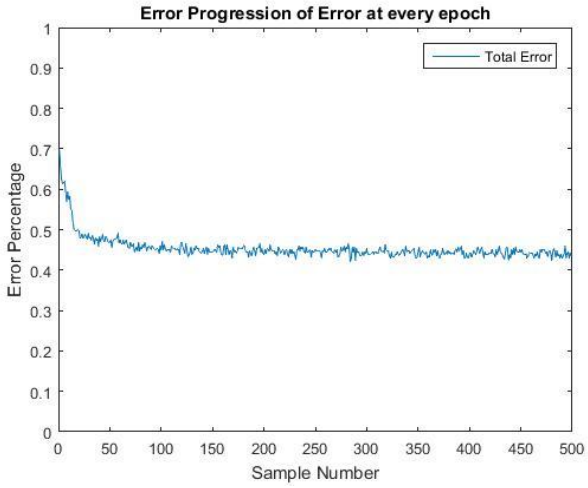
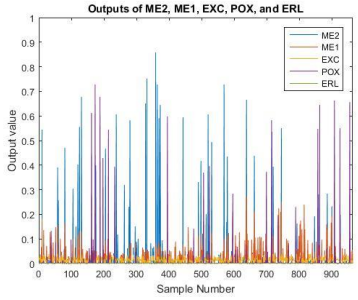
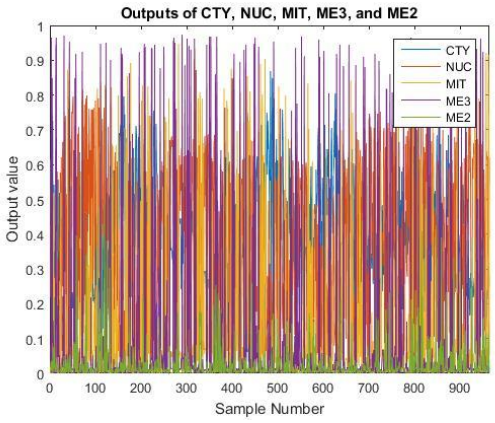
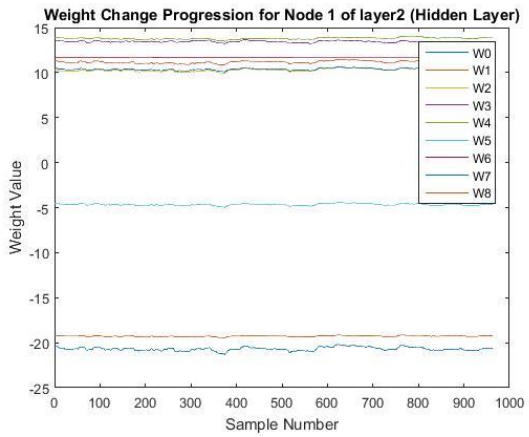
Q1

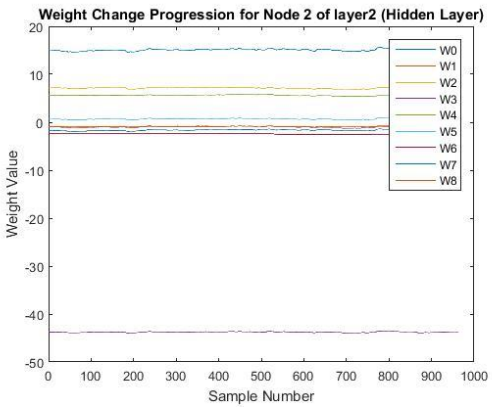
I used the public code which I found on GitHub. There is deeplearnToolbox-master, it build in nntrain function which provided trains a neural net. It request the neural network nn with input and output for opts.numepochs epochs, with minibatches of size opts.batchsize. returns a neural network nn with updated activations,errors, weights and biases, and L ,the sum squared error for each training minibatch.

