Ridge Regression

9 试题

1 point

1.
Which of the following is NOT a valid measure of overfitting?

- (●) Sum of parameters ($w_1 + w_2 + \ldots + w_n$)
- ( ) Sum of squares of parameters ($w_1^2 + w_2^2 + \ldots + w_n^2$)
- ( ) Range of parameters, i.e., difference between maximum and minimum parameters
- ( ) Sum of absolute values of parameters ($|w_1| + |w_2| + \ldots + |w_n|$)

1 point

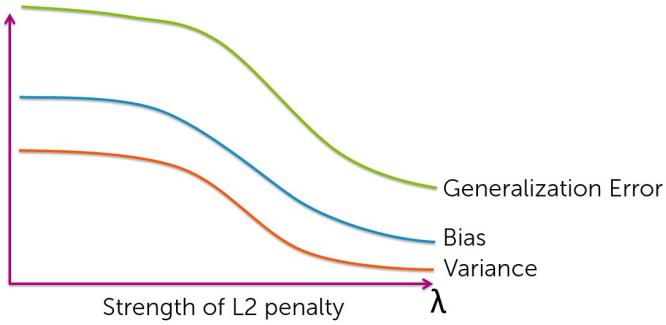
2.
In ridge regression, choosing a large penalty strength λ tends to lead to a model with (choose all that apply):

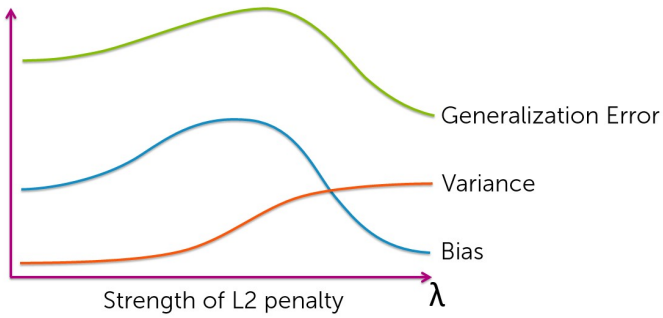
- [x] High bias
- [ ] Low bias
- [ ] High variance
- [x] Low variance

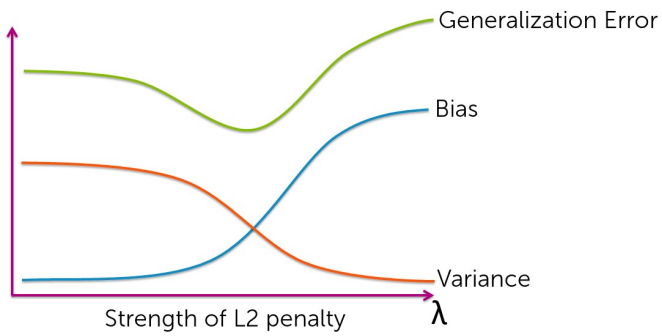
1 point

3.

Which of the following plots best characterize the trend of bias, variance, and generalization error (all plotted over λ)?







1 point

4.

In ridge regression using unnormalized features, if you double the value of a given feature (i.e., a specific column of the feature matrix), what happens to the estimated coefficients for every other feature? They:

- ○ Double
- ○ Half
- ○ Stay the same
- ● Impossible to tell from the information provided

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1 point

5.

If we only have a small number of observations, K-fold cross validation provides a better estimate of the generalization error than the validation set method.

- ● True
- ○ False

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1 point

6.

10-fold cross validation is more computationally intensive than leave-one-out (LOO) cross validation.

- ○ True
- ● False

1 point

7.

Assume you have a training dataset consisting of N observations and D features. You use the closed-form solution to fit a multiple linear regression model using ridge regression. To choose the penalty strength λ, you run leave-one-out (LOO) cross validation searching over L values of λ. Let $\mathrm{Cost}(N, D)$ be the computational cost of running ridge regression with N data points and D features. Assume the prediction cost is negligible compared to the computational cost of training the model. Which of the following represents the computational cost of your LOO cross validation procedure?

- $LN \cdot \mathrm{Cost}(N, D)$
- $LN \cdot \mathrm{Cost}(N-1, D)$
- $LD \cdot \mathrm{Cost}(N-1, D)$
- $LD \cdot \mathrm{Cost}(N, D)$
- $L \cdot \mathrm{Cost}(N-1, D)$
- $L \cdot \mathrm{Cost}(N, D)$

1 point

8.

Assume you have a training dataset consisting of 1 million observations. Suppose running the closed-form solution to fit a multiple linear regression model using ridge regression on this data takes 1 second. Suppose you want to choose the penalty strength λ by searching over 100 possible values. How long will it take to run leave-one-out (LOO) cross-validation for this selection task?

- About 3 hours

- ○ About 3 days
- ◉ About 3 years
- ○ About 3 decades

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1 point

9.

Assume you have a training dataset consisting of 1 million observations. Suppose running the closed-form solution to fit a multiple linear regression model using ridge regression on this data takes 1 second. Suppose you want to choose the penalty strength λ by searching over 100 possible values. If you only want to spend about 1 hour to select λ, what value of k should you use for k-fold cross-validation?

- ○ k=6
- ◉ k=36
- ○ k=600
- ○ k=3600

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