

Deliverable 3

Final Training Results:

We modify our model by adding 2 sets of layers to the previous model. Each set contains a convolutional layer, a pooling layer, and a 20% dropout layer. We also update the number of neurons to 16, 32, 64 respectively for each of the convolution layers. In terms of fitting the model, we update the parameters and add epochs=10.

By adding more layers and changing the parameters of the fitting process, the training accuracy increases from 81% to 94.7%. And the prediction accuracy scores for validation set and testing set are respectively 99.8% and 93.7%.

Comparison of Previous model and Current model			
Layer (type)	Output Shape	Layer (type)	Output Shape
conv2d_17 (Conv2D)	(None, 24, 24, 64)	conv2d_44 (Conv2D)	(None, 26, 26, 16)
max_pooling2d_17 (MaxPooling2D)	(None, 12, 12, 64)	max_pooling2d_42 (MaxPooling2D)	(None, 13, 13, 16)
dropout_24 (Dropout)	(None, 12, 12, 64)	dropout_58 (Dropout)	(None, 13, 13, 16)
flatten_7 (Flatten)	(None, 9216)	conv2d_45 (Conv2D)	(None, 11, 11, 32)
dense_14 (Dense)	(None, 600)	max_pooling2d_43 (MaxPooling2D)	(None, 5, 5, 32)
dropout_25 (Dropout)	(None, 600)	dropout_59 (Dropout)	(None, 5, 5, 32)
dense_15 (Dense)	(None, 25)	conv2d_46 (Conv2D)	(None, 3, 3, 64)
Total params: 5,546,889 Trainable params: 5,546,889 Non-trainable params: 0		max_pooling2d_44 (MaxPooling2D)	(None, 1, 1, 64)
		dropout_60 (Dropout)	(None, 1, 1, 64)
		flatten_16 (Flatten)	(None, 64)
		dense_32 (Dense)	(None, 512)
		dropout_61 (Dropout)	(None, 512)
		dense_33 (Dense)	(None, 25)
		Total params: 69,401 Trainable params: 69,401 Non-trainable params: 0	

Prediction score of validation and testing sets:

172/172 [=====] - 1s 7ms/step - loss: 0.0122 - accuracy: 0.9984
 225/225 [=====] - 1s 6ms/step - loss: 0.1728 - accuracy: 0.9378

Final demonstration proposal:

The final webpage will consist of a window centered in the middle that displays the predicted sign, a button that allows the user to upload an image, and a submit button. The image requirements will be written above the button, specifying that:

- 1) the background of the image needs to be contrastive to the color of skin.
- 2) the image need to have dimension $28 * 28 * 1$ for accurate prediction.

Screenshot of website prototype:

Sign Alphabet Recognition Project

Alice Chu and Shuru Wang

Upload image with the following requirements:

- 1) contrastive background and hand color.
- 2) $28 * 28$ grayscale.

Choose File

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