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**CSE 474 Project 1 Report**

**How to choose Hyper-parameter for Neural Network**

To choose the hyper-parameter for neural network, it is best to constantly increase lambda starting from 0 and up to 1. We do not want to use any values over 1 because it would result in an overfitting. We want to do this over multiple execution of test to find the most accurate befitting lambda value. The best lambda value is found through comparing different accuracies through the multiple execution of tests and find the one with the highest accuracy. With the nnPredict we implemented, we can find the differences in each accuracy and find the highest one.

Choosing the correct amount of hidden nodes are important because having more than enough hidden nodes would lead the training phase to slow down. On the other hand, if we have not enough hidden nodes, we cannot promise the accurate representation of the data because there is not enough to judge from, which is in other words, underfitting.

**Classification Methods**

Artificial neural network contains three layers; input, hidden, and output. The first layer which is also the input layer contains input neurons which is responsible for sending data to the second layer through synapses. The second layer which is the hidden layer then sends the data to the third layer, output layer using the same method. The weight parameter of synapses manipulates calculation data. Feed forward uses the data in the first layer, the input layer as the as the sample data for first run of calculation. It gets multiply by a certain weight and undergoes the sigmoid function. Once, the output value is obtained, it will be used to calculate the error in prediction. All the data that we obtain from this execution are returned to update the weights base on the error value. We repeat this process until all calculations for the sample are completed.