CS 397/597 Applied Machine Learning

**Project Assignment#10 Assigned: 3/11/16 Due: 3/18/16** [100 points]

**GOAL:** Please become conversant with concepts and implementation using R for the below two topics we discussed in class: Perceptron Learning, Neural Networks and Support Vector Machines. Then complete the below exercises.

Section I. **Perceptron Learning**

1. Study the Perceptron Learning Algorithm Tutorial: [15 points]

<http://blog.refu.co/?p=935>

Then, conduct your own Perceptron Analysis on a data set you make up. Make up your own data set of 20 (twenty) Black and Red points, similar to the data at the above tutorial. CLASS\_BLACK if the color is predominantly BLACK and CLASS\_RED if the color is predominantly RED. Pick the correct RGB value range. Present and discuss results.

**Section II. Neural Networks**

1. Study the Neural network Algorithm basics Tutorial:

<http://gekkoquant.com/2012/05/26/neural-networks-with-r-simple-example/>

<http://www.r-bloggers.com/using-neural-networks-for-credit-scoring-a-simple-example/>

<http://www.r-bloggers.com/r-code-example-for-neural-networks/>

<http://hodgett.co.uk/get-started-with-neural-networks-in-r/>

Then, conduct your own NN Analysis on the Wine classification dataset <http://archive.ics.uci.edu/ml/datasets/Wine> [30 points]

(Useful Ref (Not essential):

http://neuroph.sourceforge.net/tutorials/wines1/WineClassificationUsingNeuralNetworks.html

**Section III. Support Vector Machines**

1. Study the SVM R coding/tutorials at the below links: [55 points]

<http://www.svm-tutorial.com/2014/10/support-vector-regression-r/>

<http://www.r-bloggers.com/learning-kernels-svm/>

Then, use the below data set and apply both (1) your own code (The RS you built in C++) and (2) code build your own SVM to classify (SEPARATELY) (i) Flowers and (ii) Mushrooms using the Iris and Mushroom data sets.

<https://archive.ics.uci.edu/ml/datasets/Iris>

<https://archive.ics.uci.edu/ml/datasets/Mushroom>