Homework 1

ST 697 | Fall 2017

Due: Sept 7

Problem 1.1: To Explain or To Predict

Read the paper: Shmueli (2010). "To Explain Or To Predict", *Statistical Science*, 25(3), 289–310.

- In your own words, briefly describe the difference between descriptive, explanatory, and predictive modeling.
- Contrast how models are usually evaluated under the different modeling perspectives.

Problem 1.2: Simulation

Write pseudocode to recreate the simulation described in ESL Section 2.3.3 and Figure 2.4 (ESL pg 17). HERE is an example of pseudocode.

Problem 1.3: Exercise 2.2 (ESL pg 39)

Problem 1.4: Exercise 2.8 (ESL pg 40)

Problem 1.5: Exercise 2.9 (ESL pg 40)

Problem 1.6: Bayes Classifier

Consider a binary classification situation, where $Y \in \{0, 1\}$. Consider the $0-1$ loss $L(Y, f(X)) = I(Y \neq f(X))$. Find the value of $f(x)$ that minimizes the **risk** $(\mathcal{R}_x(f) = \mathbb{E}_Y[I(Y \neq f(x))|X = x])$ for a particular (fixed) value of x.