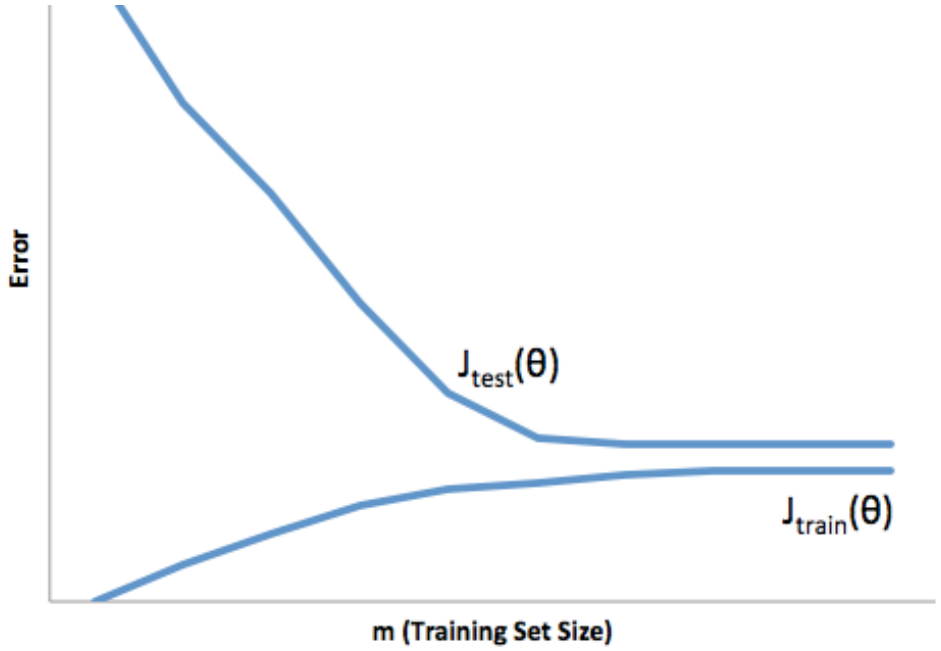
Feedback — X. Advice for Applying Machine Learning

Help

You submitted this quiz on **Wed 30 Jul 2014 1:13 PM PDT**. You got a score of **5.00** out of **5.00**.

Question 1

You train a learning algorithm, and find that it has unacceptably high error on the test set. You plot the learning curve, and obtain the figure below. Is the algorithm suffering from high bias, high variance, or neither?



Your Answer		Score	Explanation
◉ High bias	✔	1.00	This learning curve shows high error on both the training and test sets, so the algorithm is suffering from high bias.
○ High variance			
○ Neither			

Total	1.00 / 1.00

Question 2

Suppose you have implemented regularized logistic regression to classify what object is in an image (i.e., to do object recognition). However, when you test your hypothesis on a new set of images, you find that it makes unacceptably large errors with its predictions on the new images. However, your hypothesis performs **well** (has low error) on the training set. Which of the following are promising steps to take? Check all that apply.

Your Answer		Score	Explanation
☐ Try adding polynomial features.	✔	0.25	The gap in errors between training and test suggests a high variance problem in which the algorithm has overfit the training set. Using more complex features will only increase the overfitting of the training set.
☐ Try decreasing the regularization parameter λ.	✔	0.25	The gap in errors between training and test suggests a high variance problem in which the algorithm has overfit the training set. Decreasing the regularization parameter will increase the overfitting, not decrease it.
☑ Try increasing the regularization parameter λ.	✔	0.25	The gap in errors between training and test suggests a high variance problem in which the algorithm has overfit the training set. Increasing the regularization parameter will reduce overfitting and help with the variance problem.
☑ Get more training examples.	✔	0.25	The gap in errors between training and test suggests a high variance problem in which the algorithm has overfit the training set. Adding more training data will increase the complexity of the training set and help with the variance problem.
Total		1.00 / 1.00	

Question 3

Suppose you have implemented regularized logistic regression to predict what items customers will purchase on a web shopping site. However, when you test your hypothesis on a new set of customers, you find that it makes unacceptably large errors in its predictions. Furthermore, the hypothesis performs **poorly** on the training set. Which of the following might be promising steps to take? Check all that apply.

Your Answer		Score	Explanation
☐ Use fewer training examples.	✔	0.25	Using fewer training examples should never improve test set performance, as the model has fewer data points from which to learn.
☐ Try using a smaller set of features.	✔	0.25	The poor performance on both the training and test sets suggests a high bias problem. Using fewer features will decrease the complexity of the hypothesis and will make the bias problem worse.
☑ Try decreasing the regularization parameter λ.	✔	0.25	The poor performance on both the training and test sets suggests a high bias problem. Decreasing the regularization parameter will allow the hypothesis to fit the data more closely, improving both training and test set performance.
☑ Try to obtain and use additional features.	✔	0.25	The poor performance on both the training and test sets suggests a high bias problem. Using additional features will increase the complexity of the hypothesis, thereby improving the fit to both the train and test data.
Total		1.00 / 1.00	

Question 4

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

Your Answer		Score	Explanation

☑ The performance of a learning algorithm on the training set will typically be better than its performance on the test set.	✔	0.25	The learning algorithm finds parameters to minimize training set error, so the performance should be better on the training set than the test set.
☑ Suppose you are using linear regression to predict housing prices, and your dataset comes sorted in order of increasing sizes of houses. It is then important to randomly shuffle the dataset before splitting it into training, validation and test sets, so that we don't have all the smallest houses going into the training set, and all the largest houses going into the test set.	✔	0.25	We want each of the training, cross validation, and test sets to have the same data distribution. Shuffling pre-sorted data ensures this is the case.
☐ Suppose you are training a regularized linear regression model.The recommended way to choose what value of regularization parameter λ to use is to choose the value of λ which gives the lowest **training set** error.	✔	0.25	You should not use training error to choose the regularization parameter, as you can always improve training error by using less regularization (a smaller value of λ). But too small of a value will not generalize well on the test set.
☐ It is okay to use data from the test	✔	0.25	You should not use test set data in choosing the regularization parameter, as it means the test error will

set to choose the regularization parameter λ, but not the model parameters (θ).		not be a good estimate of generalization error.
Total	1.00 / 1.00	

Question 5

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

Your Answer		Score	Explanation
☑ If a learning algorithm is suffering from high bias, only adding more training examples may **not** improve the test error significantly.	✔	0.25	With high bias, the model is not fitting the training data currently present, so adding more data is unlikely to help.
☐ We always prefer models with high variance (over those with high bias) as they will able to better fit the training set.	✔	0.25	A model with high variance will still have high test error, so it will generalize poorly.
☑ When debugging learning algorithms, it is useful to plot a learning curve to understand if there is a high bias or high variance problem.	✔	0.25	The shape of a learning curve is a good indicator of bias or variance problems with your learning algorithm.
☑ A model with more parameters is more prone to overfitting and typically has higher variance.	✔	0.25	More model parameters increases the model's complexity, so it can more tightly fit data in training, increasing the chances of overfitting.
Total		1.00 / 1.00	