Computational Statistics

08.03 and 09.03, 2018
ISLR Figure 2.9: Underlying function (black) moderately nonlinear

Gray: training MSE, Red: Test MSE
ISLR Figure 2.10: Underlying function (black) slightly nonlinear

Gray: training MSE, Red: Test MSE
ISLR Figure 2.11: underlying function (black) is highly nonlinear

Gray: training MSE, Red: Test MSE
ISLR Figure 2.12: Bias-variance decomposition for the three previous scenarios
FIGURE 3.16. Plots of \( \hat{f}(X) \) using KNN regression on a two-dimensional data set with 64 observations (orange dots). Left: \( K = 1 \) results in a rough step function fit. Right: \( K = 9 \) produces a much smoother fit.
Dashed horizontal line corresponds to linear regression; Green line to KNN
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**FIGURE 3.20.** Test MSE for linear regression (black dashed lines) and KNN (green curves) as the number of variables $p$ increases. The true function is nonlinear in the first variable, as in the lower panel in Figure 3.19, and does not depend on the additional variables. The performance of linear regression deteriorates slowly in the presence of these additional noise variables, whereas KNN's performance degrades much more quickly as $p$ increases.
Literature

- Figures have been taken from "An Introduction to Statistical Learning, with applications in R" (Springer, 2013) with permission from the authors: G. James, D. Witten, T. Hastie and R. Tibshirani"