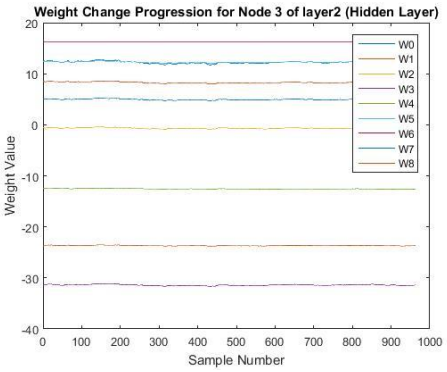


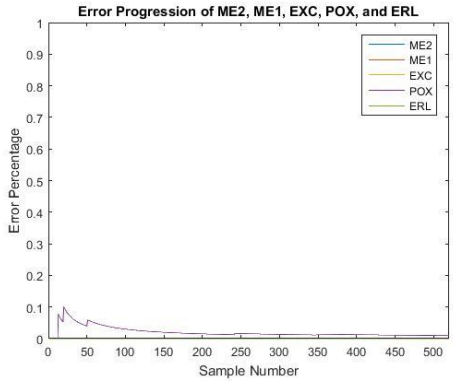


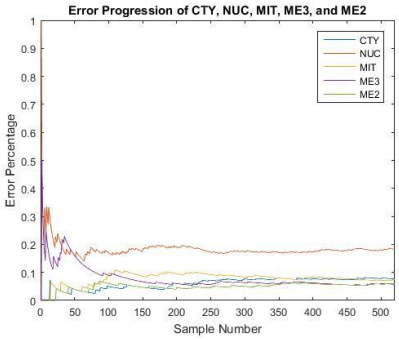


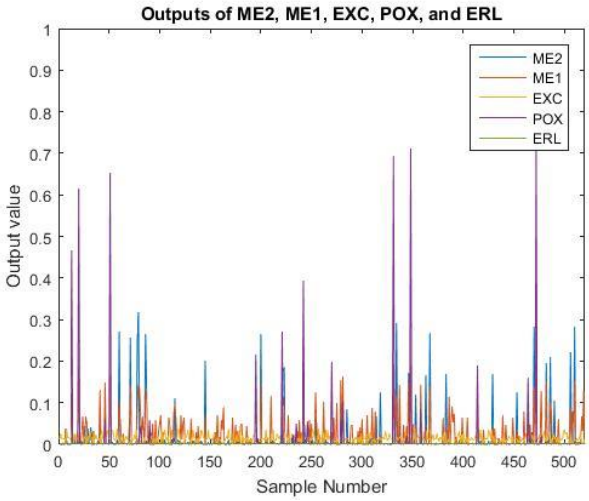


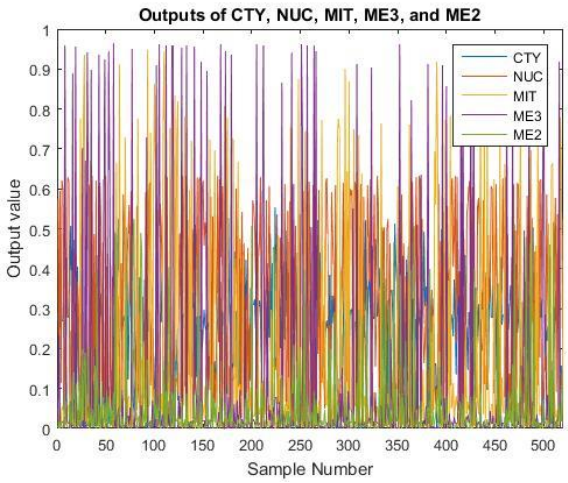


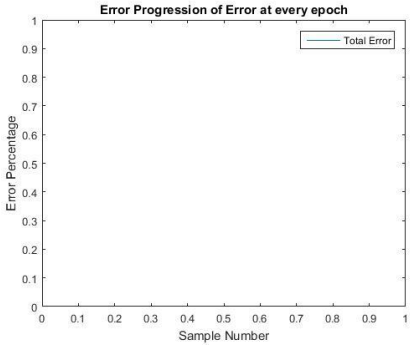

Weight Change Progression for Node 3 of layer2 (Hidden Layer)
Weight Value
Sample Number
W0
W1
W2
W3
W4
W5
W6
W7
W8

