Review Test Submission: Quiz 5: Parametric Estimation & Regression

User	Fei Shen
Course	CS-584-Parent.17S
Test	Quiz 5: Parametric Estimation & Regression
Started	2/28/17 4:18 PM
Submitted	2/28/17 4:51 PM
Due Date	2/28/17 11:59 PM
Status	Completed
Attempt Score	80 out of 80 points
Time Elapsed	32 minutes out of 2 hours
Results Displayed	Submitted Answers, Correct Answers

Question 1

20 out of 20 points

Suppose we selected a model g and trained it over 3 samples. We obtained g1, g2, and g3. Now we would like to compute bias and variance of our model g. Given the following data set with true labels (f(x)) and predictions produced by our 3 estimators, g1, g2, and g3, please calculate the $bias^2$ and the variance of this model using the formulas on Page 21 of the lecture slides. Round your answer to 3 decimal digits if necessary.

X	True labels f(X)	g1(X)	g2(X)	g3(X)
0	1	0	1	1
1	2	2	3	4
2	5	4	5	5
3	6	6	7	7
4	9	8	9	10

$Bias^2$ = **[a]**

Variance = **[b]**

Specified Answer for: a ✓ 0.333

Specified Answer for: b ✓ 0.4

Correct Answers for: a		
Evaluation Method	**Correct Answer**	**Case Sensitivity**
✓ *Pattern Match*	0?.3333*	
Correct Answers for: b		

Evaluation Method	Correct Answer	Case Sensitivity
Pattern Match	0?.4(0|00|000)?	

Question 2

10 out of 10 points

When we flip a thumbtack, it comes as heads or tails. Suppose P(Heads) = q, P(Tails) = 1- q. Since q is unknown, we need to do some experiment to estimate it. Assume we flip it for 10 times and get 6 heads. Please estimate q by maximizing the log-likehood.

Selected Answer: 0.6

Correct Answer: 0.6 ± 0

Question 3

20 out of 20 points

Give several data samples as follows.

X Y
-1 -0.8
0 0.8
1 3
2 5

We want to fit the data with a linear regression model $Y=aX+b$. Please compute a and b, and use them to compute square error (using the first formula on page 19 of the lecture slides). What's the value of square error? Please round to 3 decimal digits if necessary.

Selected Answer: 0.036

Correct Answer: 0.036

Answer range +/- 0 (0.036 - 0.036)

Question 4

30 out of 30 points

A study was conducted to see the effect of coupons on purchasing habits of potential customers. In the study, 1000 homes were selected and a coupon and advertising material for a particular product was sent to each home. The advertising material was the same but the amount of the discount on the coupon varied from 5% to 30%. The number of coupons redeemed was counted. Below are the data.

Price Reduction X	Proportion Redeemed Y (%)
5	15
10	25
15	35
20	50
30	75

Fit a simple linear regression to the observed proportions: Y=aX + b. What's the value of a? Please round your answer to 3 decimal digits if necessary.

Selected Answer: 2.432

Correct Answer: 2.432

Answer range +/- 0.001 (2.431 - 2.433)

Friday, April 28, 2017 5:40:02 PM CDT

← OK