

Image processing

Exercise 6

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Task 1

Result in the terminal from fitcknn and predict

Command Window							
>> exe6_task1							
Iter	Eval	Objective	Objective	BestSoFar	BestSoFar	NumNeighbors	Distance
	result		runtime	(observed)	(estim.)		
1	Best	0.026667	1.685	0.026667	0.026667	30	cosine
2	Accept	0.04	0.63243	0.026667	0.027197	2	chebychev
3	Accept	0.19333	0.2381	0.026667	0.030324	1	hamming
4	Accept	0.33333	0.20948	0.026667	0.033313	31	spearman
5	Best	0.02	0.36025	0.02	0.020648	6	cosine
6	Accept	0.073333	0.21996	0.02	0.023082	1	correlation
7	Accept	0.06	0.21996	0.02	0.020875	2	cityblock
8	Accept	0.04	0.15083	0.02	0.020622	1	euclidean
9	Accept	0.24	0.17797	0.02	0.020562	74	mahalanobis
10	Accept	0.04	0.19619	0.02	0.020649	1	minkowski
11	Accept	0.053333	0.20316	0.02	0.020722	1	seuclidean
12	Accept	0.19333	0.1884	0.02	0.020701	1	jaccard
13	Accept	0.04	0.13561	0.02	0.029203	1	cosine
14	Accept	0.04	0.10174	0.02	0.031888	75	cosine
15	Accept	0.04	0.1582	0.02	0.020076	1	cosine
16	Accept	0.093333	0.25417	0.02	0.020073	75	euclidean
17	Accept	0.093333	0.13376	0.02	0.02007	75	minkowski
18	Accept	0.1	0.14729	0.02	0.020061	75	chebychev
19	Accept	0.15333	0.16351	0.02	0.020044	75	seuclidean
20	Accept	0.1	0.12049	0.02	0.020044	75	cityblock
Iter	Eval	Objective	Objective	BestSoFar	BestSoFar	NumNeighbors	Distance
	result		runtime	(observed)	(estim.)		
21	Accept	0.033333	0.16528	0.02	0.020046	75	correlation
22	Accept	0.033333	0.20493	0.02	0.02656	9	cosine
23	Accept	0.033333	0.22567	0.02	0.02854	9	cosine

