

Project 2 Write-up

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1 Nearest Neighbors

test1 = (1, 1, 1)
test2 = (2, 1, 1)
test3 = (0, 10, 1)
test4 = (10, 10, 1)
test5 = (5, 5, 1)
test6 = (3, 10, 1)
test7 = (9, 4, 1)
test8 = (6, 2, 1)
test9 = (2, 2, 1)
test10 = (8, 7, 1)

Classification from test1 to test10 at K = 1: 1, -1, 1, -1, 1, -1, 1, -1, 1, -1

Classification from test1 to test10 at K = 3: 1,0,1,-1,0,1,1,0,1,-1,-2,-1,-1,0,1,1,0,-1,-1,0,1,1,0,1,-1,0,-1

Classification from test1 to test10 at K = 5: 1,0,1,0,1,-1,0,1,0,1,1,0,1,2,1,-1,-2,-1,-2,-1,1,0,-1,0,1,-1,0,1,0,-1,1,0,-1,0,-1,-1,0,1,2,1,1,0,1,0,1,-1,0,-1,0,-1

2 Clustering

When updating the value of K, it can be observed that distortion decreases and it gets closer to the centroid. This is because as the value of K increases, each cluster contains fewer elements than the previous K. If we envision a graph that illustrates the relationship between the squared error and the value of K, the point, often known as the elbow point, is where distortion declines the most. The K value at the elbow point would be the optimal value for K-means clustering.

3 Perceptron

See photo in the folder for a picture of the decision boundary. Weight = (2.0, 4.0) bias = 2