Course: CSC242
Project 4
Minghui Cen mcen@u.rochester.edu
Collaborator: Ruwei Chen rchen48@u.rochester.edu

Download the zip file, uncompress and open it, you should see a folder named "core". In the terminal, enter:

```
cd coreFolderAddress
```

Linear Classifier

1) Perceptron Classifier

To access perceptron classifier, in the terminal, enter:

```
javac learn/lc/code/Perceptron.java
```

For 3 different cases in the Earthquake dataset, and the House Votes dataset, you could enter the following to get the output.

```
java learn/lc/code/Perceptron EarthquakeClean
java learn/lc/code/Perceptron EarthquakeNoisy
java learn/lc/code/Perceptron EarthquakeNoisyDecaying
java learn/lc/code/Perceptron HouseVotes
```

2) Logistic Classifier

To access logistic classifier, in the terminal, enter:

```
javac learn/lc/code/Logistic.java
```

For 3 different cases in the Earthquake dataset, and the House Votes dataset, you could enter the following to get the output.

```
java learn/lc/code/Logistic EarthquakeClean
java learn/lc/code/Logistic EarthquakeNoisy
java learn/lc/code/Logistic EarthquakeNoisyDecaying
java learn/lc/code/Logistic HouseVotes
```

Neural Network

Due to the time limit, we only did the neural network for the Iris dataset. To access the outputs of this dataset, enter:

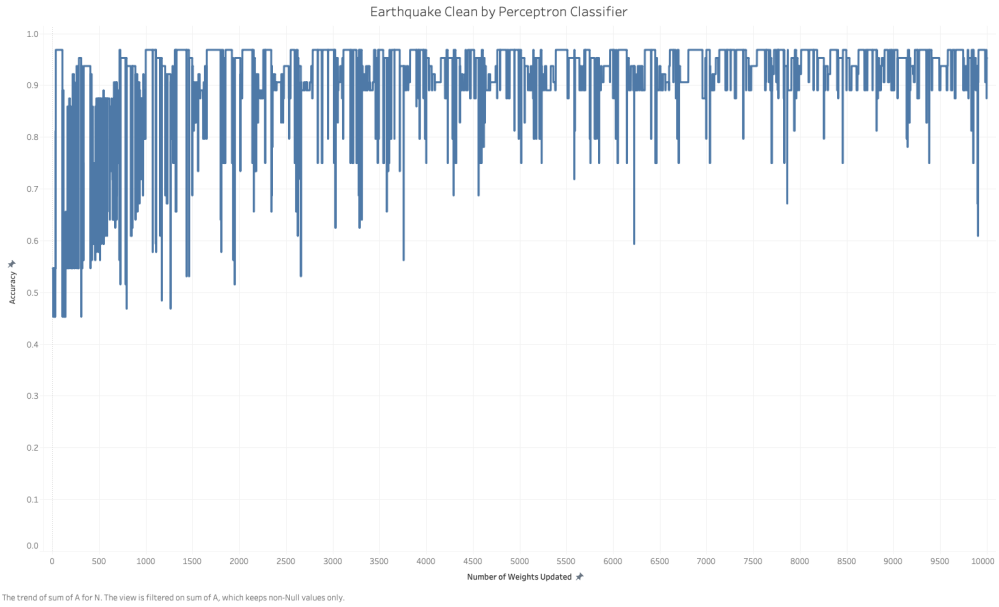
```
javac learn/nn/code/Iris.java
java learn/nn/code/Iris
```

（For convenience, the output in the terminal would show a result of training the data with a varying number of epochs from 100 to 3000 by 100s, but for details, I train the data from 0 to 3000 by 10s.)

