

STAT 450

Essay Assignment: draft of 5 September 2018

- I am asking you to produce a double spaced two page essay in 12 point font on a topic from the list below or one of your own choosing provided you ask me about the topic first. In a sensible font with reasonable margins that comes to about 500 to 700 words I think.
- The goal is to write something that a university educated person could read and understand without having studied statistics – not to write something for another professional statistician.
- I will mark the spelling, grammar, punctuation, flow, and ideas. I am not looking for difficult ideas but I don't want you to say things which are wrong or badly misleading either.
- You are free to ask me to review a draft provided you give it to me on paper or electronically by 6 November.
- The due date is 23 November by e-mail to me by midnight.

Here is a list of possible topics. Some are questions and others assertions with which you might agree or disagree.

1. Why do statisticians do power calculations?
2. Is there one best way to analyse data?
3. Hypothesis tests are a bad idea; confidence intervals are much more meaningful.
4. P -values do not measure the probability that the null hypothesis is true.
5. Hypothesis tests are a good idea.
6. Sufficiency is not a useful concept.
7. Statistics is (or is not) an exact science.

8. What is the role of mathematics in data analysis?
9. What is the difference between frequency theory and Bayesian statistics?
10. What is a model and what is a statistical model?
11. Why do statisticians prefer designed experiments?
12. Why randomize when designing experiments?
13. How does bootstrapping work?
14. Monte Carlo simulation has eliminated the need for theory.
15. Monte Carlo simulation never brings understanding.
16. What does the law of large numbers tell us and how does it work?
17. What does the central limit theorem tell us?
18. Why did statisticians disapprove of the National Household Survey?
19. Why is the previous topic suitable to a theory course?
20. What makes taking a census hard?
21. Why do the Canadian Labour Force Survey and the American Current Population Survey have similar sample sizes even though the US has 10 times the population?
22. The data collection method is irrelevant to the analysis of the data.
23. If I have enough explanatory variables I can predict the response variable perfectly; this will be the usual situation with Big Data in the future.
24. What is Simpson's paradox?