Overfitting & Regularization in Logistic Regression

8 questions

1 point

1. Consider four classifiers, whose classification performance is given by the following table:

	Classification error on training set	Classification error on validation set
Classifier 1	0.2	0.6
Classifier 2	0.8	0.6
Classifier 3	0.2	0.2
Classifier 4	0.6	0.4

Which of the four classifiers is most likely overfit?

- (●) Classifier 1
- ( ) Classifier 2
- ( ) Classifier 3
- ( ) Classifier 4

1 point

2. Suppose a classifier classifies 23100 examples correctly and 1900 examples incorrectly. Compute error by hand. Round your answer to 3 decimal places.

0.076

1 point

3. (True/False) Accuracy and error measured on the same dataset always sum to 1.

- (●) True
- ( ) False

1 point

4. Which of the following is NOT a correct description of complex models?

- ( ) Complex models accommodate many features.
- ( ) Complex models tend to produce lower training error than simple models.
- (●) Complex models tend to generalize better than simple models.
- ( ) Complex models tend to exhibit high variance in response to perturbation in the training data.
- ( ) Complex models tend to exhibit low bias, capturing many patterns in the training data that simple models may have missed.

1 point

5. Which of the following is a symptom of overfitting in the context of logistic regression? Select all that apply.

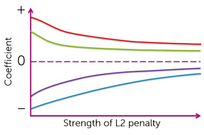
- [■] Large estimated coefficients
- [ ] Good generalization to previously unseen data
- [ ] Simple decision boundary
- [■] Complex decision boundary
- [■] Overconfident predictions of class probabilities

1 point

6. Suppose we perform L2 regularized logistic regression to fit a sentiment classifier. Which of the following plots does NOT describe a possible coefficient path? Choose all that apply.

Note. Assume that the algorithm runs for a wide range of L2 penalty values and each coefficient plot is zoomed out enough to capture all long-term trends.

[ ]



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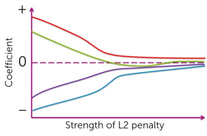

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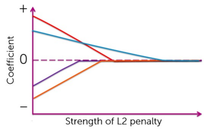

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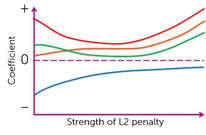
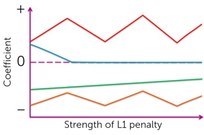


1 point

7. Suppose we perform L1 regularized logistic regression to fit a sentiment classifier. Which of the following plots does NOT describe a possible coefficient path? Choose all that apply.

Note. Assume that the algorithm runs for a wide range of L1 penalty values and each coefficient plot is zoomed out enough to capture all long-term trends.

[■]



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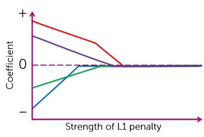

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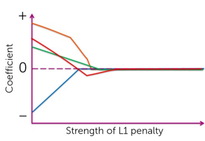

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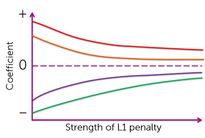

1 point

8. In the context of L2 regularized logistic regression, which of the following occurs as we increase the L2 penalty λ? Choose all that apply.

- [■] The L2 norm of the set of coefficients gets smaller
- [ ] Region of uncertainty becomes narrower, i.e., the classifier makes predictions with higher confidence.
- [■] Decision boundary becomes less complex
- [ ] Training error decreases
- [■] The classifier has lower variance
- [ ] Some features are excluded from the classifier

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