Linear Classifiers

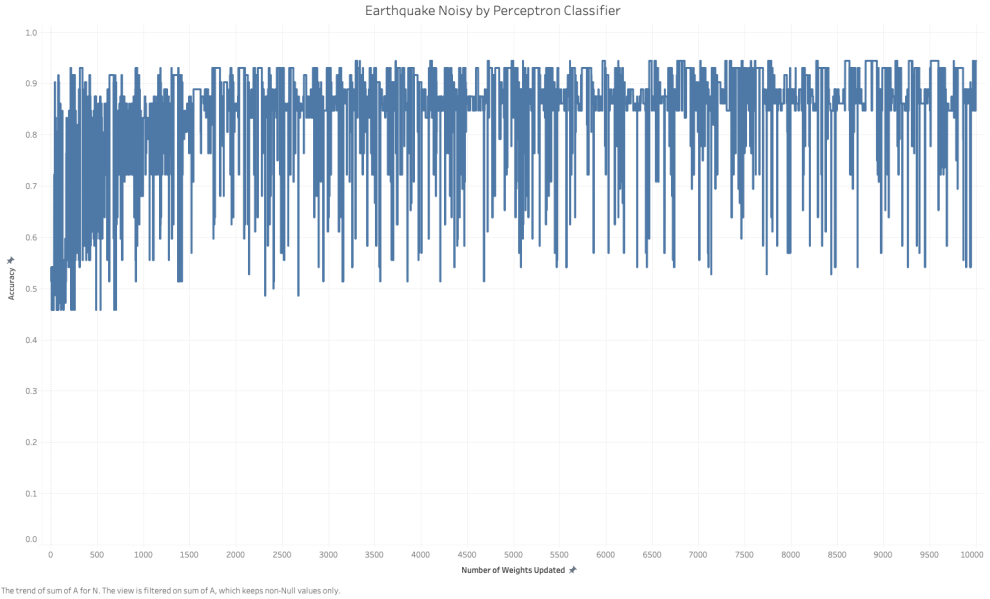
Perceptron Classifier

1) Earthquake Clean



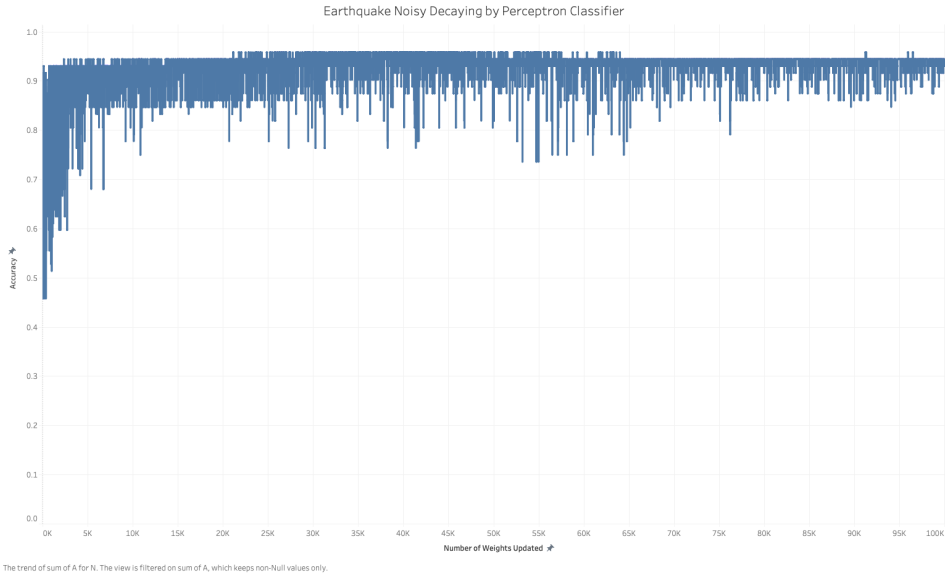
Earthquake clean by perceptron classifier has maximum 0.9688 accuracy and minimum 0.4531 accuracy. X-axis (number of weights updated) ranges from 0 to 10000 and Y-axis (accuracy) ranges from 0 to 1 with alpha=0.95. The graph clearly shows a hard threshold result.

