

Write-Up for Project-2 Artificial Intelligence Winter Quarter 2012-2013

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Training File of Zero Epochs

1. Run with test_data

Loading data from : training_run_zero.csv

Loading data from : test_data.csv

Confusion Matrix :

[0.0, 5.0, 0.0, 0.0]

[0.0, 6.0, 0.0, 0.0]

[0.0, 5.0, 0.0, 0.0]

[0.0, 4.0, 0.0, 0.0]

Profit Matrix :

[0.0, -0.35, -0.0, -0.0]

[-0.0, 0.9, -0.0, -0.0]

[-0.0, -0.35, 0.0, -0.0]

[-0.0, -0.12, -0.0, -0.0]

Classification errors : 14

Recognition Rate : 30.0%

Total Profit/Loss : 0.08

2. Run with train_data

Loading data from : training_run_zero.csv

Loading data from : train_data.csv

Confusion Matrix :

[0.0, 15.0, 0.0, 0.0]

[0.0, 22.0, 0.0, 0.0]

[0.0, 22.0, 0.0, 0.0]

[0.0, 15.0, 0.0, 0.0]

Profit Matrix :

[0.0, -1.05, -0.0, -0.0]

[-0.0, 3.3, -0.0, -0.0]

[-0.0, -1.54, 0.0, -0.0]

[-0.0, -0.45, -0.0, -0.0]

Classification errors : 52
Recognition Rate : 29.7297297297%
Total Profit/Loss : 0.26

Training File of Ten Epochs

1. Run with test_data

Loading data from : training_run_ten.csv
Loading data from : test_data.csv

Confusion Matrix :

[0.0, 0.0, 5.0, 0.0]
[0.0, 0.0, 6.0, 0.0]
[0.0, 0.0, 5.0, 0.0]
[0.0, 0.0, 4.0, 0.0]

Profit Matrix :

[0.0, -0.0, -0.35, -0.0]
[-0.0, 0.0, -0.42, -0.0]
[-0.0, -0.0, 0.25, -0.0]
[-0.0, -0.0, -0.12, -0.0]

Classification errors : 15
Recognition Rate : 25.0%
Total Profit/Loss : -0.64

2. Run with train_data

Loading data from : training_run_ten.csv
Loading data from : train_data.csv

Confusion Matrix :

[0.0, 0.0, 15.0, 0.0]
[0.0, 0.0, 22.0, 0.0]
[0.0, 0.0, 22.0, 0.0]
[0.0, 0.0, 15.0, 0.0]

Profit Matrix :

[0.0, -0.0, -1.05, -0.0]
[-0.0, 0.0, -1.54, -0.0]
[-0.0, -0.0, 1.1, -0.0]
[-0.0, -0.0, -0.45, -0.0]

Classification errors : 52
Recognition Rate : 29.7297297297%
Total Profit/Loss : -1.94

Training File of Hundred Epochs

1. Run with test_data

Loading data from : training_run_hundred.csv

Loading data from : test_data.csv

Confusion Matrix :

[5.0, 0.0, 0.0, 0.0]

[0.0, 5.0, 1.0, 0.0]

[0.0, 0.0, 5.0, 0.0]

[2.0, 1.0, 0.0, 1.0]

Profit Matrix :

[1.0, -0.0, -0.0, -0.0]

[-0.0, 0.75, -0.07, -0.0]

[-0.0, -0.0, 0.25, -0.0]

[-0.06, -0.03, -0.0, -0.03]

Classification errors : 4

Recognition Rate : 80.0%

Total Profit/Loss : 1.81

2. Run with train_data

Loading data from : training_run_hundred.csv

Loading data from : train_data.csv

Confusion Matrix :

[15.0, 0.0, 0.0, 0.0]

[0.0, 15.0, 7.0, 0.0]

[0.0, 0.0, 22.0, 0.0]

[7.0, 1.0, 3.0, 4.0]

Profit Matrix :

[3.0, -0.0, -0.0, -0.0]

[-0.0, 2.25, -0.49, -0.0]

[-0.0, -0.0, 1.1, -0.0]

[-0.21, -0.03, -0.09, -0.12]

Classification errors : 18

Recognition Rate : 75.6756756757%

Total Profit/Loss : 5.41

Training File of Thousand Epochs

1. Run with test_data

Loading data from : training_run_thousand.csv

Loading data from : test_data.csv

Confusion Matrix :

