

Data Mining, CSCI 347, Fall 2019
Perceptron, Oct. 7

Linearly separable - there is a line (in 2 D), plane (in 3D), hyperplane (in nD) that can separate the instances.

Binary classification (type of linear model)

- Line *separates* the two classes
 - Decision boundary - defines where the decision changes from one class value to the other

Perceptron algorithm

- Attempts to separate data into a hyperplane
- Assumes the data is linearly separable (big assumption!)
- Only useful if only want to classify instances. Doesn't give any probabilities for class values.

Perceptron Algorithm

1. Set all weights to zero
2. Until all instances in the training data are classified correctly
For each instance I in the training data,
 - if I is classified incorrectly by the perceptron {
 - if I belongs to the first class,
add it to the weight vector
 - else,
subtract it from the weight vector

It will be necessary to run through the instances over and over

This is a mini neural network

- Boxes show the input layer
- Circle is a perceptron (or unit). Output is either 1 (class 1) or 0 (class 2)
- Larger neural network will have more perceptrons – layers of perceptrons, all feeding into the final perceptron which is the classification.

