

Homework 7

CS 6243 – Spring 2005
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assigned March 24, 2005
due March 31, 2005

1. (50 pts.) In our notes, we have:

Let $f(\mathbf{x})$ be the target value for \mathbf{x} .

Let h_1, \dots, h_B be the base hypotheses.

Let h_{avg} be the average prediction of h_1, \dots, h_B .

Let $e(h, \mathbf{x}) = (f(\mathbf{x}) - h(\mathbf{x}))^2$

$$e(h_{avg}, \mathbf{x}) = \frac{\sum_{i=1}^B e(h_i, \mathbf{x})}{B} - \frac{\sum_{i=1}^B (h_i(\mathbf{x}) - h_{avg}(\mathbf{x}))^2}{B}$$

Show that this is true for $B = 3$.

2. (50 pts.) Show what happens for the first two rounds of boosting for the following examples. Assume that a base classifier only tests one attribute. Which examples will still be misclassified?

Attributes			Class
x_1	x_2	x_3	y
0	0	0	-1
0	0	1	-1
0	1	0	1
0	1	1	-1
1	0	0	-1
1	0	1	1
1	1	0	1
1	1	1	1