Classificaiton Using Neural Networks and Deep Learning

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1 Objective

The purpose of this project is to implement a CNN(Convolutional Neural Network) to the Handwritten Digits Recognition.
The following tasks in this project:

1. Run the code and report the accuracy.

2. Change the kernel size to 5*5, plot the learning errors along with the epoch, and also report the testing error and accuracy on the test dataset.

3. Change the number of the feature maps in the first and second convolutional layers. Then, plot the learning errors along with the epoch, and also report the testing error and accuracy on the test.

2 The Results of Baseline Code

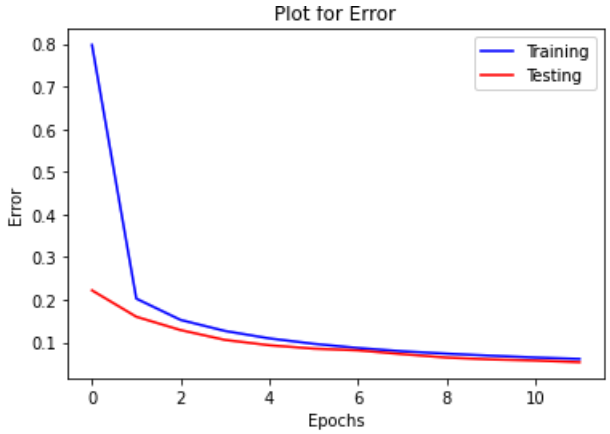
The results as below:

```
Test loss: 0.06215295780878514
Test accuracy: 0.9811999797821045
```

3 The Results of kernel size 5x5

Changed Kernel size : 5x5
Feature maps(**First Convolutional Layer**): 6
Feature maps(**Seoncd Convolutional Layer**): 16

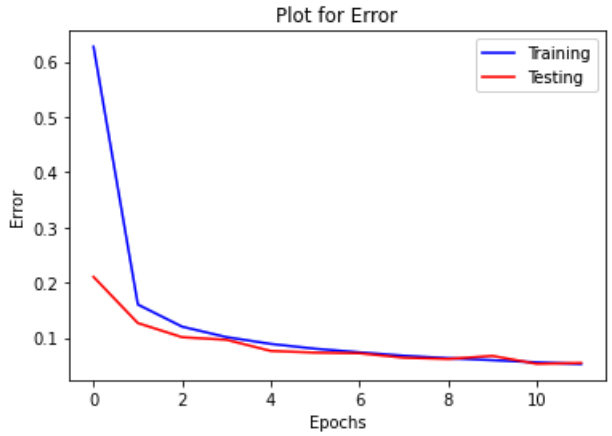
The results as below:




```
Test loss: 0.053700581530947235
Test accuracy: 0.9825000166893005
```

4 The Results of Changed Feature Maps and Kernel size 3x3

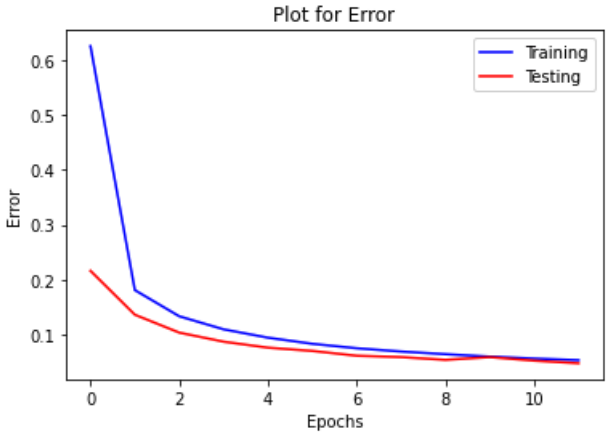
Kernel size : 3x3
Feature maps(**First Convolutional Layer**): 16
Feature maps(**Seoncd Convolutional Layer**): 32




```
Test loss: 0.05434245191225782
Test accuracy: 0.982699990272522
```

5 The Results of Changed Feature Maps and Kernel size 5x5

Changed Kernel size : 5x5
Feature maps(**First Convolutional Layer**): 16
Feature maps(**Seoncd Convolutional Layer**): 32




```
Test loss: 0.04712272657831199
Test accuracy: 0.984499990940094
```