

Homework 9

CS 3793 – Fall 2011
Tom Bylander, Instructor

assigned November 16, 2011
due November 30, 2011

For all the problems, consider the following set of examples. Examples 1–11 will be the training examples and examples 12–16 will be the test examples.

No.	Attributes				Class
	x_1	x_2	x_3	x_4	
1	0	1	1	0	pos
2	0	0	0	0	neg
3	1	1	0	0	pos
4	0	1	1	1	pos
5	0	0	1	1	pos
6	0	0	0	1	neg
7	1	0	1	0	neg
8	1	0	0	1	neg
9	0	1	0	0	pos
10	1	1	1	1	neg
11	1	1	0	1	neg
12	1	0	1	1	neg
13	0	0	1	0	pos
14	1	0	0	0	neg
15	0	1	0	1	neg
16	1	1	1	0	pos

1. (25 pts.) Learn a decision tree from the training examples using information gain to select attributes. In case of ties, prefer lower-numbered attributes.
2. (25 pts.) Learn the probabilities for naive Bayes from the training examples. Use Laplace's law of succession to estimate probabilities.
3. (25 pts.) Perform the perceptron learning algorithm on the training examples for one epoch. Use $y = 1$ for positive examples and $y = -1$ for negative examples. Use 1.0 as the learning rate.
4. (25 pts.) For each of the above hypotheses, how well do they perform on the test examples?