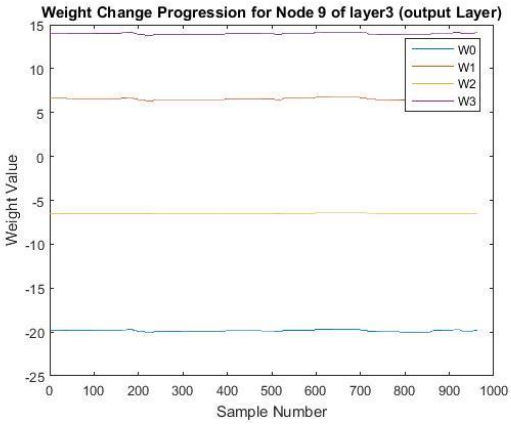

Error Progression of ME2, ME1, EXC, POX, and ERL
Error Percentage
Sample Number
ME2
ME1
EXC
POX
ERL

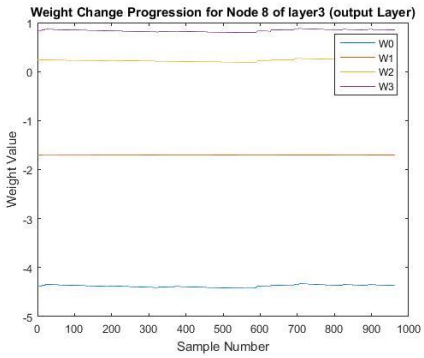

Error Progression of CTY, NUC, MIT, ME3, and ME2
Error Percentage
Sample Number
CTY
NUC
MIT
ME3
ME2

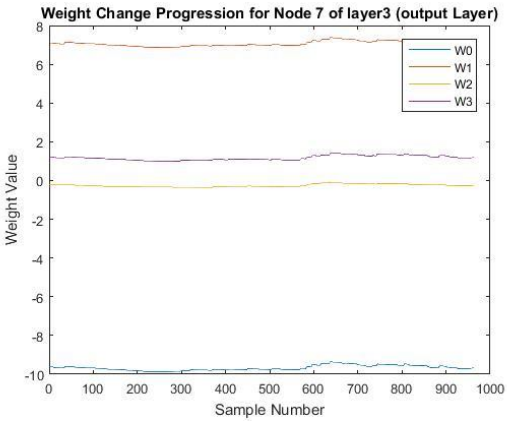

Outputs of ME2, ME1, EXC, POX, and ERL
Output value
Sample Number
ME2
ME1
EXC
POX
ERL

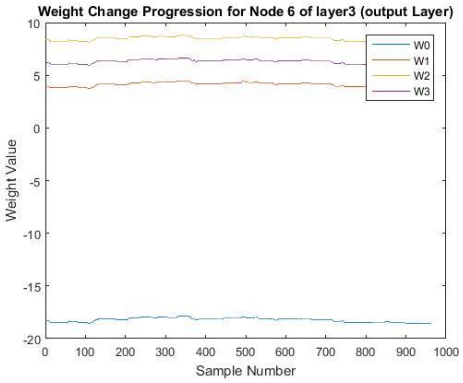

Outputs of CTY, NUC, MIT, ME3, and ME2
Output value
Sample Number
CTY
NUC
MIT
ME3
ME2

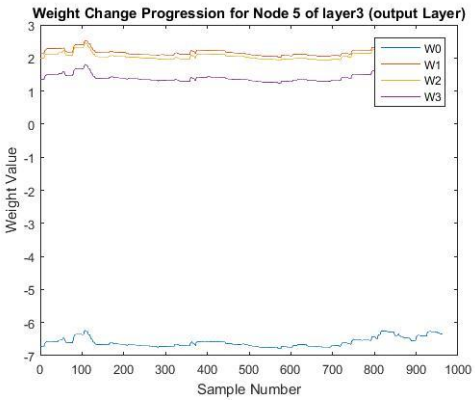

Error Progression of Error at every epoch
Error Percentage
Sample Number
Total Error

