Quiz 7 CSE 255, Spring 2017

Name: _____

PID: _____

This is the 7'th quiz of CSE255/DSE230

On your desk you should have only the exam paper and writing tools. No hats or hoods allowed (unless religious items). There is one question in this quiz.

You have 15 minutes to complete the exam.

Start by writing your name and PID on this page.

Good Luck!

Suppose examples are generated in the following way. The input feature x is a scalar drawn uniformly from the range $[0, 1]$. The label is one of $+1, -1$ and is generated according to the conditional probability

$$P(y = +1|x) = [ax + b]$$

where $a, b > 0$ are unknown parameters and the square brackets indicate restricting the variable between 0 and 1

$$[x] = \max(0, \min(x, 1))$$

. You are given a training set, generated IID according to the given distribution: $(x_1, y_1), (x_2, y_2), \ldots, (x_m, y_m)$

1. Write an expression for the Bayes optimal rule.

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2. Write an expression for the Bayes error (the error of the Bayes optimal rule).

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3. What would you try to estimate if you were using generative models?

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4. What set of rules should you consider if you were using discriminative models?

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5. What would be the optimal discriminative rule?

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