



## Evaluating a Learning Algorithm

### Bias vs. Variance

- ✓ **Video:** Diagnosing Bias vs. Variance  
7 min
- ✓ **Reading:** Diagnosing Bias vs. Variance  
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- ✓ **Video:** Regularization and Bias/Variance  
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- ✓ **Reading:** Regularization and Bias/Variance  
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- ✓ **Video:** Learning Curves  
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- ✓ **Reading:** Deciding What to do Next Revisited  
3 min

### Review

### Building a Spam Classifier

### Handling Skewed Data

### Using Large Data Sets

### Review



# Deciding What to Do Next Revisited

Our decision process can be broken down as follows:

- **Getting more training examples:** Fixes high variance
- **Trying smaller sets of features:** Fixes high variance
- **Adding features:** Fixes high bias
- **Adding polynomial features:** Fixes high bias
- **Decreasing  $\lambda$ :** Fixes high bias
- **Increasing  $\lambda$ :** Fixes high variance.

## Diagnosing Neural Networks

- A neural network with fewer parameters is **prone to underfitting**. It is also **computationally cheaper**.
- A large neural network with more parameters is **prone to overfitting**. It is also **computationally expensive**. In this case you can use regularization (increase  $\lambda$ ) to address the overfitting.

Using a single hidden layer is a good starting default. You can train your neural network on a number of hidden layers using your cross validation set. You can then select the one that performs best.

## Model Complexity Effects: