

Regularization

TOTAL POINTS 5

1. You are training a classification model with logistic regression. Which of the following statements are true? Check all that apply.

- Introducing regularization to the model always results in equal or better performance on examples not in the training set.
- Adding a new feature to the model always results in equal or better performance on examples not in the training set.
- Adding many new features to the model makes it more likely to overfit the training set.
- Introducing regularization to the model always results in equal or better performance on the training set.

2. Suppose you ran logistic regression twice, once with $\lambda = 0$, and once with $\lambda = 1$. One of the times, you got

parameters $\theta = \begin{bmatrix} 26.29 \\ 65.41 \end{bmatrix}$, and the other time you got
 $\theta = \begin{bmatrix} 2.75 \\ 1.32 \end{bmatrix}$. However, you forgot which value of θ corresponds to which value of λ . Which one do you think corresponds to $\lambda = 1$?

- $\theta = \begin{bmatrix} 26.29 \\ 65.41 \end{bmatrix}$
- $\theta = \begin{bmatrix} 2.75 \\ 1.32 \end{bmatrix}$

3. Which of the following statements about regularization are true? Check all that apply.

- Because logistic regression outputs values $0 \leq h_\theta(x) \leq 1$, its range of output values can only be "shrunk" slightly by regularization anyway, so regularization is generally not helpful for it.
- Using too large a value of λ can cause your hypothesis to overfit the data; this can be avoided by reducing λ .
- Using a very large value of λ cannot hurt the performance of your hypothesis; the only reason we do not set λ to be too large is to avoid numerical problems.
- Consider a classification problem. Adding regularization may cause your classifier to incorrectly classify some training examples (which it had correctly classified when not using regularization, i.e. when $\lambda = 0$).

4. In which one of the following figures do you think the hypothesis has overfit the training set?

Figure:

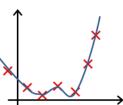


Figure:

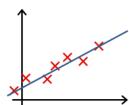


Figure:

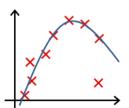
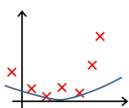


Figure:



5. In which one of the following figures do you think the hypothesis has underfit the training set?

Figure:

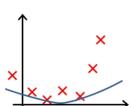


Figure:

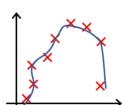


Figure:

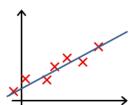


Figure:

