How to Conduct a One Sample T-Test in Python

A one sample t-test is used to determine whether or not the mean of a population is equal to some value.

This tutorial explains how to conduct a one sample t-test in Python.

Example: One Sample t-Test in Python

Suppose the university wants to know if the mean height of all students is equal to 198 inches.

Use the following steps to conduct a one sample t-test to determine if the mean height for all students is actually equal to 198 inches.

Step 1: Create the data.

First, we'll create an array to hold the measurements of the 12 plants:

```
import pandas
data = pandas.read_csv("https://modcom.co.ke/data/datasets/schoolcleaned.csv")
data
```

Step 2: Conduct a one sample t-test.

Next, we'll use the ttest_1samp() function from the scipy.stats library to conduct a one sample t-test, which uses the following syntax:

ttest_1samp(a, popmean)

where:

- **a**: is the data to be used
- **popmean**: the expected population mean

The two hypotheses for this particular one sample t-test are as follows:

H0: μ = 198 (the mean height for all students is 198 inches). **Null**

HA: μ ≠198 (the mean height is *not 198* inches). **Alternative**

Our confidence level is 0.05 (95%).

Here's how to use this function in our specific example:

```
import scipy.stats as stats

#perform one sample t-test
stats.ttest_1samp(a=data['Height'], popmean=198)
```

```
TtestResult(statistic=7.792111104766745, pvalue=5.5761370214520834e-14
```

The t test statistic is `7.792111104766745` and the corresponding two-sided p-value is `0.00000000000005576137021452083`4.

Step 3: **Interpret the results**.

The two hypotheses for this particular one sample t-test are as follows:

H0: μ = 198 (the mean height for all students is 198 inches)

HA: μ ≠198 (the mean height is *not 198* inches).

Because the p-value of our test (`0.00000000000005576137021452083`4) is less than alpha = 0.05, we reject the null hypothesis of the test and accept the alternative hypothesis.

We do not have sufficient evidence to say that the mean height for all students is equal to 198 inches.

Notebook:

https://colab.research.google.com/drive/19BIQC6mJ9zHXc3bJ29x0-kSjZTDW1v2E?usp=sharing

Assignments

Practice 2: Suppose the university wants to know if the mean for Math Subject for all students is equal to 65.

Use one sample t-test to determine if the mean for Math subject for all students is actually equal to 65 inches. Formulate the hypothesis and Test

Practice 3: Suppose the university wants to know if the mean for English Subject for all students is equal to 83.

Use one sample t-test to determine if the mean for Math subject for all students is actually equal to 83 inches. Formulate the hypothesis and Test