assn4

May 22, 2023

[4]:
```
#Aishwarya kelgandre Roll no.73 batch T3
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
s1 =pd.Series(range(1,10,1))
s1
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
plt.rcParams['figure.figsize'] = (20.0, 10.0)
```

[7]:
```
data = pd.read_csv('E:\\TRINITY ACADEMY OF ENGINEERING PUNE\\TE␣
  ↪2022-23\\assignment\\dsbda\\csv\\Housing_assn4.csv')
print(data.shape)
data.head()
```

```
(506, 14)
```

[7]:
```
      CRIM    ZN  INDUS  CHAS    NOX     RM   AGE     DIS  RAD  TAX  PTRATIO
0  0.00632  18.0   2.31   0.0  0.538  6.575  65.2  4.0900    1  296     15.3  \
1  0.02731   0.0   7.07   0.0  0.469  6.421  78.9  4.9671    2  242     17.8
2  0.02729   0.0   7.07   0.0  0.469  7.185  61.1  4.9671    2  242     17.8
3  0.03237   0.0   2.18   0.0  0.458  6.998  45.8  6.0622    3  222     18.7
4  0.06905   0.0   2.18   0.0  0.458  7.147  54.2  6.0622    3  222     18.7

        B  LSTAT  MEDV
0  396.90   4.98  24.0
1  396.90   9.14  33.4
2  392.83   4.03  36.2
3  394.63   2.94  28.7
4  396.90    NaN  22.9
```

[10]:
```
X = data['DIS'].values
Y = data['MEDV'].values
Y
```

[10]:
```
array([24. , 33.4, 36.2, 28.7, 22.9, 27.1, 16.5, 18.9, 15. , 18.9, 21.7,
       20.4, 18.2, 19.9, 23.1, 17.5, 20.2, 18.2, 13.6, 19.6, 15.2, 14.5,
       15.6, 13.9, 16.6, 14.8, 18.4, 21. , 12.7, 14.5, 13.2, 13.1, 13.5,
       18.9, 20. , 21. , 24.7, 30.8, 34.9, 26.6, 25.3, 24.7, 21.2, 19.3,
       20. , 16.6, 14.4, 19.4, 19.7, 20.5, 25. , 23.4, 18.9, 35.4, 24.7,
       31.6, 23.3, 19.6, 18.7, 16. , 22.2, 25. , 33. , 23.5, 19.4, 22. ,
       17.4, 20.9, 24.2, 21.7, 22.8, 23.4, 24.1, 21.4, 20. , 20.8, 21.2,
       20.3, 28. , 23.9, 24.8, 22.9, 23.9, 26.6, 22.5, 22.2, 23.6, 28.7,
       22.6, 22. , 22.9, 25. , 20.6, 28.4, 21.4, 38.7, 43.8, 33.2, 27.5,
       26.5, 18.6, 19.3, 20.1, 19.5, 19.5, 20.4, 19.8, 19.4, 21.7, 22.8,
       18.8, 18.7, 18.5, 18.3, 21.2, 19.2, 20.4, 19.3, 22. , 20.3, 20.5,
       17.3, 18.8, 21.4, 15.7, 16.2, 18. , 14.3, 19.2, 19.6, 23. , 18.4,
       15.6, 18.1, 17.4, 17.1, 13.3, 17.8, 14. , 14.4, 13.4, 15.6, 11.8,
       13.8, 15.6, 14.6, 17.8, 15.4, 21.5, 19.6, 15.3, 19.4, 17. , 15.6,
       13.1, 41.3, 24.3, 23.3, 27. , 50. , 50. , 50. , 22.7, 25. , 50. ,
       23.8, 23.8, 22.3, 17.4, 19.1, 23.1, 23.6, 22.6, 29.4, 23.2, 24.6,
       29.9, 37.2, 39.8, 36.2, 37.9, 32.5, 26.4, 29.6, 50. , 32. , 29.8,
       34.9, 37. , 30.5, 36.4, 31.1, 29.1, 50. , 33.3, 30.3, 34.6, 34.9,
       32.9, 24.1, 42.3, 48.5, 50. , 22.6, 24.4, 22.5, 24.4, 20. , 21.7,
       19.3, 22.4, 28.1, 23.7, 25. , 23.3, 28.7, 21.5, 23. , 26.7, 21.7,
       27.5, 30.1, 44.8, 50. , 37.6, 31.6, 46.7, 31.5, 24.3, 31.7, 41.7,
       48.3, 29. , 24. , 25.1, 31.5, 23.7, 23.3, 22. , 20.1, 22.2, 23.7,
       17.6, 18.5, 24.3, 20.5, 24.5, 26.2, 24.4, 24.8, 29.6, 42.8, 21.9,
       20.9, 44. , 50. , 36. , 30.1, 33.8, 43.1, 48.8, 31. , 36.5, 22.8,
       30.7, 50. , 43.5, 20.7, 21.1, 25.2, 24.4, 35.2, 32.4, 32. , 33.2,
       33.1, 29.1, 35.1, 45.4, 35.4, 46. , 50. , 32.2, 22. , 20.1, 23.2,
       22.3, 24.8, 28.5, 37.3, 27.9, 23.9, 21.7, 28.6, 27.1, 20.3, 22.5,
       29. , 24.8, 22. , 26.4, 33.1, 36.1, 28.4, 33.4, 28.2, 22.8, 20.3,
       16.1, 22.1, 19.4, 21.6, 23.8, 16.2, 17.8, 19.8, 23.1, 21. , 23.8,
       23.1, 20.4, 18.5, 25. , 24.6, 23. , 22.2, 19.3, 22.6, 19.8, 17.1,
       19.4, 22.2, 20.7, 21.1, 19.5, 18.5, 20.6, 19. , 18.7, 32.7, 16.5,
       23.9, 31.2, 17.5, 17.2, 23.1, 24.5, 26.6, 22.9, 24.1, 18.6, 30.1,
       18.2, 20.6, 17.8, 21.7, 22.7, 22.6, 25. , 19.9, 20.8, 16.8, 21.9,
       27.5, 21.9, 23.1, 50. , 50. , 50. , 50. , 50. , 13.8, 13.8, 15. ,
       13.9, 13.3, 13.1, 10.2, 10.4, 10.9, 11.3, 12.3,  8.8,  7.2, 10.5,
        7.4, 10.2, 11.5, 15.1, 23.2,  9.7, 13.8, 12.7, 13.1, 12.5,  8.5,
        5. ,  6.3,  5.6,  7.2, 12.1,  8.3,  8.5,  5. , 11.9, 27.9, 17.2,
       27.5, 15. , 17.2, 17.9, 16.3,  7. ,  7.2,  7.5, 10.4,  8.8,  8.4,
       16.7, 14.2, 20.8, 13.4, 11.7,  8.3, 10.2, 10.9, 11. ,  9.5, 14.5,
       14.1, 16.1, 14.3, 11.7, 13.4,  9.6,  8.7,  8.4, 12.8, 10.5, 17.1,
       18.4, 15.4, 10.8, 11.8, 14.9, 12.6, 14.1, 13. , 13.4, 15.2, 16.1,
       17.8, 14.9, 14.1, 12.7, 13.5, 14.9, 20. , 16.4, 17.7, 19.5, 20.2,
       21.4, 19.9, 19. , 19.1, 19.1, 20.1, 19.9, 19.6, 23.2, 29.8, 13.8,
       13.3, 16.7, 12. , 14.6, 21.4, 23. , 23.7, 25. , 21.8, 20.6, 21.2,
       19.1, 20.6, 15.2,  7. ,  8.1, 13.6, 20.1, 21.8, 24.5, 23.1, 19.7,
       18.3, 21.2, 17.5, 16.8, 22.4, 20.6, 23.9, 22. , 11.9,  nan,  nan])
```

```
[11]: mean_x = np.mean(X)
      mean_y = np.mean(Y)
```

```
# Total number of values
n = len(X)
n
```

[11]: 506

[12]:

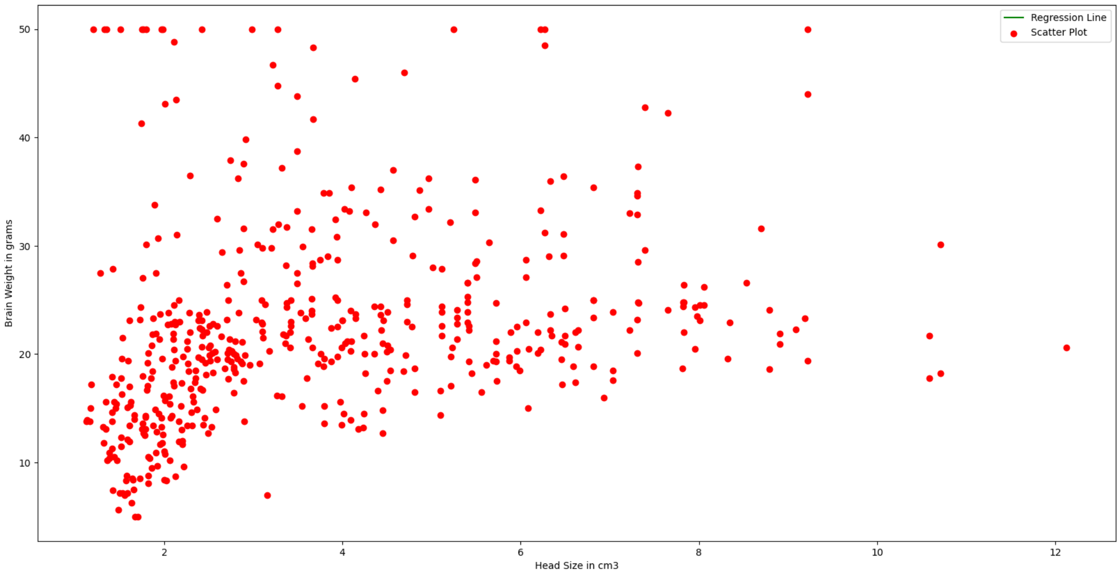
```
numer = 0
denom = 0
for i in range(n):
 numer += (X[i] - mean_x) * (Y[i] - mean_y)
 denom += (X[i] - mean_x) ** 2
b1 = numer / denom
b0 = mean_y - (b1 * mean_x)

print("Coefficients")
print("m=",b1)
print("c=",b0)
```

```
Coefficients
m= nan
c= nan
```

[13]:

```
max_x = np.max(X)
min_x = np.min(X)
# Calculating line values x and y
x = np.linspace(min_x, max_x, 1000)
y = b0 + b1 * x
# Ploting Line
#plt.plot(x, y, color='#58b970', label='Regression Line')
plt.plot(x, y, color='green', label='Regression Line')
# Ploting Scatter Points
#plt.scatter(X, Y, c='#ef5423', label='Scatter Plot')
plt.scatter(X, Y, c='red', label='Scatter Plot')
plt.xlabel('Head Size in cm3')
plt.ylabel('Brain Weight in grams')
plt.legend()
plt.show()
```



[16]:
```
ss_tot = 0
ss_res = 0
for i in range(n):
 y_pred = b0 + b1 * X[i]
 ss_tot += (Y[i] - mean_y) ** 2
 ss_res += (Y[i] - y_pred) ** 2
r2 = 1 - (ss_res/ss_tot)
print("R2 Score")
print(r2)
```

```
R2 Score
nan
```