CSCI/ARTI 8950 Machine Learning

Assignment Number 4: Due 4/6/2023 (by eLC)

[**100 points**] For this assignment you need to create or use a suitable **Back-propagation** neural network package. I recommend the WEKA package mentioned in class but there are many other packages available for free download on the web. You should choose a data set from WEKA or the UCI repository with at least **400** instances (preferably the same one you used for the decision tree homework so you can compare the performance) for this assignment (please don't forget to mention which one you used!).

You should train a neural network using back-propagation. You should **experiment** to find the best number of hidden units and report your experimental results in a **table**. You should also use a **validation set** to stop the training before over-fitting happens. You should turn in your code if you wrote your own or just the name and web location of the package you used as well as the settings and any code modifications. You should describe the network structure and number of nodes in each layer as well as any special settings you used such as momentum terms or special error functions. You should also report the training, validation and testing/cross-validation error as well as training time if available (CPU time is preferred but the number of epochs will suffice). Please turn in one PDF file for the assignment.

Important note: In WEKA the default validation set size is 0 which means it does not stop on validation set error going up. You need to specify a validation set size. I recommend 20%. Also beware that the validation set size is different from the validation threshold which may be left at the default value of 25 epochs.