

Python-For-DataScience

10. Write python program

a. To read from a CSV file of the given data using 'pandas' library.

b. For the given data, plot the scatter matrix for males only. Explain about 2 sub-populations' correspondence to gender.

c. For the given data, using python environment, apply 1-sample t-test: testing the value of population mean.

d. For the given data, using python environment, apply 2-sample t-test: testing for difference across the population.

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

```
In [7]: data = pd.read_csv('ML/DataFrames/brain_size.csv', sep=';', na_values=".")
print(data.shape)

(40, 8)
```

```
In [9]: data.head()
```

Out[9]:

| | Unnamed: 0 | Gender | FSIQ | VIQ | PIQ | Weight | Height | MRI_Count |
|---|------------|--------|------|-----|-----|--------|--------|-----------|
| 0 | 1 | Female | 133 | 132 | 124 | 118.0 | 64.5 | 816932 |
| 1 | 2 | Male | 140 | 150 | 124 | NaN | 72.5 | 1001121 |
| 2 | 3 | Male | 139 | 123 | 150 | 143.0 | 73.3 | 1038437 |
| 3 | 4 | Male | 133 | 129 | 128 | 172.0 | 68.8 | 965353 |
| 4 | 5 | Female | 137 | 132 | 134 | 147.0 | 65.0 | 951545 |

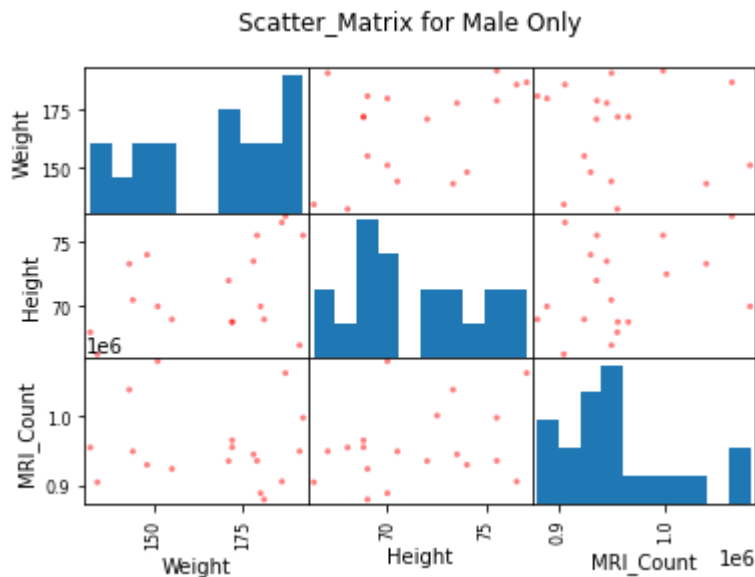
```
In [8]: groupby_gender = data.groupby('Gender')
for gender, value in groupby_gender['Height']:
    print((gender, value.mean()))

print(groupby_gender.mean())
```

('Female', 65.765)
('Male', 71.43157894736842)

| | Unnamed: 0 | FSIQ | VIQ | PIQ | Weight | Height | MRI_Count |
|--------|------------|-------|--------|--------|------------|-----------|-----------|
| Gender | | | | | | | |
| Female | 19.65 | 111.9 | 109.45 | 110.45 | 137.200000 | 65.765000 | 862654.6 |
| Male | 21.35 | 115.0 | 115.25 | 111.60 | 166.444444 | 71.431579 | 954855.4 |

```
In [12]: male_index=(data["Gender"]=="Male") # to retrieve Male indices
male_data=data[male_index] # to separate male data
# scatter matrix for only Weight,height and MRI Count
pd.plotting.scatter_matrix(male_data[['Weight', 'Height', 'MRI_Count']], color = 'r')
plt.suptitle("Scatter_Matrix for Male Only")
plt.show()
```



```
In [13]: from scipy import stats
test_result=stats.ttest_1samp(data['VIQ'], 0)
print("1-Sample t-Test")
print(test_result)
```

1-Sample t-Test
Ttest_1sampResult(statistic=30.088099970849328, pvalue=1.3289196468728067e-28)

```
In [14]: female_viq=data[data['Gender']=='Female']['VIQ']  
male_viq=data[data['Gender']=='Male']['VIQ']  
test_result2=stats.ttest_ind(female_viq, male_viq)  
print("2 Sample t-test")  
print(test_result2)
```

2 Sample t-test

Ttest_indResult(statistic=-0.7726161723275011, pvalue=0.44452876778583217)