USING RASPBERRY PI HUMAN MACHINE INTERFACE TECHNOLOGY FOR VIRTUAL TALKING SYSTEM WITHOUT SENSOR AND VIRTUAL DISPLAY SYSTEM FROM VOICE COMMAND IMPLEMENTATION.

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ABSTRACT

Abstract-Every day we see many people who are facing problem like deaf, dumb and blind etc. Cooperating with others individual without preparing is issue for better communication. Recently created methods are all sensor based and they didn't gave the general arrangement. This paper clarifies another strategy of virtual display system from voice command without sensors utilizing Raspberry Pi. A picture preparing system called Histogram of gradient (HOG) alongside artificial neural network (ANN) has been utilized to prepare the picture. Web Camera is utilized to take the picture of various signals and that will be utilized as contribution to the Mat lab along with a digital display will convert voice to hand gestures which are stored in database. The product will perceives the picture and distinguishes the relating voice yield which is played utilizing voice replay pack. This will be a two way communication between Deaf and Mute, when a mute shows hand signal the device will convert it to voice, whereas when a deaf speak to mute voice will convert to hand gestures which will be useful for mute to communicate . This paper discloses hand flag to voice correspondence between the hard of hearing, imbecilic and typical individuals.

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1. INTRODUCTION

India is a country having many culture and languages. Communication is the major difficulty between people to communicate. Then how about the disables as it is difficult for normal people. The deaf and dumb people faces many problems and can be broadly classified into a different categories like interaction with society, language and communication, education, problems in behavior, mental sickness, and safety concerns. Their problems have been worsened because of the absence of a proper technology for them to interact with others.

Virtual talking without using sensors along with to and fro conversation between the users. This project is an attempt to a sensor less virtual talking machine for Deaf and Mute people. The image processing technique called Histogram of Gradient (HOG) and Artificial Neural network has been used for converting the sign language in to voice output.

In this project uses camera with the PC and MATLAB installed in it. And it is advantageous as there also implements two way communications between the deaf and dumb people and normal people who don’t know sign languages. Which means the proposed system is capable of converting the sign language to voice, and can also convert the voice input to the sign language output.

The centralized system which is controlled by user the user trains the system for different sign inputs then it is tested by user and matched output will be displayed on screen.

2. EXISTING SYSTEM

- In existing system the dumb person hand is attached with the flex sensors.
- The flex sensor reacts on bend of each finger individually.
- Each flex sensor holds unique voice stored in APR Kit.
- For each sign it will play unique voice

2.1. DEMERITS OF EXISTING SYSTEM

- It's restricted to only 10 voice announcements
- Dumb person should always carry the hardware
- User can't do any other work with flex sensor on fingers
- Flex sensor are should be straight, if it's not controller will think user giving command ➢ Less hardware lifetime

2.2. PROPOSED METHODOLOGY

The steps involved in converting the sign language to voice and voice to sign language is shown in the block diagrams below.

- This project is an attempt to a sensor less virtual talking machine for Deaf and Mute people.
- This involved in converting the sign language to voice and voice to sign language.
- Use image processing and computer vision for purpose of object detection.
- The module provides two way communications.
- This project helps in easy interaction between the normal people and disables.

3. SYSTEM ARCHITECTURE

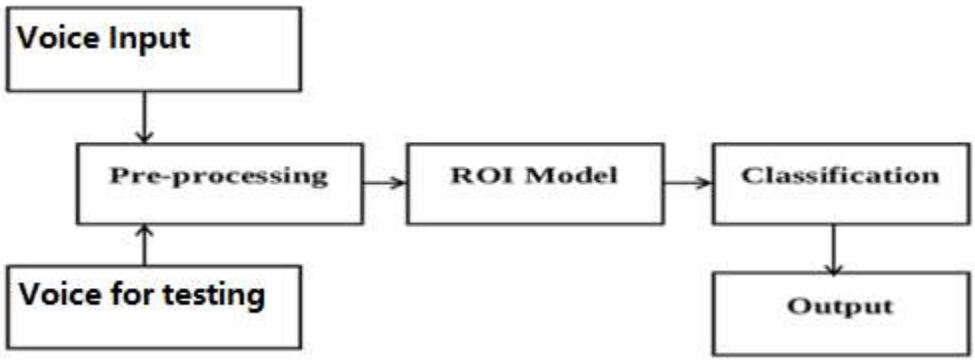

Fig -1 System Architecture of Virtual Display system from voice command.

