Sample title

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Overview

1. Q1: Bias–variance tradeoff
2. Q2: Hastie and Tibshirani

Bias-Variance Trade-Off

Bias Error

- Also called 'Overfitting'

Variance

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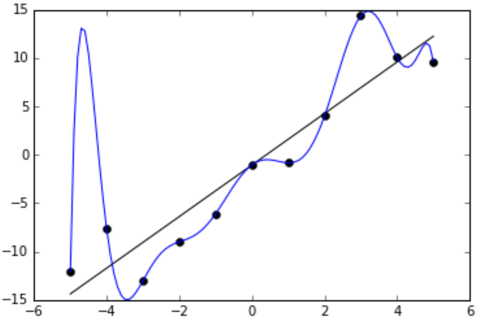

Bias-Variance Trade-Off

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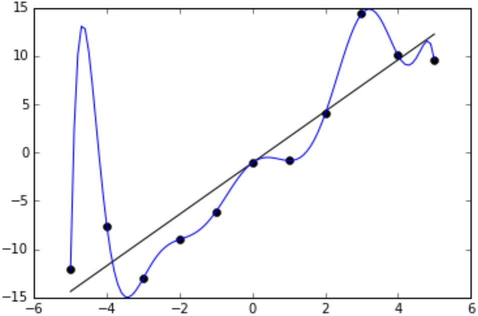
- Predicts test data too well

Variance

- Also called 'Underfitting'



Bias-Variance Trade-Off

Bias Error

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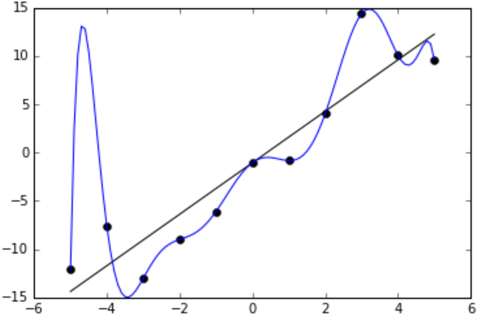
- Predicts test data too well

Variance

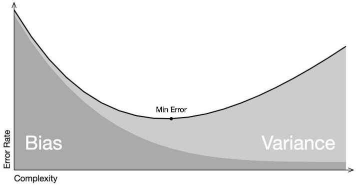
- Also called 'Underfitting'
- Generalizes too well



Bias-Variance Trade-Off

- Aiming for the lowest total error typically means finding a "middle-ground"
- A common technique for this is determining the minimum *mean squared error.*

$$\mathrm{MSE} = \left(E\left[\hat{f}(x)\right] - f(x)\right)^2 + E\left[\left(\hat{f}(x) - E\left[\hat{f}(x)\right]\right)^2\right] + \sigma_e^2$$
$$= \mathrm{Bias}^2 + \mathrm{Variance} + \text{Irreducible Error}$$



Hastie Lectures

- Statistical Learning and Regression
- Dimensionality and Parametric Models
- Assessing Model Accuracy and Bias-Variance Trade-Off
- Classification Problems and K-Nearest Neighbors

Statistical Learning and Regression

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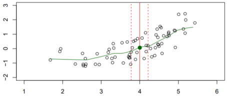

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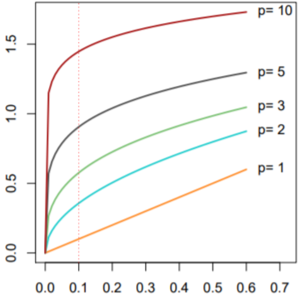

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- Structured models allowed allow flexible adjustment to obtain preferred level of fitting

Assessing Model Accuracy and Bias-Variance Trade-Off

Classification Problems and K-Nearest Neighbors