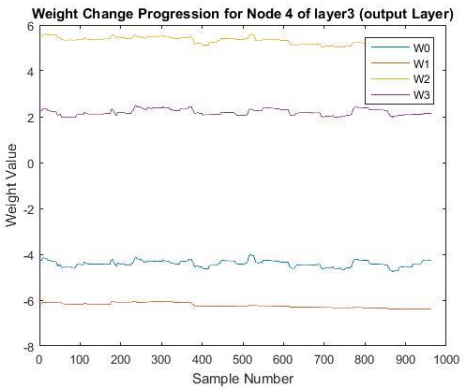

Weight Change Progression for Node 9 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number

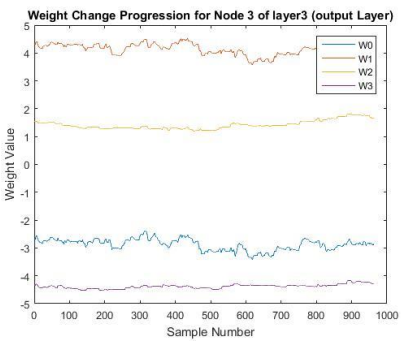

Weight Change Progression for Node 8 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number

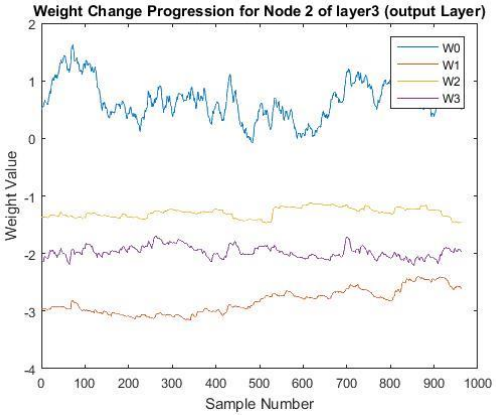

Weight Change Progression for Node 7 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number

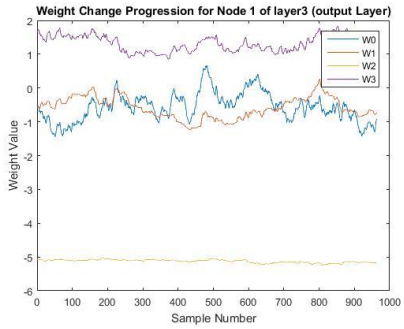

Weight Change Progression for Node 6 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number

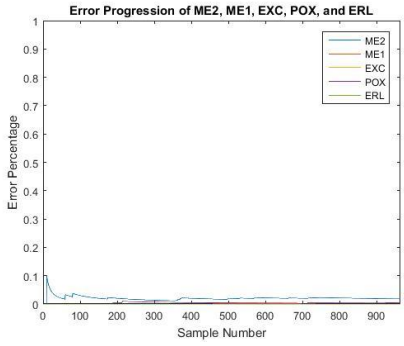

Weight Change Progression for Node 5 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number

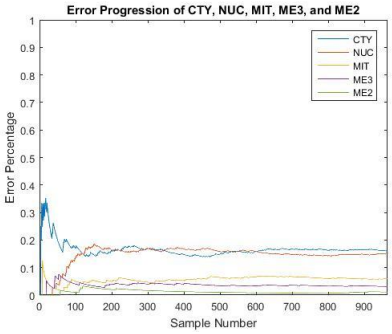

Weight Change Progression for Node 4 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number


Weight Change Progression for Node 3 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number


Weight Change Progression for Node 2 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number

