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. 1 point

- [ ] Adding a new feature to the model always results in equal or better performance on examples not in the training set.
- [x] 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 examples not in 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 $\theta = \begin{bmatrix} 81.47 \\ 12.69 \end{bmatrix}$, and the other time you got $\theta = \begin{bmatrix} 13.01 \\ 0.91 \end{bmatrix}$. However, you forgot which value of λ corresponds to which value of θ. Which one do you think corresponds to $\lambda = 1$? 1 point

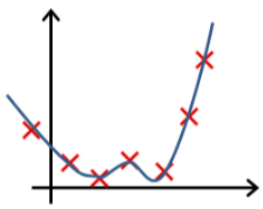
- ○ $\theta = \begin{bmatrix} 81.47 \\ 12.69 \end{bmatrix}$
- ◉ $\theta = \begin{bmatrix} 13.01 \\ 0.91 \end{bmatrix}$

3. Which of the following statements about regularization are true? Check all that apply. 1 point

- [ ] Using too large a value of λ can cause your hypothesis to overfit the data; this can be avoided by reducing λ.
- [ ] 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.
- [x] 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 $\lambda = 0$).
- [ ] 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.

4. In which one of the following figures do you think the hypothesis has overfit the training set? 1 point

- ◉ Figure:



- ○ Figure:

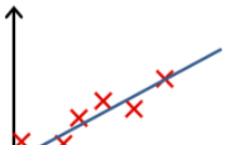


Figure:

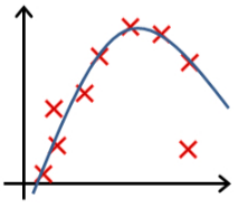
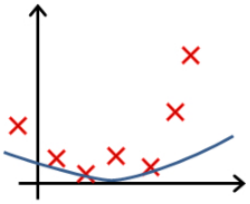


Figure:



5. **In which one of the following figures do you think the hypothesis has underfit the training set?** 1 point

Figure:

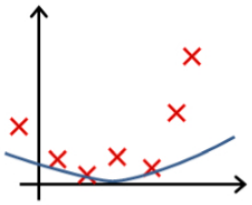


Figure:

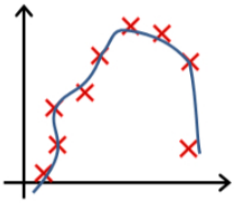


Figure:

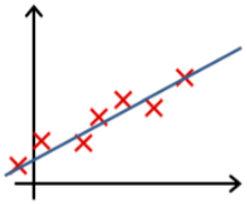
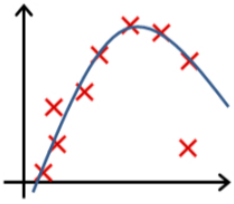


Figure:



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