2) Earthquake Noisy



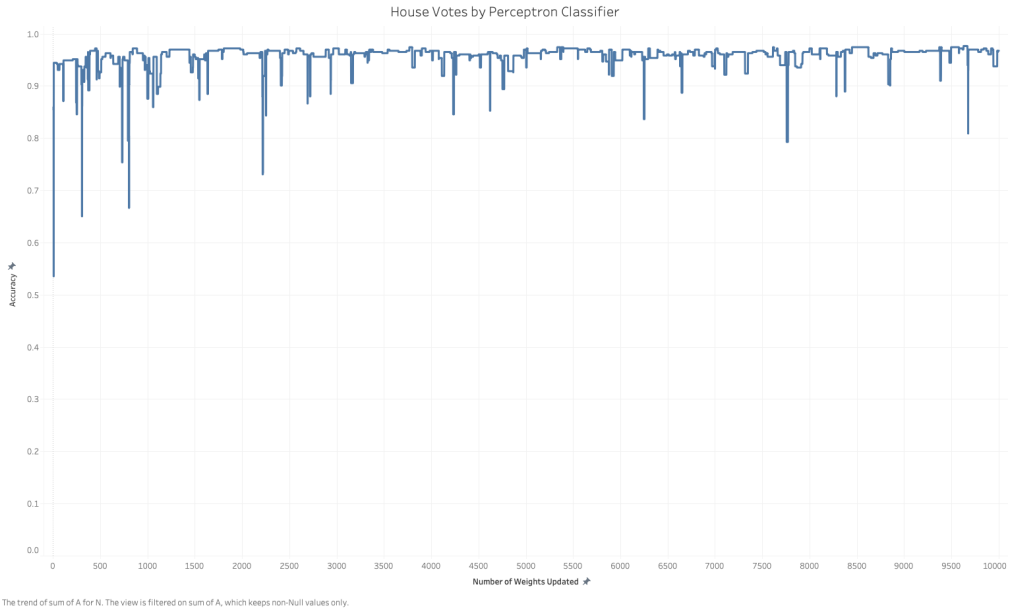
Earthquake noisy by perceptron classifier has maximum 0.9444 accuracy and minimum 0.4583 accuracy. X-axis (number of weights updated) ranges from 0 to 10000 and Y-axis (accuracy) ranges from 0 to 1 with alpha=0.95. Compared to the previous clean graph, the accuracies with high number of weights updated are not stable as those. The graph clearly shows a hard threshold result.

3) Earthquake Noisy Decaying



Earthquake Noisy decaying by the perceptron classifier has maximum 0.9583 accuracy and minimum 0.4583 accuracy. X-axis (number of weights updated) ranges from 0 to 100000 and Y-axis (accuracy) ranges from 0 to 1 with alpha=0.95. The graph clearly shows a hard threshold result.

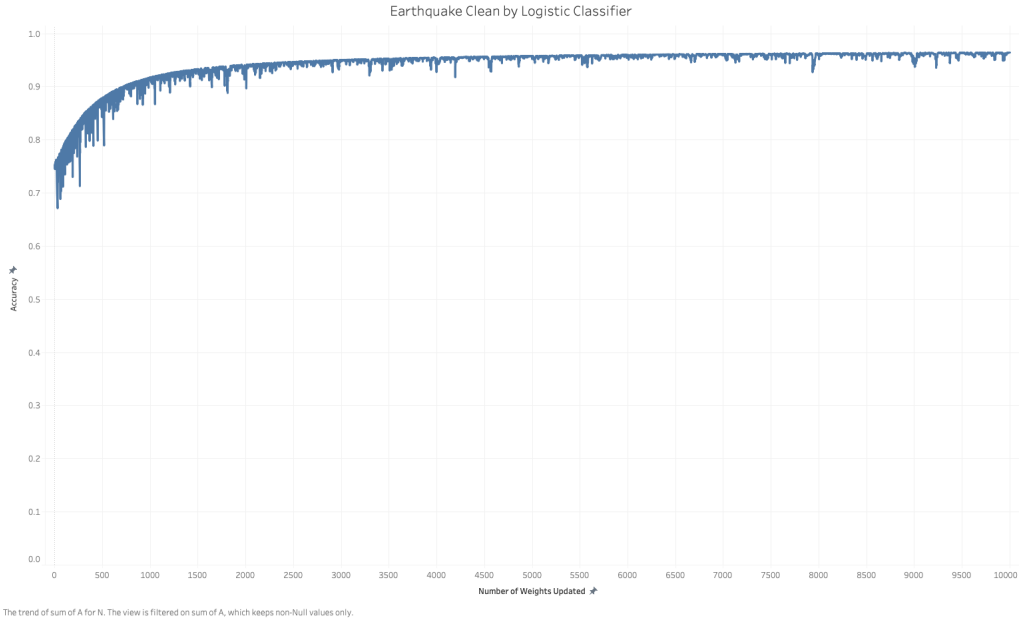
4) House Votes



House votes by perceptron classifier has maximum 0.9770 accuracy and minimum 0.5356 accuracy. X-axis (number of weights updated) ranges from 0 to 10000 and Y-axis (accuracy) ranges from 0 to 1 with alpha=0.95. The graph clearly shows a hard threshold result.

