Class Notes

Statistical Computing & Machine Learning

Class 8

Review

The Price is Right!

The Price is Right is a game show in which contestants compete to guess the price of a prize. The winner is the person whose guess is closest to the actual price considering just those contestants who guesses a price less than or equal to the actual price.

Strategy:

1. First person to guess: an honest guess, hedged on the low side.
2. Second person: bias guess to be far from the first person's guess.
3. Third person:
4. Fourth person: Zero, or just above one of the other guesses.

Play this game. Call down 4 contestants. What's the price of this yacht?

Now, suppose rather than being a strategic game biased toward the last guesser, we wanted to evaluate political prognosticators. The winner should be the person who makes the best prediction rather than the best guess.

Game: Predict the results of the Ukrainian Parliament's vote of no confidence in Prime Minister Arseniy Yatsenyuk. How many votes for no confidence were there.

(Actual result for you to compare your prediction to: one-hundred ninety-four out of three-hundred thirty-nine.)

1. Play this game asking people to draw the probability distribution of their prediction. Who won. How to evaluate the predictions?

2. Suppose you know something about the contestants.

   - David Moore from International Studies
   - Gary Krueger from Economics
   - Sybill Trelawney from Divination Science
   - Jesse Ventura from Political Science

From likelihood to Bayes

Multiply likelihood by prior probability.

What is Bayesian Statistics?

Emphasize the choice of what detail of the sampling model to use. Just this school in isolation? This school as the max of 1000 schools?

Choosing models using maximum likelihood

Straight line model:

Gaussian errors: $f(x \mid \mu, \sigma) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$

What happens when you take the log ... why it's sum of squares.

Question: What about minimizing the absolute value of the residuals, rather than the square?

In-class programming activity

Likelihood calculations II link