**In-Class Assignment 16**

For this problem, we will use the mtcars dataset.

1. The fuel efficiency of a set of 25 cars is calculated to be 22.3 mpg with a standard deviation of 5. We want to determine whether this value is statistically different from 20.09 mpg, which is the mean mpg value in the mtcars dataset, at the 95% confidence level.

(a) State the null hypothesis. Is it one-sided or two-sided?

The null hypothesis is that the mean of cars is 20.09. The hypothesis is two sided.

(b) Determine whether the null hypothesis is or is not falsified, by

(i) examining an appropriate confidence interval

So we fail to disprove our null hypothesis, as the mean value does not fall in the 95% confidence interval.

Graphical user interface

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(ii) finding the p-value of the test result.

The p-value is

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2. Sellers typically sell on average $5,300 in product per day. A new ad campaign has started for the products, and over the last several days sellers have sold $5,425 in products per day, with a standard deviation of $500, covering 38 person-days. We want to determine whether, at a 90% confidence level, sales have improved.

(a) State the null hypothesis. Is it one-sided or two-sided?

The null hypothesis is that the average sell per day is 5300$. The hypothesis is one sided.

b) Determine whether the null hypothesis is or is not falsified, by

(i) examining an appropriate confidence interval

With 90% confidence interval we can say that the null hypothesis is falsified, as the mean value is less than the .1 quintile of the new distribution.

(ii) finding the p-value of the test result.

The p-value is less than 0.1 therefore we can say that the null hypothesis is falsified.

Logo, company name

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(c) Suppose the mean value of $5,425 continues to be the case. How many person-days would it take to say that the ad campaign worked at a 99% confidence level?

To get 99% confidence we need 90 person days to say that the ad campaign was successful.

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