The above Fig-1 represents system architecture of Virtual Display system from voice command. The voice commands training dataset will take the input from the mice and pre-processing is done and trained the model for different voice commands stores the data in classification model.

Then the testing is done for voice commands given by the user then the pre-processing is done for testing voice commands ROI (Region of interest) then if the encoded input matches with the testing voice commands then classification is done with the training images. If the input matches with the training data then respected output voice is played.

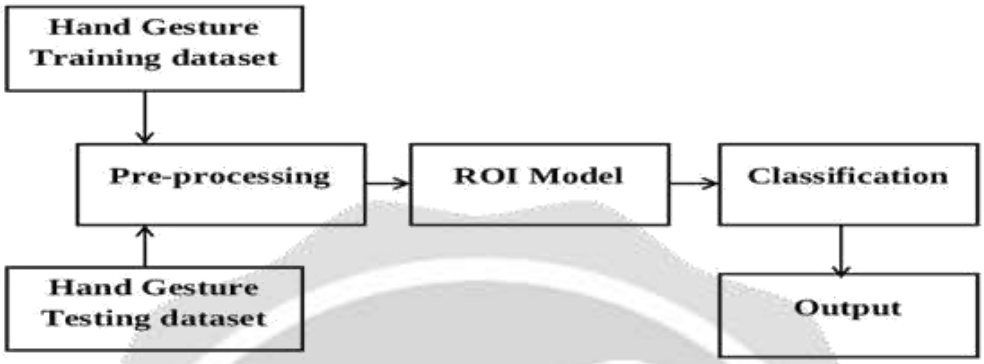

Fig -2 System Architecture of Virtual Talking System.

3.1 TRAINING DATASET FOR GESTURE RECOGNITION

A Use Case Diagram is a coherent piece of functionality that a system can provide by interacting with actors. Each use case involves one or more actors as well as the system itself. A use case involves a sequence of messages among the system and its actors. Some use case have fixed sequence of messages, it also includes error messages. A use case brings together all of the behavior relevant to a slice of system functionality

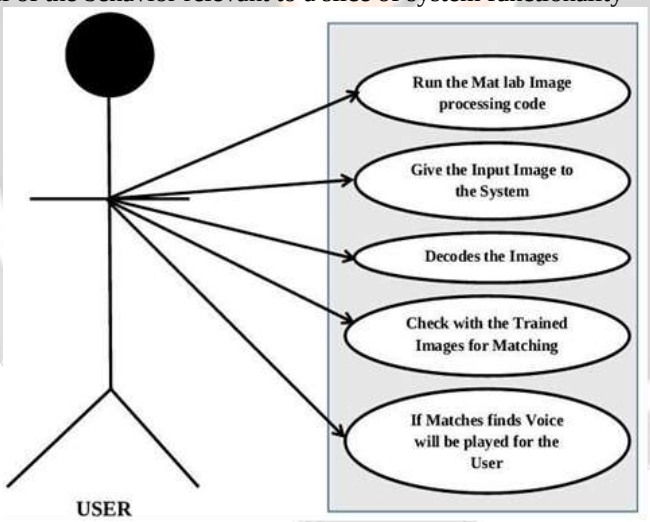

Fig -2 Training Dataset for Gesture Recognition

Instead of using sensors which limits the number of signs, sensor less approach is applied. The sensor less approach needs a vision based approach. The different steps involved in the software are shown in the Fig-2. First step is to capture the image of hand gesture using the camera and this is used as an input to image processing algorithm. The "imresize" inbuilt function is used in MATLAB to vary the pixels size based on the requirement. The next step is to split the image into 4 parts and processed individually using algorithm. Then next step is finding the gradient magnitude and gradient direction of the image. Gradient of an image means directional change in the intensity, using which we can get the information about the image. Histogram of all four portions will be combined to form array which is a descriptor. Then the neural network will be trained using gradient angle of the histogram and will be tested using gradient angle.

