

WS #14 - Variance + Bias

Wednesday, October 29, 2025

Math 154 - Jo Hardin

Your Name: _____

Names of people you worked with: _____

What is your favorite place to hang out on the 5Cs?

Task:

Bias in a model happens when the model is too simple and doesn't quite capture the true (more complicated) model.

Variance in a model happens when the model is too complicated because it over fits the training data.

The two questions below are about the **model** (not about the data, test, training, etc.).

1. For k -NN, what would lead to a more biased model? What would lead to a higher variance model? (Hint: think about what you can control.)
2. For CART, what would lead to a more biased model? What would lead to a higher variance model? (Hint: think about what you can control.)

Solution:

1. $k = n$ would be more biased, $k = 1$ would be higher variance.
2. One split would be more biased (α huge), as many splits as possible (each observation in its own terminal node) (α tiny) would be higher variance.