Optional Tutorial Week 6

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Possible Topics for Today

- Q & A Session
- Hypothesis Testing vs Bootstrap Sampling

Section 1

Q & A Session

Course Materials?

- Assignments
- Project Procedure
- ...

Section 2

Hypothesis Testing vs Bootstrap Sampling

Similarities

- Both bootstrapping and traditional methods use samples to draw inferences about populations.

Characteristics of Hypothesis Testing

- Traditional hypothesis testing procedures require equations that estimate sampling distributions using the properties of the sample data, the experimental design, and a test statistic.
- Requires proper test statistic and certain **assumptions**.
- For example, t-test requires the assumption that the population follows a normal distribution.

Characteristics of Bootstrap Sampling

- This method takes the sample data that a study obtains, and then resamples it over and over to create many simulated samples.
- Each of these simulated samples has its own properties. When you graph the distribution of these means on a histogram, you can observe the sampling distribution of the mean.
- Don't need to worry about test statistics, formulas, and assumptions.
- No new data are created in this process.

Bootstrap Sampling Method

1. The bootstrap method has an equal probability of randomly drawing each original data point for inclusion in the resampled datasets.
2. The procedure can select a data point more than once for a resampled dataset. This property is the "with replacement" aspect of the process.

Assumptions for Bootstrap?

Representative Sample: This method treats the original sample as a proxy for the real population and then draws random samples from it. Consequently, the central assumption for bootstrapping is that the original sample accurately represents the actual population.

Why Bootstrap?

- When it is not feasible to obtain other samples from a population.
- When we do not want to make assumptions about the population distribution.

Reference

Frost, J. (2020, June 12). Introduction to Bootstrapping in Statistics with an Example. Retrieved October 22, 2020, from https://statisticsbyjim.com/hypothesis-testing/bootstrapping/