STA 360/602L: Module 0.1

Course overview

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Welcome to STA 360/602L!

What is this course about?

 Learn the foundations of Bayesian inference.

 Work through the theory of several Bayesian models.

 Use Bayesian models to answer inferential questions.

 Apply the models to several different problem sets.

 "Prior → likelihood → posterior" over and over again!

 We will follow the Hoff book closely – roughly two chapters per week.

A Bayesian version will usually make things better...

– Andrew Gelman.

Instructor

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FAQs

All materials and information will be posted on the course webpage:

https://sta-360-602l-su20.github.io/Course-Website/

- How much theory will this class cover? A lot! Make sure you are especially comfortable working with probability distributions.
- Am I prepared to take this course? Yes, if you are familiar with the topics covered in the course prerequisites.
- Will we be doing "very heavy" computing? Not too heavy but yes, a good amount. You will be expected to be able to write your own MCMC sampler later on.
- What computing language will we use? R!
- What if I don't know R? This course assumes you already know R but you can still learn on the fly (you must be self-motivated). Here are some resources for you: https://sta-360-602l-su20.github.io/Course-Website/resources/.

FAQs

- What if I can't remember the topics in the prerequisites?

  1. Review Chapters 1 to 5 of the Casella and Berger book
  2. You can find the solution manual here
  3. Focus on the following topics:
     - basic probability theory, random variables, transformations of random variables, expectations of random variables, common families of probability distribution functions including multivariate distributions
     - concepts of convergence, principles of statistical inference, likelihood based inference, sampling distributions and hypothesis testing.

Course structure and policies

Course structure and policies

- All on the website (here: https://sta-360-602l-su20.github.io/Course-Website/policies/)
- Make use of the teaching team's office hours, we're here to help!
- Do not hesitate to come to my online office hours or you can also make an appointment to discuss a homework problem or any aspect of the course.
- When the teaching team has announcements for you we will send an email to your Duke email address. Please make sure to check your email daily.
- Try as much as possible to refrain from texting or using your computer for anything other than coursework while watching the lecture videos and during discussion sessions.

Other details

- What topics will we cover? Refer to Section 11 of the syllabus (here: STA 360 Syllabus or STA 602L Syllabus).
- Also refer to the schedule on the website for updated breakdown of the courses. Remember to refresh the page frequently. See here: Class Schedule.
- If you are auditing this course, remember to complete the necessary audit forms.
- Confirm that you have access to Sakai, Piazza and Gradescope.

Other details

Finally, here are some readings to keep you busy. Make sure to glance through them within the next week or so.

1. Efron, B., 1986. Why isn't everyone a Bayesian?. The American Statistician, 40(1), pp. 1-5.
2. Gelman, A., 2008. Objections to Bayesian statistics. Bayesian Analysis, 3(3), pp. 445-449.
3. Diaconis, P., 1977. Finite forms of de Finetti's theorem on exchangeability. Synthese, 36(2), pp. 271-281.
4. Gelman, A., Meng, X. L. and Stern, H., 1996. Posterior predictive assessment of model fitness via realized discrepancies. Statistica sinica, pp. 733-760.
5. Dunson, D. B., 2018. Statistics in the big data era: Failures of the machine. Statistics & Probability Letters, 136, pp. 4-9.

What's next?

Move on to the readings for the next module!