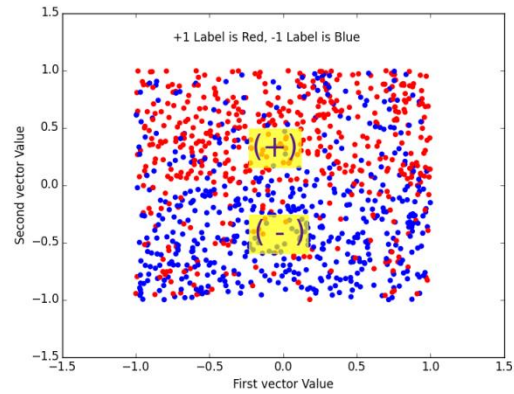
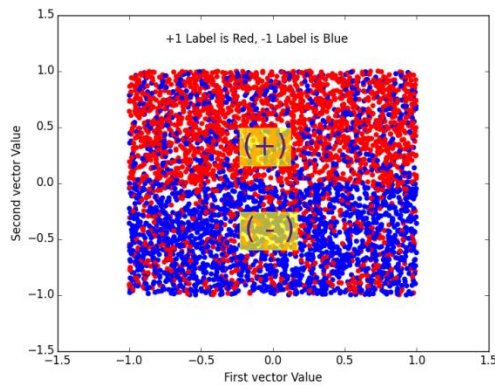


3.a.

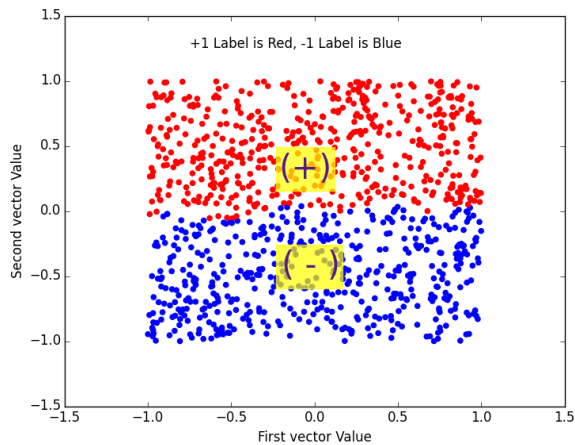
3.b. Plot of Y2 (left) and Y3 (right)



3.c. Check code, Section C

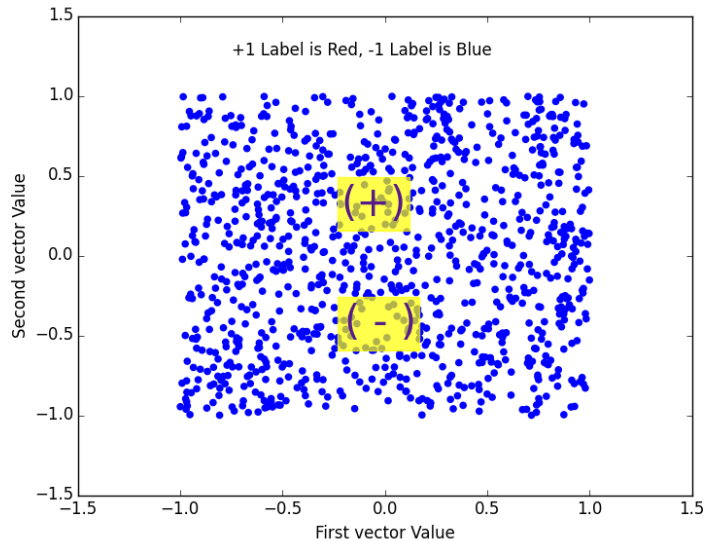
3.d. The square root is unnecessary since what important is the ranking of distance, which is the same whether the value is square rooted or not.

3.e. Zero-one error of data is 25.3%



(continued)

3.f. Zero-one error of scaled data is 49.3%



3.g. The scaled data has very high error, and visualization shows that it is wrong

3.h. For unscaled data

Standard Deviation of dimension 1 of X2 is 0.577715071451

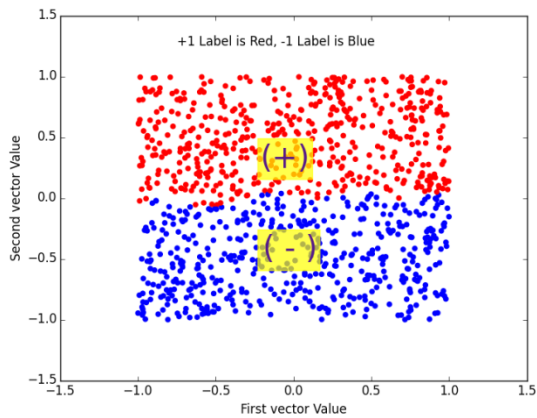
Standard Deviation of dimension 2 of X2 is 0.576799959757

Standard Deviation of dimension 1 of X3 is 0.576895932665

Standard Deviation of dimension 2 of X3 is 0.575999271335

(continued next page)

3.i. Zero-one error of normalized data is 25.3%



3.j. Normalizing reduces the 0-1 lost function

3.k. Normalizing Euclidean distance formula:

$$d(X, Y) = \sqrt{\frac{1}{s_1^2}(x_1 - y_1)^2 + \frac{1}{s_2^2}(x_2 - y_2)^2}$$

Where s_1, s_2 are the standard deviation of the first and second dimension of X, Y.