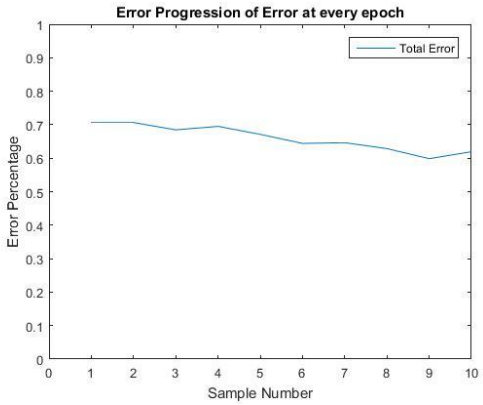


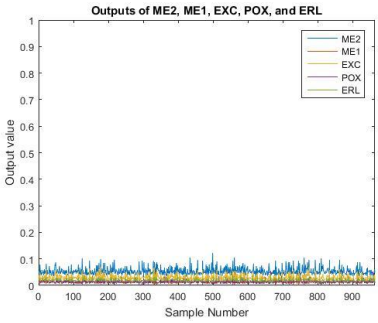


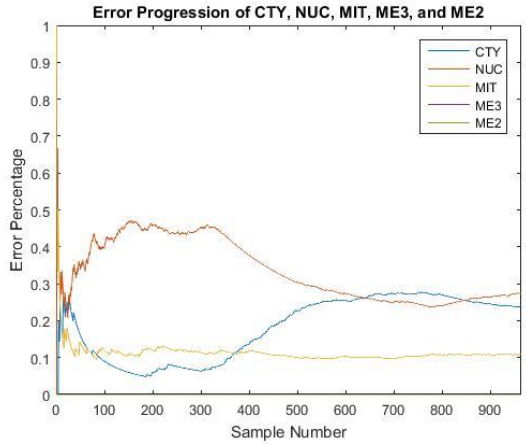


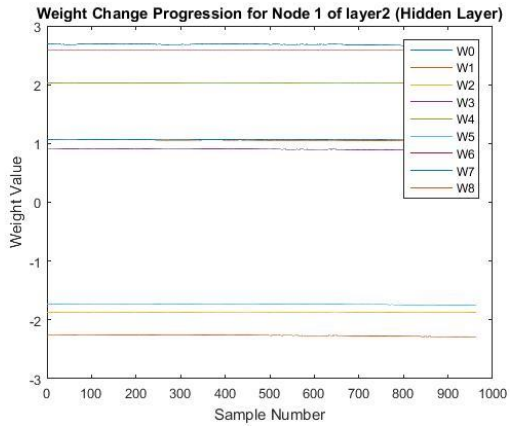
Q 2&3

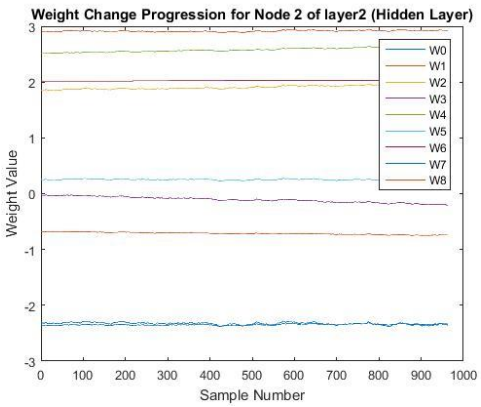
Basic I just edit the nntrain funtions variable. Using all 1484 samples as training data. And I've plot all the train error , and the weight change.

