CSE/EST/ISE 323 HW 3: ANOVA and pairwise t-test

Due: Tuesday, April 27th, 2021 at 11:59 PM

The purpose of this assignment is to understand the basics of statistical significance testing. We are interested in analyzing given datasets and performing pairwise t-test and Analysis of Variance (ANOVA). Please use the R programming language for this assignment.

Tasks :

Imagine that you are conducting user studies to evaluate several types of menus for their performance on navigating. Here, please compute ANOVA and pairwise-t-test for each scenario.

1. The first dataset contains **user id, type of menu** and **task completion time**. There are a total of 40 users, 10 each for a particular menu type. So, there are 4 groups of users and it is a one-way **between-group** design.
    a. ANOVA (**20pts**)
    b. Pairwise-t-test : Simplification – no Adjustment (**20pts**)
2. Second dataset **user id, type of menu, task completion time**. There are a total of 10 users, each user testing each menu type. It's a **within-subject** design.
    a. ANOVA (**20pts**)
    b. Pairwise-t-test : Simplification – no Adjustment (**20pts**)
3. Write a report on what insights you gained from the data after performing the tests. You can go through HCI research papers (e.g. page 9: Results of

the provided paper), especially from the conference CHI 2018-2020, to get an idea of how results are reported in this field.(**20pts**)

Bonus Points :

1. Visualization: For each scenario, you need to report your results using graphs. For this part, you can use any kind of graph plotting library in R. It should be relevant plots that visualize data points, mean, sd, median, etc. You need to include the plots (**10pts**) along with a brief explanation for each plot (**10pts**) in your report (pdf format) to get bonus points.

Note : There are typically three types of pairwise t-tests:
(1) pairwise t-test without adjustment (**`p.adj = "none" in R)`**
(2) pairwise t-test with bonferroni adjustment, (**`p.adj = "bonf" in R)`**
(3) pairwise t-test with holm adjustment (**`p.adj = "holm" in R)`**.
The (1) is the simplest. You should use the approach (1) in this homework.

Submission

This is an individual assignment. Along with the code, you have to submit your .zip file through blackboard, please name your zip file as SBUID_first_last.zip, which includes the folder (e.g. 111122333_Yan_Ma.zip):

SBUID_first_last/

|---q1.R
|---q2.R
|---report.pdf

Don’t submit .rar instead of .zip