

Homework 3

CS 3793/5233 – Fall 2016
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assigned October 11, 2016
due October 18, 2016

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	1	0	0	1	pos
2	0	0	0	0	neg
3	0	0	1	1	neg
4	1	0	0	0	pos
5	1	1	0	0	neg
6	1	0	1	1	neg
7	0	1	1	0	pos
8	1	1	0	1	neg
9	0	0	1	0	neg
10	1	1	1	1	pos
11	0	1	1	1	neg
12	1	1	1	0	pos
13	0	0	0	1	neg
14	1	0	1	0	pos
15	0	1	0	1	neg
16	0	1	0	0	neg

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, which is one pass through the examples. 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 predictors, how do they classify the test examples?