

## **Group Assignment 1**

The Group Assignment 1 has two parts: **Part A: Data Collection; Part B: Descriptive Analysis of the Data**

### **Part A**

#### **Where on Campus is noisiest?**

In this exercise, each group will collect and analyse data to determine which location on the campus is noisiest. To carry out this exercise, all members of each group would require to download the Physics Toolbox Sensor Suite app on your phone (<https://www.vieyrasoftware.net/>)



There are two data collection scenarios: Groups with odd numbers will study scenario-1, while groups with even numbers will focus on scenario-2.

#### ***Scenario-1: Which student cafeteria is noisier?***

Each group will collect 25 minutes of sound levels with sound level meter in the app downloaded on the phone at three different times of the day (e.g., 8 am, 13pm and 19pm) on four different days of the week (Monday, Wednesday, Thursday, and Friday) from three different campus cafeterias (The Pav, The Buttery, and the Dining Hall).

#### ***Scenario-2: Which campus gate is noisier?***

Each group will collect 25 minutes of sound levels with sound level meter in the app downloaded on the phone at three different times of the day (e.g., 8 am, 13pm and 19pm) on four different days of the week (Tuesday, Wednesday, Saturday, and Sunday) from three campus entrance gates, close to their traffic intersections (College Green/Front Gate, Nassau Street/Nassau Gate, and Pearse Street/Entrance to the Gym).

***Note:*** Make sure to keep your phone unlocked while you do each recording, if the phone locks, you will lose the data before it is saved!

Each group will need to create 300 sound level averages from each 25-minute recordings. The data should be collected with a sampling frequency of 110 Hz. Calculate an average for every 5 seconds of recording. At the end of your data collection and preparation you should have 36 groups (3 locations X 3 times of the day X 4 days of the week) of 300 sound level averages each.

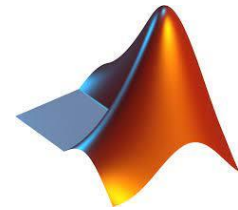
**Data storage:** Each group should collect and store the sound level dataset in .csv format. This file should be submitted on BB. Data should be stored segregated by time of day, day of week and location.

## **Part B**

### **Descriptive Analysis of the Data**

It is recommended that you use Matlab to complete Part B of the assignment.

To carry out the assignment, please import the collected data in Matlab. To read the .csv file, use the [readmatrix function](#).



1. Using the Matlab function “histogram”, plot a histogram of the averaged data samples that has 20 bins and comment on the distribution of each dataset. Mention if each dataset is symmetric or skewed?
2. For each collected data set, mention which measure of centrality is the best choice and why? Mention if you have observed any outliers.
3. Based on the measure of centrality of your choice, comment on the noisiness of each location at different times of the day.
4. Calculate the 5%, 10% and 20% trimmed mean and comment on the measure of centrality of your choice.
5. Find the coefficient of variation for each location at different times of the day and different days of the week. And comment on the spread of the noise level.

Please prepare a pdf file containing the results of part B.

## **Submission**

Each group is required to submit two files, dataset in .csv format and report in .pdf format on or before 3<sup>rd</sup> March, 2024 on BB.

*Note: Teamwork is an essential part of this assignment, thus, make sure to distribute the tasks evenly among team members. Clearly mention the contributions of each team member in your submission. Upon request, your submission may require an interview session.*

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