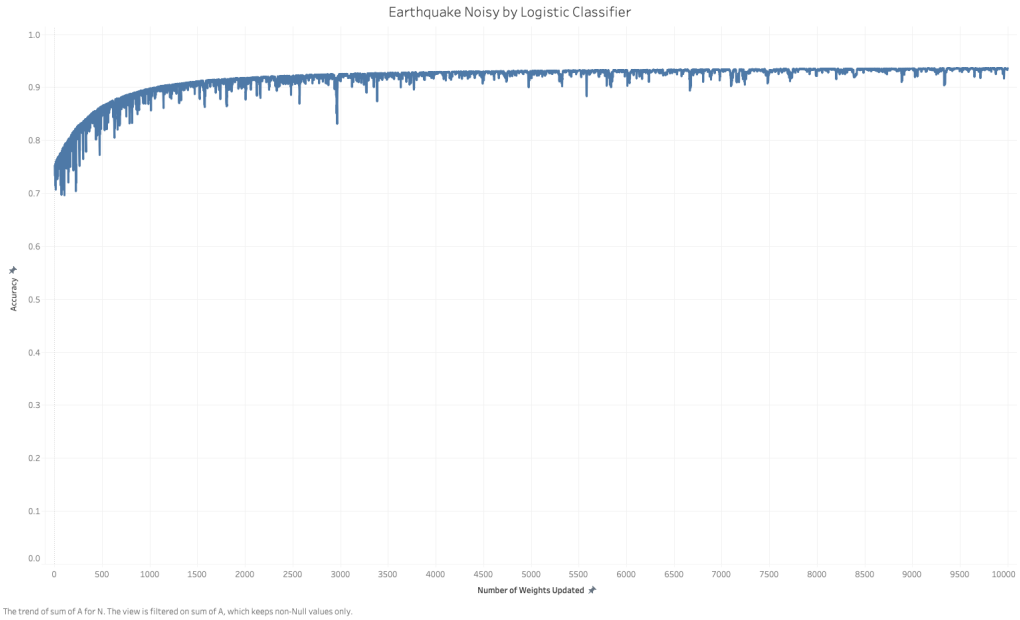
Logistic Classifier

1) Earthquake Clean



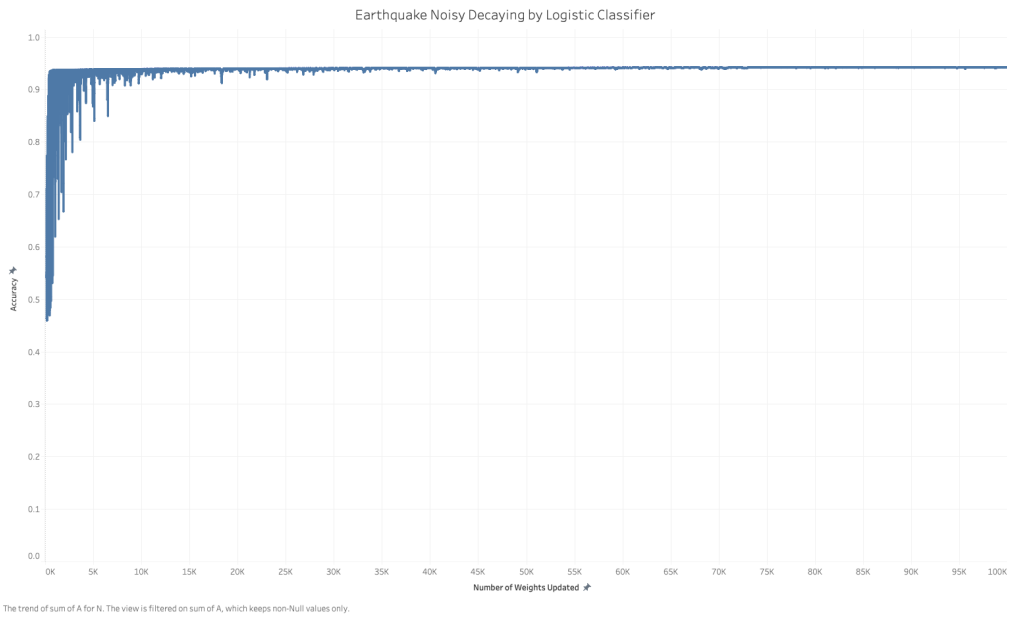
Earthquake clean by logistic classifier has maximum 0.9643 accuracy and minimum 0.6714 accuracy. X-axis (number of weights updated) ranges from 0 to 10000 and Y-axis (accuracy) ranges from 0 to 1 with alpha=0.1. The graph clearly shows a soft threshold result.

