APPLICATION PROJECT 1

Overview

The statistics ideas and techniques you are studying this semester have applications in a variety of fields. Learning about the ways in which mathematical ideas are applied to problems from other disciplines is one of the goals of this course. To that end, you will be required to complete a two-part application project during the semester.

Your application project should demonstrate your understanding of a particular data-centric problem from the engineering sciences (or other discipline), data visualization tools useful for exploring that problem, the statistical concepts and techniques that can be used to solve the problem, and the ways in which mathematical modes of thought are brought to bear on the problem.

Please note that you must work in teams of three on these projects. You are responsible for sharing the workload with your teammates fairly. I have three reasons for this policy: (1) the quality of your work will likely be greater than it be if you worked alone, (2) developing collaboration skills is a valuable learning goal for this project, and (3) having fewer projects to grade (and provide feedback on) makes it feasible for me to implement this very important assignment in this course.

Part 1 - Proposal

For the first part of your application project, your team will describe a particular problem from the engineering sciences or other discipline that can be addressed through the primary statistical techniques we are studying this semester—namely, confidence intervals and hypothesis testing, and linear regression. Your team should not attempt to use these techniques to actually solve the problem you describe in this part of the project. However, you should pose one or more interesting questions relevant to your problem and make the case that these techniques could help someone answer those questions. You should include any data relevant to the problem you choose—or instructions for how someone could obtain such data.

This first part of your project will take the form of a 500-to-700-word post on the course blog. I'll upgrade one member of each team to "contributor" status on the blog so that s/he can post your work. Although I'll be the one grading your project proposal, it will be available here on the blog for everyone to read, so write accordingly. In particular, I expect you to use APA Style for your citations and references.

You will be graded on the extent to which the problem you describe is a reasonable application of the statistical techniques covered in this course, as well as on the clarity of your writing. Grammar and presentation will be factored into your grade to a lesser extent. This first part of your project will count for 30% of your overall project grade. It is due as a "draft" post on the course blog by the start of class on Monday, March 26th.

Part 2 - Infographic

For the second part of your application project, your team will implement the project you proposed in part one and design an infographic (to be posted on the course blog) that communicates the following:

- The context of your chosen problem, along with the particular questions you set out to answer,
- The mathematical model used to answer those questions, along with any appropriate assumptions made, and
- The analysis of the mathematics used to answer your questions, connecting the statistical results to the context of the problem.

You should use appropriate data visualizations and other visual elements (colors, shapes, lines, typography, whitespace, and so on) in ways that enhance your infographic's potential for communicating your work on the project. Your infographic can be any size or shape, but it must be of sufficient resolution to display well on the course blog.

Your infographic should be designed so as to make sense to a fellow student in Math 216. Thus, you may assume that your audience is familiar with the material we have covered together as a class this semester.

You'll need to use some software for this project. You're welcome to use any statistics or design software you like, but know that if you use R/RStudio, Excel, PowerPoint, or Prezi, I'll be able to help you with technical questions.

Additionally, your team should submit a 400-to-600-word "designer's statement" to me. This statement will not be posted to the blog, but it will be considered alongside your infographic during grading. Your designer's statement should address the following questions:

1. How do you think the visual elements of your infographic helped you communicate your project?
2. What aspects of your project were most challenging to communicate in your infographic?
3. What advice would you give future Math 216 students for completing the application project successfully?

You will be graded not only on the content of your project (the questions you address, the methods you use, the assumptions you make), but also on the clarity of your infographic in communicating that content visually. See the application project rubric (forthcoming) for details. This second part of your project will count for 70% of your overall project grade. It is due as a "draft" post on the course blog by the start of class on Monday, April 23rd.

Note: If you proposed a project in "part one" that isn't actually feasible, then you may, with my permission, implement one of the projects proposed by the other teams.

(Hat tip to Sidneyeve Matrix of Queen's University for sharing her infographic assignment, upon which this assignment was based.)

Academic Integrity

You must cite your sources appropriately, using APA Style for your project proposal and (as best you can) your infographic. It should be clear from your citations how you used the ideas, words, analyses, and data of others. Whatever else you do, do not plagiarize! If your life is falling apart and you're tempted to plagiarize to save time or get a good grade, please see me instead. I would rather grant you an extension than send you before the Honor Council for plagiarism—but I will send you to the Honor Council if it comes to that.