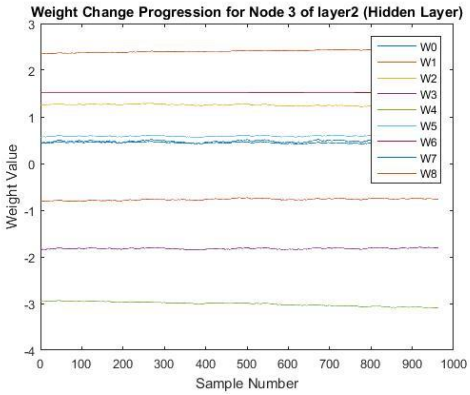


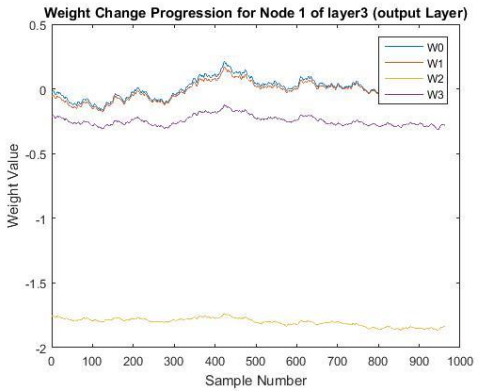


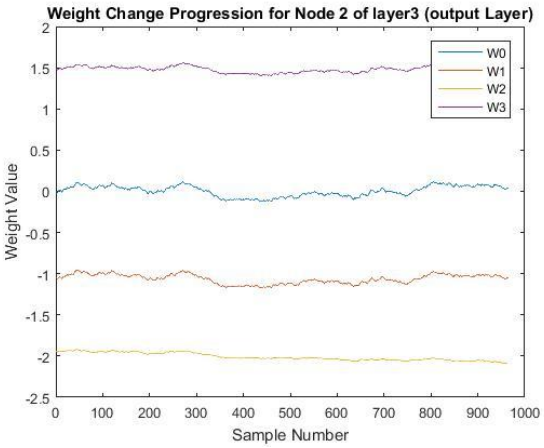


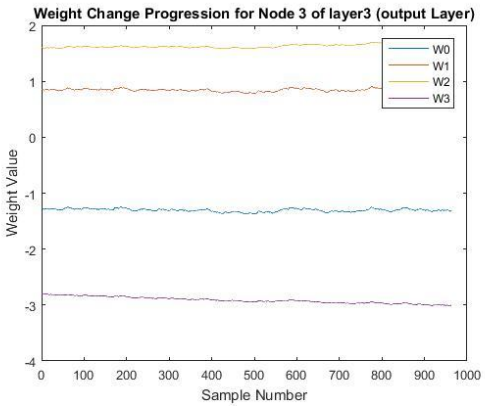


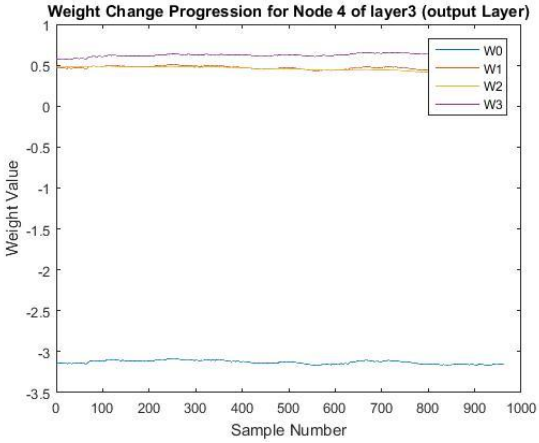

Weight Change Progression for Node 2 of layer2 (Hidden Layer)
Weight Value
Sample Number
W0
W1
W2
W3
W4
W5
W6
W7
W8

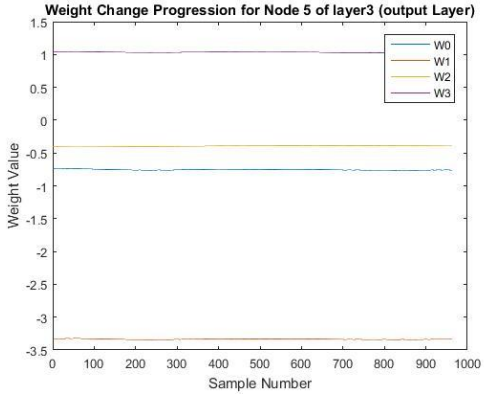

Weight Change Progression for Node 3 of layer2 (Hidden Layer)
Weight Value
Sample Number
W0
W1
W2
W3
W4
W5
W6
W7
W8

