MAIS 202 Deliverable 1: ASL Alphabet Classifier

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I. Dataset

I will be using the ASL dataset (https://www.kaggle.com/grassknoted/asl-alphabet), a collection of 3000 training images for each of the letters in American Sign Language.

II. Methodology

i. Data preprocessing

The training set is organized into labelled folders for each ASL letter. While I don't think a lot of data cleaning is necessary, I will need to parse out each image's pixels into RBG or intensity values. Then, I may need to decrease the feature space (PCA or something similar) as each image is 200x200 pixels, with 3 RGB values per pixel. I will also need to ensure that each representation of an image is correctly linked with their label.

ii. Machine learning model

I want to predict the ASL letter being formed by the user's hand. Because my inputs (the photos) are very complicated, I plan on using a neural network for classification. I need a model that can handle coloured image classification, and convolutional neural networks seem to do well (https://blog.doculayer.com/image-classification-using-machine-learning-ins-and-outs; https://towardsdatascience.com/image-classification-in-10-minutes-with-mnist-dataset-54c35b77a38d). The benefits of using an NN means that my model can handle the complexities of ASL letter images. The cons are that the model may take longer to run than a simpler model that meets comparable performance benchmarks.

iii. Final conceptualization

I plan on building a simple web app that uses a webcam to receive ASL letters inputs. The page will have a title, and a display for the input the webcam is receiving. Furthermore, an area of the webcam output may be outlined to indicate where the user should form their letter. Lastly, my model will output a letter underneath the webcam display. I'll most likely use HTML and CSS for landing page design, and Heroku to host the website and integrate the model.

A (poorly drawn) example of my landing page: