Report Task 2

Task 2.1

Elapsed time is 9.987109 seconds. k: 1 N: 4017 Nerrs: 132 acc: 0.96714	Elapsed time is 9.951864 seconds. k: 3 N: 4017 Nerrs: 171 acc: 0.957431	Elapsed time is 9.896921 seconds. k: 5 N: 4017 Nerrs: 196 acc: 0.951207
Elapsed time is 9.923703 seconds. k: 10 N: 4017 Nerrs: 247 acc: 0.938511	Elapsed time is 12.401225 seconds. k: 20 N: 4017 Nerrs: 280 acc: 0.930296	>> Ks = [1,3,5,10,20]; >> task2_1(Xtrn, Ytrn, Xtst, Ytst, Ks)

Figure 2.1: Runtimes for run_knn_classifier
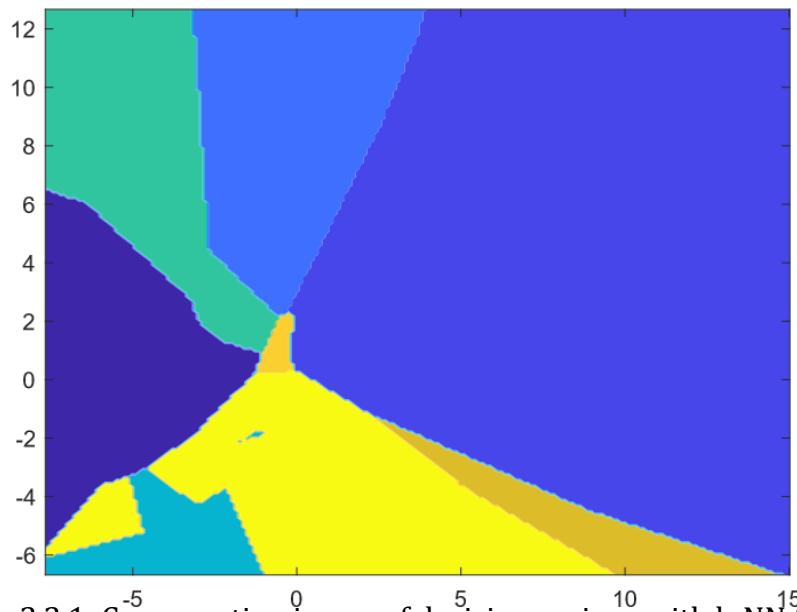
Task 2.2

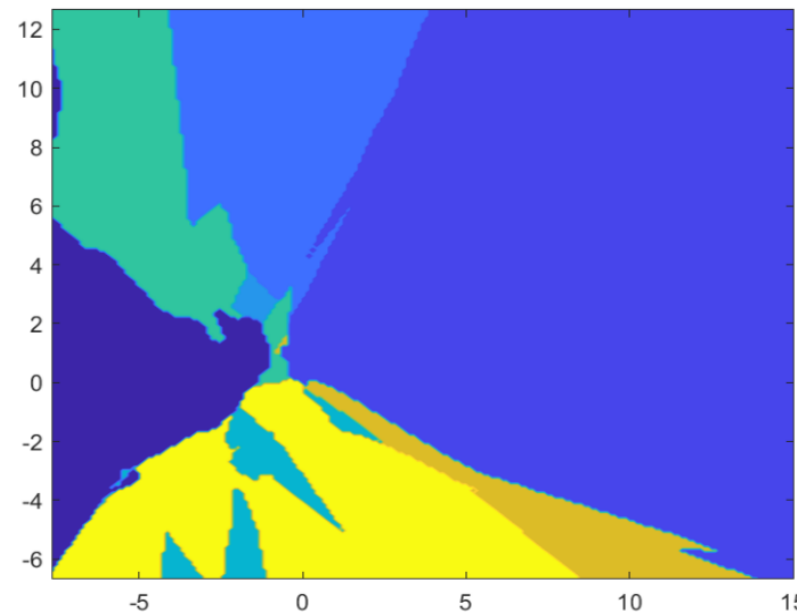Figure 2.2.1: Cross-section image of decision regions with k-NN for k =1

Figure 2.2.2: Cross-section image of decision regions with k-NN for k =3
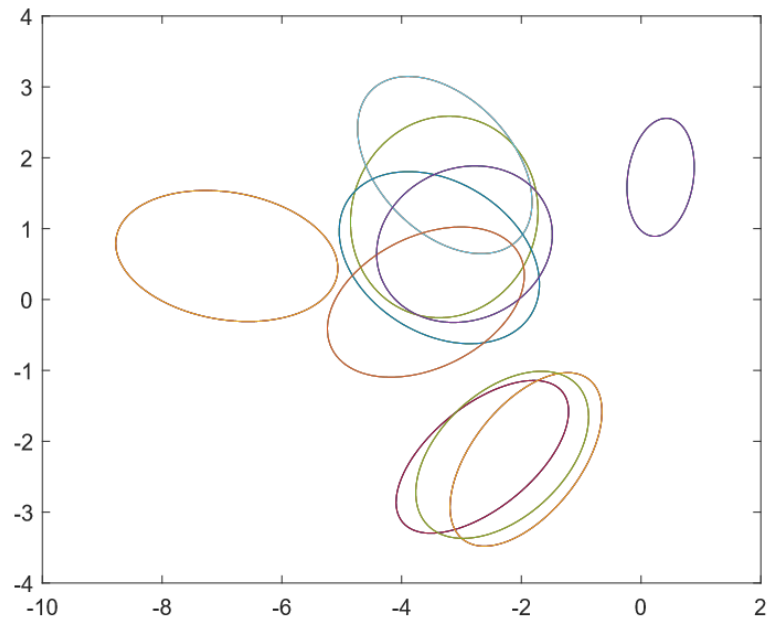
Report Task 2

