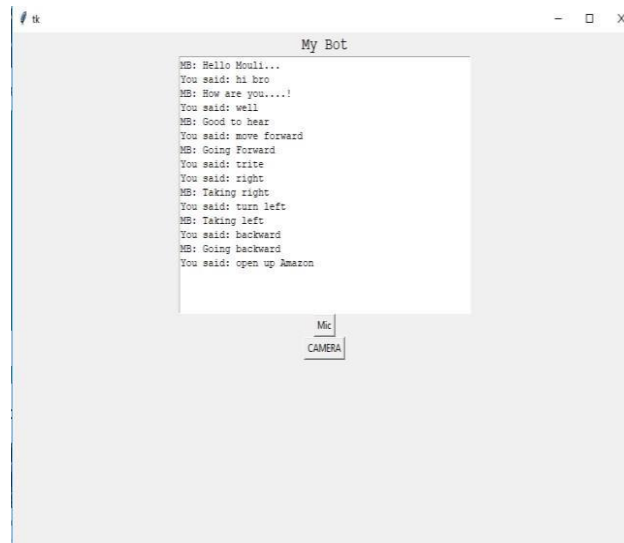


Fig. 7.2 FACE RECOGNITION



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