Formalizing Bias Variance Trade-Off

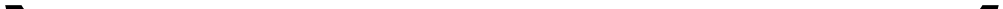
[try it out: https://floswald.shinyapps.io/bias_variance/]

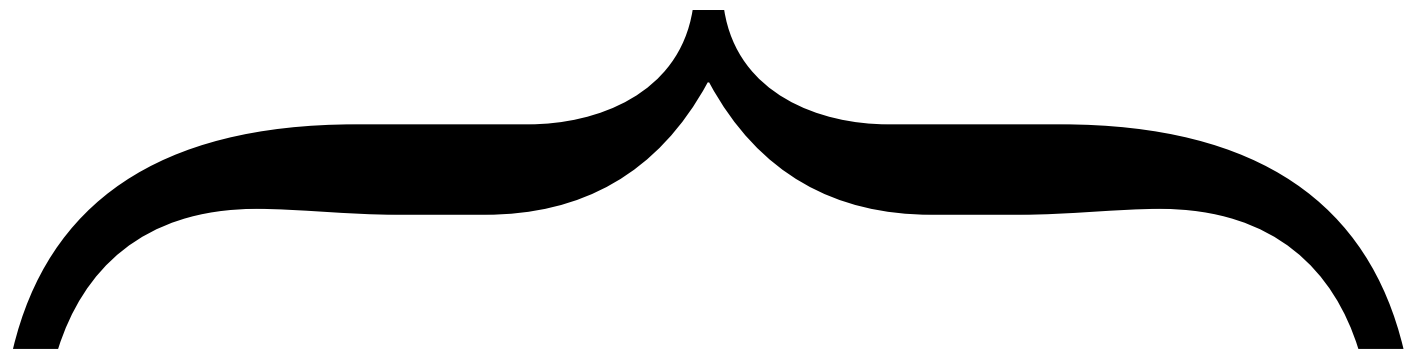
Expected **test MSE**

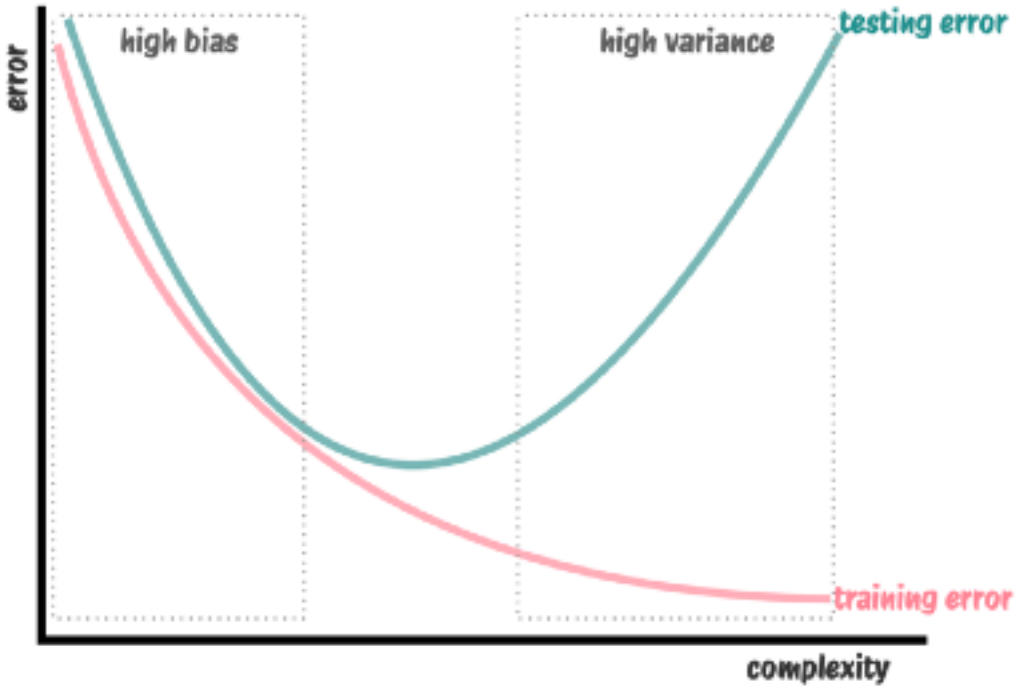
$$E\left(y_0 - \hat{f}(x_0)\right)^2 = \text{Var}(\hat{f}(x_0)) + \left[\text{bias}(\hat{f}(x_0))\right]^2 + \text{Var}(\epsilon)$$

expected MSE at x_0 if we repeatedly estimated $f(x)$ with different training sets

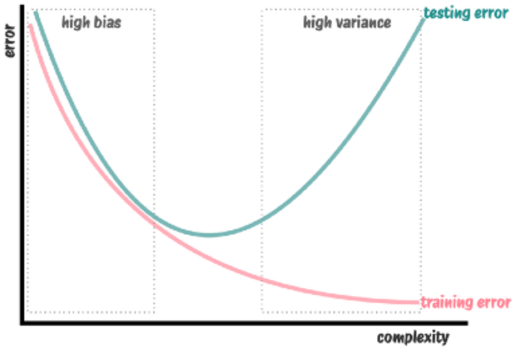
irreducible error






error
high bias
high variance
testing error
training error
complexity

Formalizing Bias Variance Trade-Off



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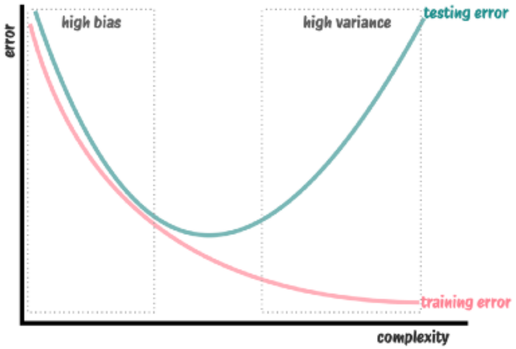

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