program_27

October 26, 2022

1 PROGRAM 27

1.0.1 Aim : linear regression

1.0.2 Date : 26/10/2022

1.0.3 By : Anu C Scharia

[ ]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn import metrics
```

[ ]:
```
df=pd.read_csv('Salary_Data.csv')
print(df)
```

```
    YearsExperience    Salary
0               1.1   39343.0
1               1.3   46205.0
2               1.5   37731.0
3               2.0   43525.0
4               2.2   39891.0
5               2.9   56642.0
6               3.0   60150.0
7               3.2   54445.0
8               3.2   64445.0
9               3.7   57189.0
10              3.9   63218.0
11              4.0   55794.0
12              4.0   56957.0
13              4.1   57081.0
14              4.5   61111.0
15              4.9   67938.0
16              5.1   66029.0
17              5.3   83088.0
18              5.9   81363.0
```

```
19              6.0   93940.0
20              6.8   91738.0
21              7.1   98273.0
22              7.9  101302.0
23              8.2  113812.0
24              8.7  109431.0
25              9.0  105582.0
26              9.5  116969.0
27              9.6  112635.0
28             10.3  122391.0
29             10.5  121872.0
```

[ ]:
```
sns.heatmap(df.corr(),annot=True)
```

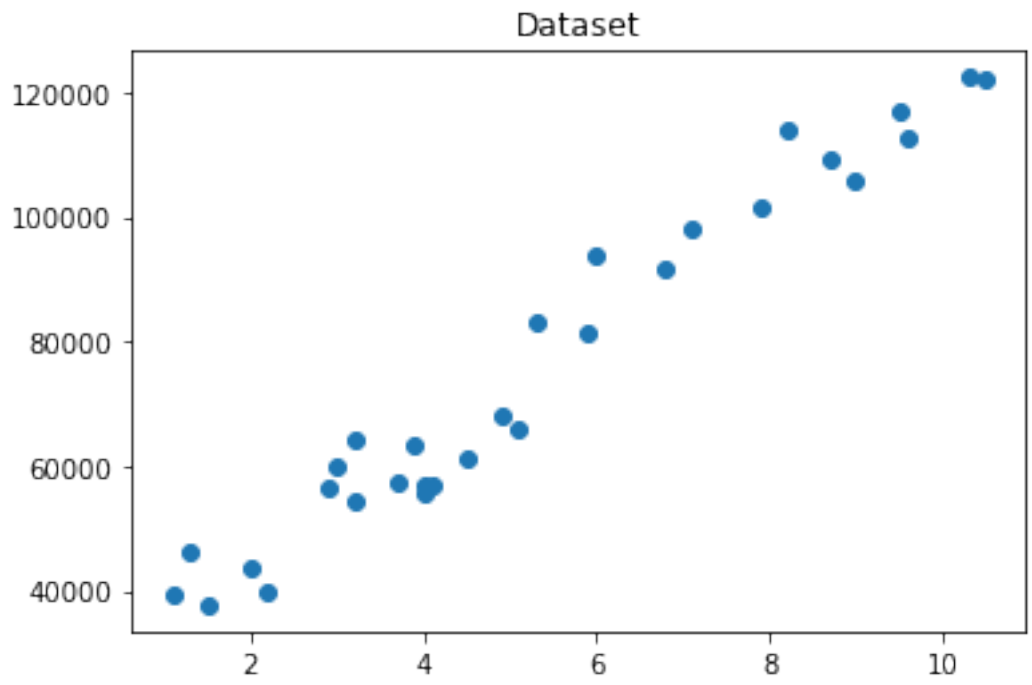
[ ]: <AxesSubplot:>

[ ]:
```
x=df.iloc[:,:-1].values
y=df.iloc[:,1].values
print(x)
print(y)
```

```
[[ 1.1]
 [ 1.3]
 [ 1.5]
 [ 2. ]
 [ 2.2]
```

```
 [ 2.9]
 [ 3. ]
 [ 3.2]
 [ 3.2]
 [ 3.7]
 [ 3.9]
 [ 4. ]
 [ 4. ]
 [ 4.1]
 [ 4.5]
 [ 4.9]
 [ 5.1]
 [ 5.3]
 [ 5.9]
 [ 6. ]
 [ 6.8]
 [ 7.1]
 [ 7.9]
 [ 8.2]
 [ 8.7]
 [ 9. ]
 [ 9.5]
 [ 9.6]
 [10.3]
 [10.5]]
[ 39343.  46205.  37731.  43525.  39891.  56642.  60150.  54445.  64445.
  57189.  63218.  55794.  56957.  57081.  61111.  67938.  66029.  83088.
  81363.  93940.  91738.  98273. 101302. 113812. 109431. 105582. 116969.
 112635. 122391. 121872.]
```

[ ]:
```
plt.scatter(x,y)
plt.title('Dataset')
plt.show()
```



[ ]:
```
df.describe()
```

[ ]:
```
       YearsExperience         Salary
count        30.000000      30.000000
mean          5.313333   76003.000000
std           2.837888   27414.429785
min           1.100000   37731.000000
25%           3.200000   56720.750000
50%           4.700000   65237.000000
75%           7.700000  100544.750000
max          10.500000  122391.000000
```

[ ]:
```
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=1/3,random_state=0)
```

[ ]:
```
regressor=LinearRegression()
regressor.fit(x_train,y_train)
```

[ ]:
```
LinearRegression()
```

[ ]:
```
y_test_pred=regressor.predict(x_test)
y_train_pred=regressor.predict(x_train)
```

[ ]:
```
plt.scatter(x_train, y_train)
plt.plot(x_train, y_train_pred, color='black')
```

```
plt.title('"Salary vs Experience (Training Dataset)')
plt.xlabel('Years of Experience')
plt.ylabel('Salary(In Rupees)')
```

[ ]: Text(0, 0.5, 'Salary(In Rupees)')

[ ]:
```
plt.scatter(x_test, y_test)
plt.plot(x_test, y_test_pred, color='black')
plt.title('"Salary vs Experience (Testing Dataset)')
plt.xlabel('Years of Experience')
plt.ylabel('Salary(In Rupees)')
```

[ ]: Text(0, 0.5, 'Salary(In Rupees)')

[ ]:
```
print(regressor.score(x_test, y_test))
```

```
0.9749154407708353
```

[ ]:
```
print(regressor.score(x_train, y_train))
```

```
0.9381900012894278
```

[ ]:
```
print(regressor.intercept_)
print(regressor.coef_)
```

```
26816.192244031176
[9345.94244312]
```

[ ]:
```
print('Mean Absolute Error:', metrics.mean_absolute_error(y_test, y_test_pred))
print('Mean Squared Error:', metrics.mean_squared_error(y_test, y_test_pred))
print('Root Mean Squared Error:', np.sqrt(metrics.mean_squared_error(y_test,␣
↪y_test_pred)))
```

```
Mean Absolute Error: 3426.42693743071
Mean Squared Error: 21026037.329511303
Root Mean Squared Error: 4585.415720467589
```

[ ]:
```
print('Mean Absolute Error:', metrics.mean_absolute_error(y_train,␣
 ↪y_train_pred))
print('Mean Squared Error:', metrics.mean_squared_error(y_train, y_train_pred))
print('Root Mean Squared Error:', np.sqrt(metrics.mean_squared_error(y_train,␣
 ↪y_train_pred)))
```

```
Mean Absolute Error: 5310.294905607347
Mean Squared Error: 36852948.76438455
Root Mean Squared Error: 6070.662959214961
```

[ ]:
```

```