

## Model Description

- Inputs
  - Grayscale image of handwritten text (jpeg)
  - 284 x 31(pixels)
- Output(s)
  - An array of where the model thinks each letter is
  - The text written in the image (string)
  - Confidence (float)
- Model Type
  - CRNN with Attention or CTC
- Model Architecture
  - **Transformation:** Spatial Transformer Network (STN) for text alignment.
  - **Feature Extraction:** ResNet-based CNN backbone.
  - **Sequence Modeling:** 2-layer BiLSTM for contextual character representation.
  - **Prediction:** Attention-based decoder (softmax over character set).

The model works by:

- Determining where the letters of each word are, and
- then it figures out which letters they are.

## Model intended uses:

- Read handwriting from image.
- Characters are Upper and lower case letters only

## Performance:

In the validation set of 41292 handwritten names, the results had non-letter symbols in the prediction, so I tested it's accuracy on the raw predictions and also the prediction where I substitute non-letter symbols for characters which made sense.

Raw prediction was correct 15.8% of the names

After substituting non-letter symbols, it was correct 25.2% of the names

The model predicted the correct letter 81% of the time for entries where the label and prediction had the same length

(Note: Sometimes letters are missed out or the model thinks one handwritten letter is actually two. Those cases where if the the name and predicted name differs in length, it would not be counted in this confusion matrix)

## Limitations:

- The model sees printed text as well as handwritten text. The printed text interferes with the results.
- Sometimes the model tries to read letters which are half cropped out, which interferes with the prediction.
- Sometimes the model would not be able to read some text, especially when the text is faded.

### **Trade-offs**

The model can definitely be improved. This is an early state of the model as training it took a long time I didn't explore different hyperparameters.