Implementation Hand Sign Detection and Recognition with Help of Machine Learning

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ABSTRACT

Addressing the issues of People with Hearing and Vocal Impairment through a single aiding system is a tough job. A lot of work in modern day research focuses on addressing the issues of one of the above challenges but not all. The work focuses on finding a unique technique based on the machine learning that aids the mute by letting them hear what is represented as text and its sound. The proposed system achieved the technique that takes the sign image through a web camera and applies to the image processing then analysis what exactly want to the mute people at end the text available to voice signals. All these three solutions were modulated to be in a single unique system. All these activities are coordinated using the Ubuntu system using python. The vocally impaired people are helped by the process in which the image to text and text to speech is given using machine learning.

Keywords: Image Processing, Tensor flow Algorithm, CNN Algorithm Process, Languages and compilers, Classification, Verification.

I. INTRODUCTION

Dumber people can simply tilt the message by sign language which could not be understandable by other people. By this system we provide the solution for blind, deaf and dumb people. For blind people the image is converted to voice by using Tesseract software, the deaf people received their content by message as soon as the opposite person speaks out it displayed as a message. The dumb persons conveyed their message through text instead of sign language which is delivered via e speak. We have provided necessary steps to resolve the problems of those masses. Approximately 285 million people are judged to be visually impaired worldwide in which 39 million are blind and 246 are said have low vision. Approximately 90% of this world's vocall impaired is from the dispirited income people and 82% of people living with blindness aging persons and above. The numbers of people visually impaired from eye related diseases have been brought down in the past 20 years according to global estimated

work. In which 80% of all visual restitution can be prevented or cured. India is considered to be the home for the world's largest act of blind people. In this world, about 37 million are blind, in which 15 million are from India. There are so many researches have been getting along in this universe, but the visual impairment could not be broken for good. In lodge to facilitate these people we have developed

the assistive device for blind people who does not want the assistance of other neighbours.

Goal and Objective:

- The great challenge lies in developing an economically feasible system so that physically impaired people can communicate easily.
- Datasheet of all the hand gestures will be made beforehand.
- Then, using python programing the real time picture of sign will be captured and will be compared with the datasheet. (photo captured will be converted into binary image).
- Then python will give the output based on Ubuntu system will be in accordance with the matched picture.
- At the end there is a sound that is being used to generate the voice message.
- There is a speaker through which message can be easily heard.

II. LITERATURE SURVEY

[1] Vigneshwaran S, Shifafathimam, "Hand Gesture Recognition And Voice Conversion System For Dump People", in this paper author Explain two major techniques available to detect hand motion or gesture such as vision and non-vision technique and convert the detected information into voice through raspberry pi.

Advantages: Easy to wear hardware, Easy to design

Disadvantage: Sometimes fail hardware, Take time to detection

[2] Trung-Hieu Le, Thanh-Hai Tran, Cuong Pham, "The Internet-of-Things based hand gestures using wearable sensors for human machine interaction" This paper introduces a new human hand gesture dataset which could be suitable for controlling home appliances. The dataset is captured with a low-cost and sensor plugable Internet of Things (IoT) device which is currently embedded with accelerometer and gyroscope sensors.

Advantages: Accelerometer and gyroscope sensors used, Easy to implement.

Disadvantage: Dataset used live predication not, sensor detection not work properly.

[3] Rajit Nair Dileep Kumar Singh Ashu Shivam Yadav Sourabh Bakshi, "Hand Gesture Recognition system for physically challenged people using IoT", In this research a gesture-based recognition system has been developed that recognizes gestures with a Web camera in real time. The framework developed is based on a machine learning features and gestures. In order to improve efficiency and precision, we employ a number of steps in order to process and segment the picture before submitting it to the HGR Program. Our measures in image processing will identify movements in real time with high precision.

[4] Vasileios Sideridis, Andrew Zacharakis, George Tzagkarakis, and Maria Papadopouli, "Gesture Keeper: Gesture Recognition for Controlling Devices in IoT Environments", This paper presents GestureKeeper which employs an accelerometer, gyroscope and magnetometer, from a wearable IMU, to first identify time-windows that contain a gesture, and then, recognize which specific gesture it is. GestureKeeper uses features based on statistical properties and acceleration samples. It can accurately recognize gestures from our 12-hand-gesture dictionary, exhibiting its best performance when the combination of features are used (e.g., about 96% mean accuracy). With

the noise addition and feature selection, the mean accuracy is increased to over 97%.

III. PROPOSED SYSTEM

The great challenge lies in developing an economically feasible system so that physically impaired people can communicate easily.