2) Earthquake Noisy



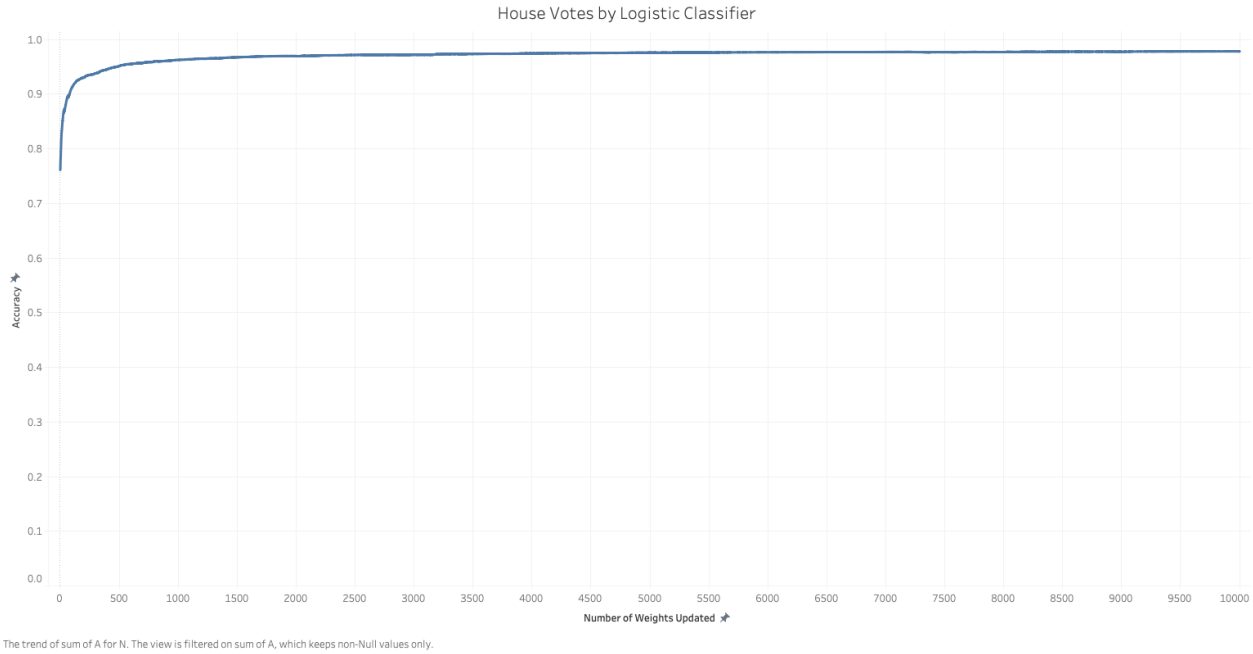
Earthquake noisy by logistic classifier has maximum 0.9364 accuracy and minimum 0.6964 accuracy. X-axis (number of weights updated) ranges from 0 to 10000 and Y-axis (accuracy) ranges from 0 to 1 with alpha=0.1. The graph clearly shows a soft threshold result.

