Reliability Assignment
Behavioral Research: Statistical Methods
Spring 2024

Instructions

Please read the following instructions carefully before attempting.

1. The dataset for all questions are available at this link. The required sheet name is mentioned in each question. Download the dataset and load in your code accordingly.
2. If you are coding in R, make sure to submit only the pdf file after knitting. File name format should be <Roll Number>_Reliability_Class_Activity.pdf
3. If you are using any other language/software, submit the appropriate file following the same nomenclature.

1 Advert Rating: Outlier Detection

26 participants (labelled A to Z) were asked to rate sentiment of 110 advertisements on a likert scale (-4 to 4). The individual ratings have been provided in Sheet 1 (Advert Rating).

However, one of the participants has provided random ratings. Using a correlation heatmap, find the outlier.

2 Reliable Job: Internal Consistency

30 participants were given a questionnaire that measured job satisfaction and job performance through 4 questions each. They have been denoted by fields 'JS' and 'JP' respectively in the Sheet 2 (Reliable Job).

Calculate Cronbach alpha for each of the measure and comment on the internal consistency and acceptability of the measures. You may follow the following steps:

1. Calculate Cronbach's Alpha for Job Satisfaction (JS):
    - Use the `cor` function to calculate the Spearman correlations between the JS items.
    - Using the lower triangle (excluding the diagonal) of the correlation matrix, calculate mean correlation.
    - Apply the formula for Cronbach's alpha using the mean correlation and the number of JS items.
2. Calculate Cronbach's Alpha for Job Performance (JP) following similar steps.
3. Comment on Internal Consistency and Acceptability
    - Based on the Cronbach's alpha values obtained for JS and JP, provide a commentary on the internal consistency of the questionnaire items.

3 Yulu: Normality Testing

Yulu is India's leading micro-mobility service provider, which offers unique vehicles for the daily commute. Starting off as a mission to eliminate traffic congestion in India, Yulu provides the safest commute solution through a mobile app to enable shared, solo and sustainable commuting.

Given here is a dataset which contains data about the number of total yulu users over a period of time, with information about each day like temperature, windspeed, whether that particular day was a holiday or not, etc.

1. Conduct exploratory analysis on the dataset and check which variables are normally distributed. Plot a histrogram, Q-Q plots and use the Shapiro-Wilk test.

2. If the variables are not normally distributed, use the Box-Cox transformation to make the data normally distributed.
3. Does there exist any partial or semi-partial correlations between any of the variables? If so, what does it imply? Comment the usage of partial correlations and the observations found.