Deep Learning Neural Nets
Programming the Linear Classifier Perceptron Algorithm
Fall 2017

The files `perceptrondat1` and `perceptrondat2` contain ascii data representing two different classes of data.

Using python, write a program to do the following:

- Load the data files.
- Plot the data files, with data from each file printed with a different color and/or marker. Do the data appear to be linearly separable?
- Write a function which finds the separating hyperplane between the data sets. Every time the weight vector $\mathbf{a}$ is updated, plot the line described by $\mathbf{a}$ on the same axes as you plotted the data.
- Try running your classifier algorithm for different initial values of $\mathbf{a}$. Take note of how many updates to $\mathbf{a}$ are required for various initial $\mathbf{a}$.
- Change the data so that it is no longer linearly separable. That is, take some of the data points from the `perceptrondat1` data and move them to the `perceptrondat2` data so that the resulting data are not linearly separable (which you should be able to verify visually). How does your linear classifier work now? What would be a good termination criterion for your algorithm?

Turn in: program listings; plots of the data and the separating lines as a function of iteration; answers to discussion questions.