**Sign Language Recognition**

**Introduction**

For deaf-mute people, sign language is the main way to communicate inside their group and with the outside world. A high accuracy sign language translation system would bridge the communication between deaf-mute people and hearing people, improving the quality of life of deaf-mute people.  We think that a robust system like this would have important scientific research value and social impact.

We aim to design a model to convert a video of sign language to corresponding semantic meaning. This model could deployed in a mobile phone or laptop and would make it easier for non sign language fluent people to communicate with the deaf-mute group.

The input of our model is a video. Furthermore, a video could be viewed as a sequence of images as a 3D matrix. With such inputs, we need to do classify them into a range of semantic meaning. The output is an integer representing a specific translated meaning of the sign language.

**Model**

Our model contains components/steps shown below:

**1. Data processing**

Using OpenCV, Faster RCNN or YOLO algorithms to set black background and the body except for hands and face. This process is designed to make it easier for the model to focus on valuable parts of images.

**2. Spatial Mechanism**

For this we will use hourglass network to get an attention map of each image. Although we already mask the images, there still is a need for more work for feature extraction. A deep learning method is used to get the weights for each pixel on images.

**3. Temporal Mechanism**

As we have a sequence of images, different images may show varying importance in sign language recognition. A hourglass or self-attention mechanism is taken to solve it.

**4. Classification**

Make classification based on the features we have already extracted from the video.

**5. Sign language investigation**

Investigate more about sign language and get the frequency of each word.  Possibly we will look to create our own metric based off the importance of different words and their use.  We hope this will lead to a more valid and reasonable estimation of results.

**Milestones**

**Week 1**: step (1) (Done)

**Week 2**: step(2)

**Week 3**: step(3)

**Week 4**: step(4)

Remaining time could be used for advanced innovation and/or further experiments.

**Database**

There are so many databases available and we haven’t decided on which database to use for final training.