[5.0, 0.0, 0.0, 0.0]

[0.0, 6.0, 0.0, 0.0]

[0.0, 0.0, 5.0, 0.0]

[0.0, 0.0, 0.0, 4.0]

Profit Matrix :

[1.0, -0.0, -0.0, -0.0]

[-0.0, 0.9, -0.0, -0.0]

[-0.0, -0.0, 0.25, -0.0]

[-0.0, -0.0, -0.0, -0.12]

Classification errors : 0

Recognition Rate : 100.0%

Total Profit/Loss : 2.03

2. Run with train_data

Loading data from : training_run_thousand.csv

Loading data from : train_data.csv

Confusion Matrix :

[14.0, 0.0, 0.0, 1.0]

[0.0, 22.0, 0.0, 0.0]

[0.0, 0.0, 22.0, 0.0]

[0.0, 1.0, 1.0, 13.0]

Profit Matrix :

[2.8, -0.0, -0.0, -0.07]

[-0.0, 3.3, -0.0, -0.0]

[-0.0, -0.0, 1.1, -0.0]

[-0.0, -0.03, -0.03, -0.39]

Classification errors : 3

Recognition Rate : 95.9459459459%

Total Profit/Loss : 6.68

Training File of Ten Thousand Epochs

1. Run with test_data

Loading data from : training_run_ten_thousand.csv

Loading data from : test_data.csv

Confusion Matrix :

[5.0, 0.0, 0.0, 0.0]

[0.0, 6.0, 0.0, 0.0]

[0.0, 0.0, 5.0, 0.0]

[0.0, 0.0, 0.0, 4.0]

Profit Matrix :

[1.0, -0.0, -0.0, -0.0]

[-0.0, 0.9, -0.0, -0.0]

[-0.0, -0.0, 0.25, -0.0]

[-0.0, -0.0, -0.0, -0.12]

Classification errors : 0

Recognition Rate : 100.0%

Total Profit/Loss : 2.03

2. Run with train_data

Loading data from : training_run_ten_thousand.csv

Loading data from : train_data.csv

Confusion Matrix :

[14.0, 0.0, 0.0, 1.0]

[0.0, 22.0, 0.0, 0.0]

[0.0, 0.0, 22.0, 0.0]

[0.0, 1.0, 1.0, 13.0]

Profit Matrix :

[2.8, -0.0, -0.0, -0.07]

[-0.0, 3.3, -0.0, -0.0]

[-0.0, -0.0, 1.1, -0.0]

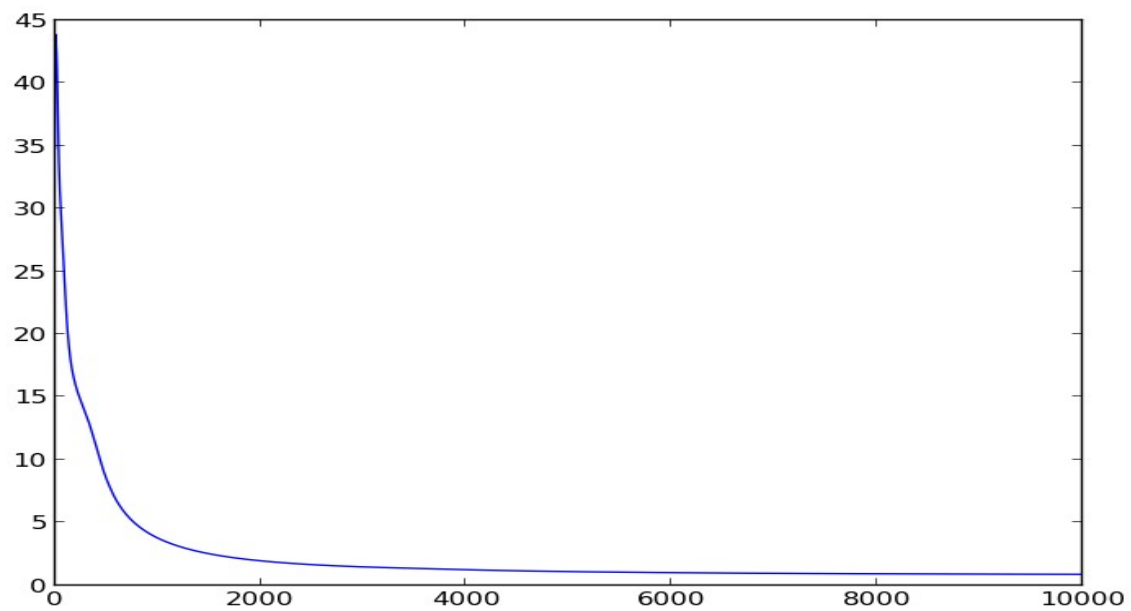
[-0.0, -0.03, -0.03, -0.39]