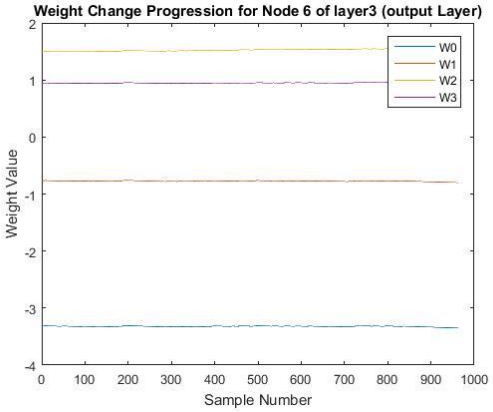

Weight Change Progression for Node 1 of layer3 (output Layer)
Weight Value
Sample Number
W0
W1
W2
W3

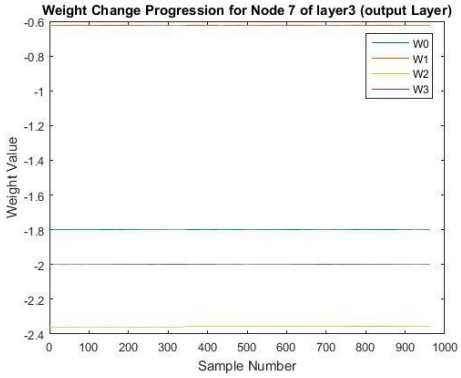

Weight Change Progression for Node 2 of layer3 (output Layer)
Weight Value
Sample Number
W0
W1
W2
W3

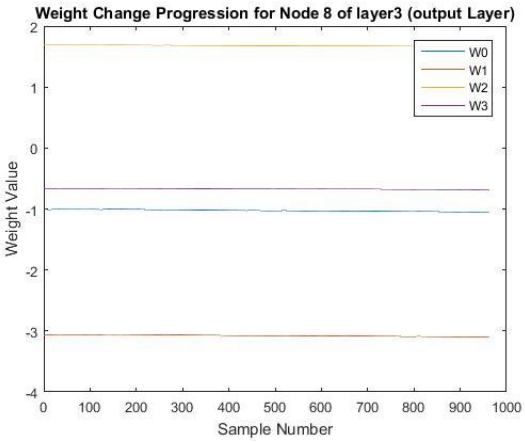

Weight Change Progression for Node 3 of layer3 (output Layer)
Weight Value
Sample Number
W0
W1
W2
W3

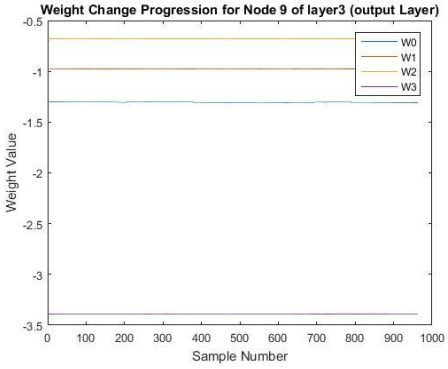

Weight Change Progression for Node 4 of layer3 (output Layer)
Weight Value
Sample Number
W0
W1
W2
W3

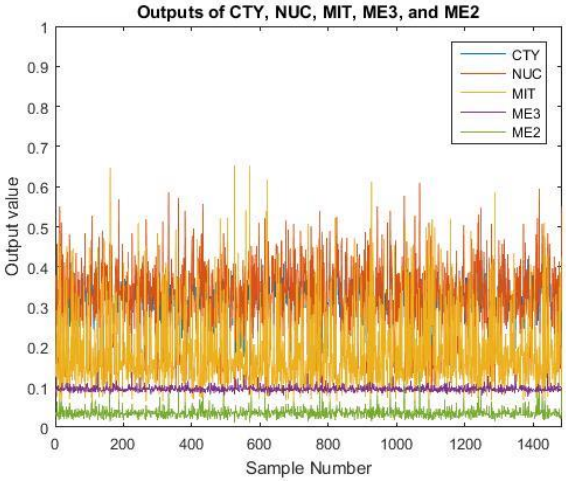

Weight Change Progression for Node 5 of layer3 (output Layer)
Weight Value
Sample Number
W0
W1
W2
W3