3) Earthquake Noisy Decaying



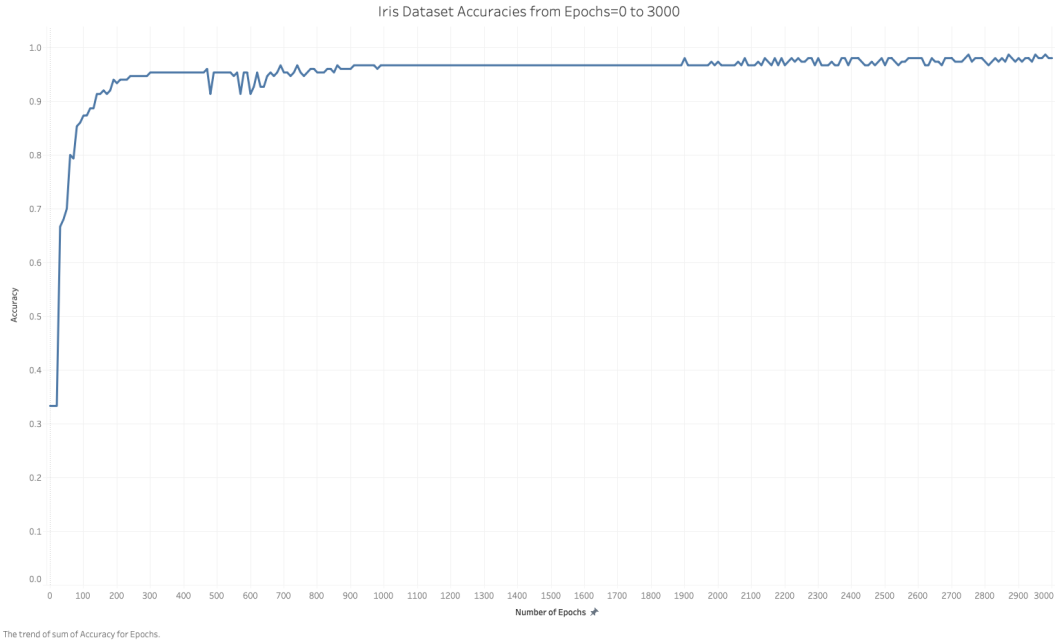
Earthquake noisy decaying by logistic classifier has maximum 0.9429 accuracy and minimum 0.4596 accuracy. X-axis (number of weights updated) ranges from 0 to 100000 and Y-axis (accuracy) ranges from 0 to 1 with alpha=0.1. The graph clearly shows a soft threshold result.

4) House Votes

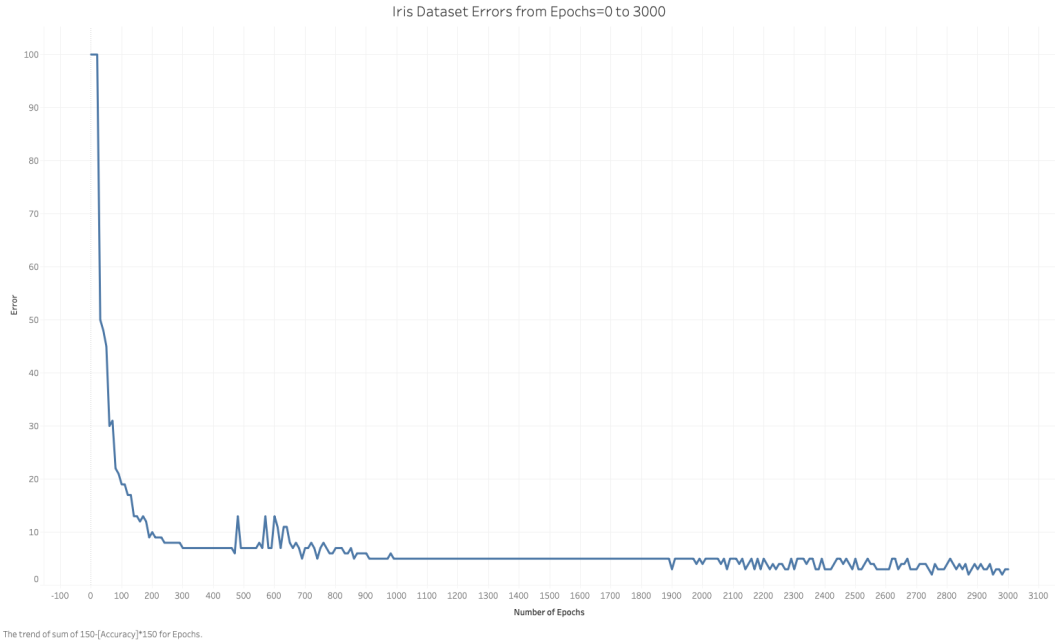


House votes by logistic classifier has maximum 0.9783 accuracy and minimum 0.7612 accuracy. X-axis (number of weights updated) ranges from 0 to 10000 and Y-axis (accuracy) ranges from 0 to 1 with alpha=0.1. The graph clearly shows a soft threshold result.

Neural Networks



This is the graph of accuracy on the training data. It has a rising pattern with accuracies converging to a relatively stable range as the number of epochs rises. The number of epochs ranges from 0 to 3000 with 10 as the gap.



This is the graph of error on the test set. It has a decreasing pattern with accuracies converging to a relatively stable range as the number of epochs rises. The number of epochs ranges from 0 to

3000 with 10 as the gap. Since we utilize the logistic classifier in the algorithm, the graph shows a soft threshold trend.