

Name:

In The Name of Almighty

ECE Dept. Isfahan University of Technology

STN:

Statistical Pattern Recognition

Computer Assignment #3



-
1. Write a program to implement the Perceptron algorithm.
 - a) Starting with $w = \mathbf{0}$, apply your program to the training data from ω_1 and ω_2 . Note the number of iterations required for convergence.
 - b) Apply your program to ω_3 and ω_2 . Again, note the number of iterations required for convergence.
 - c) Explain the difference between the iterations required in the two cases.
 - 2- Write a program to implement the least squares (LS) criterion algorithm.
 - a) Apply your program to the training data from ω_1 and ω_2 .
 - b) Apply your program to the training data from ω_3 and ω_2 .
 - 3- Write a program to implement a multi-category generalization of Logistic Discrimination.
 - a) Apply it to the data in all four categories in the table based on ω_i vs. not ω_i for $i=1, 2, 3, 4$.
 - b) Apply it to the data in all four categories in the table based on ω_i vs. ω_j for $i, j=1, 2, 3, 4$.
 - c) Find any regions whose categorization by your system is ambiguous.

Table 1: Training Data for Computer Assignment #3

Sample	ω_1		ω_2		ω_3		ω_4	
	$x1$	$x2$	$x1$	$x2$	$x1$	$x2$	$x1$	$x2$
1	0.1	1.1,	7.1	4.2	-3.0	-2.9	-2.0	-8.4
2	6.8	7.1	-1.4	-4.3	0.5	8.7	-8.9	0.2
3	-3.5	-4.1	4.5	0.0	2.9	2.1	-4.2	-7.7
4	2.0	2.7	6.3	1.6	-0.1	5.2	-8.5	-3.2
5	4.1	2.8	4.2	1.9	-4.0	2.2	-6.7	-4.0
6	3.1	5.0	1.4	-3.2	-1.3	3.7	-0.5	-9.2
7	-0.8	-1.3	2.4	-4.0	-3.4	6.2	-5.3	-6.7
8	0.9	1.2	2.5	-6.1	-4.1	3.4	-8.7	-6.4
9	5.0	6.4	8.4	3.7	-5.1	1.6	-7.1	-9.7
10	3.9	4.0	4.1	-2.2	1.9	5.1	-8.0	-6.3