Classification errors : 3

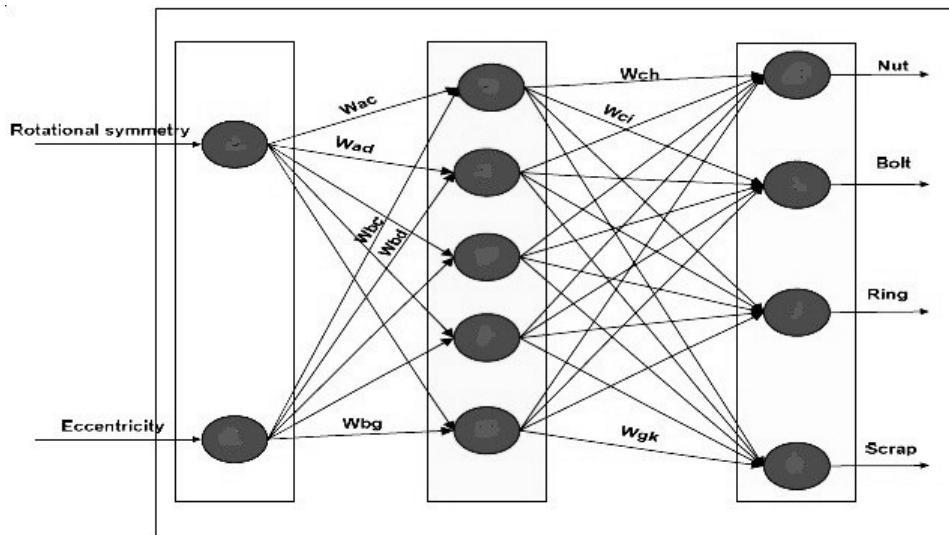
Recognition Rate : 95.9459459459%

Total Profit/Loss : 6.68

Plot of Sum of Squared Errors VS Training Samples



The above plot shows the variation of SSE with increase in number of training samples

