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SYS 411

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In-Class Exercise: Iris Data

The goal of this assignment is to create the back propagation Neural Network algorithm that creates the best classifier for the Iris data. We have three input nodes for the three independent variables to try to classify between four types of flowers through the four output nodes. The goal of the experiment is to figure out the true error rate of the system with the test data that a botanist would have the best system for classifying the flowers.

We experiment with different configuration to try and obtain the best possible Network through a variety of modifications to the data to see if we can get better classification results.

For complexity and times sake, we are going to constrain ourselves to a max of 100,000 iterations with early exit based on low root means squared error or perfect classification of the test data for modifying different variables to run the system.

Some of the modifications we look into to modify the test error are:

* Number of Hidden Nodes
  + How complex should our system be with hidden layers?
  + We will look into the range of 2 – 9 test nodes for testing our system
* Learning Rate
  + By how much should our system change with each iteration in order to reach an optimal solution?
  + We will look at different learning rates changing by a power of ten, .1, .01, .001, etc.
* Number of Epochs
  + How many iterations do we want the system to run on our test data?
  + We will run between 1,000 to 20,0000 epochs on the system
* Normalize the Data
  + Does this increase the efficiency of reaching an optimal solution?
  + We will normalize our data and see if this provides superior results for the system?
* Cross Validation
  + We will not do this, but this is an option to check the system
* Random samples of data with
  + 90% to 10% on the data with random samples of the test data to see if we can get better results on the data.
  + Control the % of the data that we want to collect from the system
  + Control the number of iterations of randomization we want to use
* Elapsed Time
  + Make a worst case to track time to the data

How quickly did the model converge?

Dr. White Success Measures for .0164 error rate

MaxEphoch = 20000

learnRate = .1

numInput = 4

numHidden = 5

numOutput = 3