Perceptron Homework

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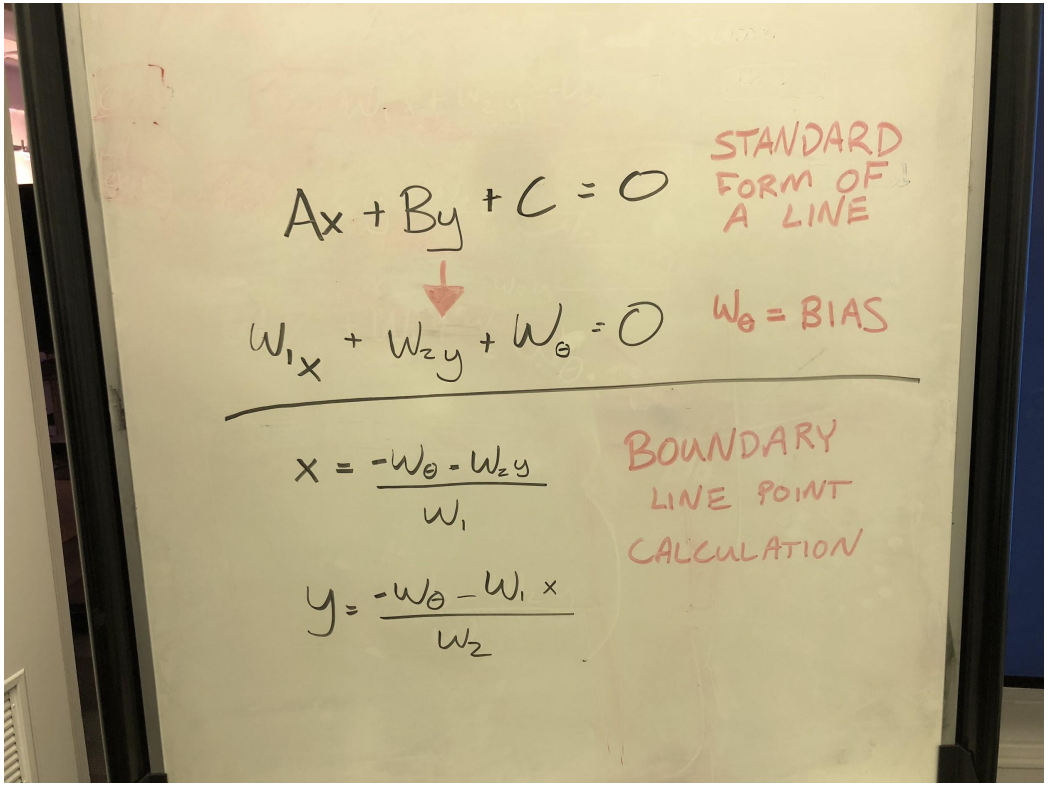
Background information

Perceptrons are modeled off of human neurons.

Can be used to for classification problems where there are two outcomes

Only works on data sets that are linearly separable! Can’t solve XOR problems.

Weights


$Ax + By + C = 0$
STANDARD FORM OF A LINE
$W_1x + W_2y + W_0 = 0$
W_0 = BIAS
$x = \frac{-W_0 - W_2y}{W_1}$
$y = \frac{-W_0 - W_1x}{W_2}$
BOUNDARY LINE POINT CALCULATION

Learning rate

Learning rate affects the rate at which the perceptron corrects the weights that it assigns.

Too large of a learning rate and the perceptron may over correct weights.

Too small of a learning rate and the perceptron will take a long time to correctly learn to classify a data set

$$\mathbf{w} \mathrel{+}= c(l_j - y_j)\mathbf{x}_j$$

Data set

Classified data as -1 or 1 on the plot and drew the lines that the perceptron thought would be the correct classification for each iteration

More iterations means the perceptron learns more and the weights become more and more accurate