✓ **Congratulations! You passed!**

    Grade received 100%   Latest Submission Grade 100%   To pass 80% or higher
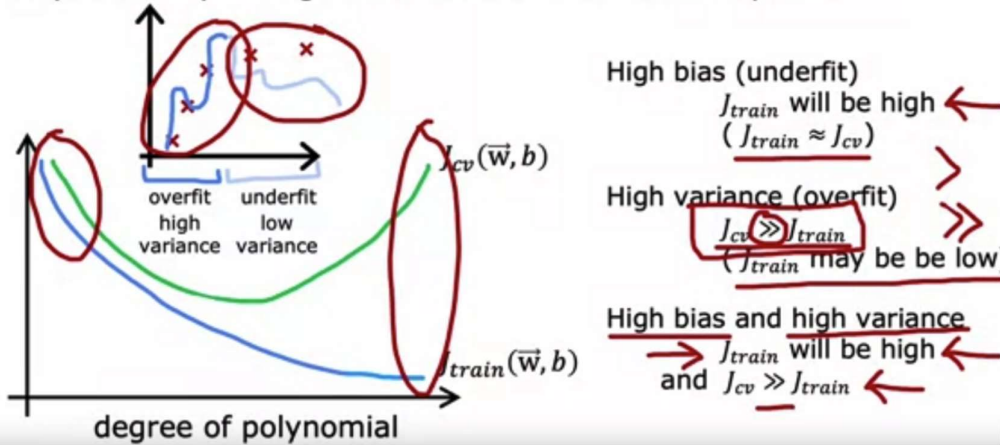
Go to next item

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1.   1 / 1 point

If the model's cross validation error J_{cv} is much higher than the training error J_{train}, this is an indication that the model has…

○ high bias

○ Low variance

⦿ high variance

○ Low bias

✓ **Correct**

When $J_{cv} >> J_{train}$ (whether J_{train} is also high or not, this is a sign that the model is overfitting to the training data and performing much worse on new examples.

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2.   1 / 1 point

Which of these is the best way to determine whether your model has high bias (has underfit the training data)?

◉ Compare the training error to the baseline level of performance

○ See if the training error is high (above 15% or so)

○ Compare the training error to the cross validation error.

○ See if the cross validation error is high compared to the baseline level of performance

✓ **Correct**
Correct. If comparing your model's training error to a baseline level of performance (such as human level performance, or performance of other well-established models), if your model's training error is much higher, then this is a sign that the model has high bias (has underfit).

3. 1 / 1 point

Debugging a learning algorithm

You've implemented regularized linear regression on housing prices

$$J(\vec{w}, b) = \frac{1}{2m} \sum_{i=1}^{m} \left(f_{\vec{w},b}(\vec{x}^{(i)}) - y^{(i)} \right)^2 + \frac{\lambda}{2m} \sum_{j=1}^{n} w_j^2$$

But it makes unacceptably large errors in predictions. What do you try next?

→ Get more training examples   fixes high variance
→ Try smaller sets of features $x, x^2, $ ✗, ✗, ✗...   fixes high variance
→ Try getting additional features ←   fixes high bias
→ Try adding polynomial features $(x_1^2, x_2^2, x_1 x_2, etc)$ fixes high bias
→ Try decreasing λ ←   fixes high bias
→ Try increasing λ ←   fixes high variance

You find that your algorithm has high bias. Which of these seem like good options for improving the algorithm's performance? Hint: two of these are correct.

☑ Decrease the regularization parameter λ (lambda)

✓ **Correct**
Correct. Decreasing regularization can help the model better fit the training data.

☐ Remove examples from the training set

☐ Collect more training examples

☑ Collect additional features or add polynomial features

✓ **Correct**
Correct. More features could potentially help the model better fit the training examples.

4. 1 / 1 point

You find that your algorithm has a training error of 2%, and a cross validation error of 20% (much higher than the training error). Based on the conclusion you would draw about whether the algorithm has a high bias or high variance problem, which of these seem like good options for improving the algorithm's performance? Hint: two of these are correct.

☐ Reduce the training set size

☑ Increase the regularization parameter λ

✓ **Correct**
Yes, the model appears to have high variance (overfit), and increasing regularization would help reduce high variance.

☐ Decrease the regularization parameter λ

☑ Collect more training data

✓ **Correct**
Yes, the model appears to have high variance (overfit), and collecting more training examples would help reduce high variance.