PROGRAMMING ASSIGNMENT 2 ANALYSIS FOR MACHINE LEARNING

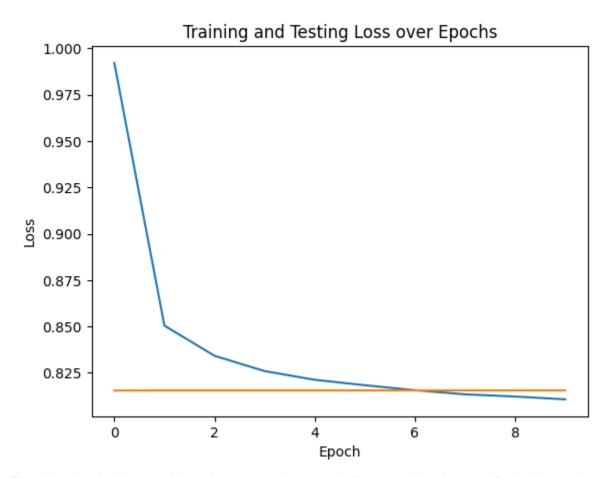|	
Name	: Aravindh Gopalsamy
UTA ID	: 1002028538
Assignment	: 2
Course	: CSE 6363 - Machine Learning

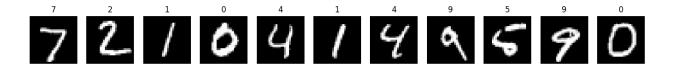## Analysis of LeNet5 Implementation :

Testing the LeNet5 from the MNIST dataset, storing the loss values in a array on both training and test over the epochs.

The blue line indicate training dataset and orange indicate testing dataset. Both blue and orange line curve decrease shows the efficiency of the model.

```
Epoch : 1, Loss : 0.9921929488685339
----------------------------------------
Epoch : 2/10
----------------------------------------
Epoch : 2, Loss : 0.8504282297737309
----------------------------------------
Epoch : 3/10
----------------------------------------
Epoch : 3, Loss : 0.8341718842225797
----------------------------------------
Epoch : 4/10
----------------------------------------
Epoch : 4, Loss : 0.8259053957868995
----------------------------------------
Epoch : 5/10
----------------------------------------
Epoch : 5, Loss : 0.8212157428137529
----------------------------------------
Epoch : 6/10
----------------------------------------
Epoch : 6, Loss : 0.818277500839884
----------------------------------------
Epoch : 7/10
----------------------------------------
Epoch : 7, Loss : 0.8155970673825441
----------------------------------------
Epoch : 8/10
----------------------------------------
Epoch : 8, Loss : 0.8133733808867204
----------------------------------------
Epoch : 9/10
----------------------------------------
Epoch : 9, Loss : 0.8121750572724129
----------------------------------------
Epoch : 10/10
----------------------------------------
Epoch : 10, Loss : 0.81066451944522
----------------------------------------
```

By observing the epoch loss clearly states that the model is not overfitted.

Above shows the predicate values with the actual image.

Testing and training dataset has been split using the predefined function which makes model to have an high accuracy.

I tried with 100 and 1000 epoch approach the accuracy score were pretty much same with 10 epochs approach. So i went with the 10 epoch approach.

The LeNet5 architecture implementation has an accuracy of 98.57%, which is high for the MNIST dataset. This high accuracy has been achieved by implementing the CrossEntropyLoss function from torch.nn package for criterion and optimize the mode using Adam from optim package.