Lab7-MNIST: MLP vs LeNet

CIS694/EEC693/CIS593 Deep Learning

Cleveland State University

**This lab will compare the MLP and LeNet on the MNIST dataset for the handwritten digit recognition.**

1. Download the MNIST dataset from Blackboard, unzip it and put the unzipped folder in your PyCharm project MyDL:

MyDL/data/MNIST

*The publicized MNIST dataset contains 60,000 training images and 10,000 testing images.*

2. Please run the file “mnist\_LeNet.py” to train and test the CNN LeNet for the MNIST handwritten digit recognition. Try to read and understand each line of the code. It will output the following log:

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[1, 2000] loss: 1.141

[1, 4000] loss: 0.250

[1, 6000] loss: 0.179

[1, 8000] loss: 0.147

[1, 10000] loss: 0.122

[1, 12000] loss: 0.109

[1, 14000] loss: 0.094

[2, 2000] loss: 0.081

[2, 4000] loss: 0.069

[2, 6000] loss: 0.067

[2, 8000] loss: 0.064

[2, 10000] loss: 0.066

[2, 12000] loss: 0.066

[2, 14000] loss: 0.064

Finished Training

Ground Truth of the test images: 7 2 1 0

Predicted of the test images: 7 2 1 0

Accuracy of the network on the 10000 test images: 97 %

Accuracy for class 0 is: 99.3 %

Accuracy for class 1 is: 99.5 %

Accuracy for class 2 is: 98.2 %

Accuracy for class 3 is: 99.7 %

Accuracy for class 4 is: 99.0 %

Accuracy for class 5 is: 91.6 %

Accuracy for class 6 is: 97.7 %

Accuracy for class 7 is: 98.6 %

Accuracy for class 8 is: 97.4 %

Accuracy for class 9 is: 97.4 %

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Finally, the well trained LeNet model will be saved as './mnist\_letnet.pth' on your computer.

3. Please work on the file “mnist\_mlp\_lab.py” to design a new MLP with 3 fully-connected layers:

1x32x32 -> 120

120 ->84

84 -> 10

First, please write your code in the file “mnist\_mlp\_lab.py” to define your MLP.

Then, please train and test your MLP. Finally, the well trained MLP model will be saved as './mnist\_mlp.pth' on your computer.

You may copy the running log in the following and compare it with the above LeNet performance:

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**Brainstorm:**

Which one is better? What are your findings? What happen if you add more fully-connected layers in MLP?