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Artificial Intelligence
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Homework 3

1 a) Running the pocket algorithm starting from $w = 0$ takes the most computation to solve. The perceptron has no idea where to begin so it just starts working. Using the two blob data set it either found a solution in some iterations or it could never find a solution. Often times the solution that was found was not “good”, as in it was very close to one blob or the other. I recorded the weights in an array and printed them after. The best weight was chosen if the solution was not found in a given number of iterations.

[illegible]

b) The linear regression process is the fastest. It finds the solution immediately and seems to use little to no computation. Linear regression also doesn't care if it misclassifies a few points if it can find the best solution. This means it does not get stuck if there is no possible linear separation between the blobs.

c) The Pocket algorithm tends to work well if it starts from the linear regression line. If the linear regression line is perfect, the pocket algorithm is too and find the solution within one or two iterations. However, if the blobs are not linearly separable, the perceptron just continues until it the maximum number of iterations is reached. Below are the printed weights. They tend to be better when starting from the linear regression line. Screenshots for the graphs/iterations are also on my github.

[illegible]

Adding outliers to the set tends to skew the linear regression line. It does not seem to affect the perceptron as much because they perceptron only checks whether the point was misclassified or not.