Presentation

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Applied Bayes

This lecture is practical excercise with Bayesian statistics and how to do it in R (RStudio). Accompanig code will be provided before the lecture. You should install latest version of R and RStudio before the lecture. Also run the provided script and possibly solve all errors.

1. Introduction

1.1 Why R and RStudio?

To be Stay reproducible!

1.2 Why Bayes?

Bayes theorem

$$P(\theta \mid y) = \frac{P(\theta)P(y|\theta))}{P(y)}$$

The equation solves the problem of updating prior information about parameters by actually observed data to obtain posterior knowledge. Solves everyday questions like probability of rain or which theory is more likely to explain observed phenomenon (brest cancer, marble problem).

Bayesians are (more or less) ok with:

Using prior knowledge
Low sample size (rare species, lots of NAs, expensive sampling)
Multiple comparisons (Geldman et al., 2012)

Upside

More meaningful inferences (only exact way how to draw inferences for generalized mixed models (Bolker et al., 2008))

Downside

Choosing a prior
Priors can disproportionaly influence the posterior
Computation heavy (less problem now)