Learning Objectives

Upon successful completion of Module 2, you will be able to:

• Understand the likelihood function.

• Understand the meaning and interpretation of a frequentist confidence interval.

• Compute a confidence interval for a Bernoulli or binomial outcome.

• Compute a maximum likelihood estimate in simple cases.

• Compute a posterior from a prior and a Bernoulli or binomial likelihood.

• Understand the posterior as a representation of information and uncertainty.

• Understand the meaning and interpretation of a Bayesian posterior interval.

Assignments

This module has three required quizzes and an honors quiz. A score of 75% is required to pass. Quizzes can be attempted up to four times in an eight-hour period.

Additional Materials

In addition to regular lectures and quizzes, this module includes the following materials.

Lesson 4: Frequentist inference

Not likely Very likely

• Background reading: This required reading reviews product notation, properties of exponents and logarithms, and notation for function maximization. Each is essential to working with likelihood functions.

• Introduction to R: This background lecture introduces R and demonstrates some functions for basic calculations and plotting.

• Plotting a likelihood: This optional lecture demonstrates plotting a likelihood function in Excel (and R).

• Supplementary reading: This optional reading provides some additional insight into maximizing the likelihood by differentiation, and combining indicator functions in products.

Lesson 5: Bayesian inference

• Background reading: This reviews the cumulative distribution and quantile functions for random variables, and shows how to evaluate these functions in Excel and R. These functions will be necessary to evaluate complicated integrals required for posterior probabilities and intervals.

• Supplementary reading: This optional reading elaborates on why Bayesian computations typically begin with likelihood×prior and why we usually work with the posterior up to a proportionality constant.

• Discussion prompt: Read what your peers have to say about the prompt and share your ideas on the discussion board.

Mark as completed