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Real Time Software Based Communication System for Speech and Hearing Impaired

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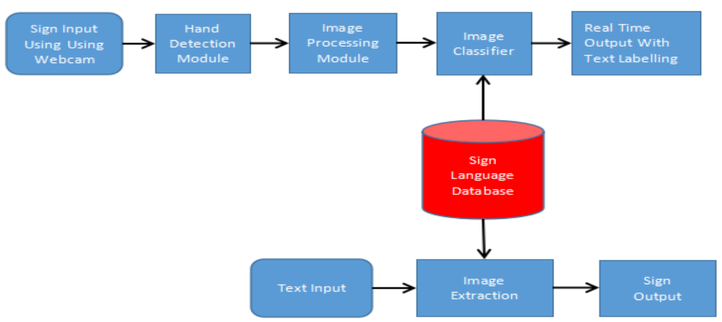
Introduction

- In India itself, close to 3 million people are categorized as speech and hearing impaired according to a general survey conducted.
- There is a large communication gap that is faced by the speech and hearing-impaired community with normal people and vice versa.
- The deaf/mute person is taught sign language from a very young age to overcome this barrier.
- Sign language allows these people to communicate with other members of the community as well as the members of the society.

Image Preprocessing & Feature Extraction

- Hand detection is done using defining a region of interest on the screen in which the user must place its hand.
- In this process of getting the hand histogram, we extrapolate the hand to fill dark spots within and blur the image using median blur.
- This reduces the noise in the image up to a great extent.
- Then find the contour with the maximum area which is the hand.



System Diagram

Computer Vision

Computer vision is a sector of Artificial Intelligence that uses Machine and Deep Learning to allow computers to "see" and analyze their surroundings.

Computer vision is a field of artificial intelligence (AI) that enables computers and systems to derive meaningful information from digital images, videos and other visual inputs — and take actions or make recommendations based on that information

Tensorflow

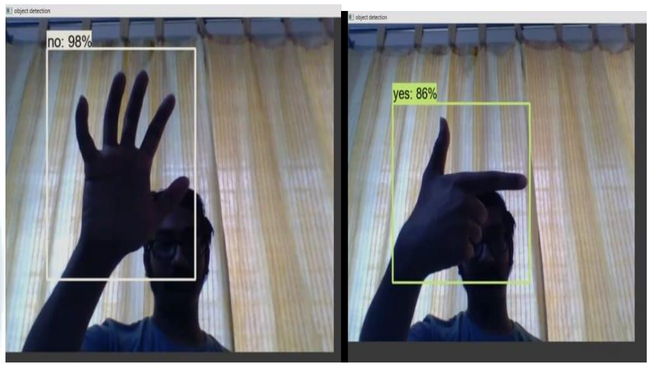
- TensorFlow is an open source library for numerical computation and large-scale machine learning.
- We had used Tensorflow 2.2.0 which has Keras API included which was one of of the main reasons why we were able to process the images and keep them for training the model.

Machine Learning

Machine learning algorithms build a model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so.[2] Machine learning algorithms are used in a wide variety of applications, such as in medicine, email filtering, speech recognition, and computer vision, where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.[

Modern day machine learning has two objectives, one is to classify data based on models which have been developed, the other purpose is to make predictions for future outcomes based on these models. A hypothetical algorithm specific to classifying data may use computer vision of moles coupled with supervised learning in order to train it to classify the cancerous moles

Results



Conclusion

- Many different software and hardware solutions have been implemented for field of sign language to speech translator that have been reviewed for our paper.
- Various machine learning and image processing techniques have been implemented through the years and have been studied deeply to make these solutions.

Reference

1. Cheok Ming Jin, Zaid Omar , Mohamed Hisham Jaward "A Mobile Application of American Sign Language Translation via Image Processing Algorithms" 2016 IEEE Region 10 Symposium (TENSYMP), Bali, Indonesia.
2. Abey Abraham , Rohini V "Real time conversion of sign language to speech and prediction of gestures using Artificial Neural Network." Real time conversion of sign language to speech and prediction, raham and Rohini V/ Procedia Computer Science 00 (2018) 587–594
3. Communication and Signal Processing, April 6-8, 2016, India.

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