

Homework 3

CS 4793 – Fall 2003
Tom Bylander, Instructor

assigned November 4, 2003
due November 18, 2003

1. Do Exercise 2.7 from the book.
2. For the following points, show a SVM (linear kernel) that separates the positive points from the negative points. Show a graph of the SVM and also list the bias weight and list the support vectors and their weights. Hint: Download the svm program from the web page. Set C to a high value and set the tolerance to 0.001.

Class 1			Class 2		
x_1	x_2	d	x_1	x_2	d
-1	-1	1	0	1	-1
-1	0	1	1	-1	-1
-1	1	1	1	0	-1
0	-1	1	1	1	-1
0	0	1			

3. For the following points, show the SVMs (linear kernel) that would be learned from the points for $C = 1$ and two other values for C (choose values not likely to be chosen by your classmates). For each of the three SVMs, show a graph of the SVM and also list the bias weight and list the support vectors and their weights. Hint: Use the svm program from the web page. Set the tolerance to 0.001.

Class 1			Class 2		
x_1	x_2	d	x_1	x_2	d
-1	-1	1	0	1	-1
-1	0	1	1	-1	-1
-1	1	1	1	0	-1
0	-1	1	1	1	-1
0	0	1	-0.5	-0.5	-1
0.5	-0.5	1	-0.5	0.5	-1
0.5	0.5	1			

4. (Extra Credit) Repeat the above problem using a Gaussian kernel.