SYDE 372 – Lab 1 Report

Introduction:

This lab provides examples of using various classifiers to random Gaussian distribution set, specifically the Minimum Euclidean Distance (MED), the Generalized Euclidean Distance (GED), the Maximum A Posterioi (MAP), the Nearest Neighbours (NN), and the k-Nearest Neighbours (kNN) classifiers. Additionally, the lab investigates the error for each classifier to compare how each classifier fare for a specific distribution.

Discussion of Scripts:

Section 2:

*normalDistribution.m*:

* Purpose: to create a matrix of random values that have a normal distribution
* Reduce covariance matrix to row echelon form
* Return matrix (size (N, 2)) that has values multiplied by the reduced covariance matrix

*plotEquiprobabilityContour.m*:

* Purpose: to plot the equiprobability contour of each class
* Plot ellipse depending on smallest/largest eigenvector (major and minor axes) and angle

Section 3:

**MED Classifier:**

(Explanation of implementation/results, explain equations implemented)

**GED Classifier:**

*ged.m*:

* Using the GED/MICD equation to calculate each point

*gedClassifyMulticlass.m*:

* For a case that has more than 2 classes
* Setting value to be 1 for class C, 2 for class D, and 3 for class E
* Each point belongs to the class that has shortest distance

*plotGed2.m*:

* Plots equiprobability contour, the cluster of plots, and the decision boundary of 2 classes

*plotGed3.m*:

* Plots equiprobability contour, the cluster of plots, and the decision boundary of 3 classes

**MAP Classifier:**

(Explanation of implementation/results, explain equations implemented)

**NN Classifier:**

(Explanation of implementation/results, explain equations implemented)

**kNN Classifier:**

(Explanation of implementation/results, explain equations implemented)

Graphs:

(Printout of pertinent graphs)