Evaluating a Learning Algorithm

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

Reading: Deciding What to do Next Revisited
3 min

Review

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

Model Selection and Train/Validation/Test Sets

Just because a learning algorithm fits a training set well, that does not mean it is a good hypothesis. It could over fit and as a result your predictions on the test set would be poor. The error of your hypothesis as measured on the data set with which you trained the parameters will be lower than the error on any other data set.

Given many models with different polynomial degrees, we can use a systematic approach to identify the 'best' function. In order to choose the model of your hypothesis, you can test each degree of polynomial and look at the error result.

One way to break down our dataset into the three sets is:

- Training set: 60%
- Cross validation set: 20%
- Test set: 20%

We can now calculate three separate error values for the three different sets using the following method:

1. Optimize the parameters in Θ using the training set for each polynomial degree.
2. Find the polynomial degree d with the least error using the cross validation set.
3. Estimate the generalization error using the test set with $J_{test}(\Theta^{(d)})$, (d = theta from polynomial with lower error);

This way, the degree of the polynomial d has not been trained using the test set.

✓ Complete

Go to next item