Final Reflection Assignment for Stat 495 **Due: Saturday, Dec. 17th by 11:59 pm**

Worksheet

Consider your Hmk 5 submission as a portfolio piece. Review it briefly / skim over it.

1. Which of the following statistical skills are you practicing, applying, and/or demonstrating in this portfolio piece?

Descriptive Statistics
Exploratory Data Analysis
Design
Model Assessment (Comparison)
Estimation
Other Statistical Methods
Appropriate Graphical Displays
Regression (of any kind)
Resampling Methods (Bootstrap, Randomization Tests)
Hypothesis Testing (and Sampling Distributions)
Understanding Variability
Understanding Probability
Working with Statistical Notation / Writing Models

2. Which of the following coding-related skills are you practicing and/or demonstrating in this portfolio piece?

Data wrangling
Reproducible workflow
Good programming practices (comments, organization)
Understanding code syntax

3. Now let's consider communication skills in relation to this portfolio piece. Which of the following are you practicing and/or demonstrating?

Using writing to demonstrate and help develop my understanding of new concepts
Use writing to communicate statistical knowledge and understanding to:
- **A teacher**
- **My classmates / peers**
- A non-expert audience

The ability to make a clear, convincing, coherent, well-organized argument
Present ideas in a logical order with an appropriate narrative thread
Provide sufficient interpretation/explanation of figures/graphics
Provide an appropriate amount of supporting evidence without too much extraneous information
Provide a conclusion that summarizes your findings, their importance and implications, and sets forth proposals for future work

4. What do you consider as the strengths of this portfolio piece?

I had a good organization and had a clear process that a reader could follow. My descriptive analayis and EDA of the variables were also a strength because I included a lot of information and detail.

5. What do you consider as the weaknesses of this portfolio piece?

I think that one of the weaker points of this piece was my model comparison section because I didn't use a lot of comparison techniques and could've picked a final model better.

Consider your final report submission as a portfolio piece. Review it briefly / skim over it.

1. Which of the following statistical skills are you practicing, applying, and/or demonstrating in this portfolio piece?

Descriptive Statistics
Exploratory Data Analysis
Design
Model Assessment (Comparison)
Estimation
Other Statistical Methods
Appropriate Graphical Displays
Regression (of any kind)
Resampling Methods (Bootstrap, Randomization Tests)
Hypothesis Testing (and Sampling Distributions)
Understanding Variability
Understanding Probability
Working with Statistical Notation / Writing Models

2. Which of the following coding-related skills are you practicing and/or demonstrating in this portfolio piece?

Data wrangling
Reproducible workflow
Good programming practices (comments, organization)
Understanding code syntax

3. Now let's consider communication skills in relation to this portfolio piece. Which of the following are you practicing and/or demonstrating?

Using writing to demonstrate and help develop my understanding of new concepts
Use writing to communicate statistical knowledge and understanding to:
- **A teacher**
- **My classmates / peers**
- **A non-expert audience**

The ability to make a clear, convincing, coherent, well-organized argument
Present ideas in a logical order with an appropriate narrative thread
Provide sufficient interpretation/explanation of figures/graphics
Provide an appropriate amount of supporting evidence without too much extraneous information
Provide a conclusion that summarizes your findings, their importance and implications, and sets forth proposals for future work

4. What do you consider as the strengths of this portfolio piece?

I think a strength of the piece was my simulation because I had a clear process that the reader could follow and I explored many different variations and gave a thorough analysis of what occurred.

5. What do you consider as the weaknesses of this portfolio piece?

I think that I could've written more in my exposition, but there was a lot of information that was still difficult for me to grasp after doing research, but I attempted to add as much relevant information as I could.

Review your earlier portfolio work (the prior worksheet, in-class activity, and Hmk1 portfolio reflection) and your stated goals for the course (Readme and reflection) and the responses to the new portfolio pieces above.

1. What skills have you developed or feel you demonstrated well this semester? Do these skills align with your stated goals from earlier this semester?

I think that one of the goals that I had for this semester which I improved on was getting better at statistical communication. In this course, we did a lot of writing and reading papers (this was my first time reading statistical papers), so this really helped me feel better about my writing and being able to communicate my results.

2. Reflect on your journey through the course. What did you learn this semester (through these assignments and our coursework) about statistics, statistical thinking, and writing in statistics?

I think that I learned a lot of interesting modelling techniques and methods that went beyond the previous classes I've taken. The homework and labs were nice because we could practice using the models for training data sets and then see how well the models performed for test sets. I had never done that before, so it definitely gave me a different way to approach statistics. Overall, my writing has gotten better, and I definitely improved on being able to take about statistics in a way that is approachable for non-expert audiences.

