

Amaan Rahman
ECE472: Deep Learning
Processor Curro

Assignment 3: MNIST Classifier

Architecture:

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 26, 26, 32)	320
max_pooling2d (MaxPooling2D)	(None, 13, 13, 32)	0
conv2d_1 (Conv2D)	(None, 11, 11, 32)	9248
max_pooling2d_1 (MaxPooling2D)	(None, 5, 5, 32)	0
flatten (Flatten)	(None, 800)	0
dense (Dense)	(None, 20)	16020
dropout (Dropout)	(None, 20)	0
dense_1 (Dense)	(None, 20)	420
batch_normalization (Batch Normalization)	(None, 20)	80
dropout_1 (Dropout)	(None, 20)	0
dense_2 (Dense)	(None, 50)	1050
batch_normalization_1 (Batch Normalization)	(None, 50)	200
dense_3 (Dense)	(None, 10)	510
Total params: 27,848		
Trainable params: 27,708		
Non-trainable params: 140		

Output:

```
Epoch 1/5
1500/1500 [=====] - 23s 15ms/step - loss: 2.2247 - accuracy: 0.8947 - val_loss: 0.6271 - val_accuracy: 0.9351
Epoch 2/5
1500/1500 [=====] - 22s 15ms/step - loss: 0.6271 - accuracy: 0.9325 - val_loss: 0.5500 - val_accuracy: 0.9448
Epoch 3/5
1500/1500 [=====] - 25s 17ms/step - loss: 0.5755 - accuracy: 0.9352 - val_loss: 0.4908 - val_accuracy: 0.9537
Epoch 4/5
1500/1500 [=====] - 23s 15ms/step - loss: 0.5446 - accuracy: 0.9391 - val_loss: 0.4562 - val_accuracy: 0.9558
Epoch 5/5
1500/1500 [=====] - 26s 17ms/step - loss: 0.5155 - accuracy: 0.9404 - val_loss: 0.4193 - val_accuracy: 0.9659
313/313 [=====] - 2s 6ms/step - loss: 0.4191 - accuracy: 0.9647
```

Final test dataset accuracy: **96.47%**