

Project Title: Sign Language Recognition System for Deaf-Mute People

- ***Give explanation and objective of the project***

Sign language is a physical action by using hands with which we can communicate with dumb and deaf people. They can express their words or feelings with different hand shapes and movement. The task is to convert that shape or their sign language into text or speech. Due to advancement in the field of image processing (i.e. image or gesture captured through the webcam and further processing according to algorithms), this project will be implemented by using OpenCV tool and Python language. This method is adopted to reduce barriers of communication by developing an assistive device for deaf-mute persons.

The main objective is to develop a real time embedded device for the physically challenged to aid their communication in effective means or to determine gesture recognition that might enable the deaf or mute to converse with the hearing people remotely. Also this project aims to analyse and translate the sign language that is hand gestures into text or voice for easy understanding.

- ***Brief about design of the system and technical concepts***

Gesture recognition has been a very interesting problem in the Computer Vision [CV] community for a long time. This is particularly due to the fact that segmentation of foreground objects from a cluttered background is a challenging problem in real-time. The most obvious reason is because of the semantic gap involved when a human looks at an image and a computer looking at the same image. Humans can easily figure out what's in an image but for a computer, images are just 3-dimensional matrices.

For a sign language recognition system, we are using hand gestures that are able to recognise which gesture is performed by the user and accurately perform the functionality associated with it. As a software based project presently, the webcam and hand gestures are part of the computer system by using OpenCV platform for Image processing and python language for required algorithms.

- ***Brief about working procedures***

The proposed system aims to recognise the Sign Language and converts it to text. Input given to the system is video feed of the device camera facing towards the hand depicting the necessary alphabet. The histogram of the input image is then computed and analysed then it will be compared with pre-analyzed database OpenCV-Python is used as a tool for image processing in the proposed. The meaning of the sign will be displayed in the form of text according to database match analysis. As the initial development the method will be developed with respect to a single user at a time.

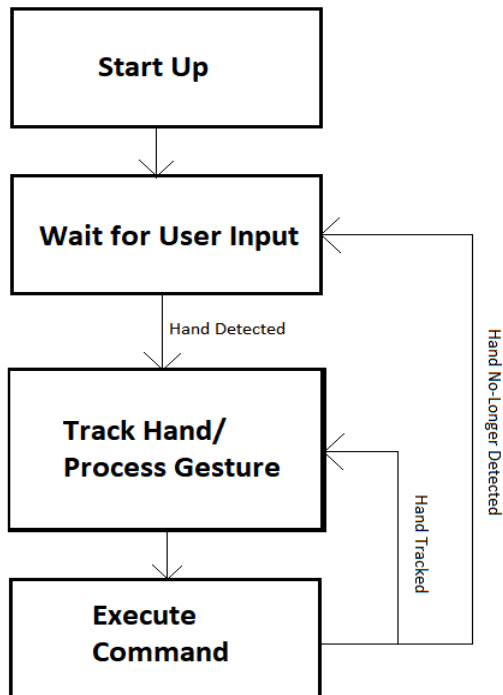


Figure: FLOW CHART OF SYSTEM

A simplistic overview of a gesture recognition system is given above in a flow chart of the system. Depending on the method of detection used, there may be a need for an additional calibration step immediately after start-up. As can be seen from the flow chart, until a hand is detected, the system will constantly be scanning and segmenting, attempting to identify the presence of a hand. The focus of this project is on this stage; how to clearly identify a hand given a non-simple background, simulating the situations of the everyday laptop user. These methods are once a hand is detected, it moves on to gesture recognition. The system tracks the position and state of the hand, and based on how the user moves, determines the command to execute. At any point of this stage, the user can choose to exit gesture control by hiding their hand the moment the system can no longer track or detect the hand, it will return to standby, waiting for the next user input or also any alphabetical key like 'q' to quit the running flow.