

One-Shot Learning Gesture Model

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Software Requirements Specification(SRS) Document

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Richeek Das

1 Introduction

Humans exhibit a strong ability to acquire and recognize new patterns pretty easily and quickly. On the other hand, Machine Learning has been successful in achieving state-of-the-art performance in a variety of applications such as web search, spam detection, caption generation, and speech and image recognition. But, these algorithms fail, when the data available is pretty less. That's where **One-Shot Learning** comes in, with a promise to offer reasonable accuracy on very-limited datasets.

1.1 Purpose

Our task here is to implement the **One-Shot Learning** model(or a Few-Shot Learning model) using **Siamese-Neural Networks for Gesture Prediction** into 15 different classes, with very less input training data.

1.2 Intended Use

The final gesture prediction model through **One/Few Shot Learning**, will be pretty lightweight and will be viable for *cloud based deployment*. **Web-App** based approach of using such a model seems to be a very probable direction of advancement for practical usage.

2 Requirements and Dependencies

The key-points of requirements and dependencies that this model will have :

- Technologies :
 - **Keras 2.3.1**
 - **TensorFlow 2.2.0**
 - **Python 3.7.6**
 - **OpenCV 4.2.0**
- Previous Works To Be Used :

- This paper **here**, was really a great inspiration for doing this work.
- Work that I had completed on my **Deep CNN Based Gesture Recognition System in Summer 2020**. See it **here**.
- Main Ideas To Be Used :
 - **Image Preprocessing and Data Refining**
 - **Deep Siamese Neural Networks**
 - **Self Created Gestures Dataset**

2.1 System Features

For the model training and building Deep Siamese Networks, I will be using **Google Colab** or **Kaggle** or a **6GB GTX 1060 GPU** with very fast **CUDA** libraries :)

3 Timeline and Mini-Tasks

May 29 - May 31	Understand the basics of Deep Siamese Neural Networks and its novel impact on One-Shot Learning .
June 1 - June 2	Set up a database of 15+ gestures for training the Deep Siamese Network .
June 3 - June 8	Model Architecture Design and Training along with hyper-parameter tweaking.
June 9 - June 10	Maybe, I'll use this time as a buffer period for basic code review , and I will definitely want to take a look at the viable possibilities of deploying this model as a Web-App .