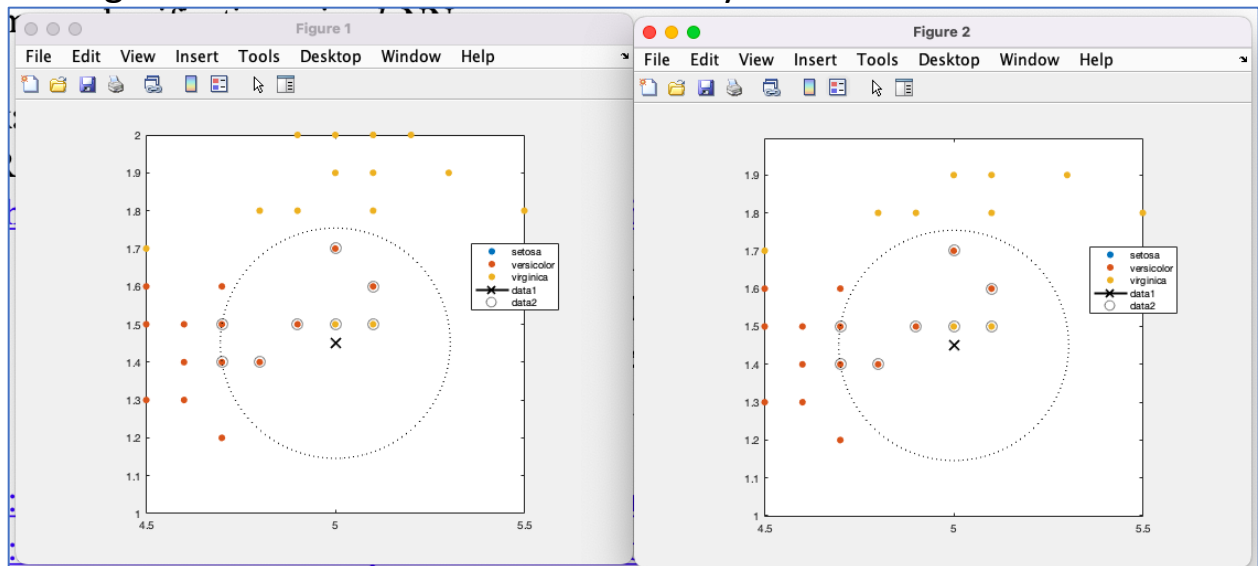
Code

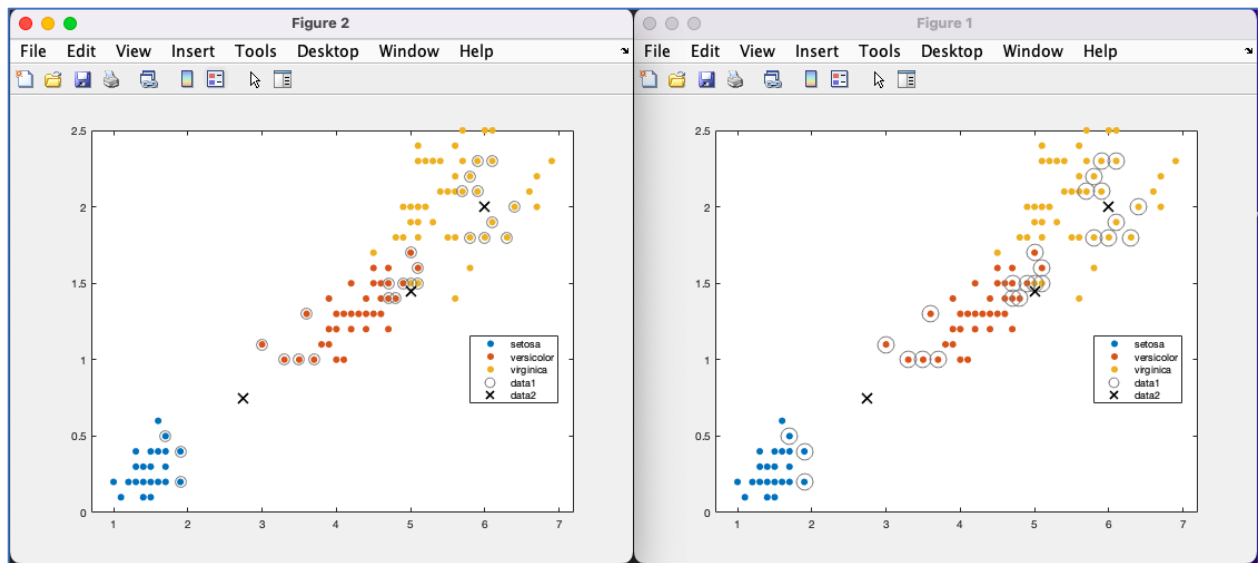
```
Editor - /Users/wcwe/Documents/MATLAB/exe6_task1.m
exe6_task1.m  knn_class.m  +
1 % Tian Xiaoyang
2 % Exercise 6
3 % fitcknn
4
5 % fitcknn
6 load fisheriris
7 X = meas;
8 Y = species;
9 rng(1)
10 Mdl = fitcknn(X,Y,'OptimizeHyperparameters','auto',...
11 'HyperparameterOptimizationOptions',...
12 struct('AcquisitionFunctionName','expected-improvement-plus'));
13 Mdl.ClassNames
14 Mdl.Prior
15 Mdl.Prior = [0.5 0.2 0.3];
16 ypred = predict(Mdl,X);
17
18 plot(X,Y,'o',X,ypred,'x')
19 legend('Data','Predictions')
20
21
22
```

knn classifier code

```
1 % Tian Xiaoyang
2 % Exercise 6
3 % knn classification
4
5 load fisheriris
6 x = meas(:,3:4);
7 gscatter(x(:,1),x(:,2),species)
8 legend('Location','best')
9
10 newpoint = [5 1.45];
11 line(newpoint(1),newpoint(2),'marker','x','color','k',...
12      'markersize',10,'linewidth',2)
13
14 Md1 = KDTreeSearcher(x);
15
16 [n,d] = knnsearch(Md1,newpoint,'k',10);
17 line(x(n,1),x(n,2),'color',[.5 .5 .5],'marker','o',...
18      'linestyle','none','markersize',10)
19
20 x(n,:);
21
22 xlim([4.5 5.5]);
23 ylim([1 2]);
24 axis square
25
26 ctr = newpoint - d(end);
27 diameter = 2*d(end);
28 % Draw a circle around the 10 nearest neighbors.
29 h = rectangle('position',[ctr,diameter,diameter],...
30              'curvature',[1 1]);
31 h.LineStyle = ':';
32
33 figure
34 newpoint2 = [5 1.45;6 2;2.75 .75];
35 gscatter(x(:,1),x(:,2),species)
36 legend('Location','best')
37 [n2,d2] = knnsearch(Md1,newpoint2,'k',10);
38 line(x(n2,1),x(n2,2),'color',[.5 .5 .5],'marker','o',...
39      'linestyle','none','markersize',10)
40 line(newpoint2(:,1),newpoint2(:,2),'marker','x','color','k',...
41      'markersize',10,'linewidth',2,'linestyle','none')
42
43 tabulate(species(n2(1,:)))
44
45 tabulate(species(n2(2,:)))
46
47 tabulate(species(n2(3,:)))
48
49
```

The figures for k=10 and k=15 are not very different





Task 2