4. SYSTEM TESTING

Software testing is performed to verify that the completed software package functions according to the expectations defined by the requirements/specifications. The overall objective is not to find every software bug that exists, but to uncover situations that could negatively impact the customer, usability and/or maintainability.

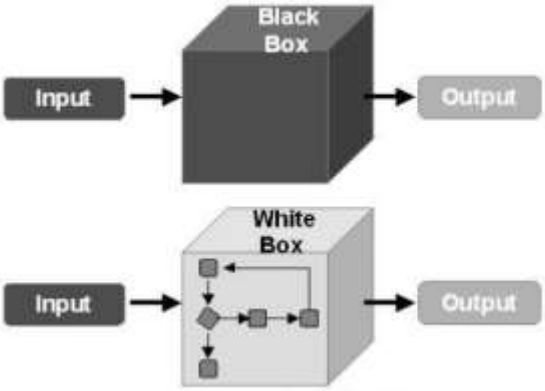

Fig -3 Types of Testing

Types Of Testing

4.1 White Box Testing

It is a software testing method in which the internal structure/design/implementation of the item being tested is known to the tester. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. Programming know-how and the implementation knowledge is essential. This method is named so because the software program, in the eyes of the tester, is like a white/transparent box; inside which one clearly sees. Internal software and code working should be known for this type of testing. Tests are based on coverage of code statements, branches, paths, conditions. Also known as structural testing and Glass box Testing.

4.1 Black Box Testing

Internal system design is not considered in this type of testing. Tests are based on requirements and functionality. This method is named so because the software program, in the eyes of the tester, is like a black box; inside which one cannot see. Black box testing is a testing technique that ignores the internal mechanism of the system and focuses on the output generated against any input and execution of the system. It is also called functional testing.

5. RESULTS

The database output portion of the Fink is applied as an input for neural network. Set targets for each input and choose how many networks we need in neural network and then train the network.
Net=train(net, input, targets)

Then reference image output portion of the fink is applied to trained network Net. It gives output as target which that we give target as training period. By using target value, we can able to find the reference image matched with at which database. For high efficiency we make the same operation as 10 times and then we choose best output from that.

Here hand signals will be converted to sound Signals (Voice).fro this communication will be ease for Deaf and Mute people.

