

STAT 491 Project

Project Overview

Intro to Bayesian statistics has a course project worth 20% of the final grade. The project will be completed individually on a dataset of the student's choosing. The project should follow the five steps of a Bayesian analysis from DBDA:

1. Identify the data relevant to the research question(s).
2. Define a descriptive model for the relevant data.
3. Specify a prior distribution on the parameters.
4. Use Bayesian inference to re-allocate probability across parameter values.
5. Check that the posterior predictions mimic the data with reasonable accuracy.

Furthermore, while this class is a Bayesian statistics course, it is also a course on statistical modeling in general. When conducting analyses remember the following QQQ framework:

- **Qualitative:** Define and describe the research question without using statistical lingo in the language of the specified domain. In a collaborative setting, this step is typically done with a collaborator with expertise in a scientific area.
- **Quantitative:** Perform the analysis - 5 steps listed above.
- **Qualitative:** Translate the statistical results (posterior in this case) and make inferences in the language of the specified domain.

All written documents will be completed through R Markdown to enable reproducibility.

Evaluation

Complete rubrics for the presentation and written project summary will be provided in future weeks.

- Oral Project Presentation: 40%
- Written Project Summary: 50%
- Peer Feedback: 10%

Checkpoints

There will be periodic homework assignments that will require intermediate work on your project.

- Week of April 18th: Project Presentations:
 - 5 to 7 minute oral presentation of your work.
- Week of April 25th: Project Summary due

Written Project Summary The written project will be the final report that continues to build upon the intermediate project summary. The report should have the following sections (or similar):

1. Introduction
2. Data
3. Statistical Model with Priors
4. Results - Discuss convergence of your MCMC, and results of the statistical models
5. Discussion - this is the last qualitative section, translate statistical results to context of the problem.

Oral Project Presentation The oral projects will be during the week of April 18th. Each student, or group of students, will have approximately 7 minutes to describe their work. Note: this will not be enough time to discuss the project in great detail, but should give classmates a sense of what was done with the project and what the findings were.

Peer Feedback Throughout the course of the project you will be asked to evaluate classmates writing and/or presentations. Thoughtful, and respectful, comments will be expected as part of this component.