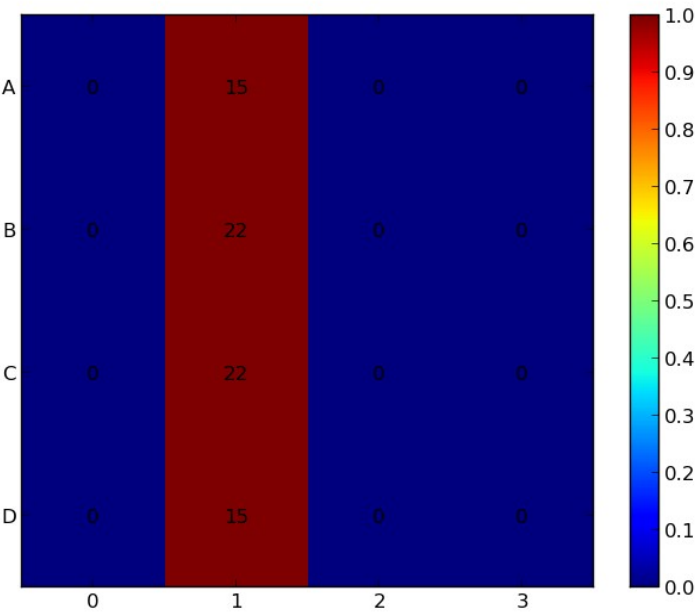


Input Neurons Hidden Neurons

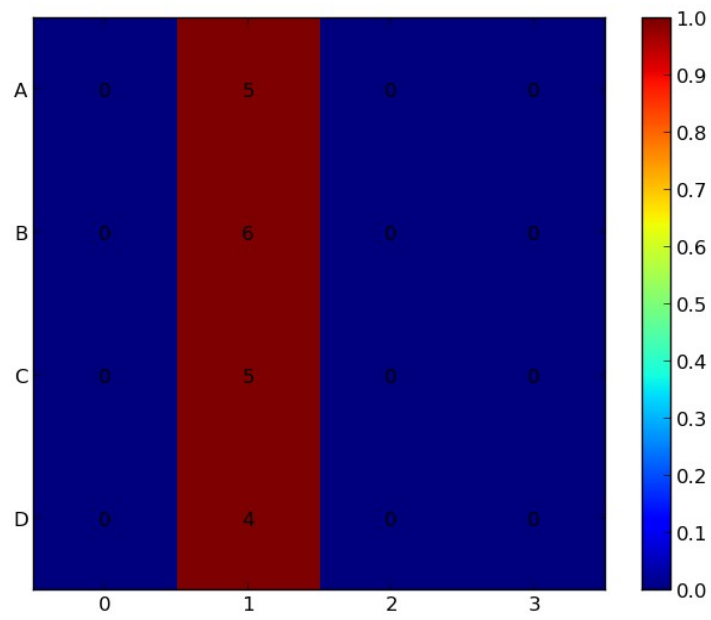
Output Neurons

Histogram Plots for classified data at given Epochs

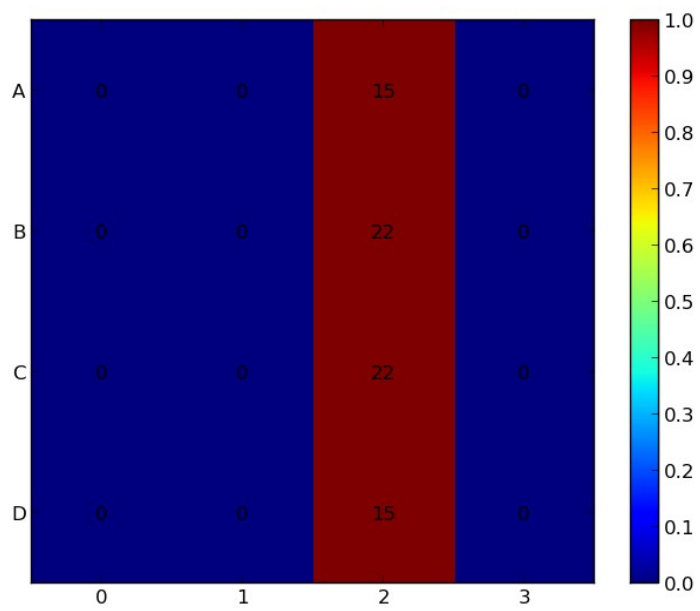
1. Epoch Zero train_data.csv



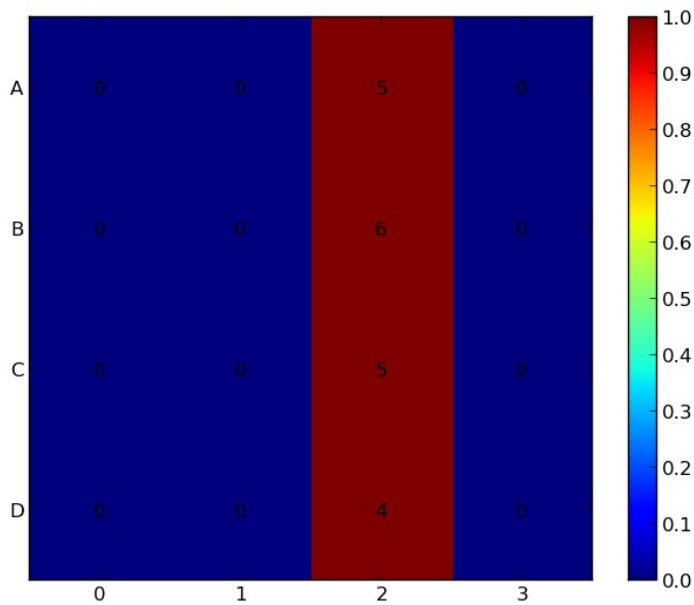
2. Epoch Zero test_data.csv



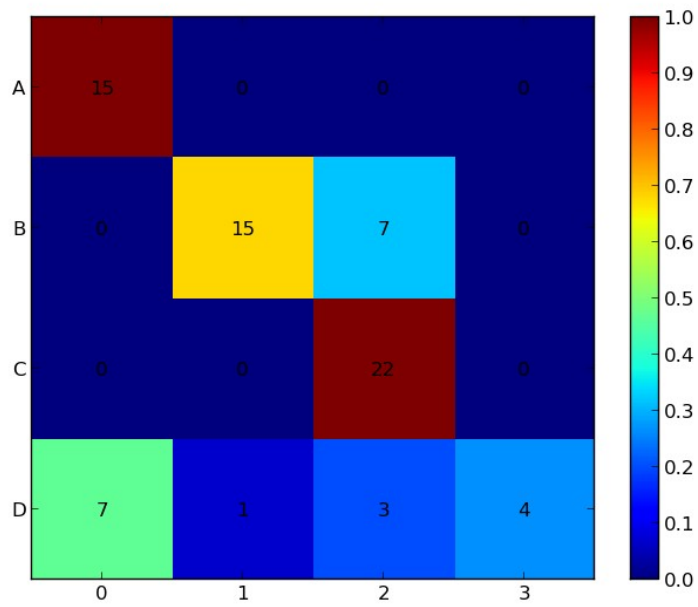
3. Epoch Ten train_data.csv



