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STAT-326

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Final Portfolio: Reflection Assignment

1. I would both probability and math-stat have been overall great experiences! My interest for these classes started with taking intro statistics, as it was my first stats course and I fell in love with the material. Furthermore, starting with probability I really enjoyed all the concepts, exercises, as well as getting to know the probability distribution sheet. Then for Math-Stat, I found learning about the in-depth derivations, proofs, and concepts on all of the basic ideas we had learned prior in the intro course to be very interesting and somewhat exciting. This is because I truly did not understand the meaning behind certain concepts and equations, especially confidence and power, however, I found that taking math stat and probability really gave me the clarification and understanding that I needed.
2. Overall, I thought all of the topics we learned were taught and explained exceptionally well. One thing I would say I struggled with was understanding some of the concepts with estimators and deciding whether it is bias or not, as well as consistency. My struggle came from understanding some of the algebra along with the expectation rules in solving for them. For me to fully understand these concepts I did extra homework problems involving them while referencing my notes from class to familiarize myself.
3. I feel that with homework’s two and five I felt the most confident with my understanding of the problems, meaning I was able to pick up quickly. Where homework two involved find the likelihood function as well as maximum likelihood, I felt that the examples and exercises were very doable and good problems to have for practice. This part of the semester was valuable to me because not only did it show up throughout rest of the semester, but I really enjoyed to the enjoyed solving those types of problems. For homework five, it includes finding confidence intervals through pivot quantities, then solving for the desired parameter following inequality rules. Furthermore, I feel that this topic where very valuable to me because, it explains how confidences intervals work beyond the equation and computer and can involve more than just a few types of distributions as well. I found this topic particularly interesting.
4. Five years from now I would like to still remember everything we learned is confidence intervals, including pivot quantities and different types. I feel that what we had learned throughout the confidence interval unit to be very useful in ways as well fun. Confidence intervals are very useful measurement that is used to interpret data, in various ways depending on sample size and significance level. Furthermore, with pivot quantities not only does it help one further understand the deeper process of a hypothesis test, but it also opens the possibility to using more distributions than just “t” and normal.
5. Prompt: What theorem or derivation did you most enjoy from the course, and why? Summarize the theorem or derivation and reconstruct its proof or derivation.
   1. The Likelihood function(definition), where it’s a function of theta, given data is… L( θ | x1, x2, …, xn ) = f(x1 | θ ) \* f(x2 | θ ) \* … \* f(xn | θ ) =
   2. Then there was maximizing the likelihood function, the maximum likelihood (MLE). This process consisted of finding the likelihood function with formula above, then we differentiate the function with respect to the desired parameter, in this case theta, then we simplify then set equation equal to zero, and finally solve for the estimators of the parameters.
   3. The reason I enjoyed this theorem the most was because doing the problems felt like doing little math puzzles, and I found it very enjoyable. It also gave me great practice to catch up on some algebra and natural log rules.
6. Prompt: Describe a time when someone (a classmate, myself, or someone else) explained a concept in such a way that made the idea “click” for you. What was the concept, and what was confusing about it? What did the person say/do/explain such the idea clicked? What do you now understand more deeply about the concept?
   1. During the estimator unit, when we covered bias and consistency, I was having hard time understanding the derivations of the expectation rules, as well visualizing the limits for consistency. It took a decent amount of practice and explaining until it finally clicked for me. I would say what helped most was going over simpler version of problems we normally do in order to understand the concept first. Now, I understand how to derive the expectation from the estimators much easier, and for consistency the concept comes much more easily after solidifying my knowledge on bias as consistency utilizes bias for its result.