USING RASPBERRY PI HUMAN MACHINE INTERFACE TECHNOLOGY FOR VIRTUAL TALKING SYSTEM WITHOUT SENSOR.

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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. Recently created methods are all sensor based and they didn't gave the general arrangement. This paper clarifies another strategy of virtual talking 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. The product will perceives the picture and distinguishes the relating voice yield which is played utilizing voice replay pack. This paper discloses hand flag to voice correspondence between the hard of hearing, imbecilic and typical individuals.

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

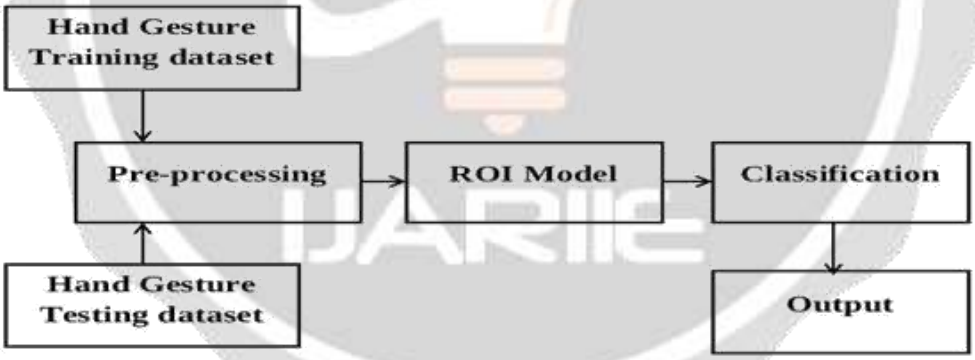

Fig -1 System Architecture of Virtual Talking System.

The above Fig-1 represents system architecture of Virtual Talking System. The hand gesture training dataset will take the input images from the camera and pre-processing is done and trained the model for different hand gestures and stores the data in classification model.

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

The diagrammatic representation is shown below for clear understanding of the entire system the captured video is broken down into continuous image frames using functions defined in Open CV. The image frames are processed in order to detect any valid gestures being performed by the use.

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

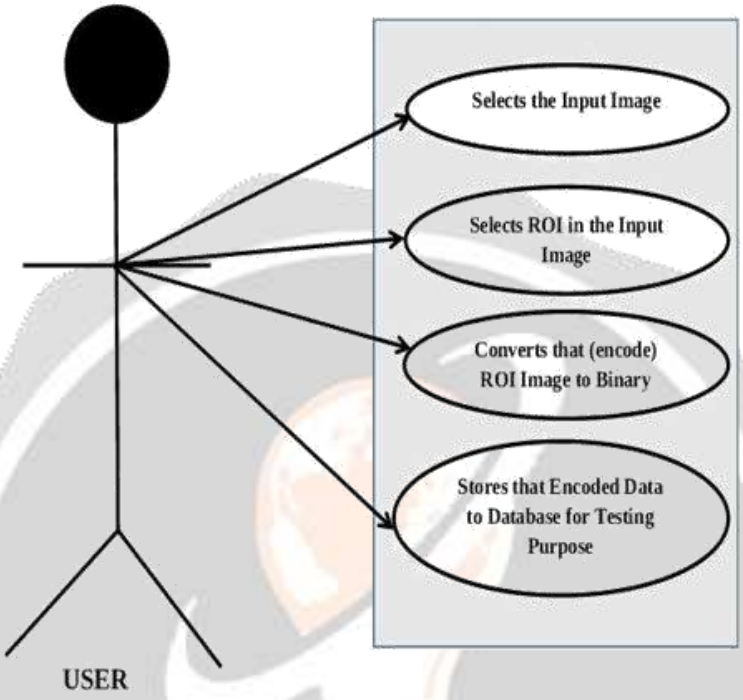

Fig -2 Training Dataset for Gesture Recognition

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. 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.

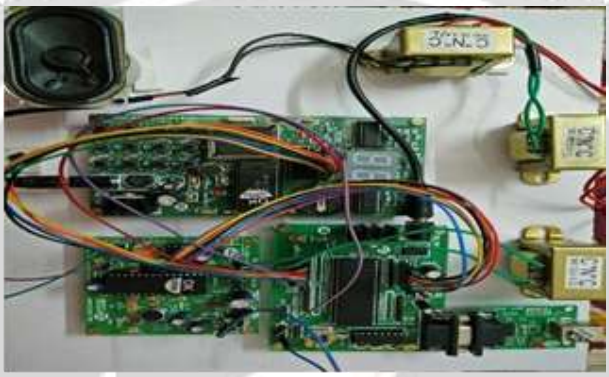

Fig -3 Experimental setup

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

6. SCOPE OF FUTURE WORK

As we still have lot of scope to continue this work, we can convert audio signals to digital hand signals using the same methodology. This will be usefull for communication between blind and Deaf.

7. REFERENCES

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