Task 2.3

Figure 2.3: Class-wise Gaussian distributions on the plane of first two principal components

Task 2.4   >> Corrs = task2_4(Xtrn, Ytrn) ;   **Corrs =**

-0.1899;	0.1739;	0.0532;	-0.4178;	0.5948;	-0.3077;	0.3586;	0.5503;	0.1223;	0.4543;	0.0000

Task 2.5   >> task2_5(Xtrn, Ytrn, Xtst, Ytst, 0.01)

Elapsed time is 3.205050 seconds.

N: 4017

Nerrs: 198
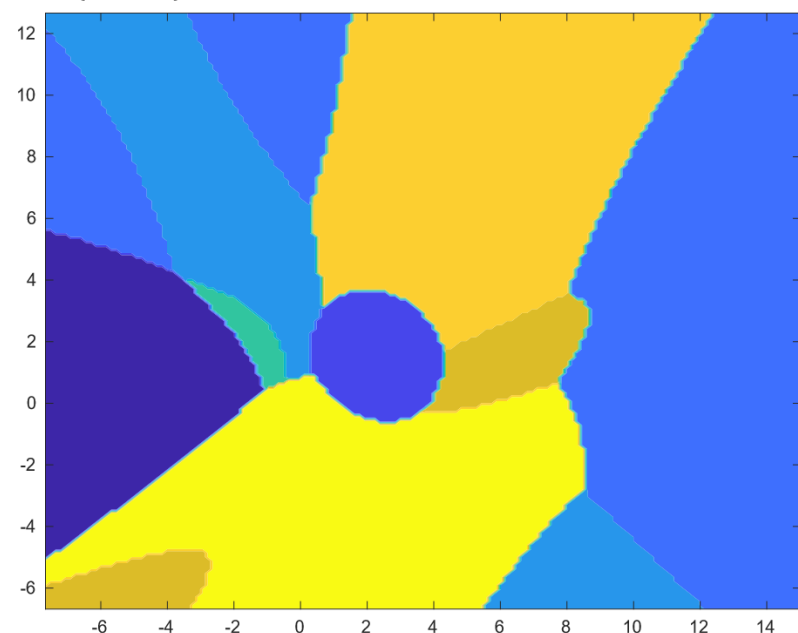
acc: 0.950709   (95.1%)

Task 2.6

Figure 2.6: Cross-section image of decision regions with Gaussian classifiers

Report Task 2

Task 2.7

>> task2_7(Xtrn, Ytrn, Xtst, Ytst, 0.01, 0.9) ratio: 0.9 N: 4017 Nerrs: 204 acc: 0.949216	>> task2_7(Xtrn, Ytrn, Xtst, Ytst, 0.01, 0.8) ratio: 0.8 N: 4017 Nerrs: 201 acc: 0.949963	>> task2_7(Xtrn, Ytrn, Xtst, Ytst, 0.01, 0.7) ratio: 0.7 N: 4017 Nerrs: 202 acc: 0.949714	>> task2_7(Xtrn, Ytrn, Xtst, Ytst, 0.01, 0.6) ratio: 0.6 N: 4017 Nerrs: 200 acc: 0.950212
>> task2_7(Xtrn, Ytrn, Xtst, Ytst, 0.01, 0.5) ratio: 0.5 N: 4017 Nerrs: 193 acc: 0.951954	>> task2_7(Xtrn, Ytrn, Xtst, Ytst, 0.01, 0.4) ratio: 0.4 N: 4017 Nerrs: 195 acc: 0.951456	>> task2_7(Xtrn, Ytrn, Xtst, Ytst, 0.01, 0.3) ratio: 0.3 N: 4017 Nerrs: 202 acc: 0.949714	

Task 2.8

>> task2_8(Xtrn, Ytrn, Xtst, Ytst, 0.01, 2) Elapsed time is 8.133596 seconds. # of test samples: 4017 # of test errors: 2894 Accuracy: 0.279562	>> task2_8(Xtrn, Ytrn, Xtst, Ytst, 0.01, 5) Elapsed time is 32.302300 seconds. # of test samples: 4017 # of test errors: 3292 Accuracy: 0.180483	>> task2_8(Xtrn, Ytrn, Xtst, Ytst, 0.01, 10) Elapsed time is 59.861179 seconds. # of test samples: 4017 # of test errors: 3623 Accuracy: 0.0980831