

IEE 380 Fall 2021 Semester Project

Introduction

Most of IEE 380 is spent reading problems from the text and applying the methods and techniques of the class. Data is provided for you in the problems. However, as working analysts, you may have to collect or generate data. Sometimes this data collection is more time consuming and challenging than the actual statistical analyses that follow.

Objectives

The objectives of this project are to (a) provide students with data collection experience, (b) give students a realistic statistical data analysis experience, (c) improve students' technical writing skills, and (d) demonstrate the Central Limit Theorem with real data.

Directions

The following steps are required to complete the project.

1. Collect at least 150 observations from data of your choice ***except from random number generators***. The observations you collect may be discrete data or continuous data. You can generate or collect the observations yourselves, but you may not use mass emails to the class to do so. The observations comprising your data should be considered a “population” of a random variable, X . Do not sort the observations.
2. Compute the population mean and population standard deviation of the observations. I recommend using Excel, R Studio, or Minitab (on myASU Apps), or another statistical package of your choice.
3. Compute at least 30 point estimates of sample mean, \bar{x} , from this data set by randomly selecting samples of size n . Choose the value for n as either 3, 4, or 5, randomly. For example, if $n=3$ is randomly selected, then \bar{x}_1 will be the average of x_1 , x_2 , and x_3 , \bar{x}_2 will be the average of x_4 , x_5 and x_6 , and so on. You will probably have data leftover. We are trying to simulate random values of the sample mean as best we can. Thirty or more manifestations of the sample mean will suffice as a “population” of \bar{X} . Do not sort the \bar{x}_i values.
4. Compute the population mean and population standard deviation of \bar{X} . We recommend using Excel or another statistical package of your choice.
5. Make a histogram of the x_i values from step 1. Minitab or MATLAB are good choices.
6. Make a histogram of the \bar{x}_i values from step 3.
7. Write up your findings per the organization at the end of this document.
8. Upload your report, as a .docx file, to the semester project submission link in the Project Materials module on Canvas by the due date.

Grading

This project is worth 8% of your course grade. The data quality and analysis accuracy, along with grammar, spelling, organization, and technical writing professionalism will comprise the project grade.

Reviews

Do not send files of your report to me or to any TAs. Instead, complete the report entirely. TAs will be instructed to not participate in a review process of the project. It is your responsibility to determine if you have met the requirements of the project and whether you are correctly implementing the methods discussed in the class.

Report Organization

The report must contain the following major sections. Be sure to include a title page with your name, my name, and the term & semester of the class. Refer to the rubric on Canvas for more details about these sections.

- Project Objectives
- Data Description
- Data
- Histogram, Population Mean, Population Standard Deviation of X
- Histogram, Population Mean, Population Standard Deviation of \bar{X}
- Explanation of the Central Limit Theorem
- References