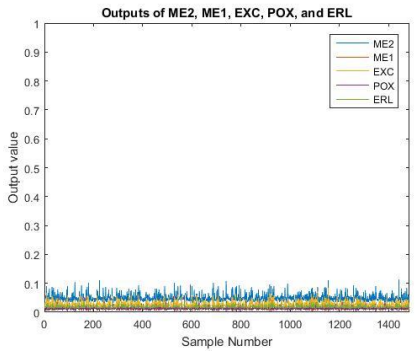

Weight Change Progression for Node 6 of layer3 (output Layer)
Weight Value
Sample Number
W0
W1
W2
W3

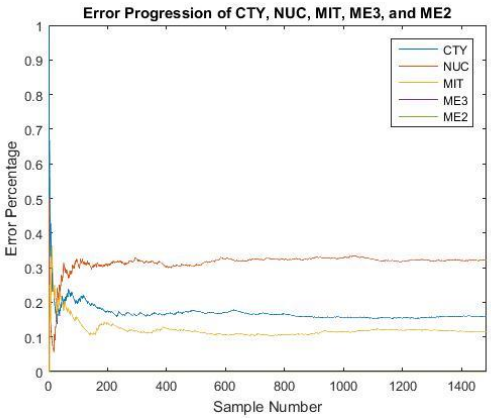

Weight Change Progression for Node 7 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number

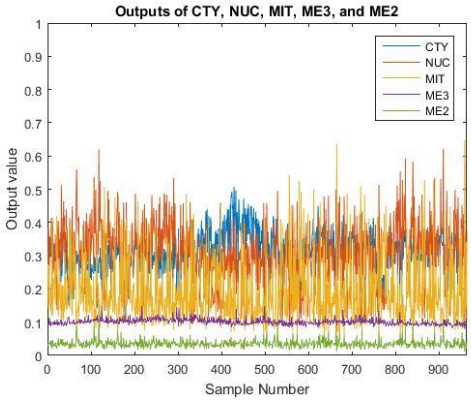

Weight Change Progression for Node 8 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number


Weight Change Progression for Node 9 of layer3 (output Layer)
W0
W1
W2
W3
Weight Value
Sample Number

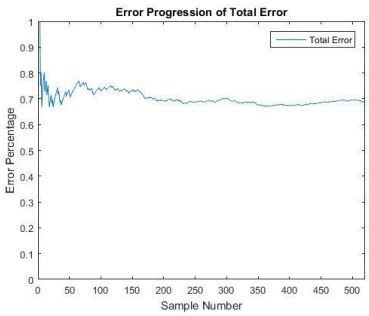

Outputs of CTY, NUC, MIT, ME3, and ME2
CTY
NUC
MIT
ME3
ME2
Output value
Sample Number


Outputs of ME2, ME1, EXC, POX, and ERL
ME2
ME1
EXC
POX
ERL
Output value
Sample Number


Error Progression of CTY, NUC, MIT, ME3, and ME2
CTY
NUC
MIT
ME3
ME2
Error Percentage
Sample Number


Outputs of CTY, NUC, MIT, ME3, and ME2
CTY
NUC
MIT
ME3
ME2
Output value
Sample Number

Q4



0.5669

0.5600

0.5897

More layers and nodes make more accuracy and decrease net error， but make the net more complicated .so that token more training time.

Q5

sample = {0.50, 0.49, 0.52, 0.20, 0.55, 0.03, 0.50, 0.39}

those belong to MIT.

Q6

Yes. Class distribution in unknown.