Sign Language to Text Convertor

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*Abstract*—This project is based on the goal to help people who do not know sign language to communicate with dumb people. The project is constructed on American Sign Language as it is the most used sign language in the world. The main aim of the project is to convert the alphabets in the sign language to text.

Keywords—Sign Language, American Sign Language [1], Python, Image Recognition, OpenCV, Contouring

# Introduction

Sign Language has been the main means of communication for the deaf and dumb people for a long time. In today’s world, almost all countries have eighter their own sign language or adopted one from the other country. The most prominent issue in this front is the amount of illiteracy in the public when it comes to sign language. A study showed that only people who had deaf or dumb relatives or friends even knew about sign languages. This fact makes the lives of the deaf and dumb people very hard and troublesome. This precludes them from having a normal job and working in many corporates in the industry. Though the tide is changing with deaf and dumb restaurants popping up in various places the rate of change is very slow. Thus, we turn to technology to solve this real-world problem. By using image recognition, we can make an effective translator between sign language and English text.

# Ease of Use

## Sign- Language

The application is developed in such a manner that the user will not find it very difficult to use. The person signing has to simply place his or her hand in the rectangle marked on the screen and sign away. The software will automatically capture the hand and process the data converting to text.

## User End

On the user side of things currently the program shows the live prediction of the sign shown to it. Thus, the person reading the text has to simply look at the top of the window and find the software prediction there

# working of the module

## Opencv

OpenCV is one of the most leading image processing libraries. It was chosen for this project because of it quick functions and also because of the inbuilt image grabbing and storing capabilities. In this project OpenCV is the base for all the image processing done. It is responsible for image grabbing, filtering, masking and contouring [2].

## Contouring and Hand recognition

Contour is a line or shape that is made by connecting points with the same pixel values. Using masking techniques, a black and white figure is obtained and then using contouring the hand is identified. Further some other features of the contour are also recorded and stored. These features [3] consist of Hull area, Contour Area, Perimeter, Aspect Ratio, Solidity, Moments of the contour, Extent, Angle of the ellipse to name a few.

## Letter Recognition

Using the [3]- data obtained from the contour in real time, it is compared with the preexisting database and then the appropriate letter is decided. Using the [2]- inbuilt functions of OpenCV this Letter is then displayed on the screen for the translator to read. It is a real time system and with minimum lag in the

## Drawbacks of the System

The system is set with a few drawbacks that will be stated as follows.

* The setup needs proper selection of the background
* The current algorithm only supports recognition of up to 6 [1]-ASL letter.
* The hand recognition is a bit rough and may result in flickering wrong results in the process of recognition

# future scope and applications

This idea has tremendous scope and varied application in the real world. With awareness towards audibly challenged people is increasing so is the need for an apt solution to the whole problem. This project is just the basic framework on which multiple applications can be build with even more varied approaches. Few of the improvements that I saw fit for the project are listed below.

## More Accurate and More Letter Recognition

The first step will be incorporate a better recognition algorithm that can handle more letter than the current version. The project can also venture into the machine learning sector to even increase its accuracy in the field.

## Home Automation

One of the most inspiring application for this technology can be a home automation system for the audibly challenged. In the current home automation solutions, the main way to give commands is via voice commands, but dumb people cannot access that facility. This new home automation system will be based on google assist or Alexa and will provide the users access to it via this project.

## Phone Calls for the Audibly Chanllenged

Phone calls are the main way of communication in todays business world. But dumb people do not have the privilege to use these services. This caused them to be not selected in many companies and affects the day-to-day work a lot. To mitigate this, we can use this text converter as a medium for the dumb people to use the phone services

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##### References

[1] <https://docs.opencv.org/trunk/d3/d05/tutorial_py_table_of_contents_contours.html>

[2] <https://www.geeksforgeeks.org/>

[3]<https://pythonprogramming.net/loading-images-python-opencv-tutorial/>