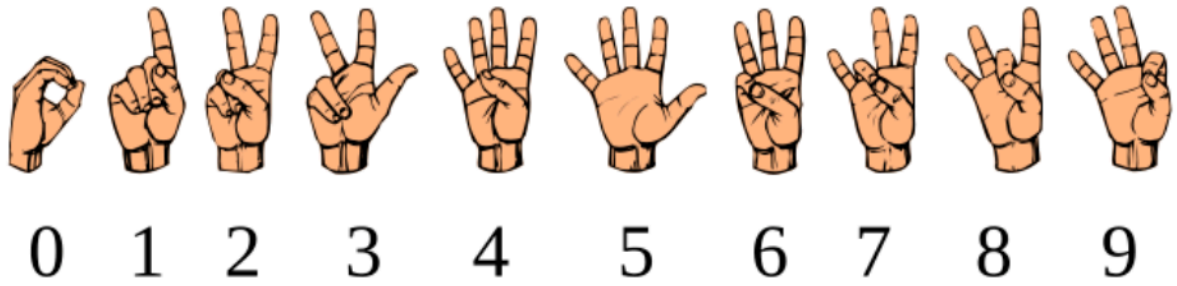
Max Baskin - DS 4002 - CS3

Predicting ASL Digit Signs from Images with CNN



Context

Online translation softwares are ubiquitous nowadays - from Google Translate to DeepL, countless people around the world use these programs to facilitate communication and to understand and be understood. While no translation software is perfect (or a substitute for actually learning the language), machine-assisted translation has become a very useful tool for many working with and around foreign languages. While most languages are verbal/text based and can therefore be translated using various language processing methods, languages like American Sign Language (ASL) are primarily visual in nature, and therefore require different methods of translation.

Motivation

You are a data scientist working for a prominent AI company that uses machine learning techniques to translate various languages more accurately and quickly than many of its competitors. Your company leadership has decided to branch out into sign languages in order to reach people who sign and would like to be able to automatically translate their language into English, and people who don't sign and would like to be able to understand ASL on a basic level. Your task is to provide a proof-of-concept for your supervisors demonstrating that the machine learning models that you use (such as CNN) are able to accurately and consistently translate sign language, using a limited set of signs (in this case, the numbers from zero to nine). If you are successful, your project could potentially be extended to cover letter signs, and later on, full words and sentences.

Deliverable

Your goal is to use the provided dataset (2180 images from 218 participants, 10 digit signs each) to train a convolutional neural network model (CNN) to recognize ASL digit signs from zero to nine. To do this, you will download the original data from the provided Github repository, run through the provided script, and then assess the accuracy of your model using various methods. Once you are finished, you should have a machine learning model that can classify ASL digit signs from images with a reasonable degree of accuracy.