Stat-X498/S690: Statistical Consulting

Meeting time: Tu 3:55-6:25pm — Meeting location: SE220
Website: http://jfukuyama.github.io/teaching/stat690

Instructor: Prof. Julia Fukuyama — jfukuyam at iu dot edu
Office hours: Mondays and Fridays, 12:45-1:45pm — Swain East 225

1 Course description

The objectives of this course are to allow students to practice the following skills:

- Translating client requests into statistical analysis plans.
- Implementing analysis plans.
- Communicating results verbally, in writing, and graphically.

Weeks 2-13 will focus primarily on the first two objectives through a series of mock consulting projects. Each student will lead one project, with the class collaborating on the analysis plan and implementation.

Each project will have three stages:

- **Stage 1 (Week n, in class)**: The professor will act as the client, and the project leader will act as the consultant in a simulated client meeting. By the end of this meeting, the consultant should be able to articulate the client's question and the client's understanding of the data-generating process.
- **Stage 2 (Between weeks n and n+1, at home)**: The project leader develops an analysis plan to present and defend in the next class. They may also try out elements of their proposed analysis. Meanwhile, every other student must submit at least one analysis suggestion for the project.
- **Stage 3 (Week n+1, in class)**: The student leader presents and defends an analysis plan. To facilitate discussion with the class, this will be done without slides. Paper notes are acceptable. We will discuss this plan, along with the other students' suggestions, focusing on the rationale, how well aligned the project is with the client's question, and whether the analysis accords with the data-generating process. Once a plan is agreed upon, we will implement as much of the analysis as possible in R. This will include exploratory analysis, data quality checks, data processing, and model fitting or hypothesis testing. The project leader will guide this process, with input and questions from the class and professor.

Overall, there will be not be a huge amount of work to do outside of class, but I expect the actual class time to be challenging. I also realize that students bring different backgrounds and knowledge bases. You will not be expected to know exactly what to do for every project, although I am going to take students' backgrounds into consideration when assigning projects. At times, we may need to research models or strategies together in class if our prior coursework has not covered the tools required. This is fine, and to be expected.

If you want to practice, you can tell your favorite LLM how the course is set up and ask it to be the professor/client for you.

Weeks 14 and 15 (the two weeks after Thanksgiving) will be devoted to presentations of your final projects. The goal is to give you practice verbally describing the results of your analysis.

2 Course schedule

- Week 1: Introductions, syllabus, talking about chatGPT. Talk through the consulting skeleton. Project 1 initial client meeting.
- Weeks 2-13: Mock projects
- Weeks 14-15: Final presentations

3 Assessment

Grades will be based on:

- Participation: 50%, split evenly between your day and contributing on others' days. For the project on which you are the leader, you will be graded on how well you perform on the elements of the consulting skeleton. For the other days, you are expected to provide suggestions and comments for the analysis. This can be either conceptual or it can have to do with implementation.
- Final presentation: 15%, scheduled for the last two weeks of class.
- Final project writeup: 35%, due Friday, December 19 (the day that is scheduled for our final exam). There will be no final exam, only the writeup for the project. You are not prohibited from using generative AI, but points will be taken off for every incorrect statement present in the report. Based on past experience, I expect that if you turn in something that was generated by chatGPT without doing some very thorough vetting, this policy will put you in negative points territory. Be sure to only write things that you really believe are true.