Regularization **Due** Jul 26, 11:59 PM PDT Graded Quiz • 10 min

## Classification and Representation **Logistic Regression Model Multiclass Classification**

QUIZ • 10 MIN

Regularization

**DUE** Jul 26, 11:59 PM PDT **ATTEMPTS** 3 every 8 hours

Submit your assignment

Receive grade

TO PASS 80% or higher

Solving the Problem of Overfitting

Overfitting 9 min Reading: The Problem of

Video: The Problem of

Overfitting 3 min Video: Cost Function

10 min Reading: Cost Function 3 min

Video: Regularized Linear Regression 10 min

Reading: Regularized Linear Regression 3 min

Video: Regularized Logistic Regression

8 min Reading: Regularized Logistic Regression

3 min

Review

Reading: Lecture Slides 10 min

Quiz: Regularization

5 questions

Programming Assignment:
Logistic Regression

Regularization **TOTAL POINTS 5** 1. You are training a classification model with logistic 1 point regression. Which of the following statements are true? Check all that apply. Start Adding a new feature to the model always results in equal or better performance on the training set. Introducing regularization to the model always results in equal or better performance on the training set. **Grade** Adding many new features to the model helps prevent overfitting on the training set. Introducing regularization to the model always results in equal or better performance on examples not in the

1 point

1 point

1 point

2. Suppose you ran logistic regression twice, once with  $\lambda=0$ , and once with  $\lambda=1$ . One of the times, you got parameters  $heta=egin{bmatrix} 81.47 \ 12.69 \end{bmatrix}$  , and the other time you got

 $heta = egin{bmatrix} 13.01 \ 0.91 \end{bmatrix}$  . However, you forgot which value of

S P

 $\lambda$  corresponds to which value of heta. Which one do you

think corresponds to  $\lambda=1$ ?

training set.

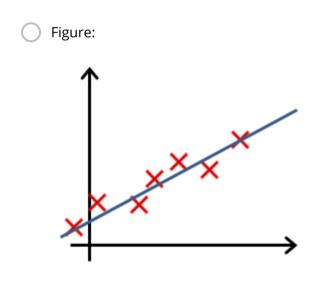
 $\Theta = egin{bmatrix} 81.47 \ 12.69 \end{bmatrix}$ 

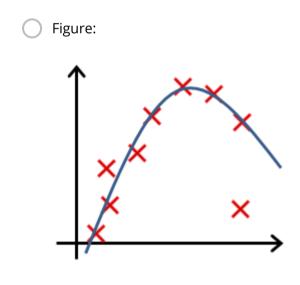
3. Which of the following statements about regularization are true? Check all that apply. igwedge Using too large a value of  $\lambda$  can cause your hypothesis to underfit the data.

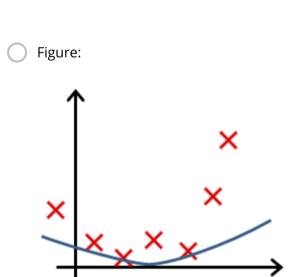
oxedge Because regularization causes J( heta) to no longer be convex, gradient descent may not always converge to the global minimum (when  $\lambda>0$ , and when using an appropriate learning rate lpha).  $oxed{\Box}$  Using a very large value of  $\lambda$  cannot hurt the performance of your hypothesis; the only reason we do not set  $\lambda$ 

to be too large is to avoid numerical problems. oxedge Because logistic regression outputs values  $0 \leq h_ heta(x) \leq 1$ , its range of output values can only be "shrunk" slightly by regularization anyway, so regularization is generally not helpful for it.

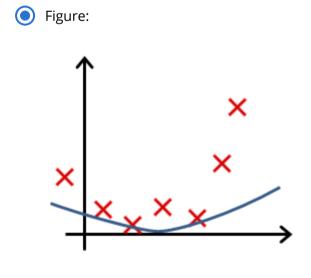
4. In which one of the following figures do you think the hypothesis has overfit the training set? Figure:

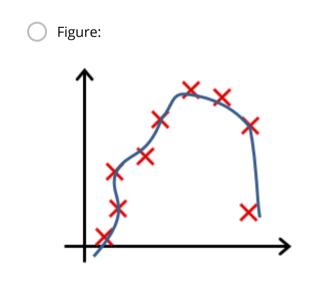


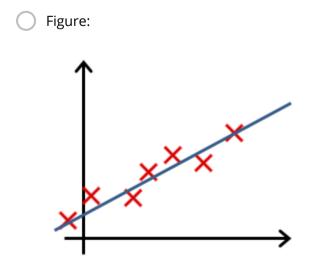


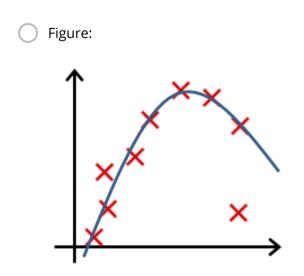


5. In which one of the following figures do you think the hypothesis has underfit the training set?









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1 point