3. Describe a moment during the semester where you felt an idea or concept "clicked" for you. What was the idea/concept (statistical or writing related) and what transpired in the moment it "clicked"?

One moment that something really clicked for me was when I was doing research for my final paper. There were lots of complicated notation that felt very overwhelming to me and I was getting stressed out about having to read so many papers. When I broke the notation down into smaller pieces, the notation and concepts "clicked" for me and I was able to understand more of the theory being bootstrapped confidence intervals. By breaking it down, I was able to look and think about more manageable pieces before it got more complicated.

4. We engaged in several activities to support your writing for the report, ranging from class discussions of statistical papers, to trying out SMART goals in class. How did these activities (broadly speaking) inform your writing this semester, particularly on the final paper?

I think that all these activities were beneficial towards my writing because I was able to see examples of what good statistical writing looked like and what could be worked on. By breaking the whole concept of writing a statistical paper into more manageable parts, it was less stressful and more of a enjoyable process. The paper was not as bad as I thought it would be because of how much guidance we received on it.

Letter

Saturday, December 10, 2022

Dear Professor Wagaman,

I hope you are doing well! I had such a great time taking Stat-495, and it was nice to have you as a professor for a second time. My statistics journey through this class has allowed me to improve my skills and gain new ones. The main goals that I set at the start of the semester were 1) improving my analytical writing skills, 2) making a report more engaging, and 3) improving my skills in creating and interpreting different models. I have made significant progress on all of these goals. In particular, doing Homework 5 and the Final paper allowed me to work on my writing skills because we could spend time creating models. However, we also focused on how to write an analysis afterward. This was my first time actually being able to focus on the writing, and it definitely paid off. I particularly enjoyed the activity where we picked apart the paper on the LASSO technique and looked at sections that did things well and could have done better. By doing this, I could get an example of what should be done in a paper and follow that as a guide. I also made progress toward my goal of improving models because we did a lot of assignments that focused exclusively on building models using different modeling techniques. This allowed me to practice making models and testing how they performed and if they needed to have any parameters adjusted.

This year, I learned a lot about statistics but received many takeaways about writing in the statistical community. The first thing I learned about statistical writing is that it is essential to have roadmaps and places in your report to outline what you will be doing in the later sections. This was especially important in my final paper so the reader could follow the process. For example, in the first paragraph of my simulation, I outlined the plan for the whole simulation. This way, the reader could have a rough idea of what would happen. In the simulation, I also gave details that foreshadowed what I

would do next. Another thing that I learned about writing is that it is crucial to know your audience when discussing a specific topic. For example, in Homework 5, our audience was a real-estate developer who did not know much about statistical techniques, so it was essential to give more explanation and details when discussing how we built models and their analysis. On the other hand, the audience for our final paper was our peers and others with some statistical knowledge. Although we gave some background information about topics we had already seen, most of the exposition could focus on new material.

While working on my final paper, the whole process could have been smoother sailing. One challenge that I faced was working on my simulation. At the start of my simulation, I was hesitant to use the "boot" package to create confidence intervals because it did not create an interval for the bias-corrected method. Therefore, I opted to create my own simulation and run each method manually. After implementing this, running the simulation 10,000 times for just one sample size took so long. I attempted to run the simulations overnight, but overall I was having many problems with the speed of it (I even tried running my simulation in parallel), so in the end, I just went back to using the "boot" package. This ran so much quicker. Even though I wasted a couple of days trying to figure out the manual way, I'm happy that I decided my old plan would not work and moved on.

Going into college, I knew that I liked statistics, but I was surprised that I would end up majoring in it. I am so happy that I decided to be a statistics major, and looking back at my portfolio, I can see how much I have grown. My writing has improved dramatically, and I can utilize everything I have learned in previous classes, such as Data Science. My portfolio is definitely incomplete because I still have another year (and a half) of courses that I can take. I want to write more statistical analyses similar to Homework 5 because I find that model analysis really interesting. I am proud of my final paper because it highlights many things I have learned and improved on throughout my journey. In particular, I did my first statistical exposition in which I had to write notation and reference various sources. It was daunting at

first, but I am proud of how it turned out. I plan on taking a couple more statistics courses in the future, although I'm not sure exactly what I want to take. Next semester, I am taking a semester off from statistics. However, I am taking Machine Learning, which will touch on some of the topics we explored in this class, and cryptography in the Math department, which I hope will be very interesting.

This has been a great semester, and I learned so much. I owe many thanks to you, and I'm grateful that you gave us lots to work with and helpful feedback on all the assignments. It was a great help to my learning and experience in this class. Thanks again for a great semester; perhaps I will have you as a professor again in the future!

Best wishes,

Justin