CS 547 MP1 Report

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In this MP, I implemented a neural network with one hidden layer of dimension 128. The input layer is of dimension 784 and the output layer is of dimension 10.

I chose the activation function to be the sigmoid function.

I implemented the mini-batch SGD algorithm with batch size to be 5.

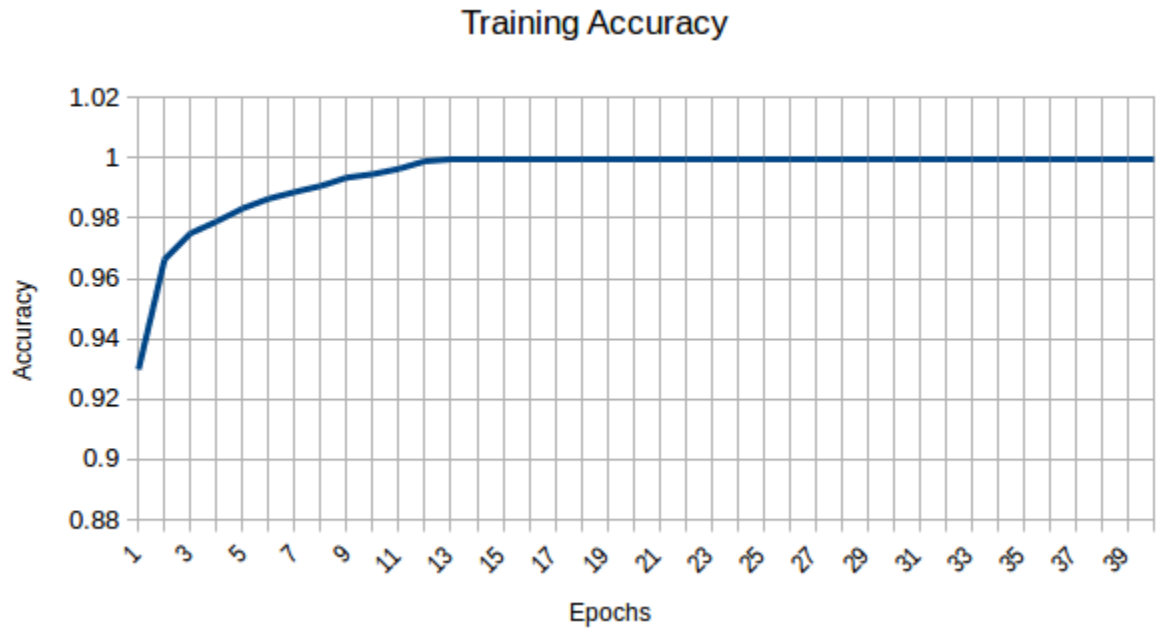
To achieve better results, we normalize the matrix W and C following $N(0, \frac{1}{d_H})$.

The training process contains 40 epochs, with gradually decreasing learning rates as below:

0 <= epoch < 10	LR = 0.1
10 <= epoch < 20	LR = 0.01
20 <= epoch < 30	LR = 0.001
30 <= epoch < 40	LR = 0.0001

The final accuracy of our model on the test data set is: 97.99%

The training accuracies of each epochs are plotted and listed as below:



0.9298333333333333
0.9663333333333334
0.975
0.9789
0.9832666666666666
0.9864666666666667
0.9887
0.9907166666666667
0.9934833333333334
0.9946333333333334
0.9963833333333333
0.9989333333333333
0.99955
0.99965
0.99965
0.9996666666666667
0.9997166666666667
0.9997333333333334
0.9997666666666667
0.9997666666666667
0.9997833333333334
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