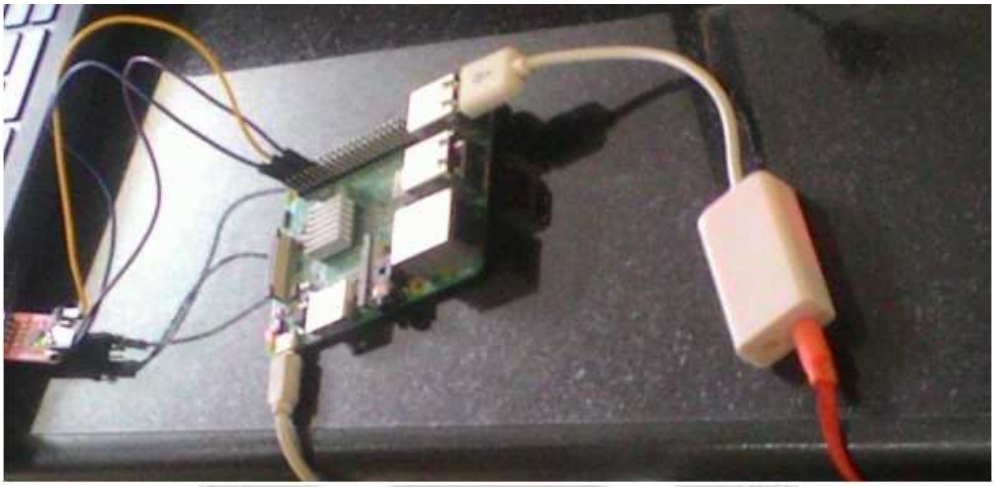

Fig -4 Experimental setup

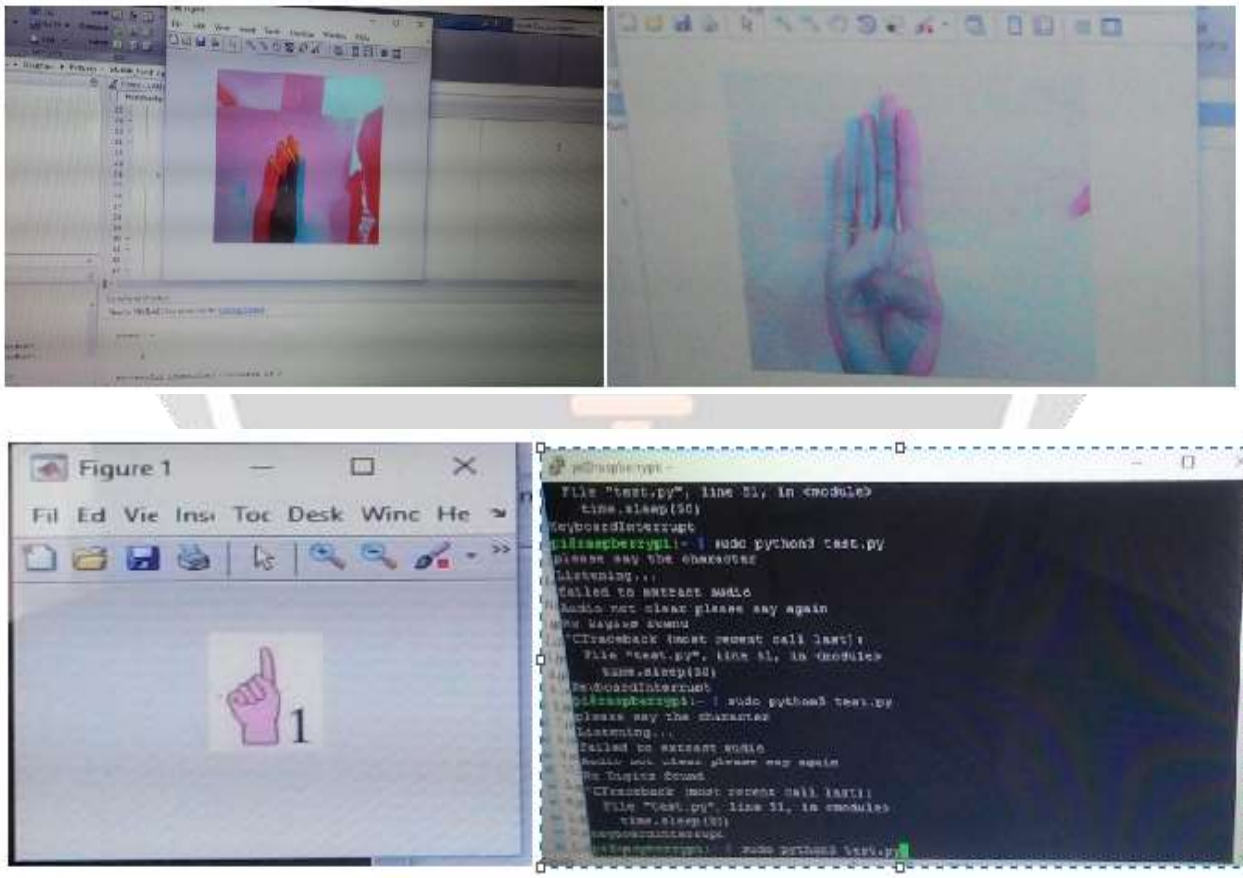

Fig -5 Mat lab Implementation

5. CONCLUSION

The sensor less Virtual Talk Module is a handy module which provides an easy and satisfactory user communication for deaf and dumb people. The module provides two way communication which helps in easy interaction between the normal people and disables. This module provides a foundation for developing a more durable module to communicate as sentences

The sensor less Virtual Talk Module is a handy module which provides an easy and satisfactory user communication for deaf and dumb people. The module provides two way communications which helps in easy interaction between the normal people and disables.

This module provides a foundation for developing a more durable module to communicate as sentences. By using both hands we can increase the number of words and even can create some small statements. Above approach is implemented by capturing the images as snaps from the web camera. Instead of this taking the video for the implementation can be considered. The hardware implementation can be done on the video development boards using DSP processors. The app can be developed for easy handling facilities, so that the disables can carry it easily in a mobile and communicate. This can also be implemented using SIFT match and point pattern algorithms.

6. REFERENCES

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