Sunghyun Kim
5362318
kimx5261@umn.edu

Homework 3
CSci 5525 Spring 23

2023-03-19

1 Dimension

1.1 Size of n, m, k

$n = 4, m = 4, k = 16$

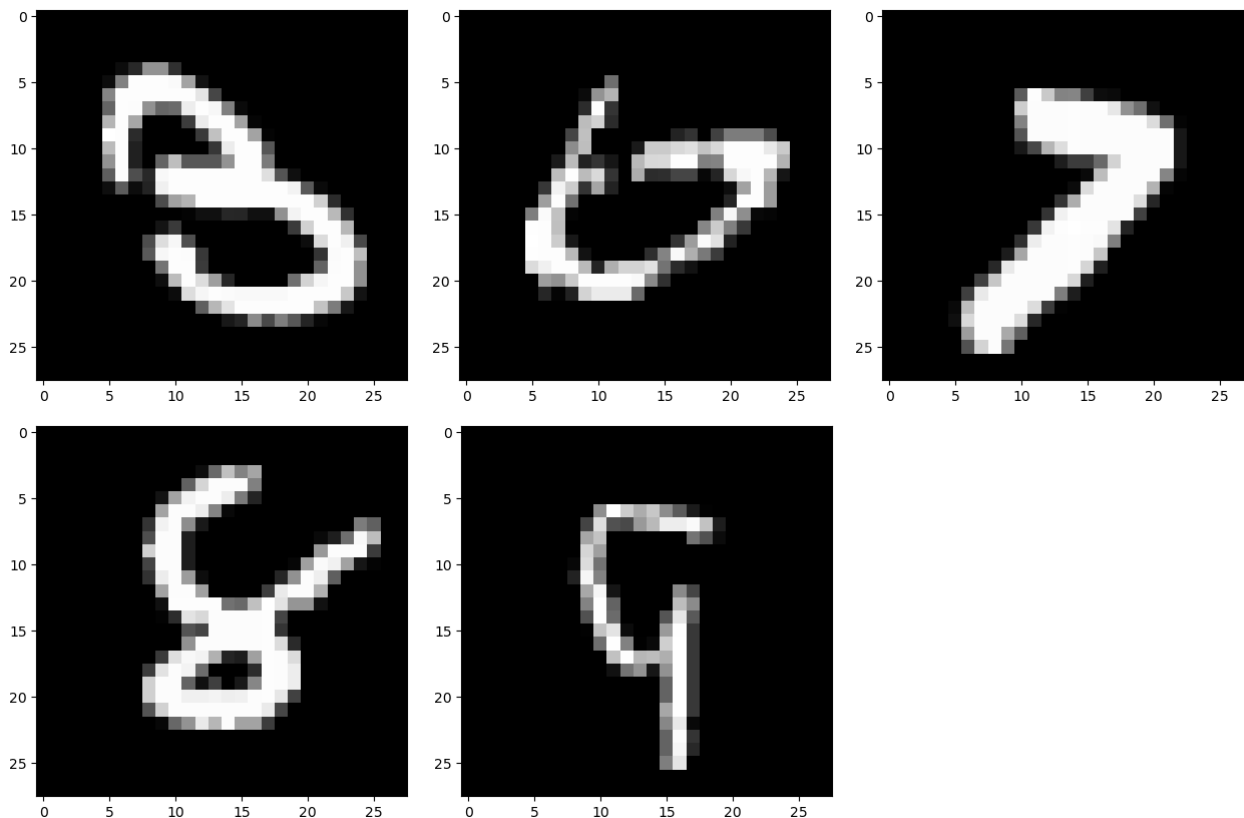## 1.2 Size of W_{conv}, W_{fc}, b

$4 * 4, 1 * 1, -6$

2 MLP

For MLP, & the best optimizer was Adagrad with η value of 0.01 without overfitting.

Test Set Loss/Error Rate for Adagrad					
η	1e-5	1e-4	1e-3	0.01	0.1
Loss	1.88	0.4709	0.1187	0.0025	0.0305
Error Rate	0.5221	0.1279	0.0677	0.0229	0.029

Please consult the code's output for more detailed result.

3 CNN

Loss on test dataset was 0.0022 with error rate of 0.0305 with η of 0.1.

As we can see, the model was not very good at classifying numbers that were written in angel like 3 or 7, and with incomplete line like 6, 8 and 9.