THE SPARK FOUNDATION INTERNSHIP

Author : Saba Badruddin Inamdar

GRIPSEP21

(Data Science And Business Analytics)

TASK1 : Prediction Using Supervised ML

Problem Statement : Predict the percentage of an student based on number of study hours.

In this task,we will predict the percentage of marks that students score based on number of hours they studied. This is simple linear regression task,as it involve only two variable

Step1: Importing all required libraries

In [1]:

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

Step2 : Reading data file

In [2]:

```
# Reading data

student_data = pd.read_csv("http://bit.ly/w-data")
print("Data imported successfully.")

student_data.head(25)
```

```
Data imported successfully.
```

Out[2]:

	Hours	Scores
0	2.5	21
1	5.1	47
2	3.2	27
3	8.5	75
4	3.5	30
5	1.5	20
6	9.2	88
7	5.5	60
8	8.3	81
9	2.7	25
10	7.7	85
11	5.9	62
12	4.5	41
13	3.3	42
14	1.1	17
15	8.9	95
16	2.5	30
17	1.9	24
18	6.1	67
19	7.4	69
20	2.7	30
21	4.8	54
22	3.8	35
23	6.9	76
24	7.8	86

In [3]:

```
# Cheacking if there are any null values
student_data.isnull == True
```

Out[3]:

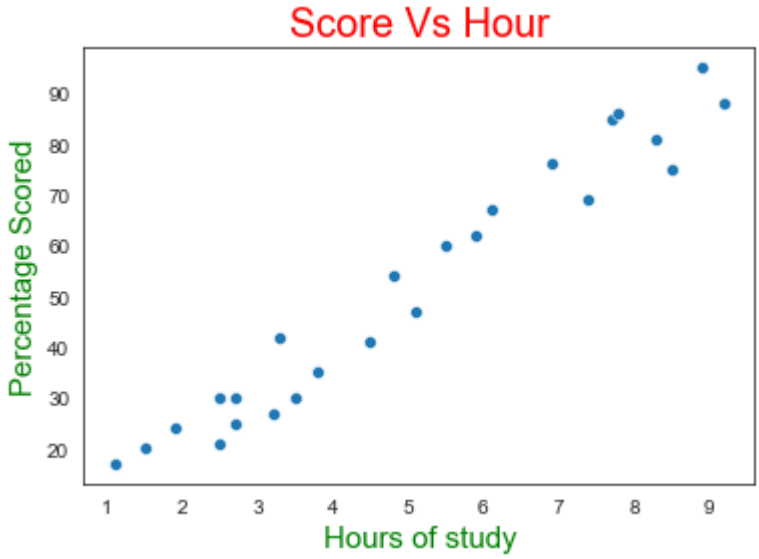
```
False
```

There is no null value in this dataset,so we can plot 2D graph to find relationship between data.

Step-3: Exploratory Data Analysis

In [4]:

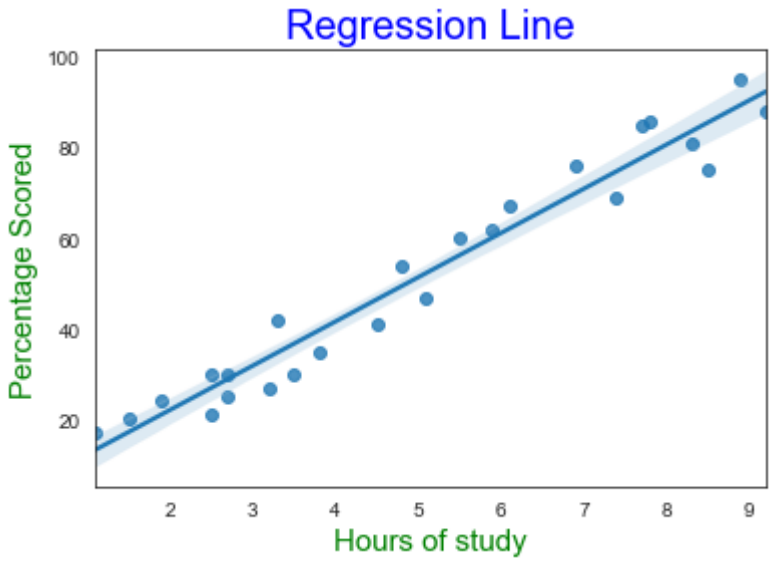
```
# Plotting the distributions
sns.set_style('white')
sns.scatterplot(y = student_data['Scores'], x = student_data['Hours'])
plt.title("Score Vs Hour", size=20, color='red')
plt.xlabel("Hours of study", size=15, color='green')
plt.ylabel('Percentage Scored', size=15, color='green')
plt.show()
```



