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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 λ: Fixes high bias
- Increasing λ: 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 λ) 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:

- Lower-order polynomials (low model complexity) have high bias and low variance. In this case, the model fits poorly consistently.
- Higher-order polynomials (high model complexity) fit the training data extremely well and the test data extremely poorly. These have low bias on the training data, but very high variance.
- In reality, we would want to choose a model somewhere in between, that can generalize well but also fits the data reasonably well.

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