

# Sign Language Recognition

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## 1 Motivation

Hearing-impaired people communicate with society solely through sign language which is expressed through facial expressions and hand gestures. Although there are human interpreters that translate to and from sign language effectively, recent development in AI and sensing technologies can help in recognizing sign language.

Our work will focus on increasing the efficiency of algorithms and contemporary technologies used in AI based interpretation of sign language into speech/text.

## 2 Application

The applications of this research are not just limited to live-translation in lectures, conferences, and music concerts; but can be applied to day-to-day activities.

Due to lack of hearing-impaired-friendly interfaces for electronic gadgets, communication with these gadgets is mostly limited to people without any disabilities. Sign Language Recognition using AI serves as a solution to this problem, so that the hearing -impaired could also use home automation gadgets, autonomous vehicles, and advanced features on smart devices.

## 3 Background knowledge and requirements

Various sensing techniques and approaches have been proposed and developed to classify human gestures and facial expressions. For the purpose of gesture recognition, current technologies use deep learning algorithms based on artificial neural networks that are trained to correlate input gestures from an extensive library of gestures.

Some of the limitations today are as follows:

1. Accuracy of sensors: Capturing fast hand movements is difficult with the

resolution of sensors that can be used day-to-day.

2. Lack of huge datasets: Accuracy of machine learning algorithms is limited by the size of available data sets.

## **4 Problem Statement**

The goal of this project is to implement an efficient machine learning algorithm for sign language recognition and interpretation.

## **5 Tools & Languages**

1. IDE (Pycharm)
2. Python (3.7)
3. Numpy
4. OpenCV
5. Keras
6. Tensorflow

## **6 Proposed Solution**

We have two approaches:

1. Classical computer vision methods
2. Machine learning methods which involve learning of features such as SVM, deep-learning based approaches.

The proposed solution would be compatible with all electronic gadgets that have a camera attached to help the hearing-impaired in communicating with these gadgets that do not ordinarily have sign language recognition enabled.