Step-4: Plotting the Regression line

In [5]:

```
sns.regplot(y = student_data['Scores'], x = student_data['Hours'])
plt.title('Regression Line', size=20, color='blue')
plt.xlabel("Hours of study", size=15, color='green')
plt.ylabel('Percentage Scored', size=15, color='green')
plt.show()
print(student_data.corr())
```




```
            Hours    Scores
Hours    1.000000  0.976191
Scores   0.976191  1.000000
```

Step-4: Preparing And Splitting the Data

In [6]:

```
# divide data into input and output
x = student_data.iloc[:,:-1].values
y = student_data.iloc[:,1].values
```

In [7]:

```
#Splitting the data into training and testing sets

train_x,test_x,train_y,test_y = train_test_split(x,y,random_state = 0)
```

Step-5: Training the Algorithm

We have split dataset into training and testing sets. Now we will train our algorithm.

In [8]:

```
regression = LinearRegression()
regression.fit(train_x,train_y)

print("Model Trained.")
```

```
Model Trained.
```

Step-6 : Predicting Percentage

In [9]:

```
pred_y = regression.predict(test_x)
prediction = pd.DataFrame({'Hours':[i[0] for i in test_x],'Predicted Marks':[k for k in
prediction
```

Out[9]:

	Hours	Predicted Marks
0	1.5	16.844722
1	3.2	33.745575
2	7.4	75.500624
3	2.5	26.786400
4	5.9	60.588106
5	3.8	39.710582
6	1.9	20.821393

Comparing Actual And Predicted Marks

In [10]:

```
# Comapring Actual Vs Predicted
df = pd.DataFrame({'Actual': test_y, 'Predicted':pred_y})
df
```

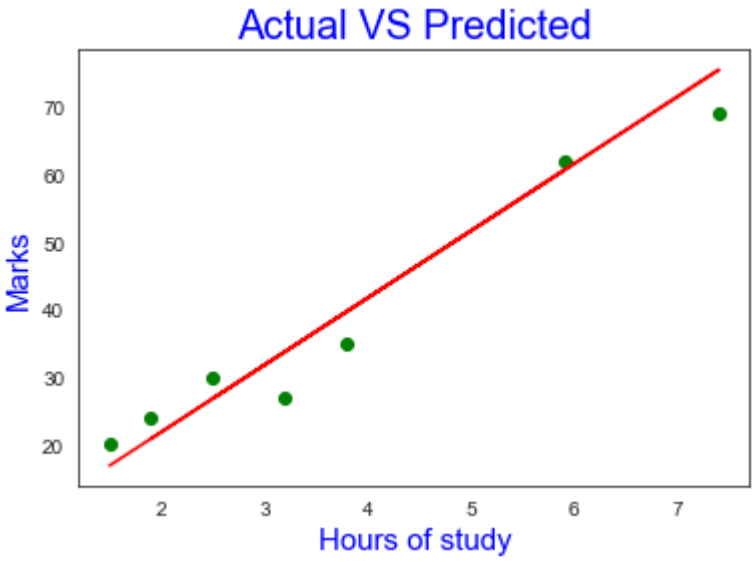
Out[10]:

	Actual	Predicted
0	20	16.844722
1	27	33.745575
2	69	75.500624
3	30	26.786400
4	62	60.588106
5	35	39.710582
6	24	20.821393

In [11]:

```
#Plotting Actual And Predicted Marks

plt.scatter(x=test_x, y=test_y, color='green')
plt.plot(test_x,pred_y, color='red')
plt.title('Actual VS Predicted', size=20, color='blue')
plt.xlabel('Hours of study', size=15, color='blue')
plt.ylabel('Marks', size=15, color='blue')
plt.show()
```



Step-7: Evaluating Model

In [12]:

```
# mean absolute error to evaluate performance of algorithm

print("Mean Squared Error :",metrics.mean_squared_error(test_y,pred_y))
print("Mean Absolute Error :",metrics.mean_absolute_error(test_y,pred_y))
print("Root Mean Squared Error :",np.sqrt(metrics.mean_squared_error(test_y,pred_y)))
```

```
Mean Squared Error : 20.33292367497997
Mean Absolute Error : 4.130879918502486
Root Mean Squared Error : 4.5092043283688055
```

Step-8: Predicting the score if student studied for 9.25 hours/day:

In [13]:

```
hours = [9.25]
result = regression.predict([hours])
print("Predicted score",result[0])
```

```
Predicted score 93.89272889341655
```

Conclusion: According to linear regression model,predicted score for a student who studied 9.25 hours/day will be 93.89 percent.