프로젝트 필기체숫자 인식모델 실험 1: MNIST

2019253018 이준형

1. 모델1 (층개수 2개 m1=16, m2=10)

실험을 통해 알아낸 제일 좋은 epoch수 46이다.

```
Train Epoch: 46 [0/48000 (0%)]  Loss: 0.159933
Train Epoch: 46 [6400/48000 (13%)]      Loss: 0.256027
Train Epoch: 46 [12800/48000 (27%)]     Loss: 0.058633
Train Epoch: 46 [19200/48000 (40%)]     Loss: 0.077460
Train Epoch: 46 [25600/48000 (53%)]     Loss: 0.134965
Train Epoch: 46 [32000/48000 (67%)]     Loss: 0.035085
Train Epoch: 46 [38400/48000 (80%)]     Loss: 0.306958
Train Epoch: 46 [44800/48000 (93%)]     Loss: 0.199763
Validation set: Average loss: 0.1757, Accuracy: 95.11%
```

최종 epoch의 validation 성능(accurarcy) & test 데이터를 이용해 test한 test성능

```
Train Epoch: 50 [0/48000 (0%)]  Loss: 0.063145
Train Epoch: 50 [6400/48000 (13%)]      Loss: 0.083182
Train Epoch: 50 [12800/48000 (27%)]     Loss: 0.071422
Train Epoch: 50 [19200/48000 (40%)]     Loss: 0.096178
Train Epoch: 50 [25600/48000 (53%)]     Loss: 0.155309
Train Epoch: 50 [32000/48000 (67%)]     Loss: 0.098717
Train Epoch: 50 [38400/48000 (80%)]     Loss: 0.060541
Train Epoch: 50 [44800/48000 (93%)]     Loss: 0.228423
Validation set: Average loss: 0.1796, Accuracy: 94.99%
Model Test set: Average loss: 0.1690, Accuracy: 95.17%
```

훈련의 마지막 epoch와 제일 좋은 epoch, test의 성능이 출력된 결과창

2. 모델2 (층개수 3개 m1=256, m2=128, m3=10)

실험을 통해 알아낸 제일 좋은 epoch수 37이다.

```
Train Epoch: 37 [0/48000 (0%)]  Loss: 0.002679
Train Epoch: 37 [6400/48000 (13%)]      Loss: 0.010299
Train Epoch: 37 [12800/48000 (27%)]     Loss: 0.004654
Train Epoch: 37 [19200/48000 (40%)]     Loss: 0.000473
Train Epoch: 37 [25600/48000 (53%)]     Loss: 0.011575
Train Epoch: 37 [32000/48000 (67%)]     Loss: 0.002526
Train Epoch: 37 [38400/48000 (80%)]     Loss: 0.012171
Train Epoch: 37 [44800/48000 (93%)]     Loss: 0.001155
Validation set: Average loss: 0.0746, Accuracy: 97.97%
```

최종 epoch의 validation 성능(accurarcy) & test 데이터를 이용해 test한 test성능

```
Train Epoch: 50 [0/48000 (0%)]  Loss: 0.007207
Train Epoch: 50 [6400/48000 (13%)]      Loss: 0.009014
Train Epoch: 50 [12800/48000 (27%)]     Loss: 0.006194
Train Epoch: 50 [19200/48000 (40%)]     Loss: 0.001983
Train Epoch: 50 [25600/48000 (53%)]     Loss: 0.006511
Train Epoch: 50 [32000/48000 (67%)]     Loss: 0.001784
Train Epoch: 50 [38400/48000 (80%)]     Loss: 0.001846
Train Epoch: 50 [44800/48000 (93%)]     Loss: 0.000472
Validation set: Average loss: 0.0787, Accuracy: 97.97%
Model 2 Test set: Average loss: 0.0729, Accuracy: 97.98%
```

훈련의 마지막 epoch와 제일 좋은 epoch, test의 성능이 출력된 결과창