- Datasheet of all the hand gestures will be made beforehand.
- Then, using python programing the real time picture of sign will be captured and will be compared with the datasheet. (photo captured will be converted into binary image)
- Then python will give the output based on Ubuntu system will be in accordance with the matched picture.
- At the end there is a sound that is being used to generate the voice message.
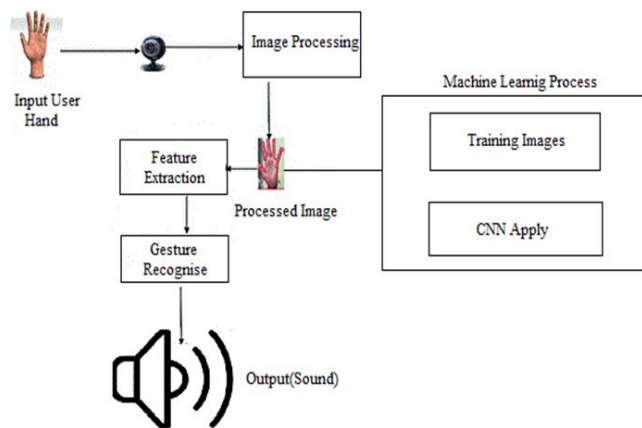- There is a speaker through which message can be easily heard.

Fig1. System Block Diagram

Basic working algorithm of overall system is as follow

A. Algorithm basic Step:

1) Start
2) Load Hand sign Dataset for analysis.
3) Capture hand sign image from web camera.
4) Apply the image processing for covert the image gray scale.

5) CNN algorithm Match Gestures based on train dataset.
6) Show Text Output On Monitor
7) Output In Form of sound

B. Mathematical Model:
Input-Output:
U= {I, O, f, S, F}
Where,
I= {I1, I2,I3}
I1= {l1,l2…... ln} where n size of image and n>0
I2= i.e. image capturing using camera
I3= i.e. sign image

O= {O1,O2,O3}
O1= Image Preprocess
O2= Image Color Segmentation
O3 = Image Segmentation (gray scale)
O4 = Sign detection
O5 =Voice Generation

f= {f1,f2,f3,f4,f5}
f1= preprocess (image,I1, I2, I3)
f2 = color_segmentation (Image,O2)
f3 = image_segmentation(Image,O3)
f4 = detection(Image, f2)
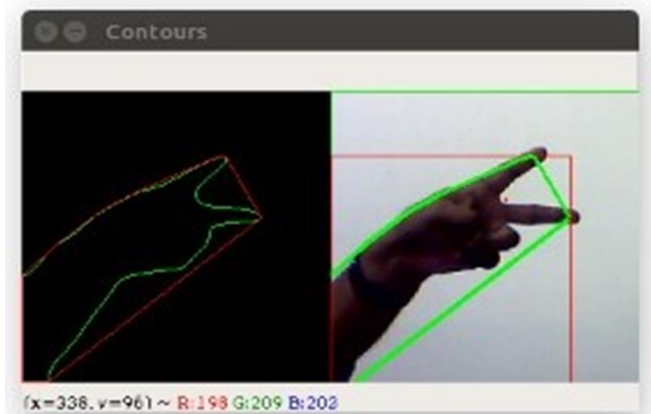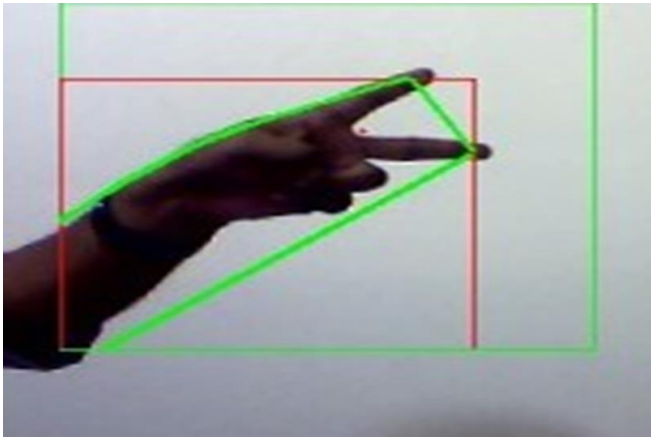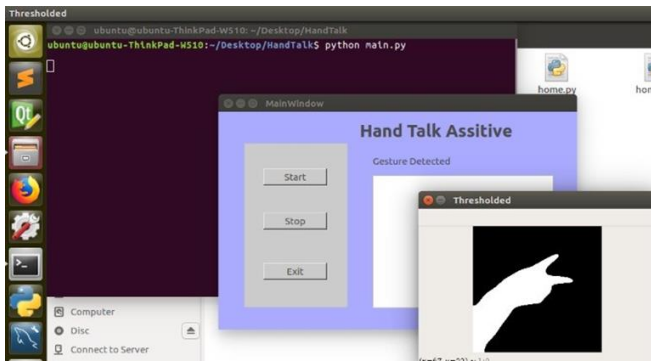f5 = voice(text, sound)

S: Success:
Image process successfully
Sign detected properly
F: Failure:
Algorithm not working properly
Voice command failure.

IV. RESULT AND DISCUSSION

V. CONCLUSION

The implementation of the proposed system aims to translate gestures into speech (voice). The scope of the project is to enhance the recognition capability for various lightning conditions and achieving more accuracy. Implementing and identifying the more number of gestures. The miniature of the system should be done.

VI. REFERENCES

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