
MATH 640: Bayesian Statistics

Final Project, due May 12

Instructions

1. The final project consists of two components: a paper and an oral presentation
2. Due to time constraints, there will be 4 groups (3 groups of 3, one group of 2) with group sign-ups will occur by **February 14** at the start of class, so find some mates or I will randomly assign your groups during class
3. Topics will be selected on **February 14** as well. Topics to choose from:
 - Sampling variance components from truncated normals
 - Cut-point sampling in ordinal regression
 - Random effect priors in binary longitudinal models
 - Convergence diagnostic alternatives
 - Joint Gamma and Beta conjugate prior distributions
 - Robust linear regression for continuous outcomes
4. The project will include at least one MCMC procedure (either a Gibbs sampler, Metropolis Algorithm, or Metropolis-Hastings Algorithm—from later in the course), most will involve the analysis of real data
5. The paper is due during the final exam period, **Friday, May 12 no later than 9:00pm**
6. The presentation takes place during the final exam period, **Friday, May 12 between 7:00pm 9:00pm**

Paper

Your group will prepare a written report whose main body must be no more than four pages in length. The report must follow the style guide and must be written assuming the reader is unfamiliar with both the problem and the data, thus sufficient background should be provided. Models do not need to be fully derived in the main body of the report, but should be fully derived in the appendix (again, follow the style guide here). In the text, you should at least report the likelihood, priors, and relevant posteriors. Some of you may design and run small empirical simulations, these should be described as well. References should also be included, particularly for any complimentary literature as well as for your data source and any additional background information. The reference section is not counted toward the page limit and should come after the discussion, but before the appendix. All code must be included in a separate file alongside the proposal and referenced in a Code appendix as well, at the very end. Do not include code inline with the text of the document.

Presentation

On the day of the final, each group will give a 25 to 30 minute presentation with each group member speaking approximately the same amount of time. The format of the presentation is up to you, however you should be sure to introduce the project, provide background detail, define your models, and present and interpret your results.

Grade Breakdown

The paper is worth 105 points while the presentation is worth 52 points for a total Final Project score out of 157 points. The score for the paper will consist of five components: the introduction (20 points), methods section (20 points), results section (20 points), discussion section (20 points), and style (15 points). The appendices and code are each worth 5 points. The score for the presentation will depend on three criteria: overall clarity (14 points), accessibility for the rest of the class (14 points), description of the methods (14 points), and time (10 points).