

Evaluating a Learning Algorithm

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Video: Deciding What to Try Next
5 min
- ✓

Video: Evaluating a Hypothesis
7 min
- ✓

Reading: Evaluating a Hypothesis
4 min
- ▶

Video: Model Selection and Train/Validation/Test Sets
12 min
- 📖

Reading: Model Selection and Train/Validation/Test Sets
3 min

Bias vs. Variance

- ▶

Video: Diagnosing Bias vs. Variance
7 min
- 📖

Reading: Diagnosing Bias vs. Variance
3 min
- ▶

Video: Regularization and Bias/Variance
11 min
- 📖

Reading: Regularization and Bias/Variance
3 min
- ▶

Video: Learning Curves
11 min
- 📖

Reading: Learning Curves
3 min
- ▶

Video: Deciding What to Do Next Revisited
6 min
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Reading: Deciding What to do Next Revisited
3 min

Review

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Reading: Lecture Slides
10 min
- 📋

Quiz: Advice for Applying Machine Learning
5 questions
- 🔗

Programming Assignment: Regularized Linear Regression and Bias/Variance
3h

Building a Spam Classifier

- ▶

Video: Prioritizing What to Work On
9 min
- 📖

Reading: Prioritizing What to Work On
3 min

Evaluating a Hypothesis

Once we have done some trouble shooting for errors in our predictions by:

- Getting more training examples
- Trying smaller sets of features
- Trying additional features
- Trying polynomial features
- Increasing or decreasing λ

We can move on to evaluate our new hypothesis.

A hypothesis may have a low error for the training examples but still be inaccurate (because of overfitting). Thus, to evaluate a hypothesis, given a dataset of training examples, we can split up the data into two sets: a **training set** and a **test set**. Typically, the training set consists of 70 % of your data and the test set is the remaining 30 %.

The new procedure using these two sets is then:

1. Learn Θ and minimize $J_{train}(\Theta)$ using the training set
2. Compute the test set error $J_{test}(\Theta)$

The test set error

1. For linear regression: $J_{test}(\Theta) = \frac{1}{2m_{test}} \sum_{i=1}^{m_{test}} (h_{\Theta}(x_{test}^{(i)}) - y_{test}^{(i)})^2$
2. For classification ~ Misclassification error (aka 0/1 misclassification error):

$$err(h_{\Theta}(x), y) = \begin{matrix} 1 & \text{if } h_{\Theta}(x) \geq 0.5 \text{ and } y = 0 \text{ or } h_{\Theta}(x) < 0.5 \text{ and } y = 1 \\ 0 & \text{otherwise} \end{matrix}$$

This gives us a binary 0 or 1 error result based on a misclassification. The average test error for the test set is:

$$\text{Test Error} = \frac{1}{m_{test}} \sum_{i=1}^{m_{test}} err(h_{\Theta}(x_{test}^{(i)}), y_{test}^{(i)})$$

This gives us the proportion of the test data that was misclassified.

✓ Complete

Go to next item