

Homework 3: Intro to Deep Learning (Spring 2020)

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Solution B:

- I used NN Sequential Module of Pytorch for training and testing the model.
- I used Cross Entropy Loss Layer in model training as Pytorch Cross Entropy Layer calculates the Softmax as well as the loss simultaneously. Also, since this problem was **MULTICLASS CLASSIFICATION** problem, I had used this layer.
- Also, since I had not explicitly used Softmax as output layer due to use of Cross Entropy Layer, I had manually built the Softmax function as output layer for testing phase.
- Total two hidden layers are used and model structure is 784-200-50-10.
- Please find the below attached image of the output. The image shows the Training Loss for each epoch, training time taken, total images tested and model accuracy.
- As seen in the image, it took around 9.3 minutes for training the model with 60000 MNIST training images in 10 epochs. After testing 10000 MNIST test images the model has an accuracy of about **97.63 percent**.
- The working code is uploaded in the assignment submitted on Sakai.
- Machine specifications are:
 - Processor: 2 GHz Intel Core 2 Duo
 - Memory: 8 GB 1067 MHz DDR3
 - Graphics: NVIDIA GeForce 9400M 256MB
 - OS: Mac OS Yosemite 10.10.5

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HW3 — bash — 80x24
(base) suketuvs-macbook:HW3 learning$ python3 Q2.py
Epoch 0 - Training loss: 0.5615320588861193
Epoch 1 - Training loss: 0.230973061452161
Epoch 2 - Training loss: 0.16575607550201385
Epoch 3 - Training loss: 0.13178564712945331
Epoch 4 - Training loss: 0.10744746849099711
Epoch 5 - Training loss: 0.08938367724982596
Epoch 6 - Training loss: 0.07597406053228546
Epoch 7 - Training loss: 0.06649740605847414
Epoch 8 - Training loss: 0.06053778588938624
Epoch 9 - Training loss: 0.05525413374386744

Training Time (in minutes) = 9.313622701168061

Number Of Images Tested = 10000
Model Accuracy = 97.63 %
(base) suketuvs-macbook:HW3 learning$
```