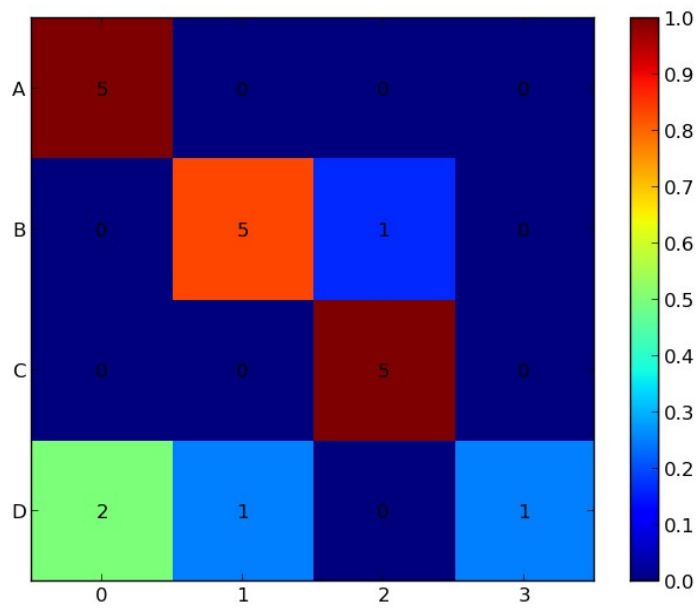
4. Epoch Ten test_data.csv



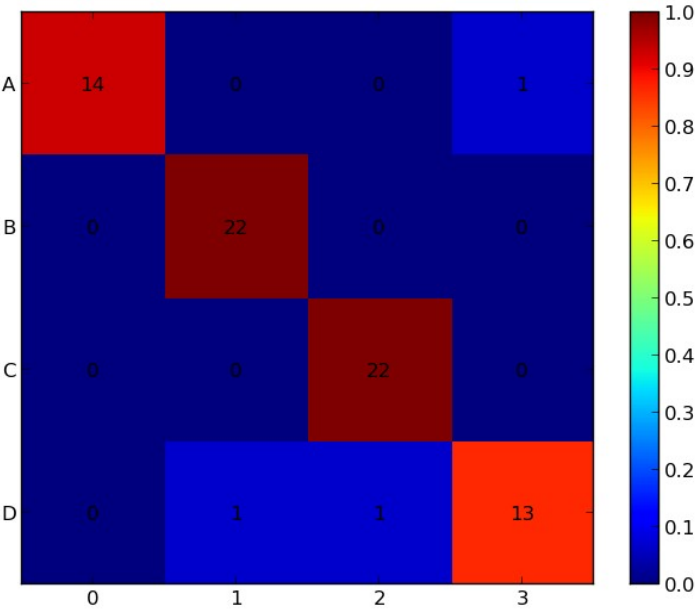
5. Epoch Hundred train_data.csv



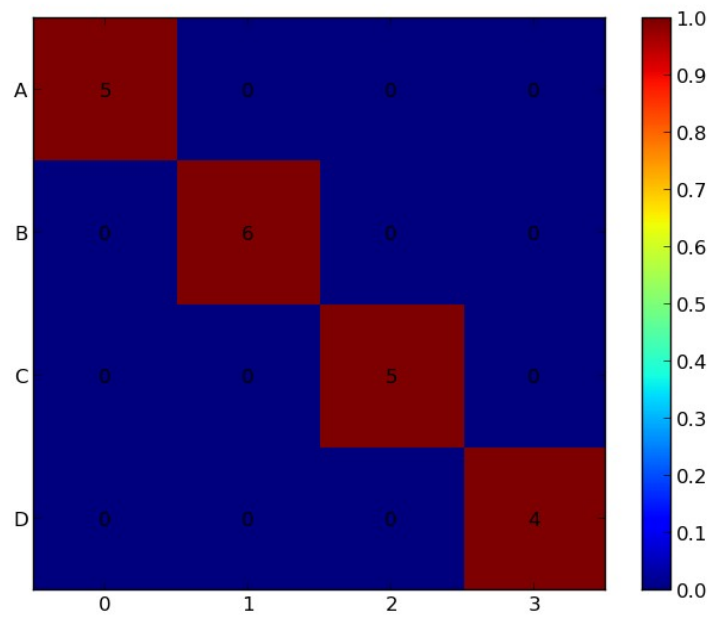
6. Epoch Hundred test_data.csv



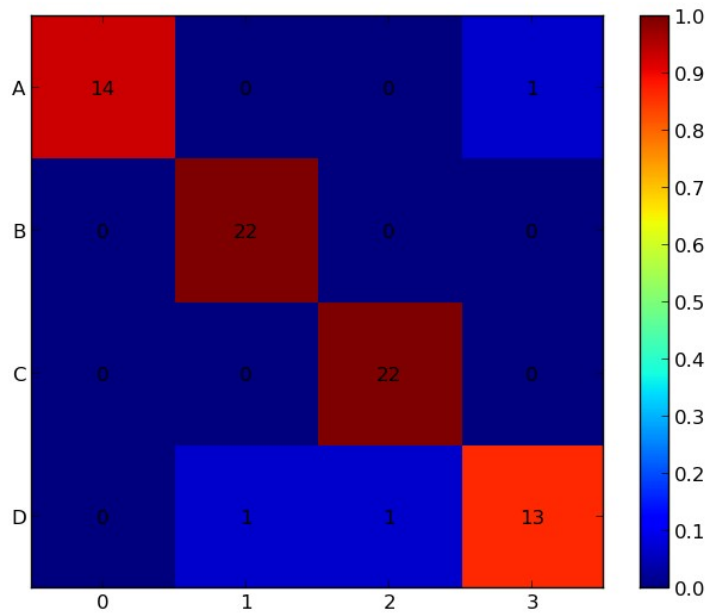
7. Epoch Thousand train_data.csv



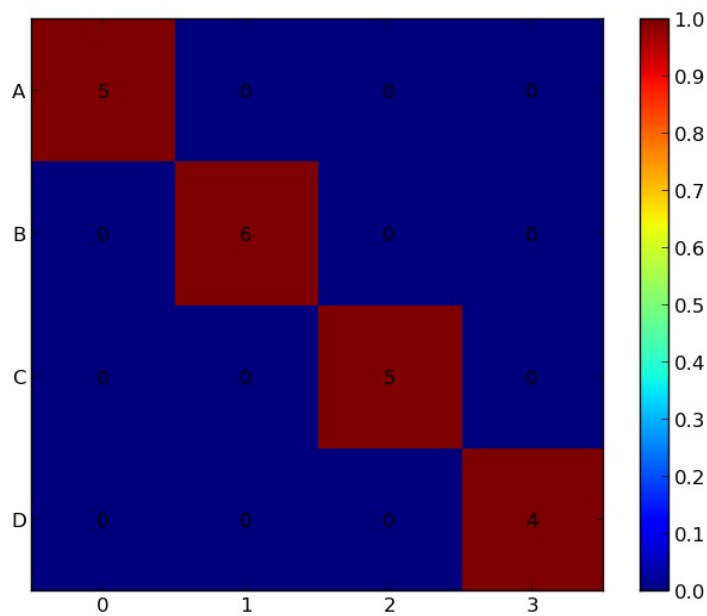
8. Epoch Thousand test_data.csv



9. Epoch Ten Thousand train_data.csv



10. Epoch Ten Thousand test_data.csv



The behavior shown at the specified epochs matches my expectations the networks trained at Thousand and Ten Thousand Epochs performed best. The classification errors were zero with upto 100 % recognition rate. The learning curve interprets the error as it goes down with every epoch. It is high initially. But slowly it decreases down.