Project   STAT 381, Applied Statistical Methods I, Spring 2015

Overview

You may work individually or in pairs on a project where you pose a question, collect data and conduct statistical inference to reach a conclusion. Contrary to what was stated in the syllabus, there is no requirement to use any particular statistical software. The question you investigate may be related to any of the following:

- An unknown probability or population proportion

- The difference between two population proportions

- An unknown population mean

- The difference in population means between two independent populations

- The mean difference between paired (dependent) members of two populations

- An unknown population variance (or standard deviation)

- Other (there are many many options that are not covered directly in class)

Here are some examples of questions you could look at, but I encourage you to come up with your own.

1. I have a number of bent coins, which I think are biased - are they biased and if so what is the probability of getting a heads when flipped?

2. If have some weirdly shaped dice (e.g. 5-sided, 14 sided). Are they fair? If not, what is the probability of getting a 1 (for example)?

3. People say that when you spin a penny you get tails about 80% of the time. Is that true?

4. Is the average word length in the New Yorker longer than in the Washington Post? If so then by how much?

5. Is some athlete performing better this year than in the past?

6. Do the two individuals in dating relationships have different opinions of how the relationship is going (e.g. scale of 1-10)?

7. Do people have higher blood pressure at the beginning of the week than at the end of the week?

8. Is the average (characteristic) of (some population at UIC) different than the national average?

9. Do math majors spend the same amount of time each week studying as computer science majors?

Project Requirements

The project must be typed! Handwritten papers will not be accepted, and I'm not kidding. You can submit it electronic ally as a PDF, or printed. I encourage you to type it up using LaTeX, but that is up to you. Of course, Microsoft Word is fine. Points will be deducted for sloppy presentation (which includes, among other factors, bad spelling, bad grammar or general lack of clarity). Furthermore, your paper must contain the following content:

1. <u>Introduction and Problem Statement</u> - be specific and explain why you are interested in this question. If necessary, explain what you intend to measure to answer this question (if you are asking about something qualitative and need to turn it into something quantitative).

2. <u>Sampling Procedure/Data Collection</u> - How did you gather data? Give details. Include a brief summary of sample statistics. (Please include all data collected in an appendix, or in a data file to be submitted electronically).

3. <u>Hypothesis Test</u> - You should begin inference by performing a hypothesis test on the parameter of interest.

4. <u>Confidence Interval</u> - construct a confidence interval for the parameter of interest.

5. <u>Conclusion</u> - briefly summarize and interpret your findings, speak to anything that is remarkable, surprising or noteworthy, and what additional questions may be of interest for further study.

6. <u>Appendix</u> - Include data collected, calculations and computations supporting your hypothesis test and confidence interval sections.

7. <u>Workload Breakdown</u> - if you worked in pairs, please include a section where you explain which parts of the project you worked on together and which ones were primarily done by either individual. This will be an important basis for grading.

I ask every individual or team to check in with me by email or in person by April 17 so I can see how things are going and if I can be of any help. Please don't wait too long! You should decide on a question and figure out how you will collect data ASAP! We will cover calculations of confidence intervals and hypothesis testing shortly, but you are encouraged to read ahead in chapters 9 and 10 to get a head start.

Due Date: May 1, 2015
Points Possible: 25