Final Project

Research Methods

November 19, 2018

The goal of this project is to solidify your understanding of research and statistical methods. For this project, you will postulate a research question, collect data, and analyze it to answer your research question. Your study has to incorporate all of the elements we discussed in Research Methods and Statistics modules in the program.

The topic can be related to your work, or simply a topic which you are curious about. I encourage you to do a literature review and find relevant papers that support the importance of your problem and discuss previous or similar analysis in this area. You can collect your data from a survey (of your classmates, colleagues, friends, etc.) or experiment.

The project consists of two parts: (1) a 20-min demo (in-class or via WebEx) (2) a 3-4 page final paper, written in the IEEE format.

1 Project Demo (12/01/18, 3:00-4:00 p.m. and 12/04/18, 6:00-7:00 pm)

Each group will do a 15-minute demo (either in person or via WebEx where you'll share your screen), explain your methodology employed in the project, justify the choices made, and analyze your results.

2 Final Paper (Due on 12/07/18 at 11:30 p.m. sharp)

Treat this paper as a piece of technical writing. i.e. keep your sentences concise and as specific as possible. Avoid passive tense. Sentences with active voice appear clearer, stronger, and more convincing. Your paper should be cohesive with a seamless flow. It should not come across disjoint as if there were different authors for different sections. Proofread your paper and check for typos and grammatical errors.

Your paper should contain the following sections:

2.1 Abstract

The abstract is a summary of the key points of your work. You may find it easier to write this section after you are done with your paper.

2.2 Introduction

Outline the problem and its importance. Explain your rational for choosing this topic. Provide any required domain-specific background. Provide a literature review. Summarize previous approaches to this problem or problems similar to this if applicable.

Explain the objective of your study, and state the null and alternative hypothesis that you will test to answer your research question.

2.3 Dataset

Describe where and how you collected the data. Describe the sample and the techniques you used in data collection. i.e. simple, strata, convenience, quota, etc.. Define the dependent and independent variables and their scale of measurement. Explain any pre-prosessing you have performed on the dataset, if any.

2.4 Methodology

Describe how you employed R for exploratory data analysis to identify relationships between variables in your data set, how you applied linear and/or nonlinear regression models, how you assessed the validity of a proposed linear model and adjust for the violation of key model assumptions or the presence of unimportant variables, etc.

2.5 Results and Discussion

Report the results of your analysis, providing appropriate tables/plots/figures. Compare your results with previous work if applicable. Discuss and interpret your findings to reach the main conclusions of your work. (You can present Results and Discussion in two different sections if it fits the style of your paper better.)

2.6 Conclusion

Assess the limitations of your research. Comment on internal and external validity of your findings. Discuss what you have contributed. Suggest topics for further work.

2.7 References

Make sure to follow the IEEE formatting guidelines.

3 Grading

Your grade will be based on the factors listed below. To get full credit for each section, make sure you address every point as described in Section 2.

- Abstract (2 points)
- Introduction (4 points)

- Dataset (4 points)
- Methodology (10 points)
- Results and Discussion (15 points)
- Conclusion (4 points)
- References (4 points)
- Quality of your technical writing. (Please proofread your paper). (4 points)
- Length of your paper (It must be between 3 to 4 pages). (4 points)
- Correct formatting. (4 points)