

## **EXPERIMENT 2**

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### **A PYTHON PROGRAM TO IMPLEMENT SIMPLE LINEAR REGRESSION USING LEAST SQUARE METHOD**

#### **AIM:**

*TO IMPLEMENT A PYTHON PROGRAM WITH SIMPLE LINEAR REGRESSION  
USING LEAST SQUARE METHOD*

#### **CODE:**

```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
data = pd.read_csv('/content/headbrain.csv')
x, y = np.array(list(data['Head Size(cm^3)'])), np.array(list(data['Brain
Weight(grams)']))
print(x[:5], y[:5])

def get_line(x, y):
    x_m, y_m = np.mean(x), np.mean(y)
    print(x_m, y_m)
    x_d, y_d = x-x_m, y-y_m
    m = np.sum(x_d*y_d)/np.sum(x_d**2)
    c = y_m - (m*x_m)
    print(m, c)
    return lambda x : m*x+c

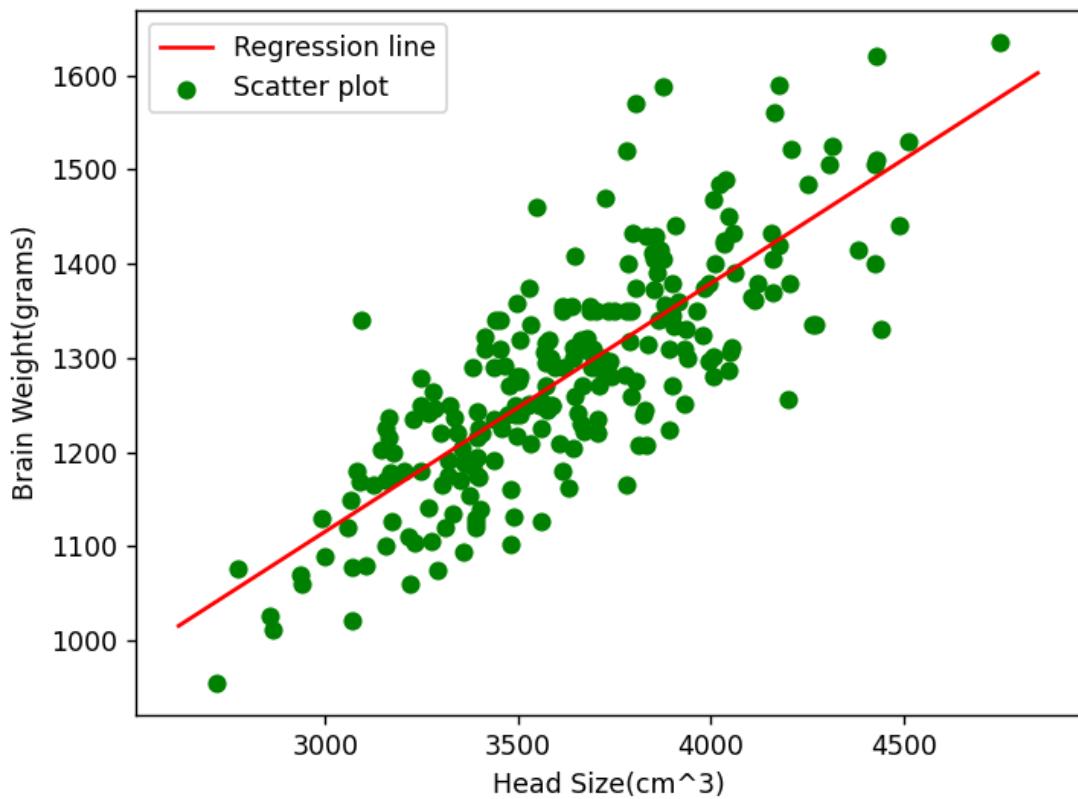
lin = get_line(x, y)
X = np.linspace(np.min(x)-100, np.max(x)+100, 1000)
Y = np.array([lin(x) for x in X])
plt.plot(X, Y, color='red', label='Regression line')
plt.scatter(x, y, color='green', label='Scatter plot')
plt.xlabel('Head Size(cm^3)')
plt.ylabel('Brain Weight(grams)')
```

```
plt.legend()  
plt.show()  
  
def get_error(line_fuc, x, y):  
    y_m = np.mean(y)  
    y_pred = np.array([line_fuc(_) for _ in x])  
    ss_t = np.sum((y-y_m)**2)  
    ss_r = np.sum((y-y_pred)**2)  
    return 1-(ss_r/ss_t)  
get_error(lin, x, y)  
  
from sklearn.linear_model import LinearRegression  
x = x.reshape((len(x),1))  
reg=LinearRegression()  
reg=reg.fit(x, y)  
print(reg.score(x, y))
```

OUTPUT:

Figure 1

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The screenshot shows the Python IDLE Shell interface. The title bar reads "IDLE Shell 3.12.3". The menu bar includes File, Edit, Shell, Debug, Options, Window, and Help. The main window displays the following Python session:

```
Python 3.12.3 (tags/v3.12.3:f6650f9, Apr  9 2024, 14:05:25) [MSC v.1938 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.

>>> = RESTART: C:/Users/itzdi/AppData/Local/Programs/Python/Python312/ex2.py
[4512 3738 4261 3777 4177] [1530 1297 1335 1282 1590]
3633.9915611814345 1282.873417721519
0.2634293394893993 325.5734210494428
0.639311719957

>>>
```

The status bar at the bottom right indicates "Ln: 9 Col: 0".

**RESULT:**

A PYTHON PROGRAM TO IMPLEMENT SIMPLE LINEAR REGRESSION USING LEAST SQUARE METHOD AS BEEN ANALYSED AND VERIFIED