EEL-4930/5930 Machine Intelligence

Fall 2016

Homework #\2   Due: **Monday, September 19, 2016**

Undergraduate students only need to complete part (a).

Graduate students must complete part (a) and (b).

(a) Write a Matlab program to implement a neural network classifier for alphabet recognition system ("a" through "z", uppercase or lowercase) based on your own dataset. For example, you may create your own 5-by-5 pixel images of handwriting samples you collect of your friends. Your Perceptron neural network in this case will have 25 inputs and 26 outputs. You may modify the example Matlab code Perceptron Image Recognition System for odd/even numbers, provided to you, for this assignment. Collect a minimum of 20 sets of sample handwritings ("a" through "z"). Use 10 sets for training and the other 10 sets for testing. In your training file, there should be $10*26=260$ rows of $25+26=51$ bits on each row. The first 25 bits is the input pattern and the second 26 bits denote the class ("a" through "z"). Note: Depending on the similarity of your handwritten alphabets, it may be difficult to resolve given the small 5-by-5 resolutions of the images. Thus the average error may be large and may not converge to very small number or zero.

(b) Use the backpropagation function (e.g., the "trainlm") in the Matlab Neural Network Toolbox to implement a neural network classifier for the UCI Iris database: http://archive.ics.uci.edu/ml/datasets/Iris

There are 150 instances in the dataset, 50 each for the 3 classes (setosa, versicolor, and virginica). Please use 25 instances of each class for training and the other 25 for testing. Hence 75 instances (25 setosa, 25 versicolor, 25 virginica) for testing and the other 75 (25 setosa, 25 versicolor, 25 virginica) for testing.

This assignment submission consists of the Matlab code(s) and a Report (refer to Format). Please email submission (code + report, zipped if possible) to ece.famufsu@gmail.com.