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:

```
[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 %
```

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:

Brainstorm:

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