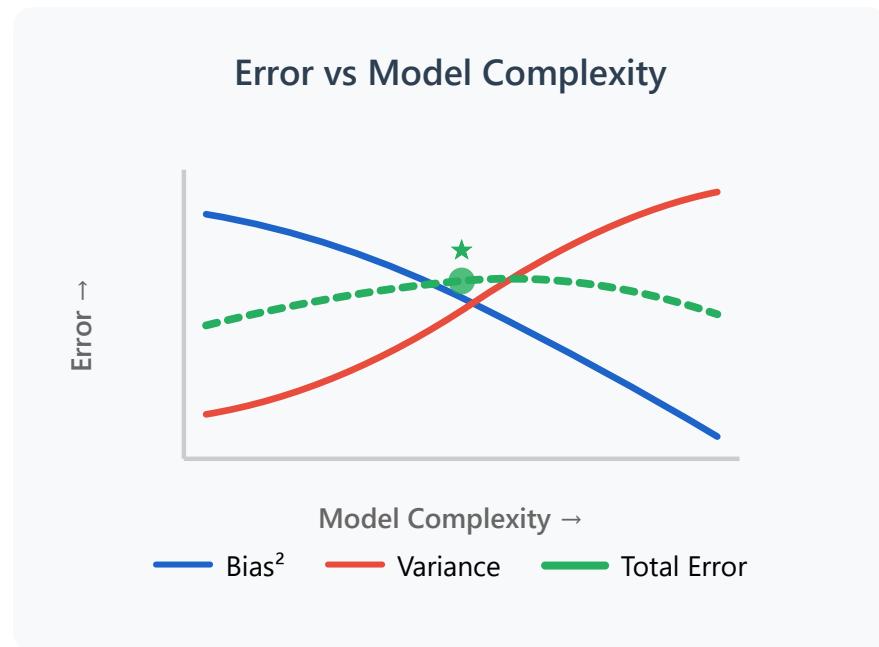


Bias-Variance Tradeoff



Bias

Error from oversimplified assumptions in the model
→ *High bias leads to underfitting (too rigid)*

Variance

Error from sensitivity to training data fluctuations
→ *High variance leads to overfitting (too flexible)*



Goal: Minimize both bias and variance simultaneously

Total Error Decomposition

$$\text{Total Error} = \text{Bias}^2 + \text{Variance} + \text{Irreducible Error}$$