GRADUATE ROTATIONAL INTERNSHIP PROGRAM(GRIP)

Data Science[#GRIPOCTOBER22] Task1:Prediction using supervised ML Name:SHAIK ABDULWASEEM

Simple Linear Regression

In this regression task we will predict the percentage of marks that a student is expected to score based upon the number of hours they studied. This is a simple linear regression task as it involves just two variables.

Importing all libraries required

In [21]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.metrics import r2_score
from sklearn.metrics import mean_squared_error
from sklearn.metrics import mean_absolute_error
from sklearn.model_selection import train_test_split
%matplotlib inline
```

In [2]:
```
url = "http://bit.ly/w-data"
data = pd.read_csv(url)
print("Data imported successfully")
data.head(10)
```

```
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

In [3]:
```
data.shape
```

Out[3]:
```
(25, 2)
```

In [5]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 25 entries, 0 to 24
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   Hours   25 non-null     float64
 1   Scores  25 non-null     int64  
dtypes: float64(1), int64(1)
memory usage: 528.0 bytes
```

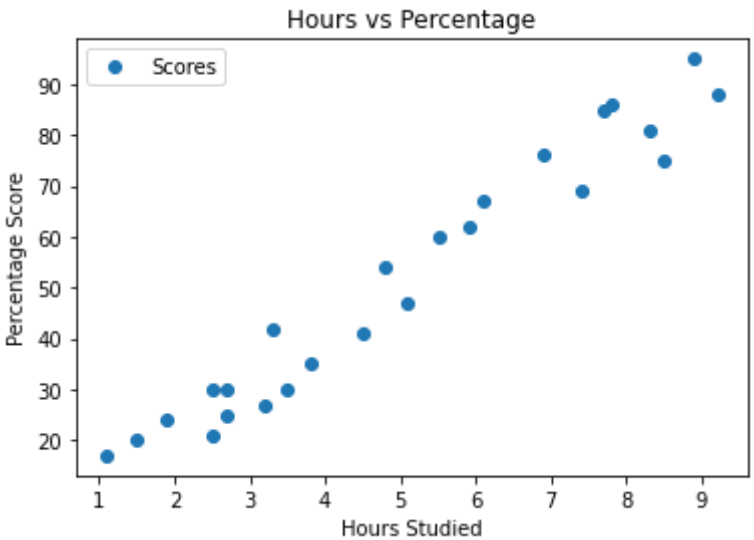
In [6]:
```
data.describe()
```

Out[6]:

	Hours	Scores
count	25.000000	25.000000
mean	5.012000	51.480000
std	2.525094	25.286887
min	1.100000	17.000000
25%	2.700000	30.000000
50%	4.800000	47.000000
75%	7.400000	75.000000
max	9.200000	95.000000

Data Visualization

In [7]:
```
data.plot(x='Hours', y='Scores', style='o')
plt.title('Hours vs Percentage')
plt.xlabel('Hours Studied')
plt.ylabel('Percentage Score')
plt.show()
```



In [8]:
```
# we can clearly see that there is a positive linear relation between the number of
```

Linear Regression Model

In [9]:
```
X = data.iloc[:, :-1].values
y = data.iloc[:, 1].values
X_train, X_test, y_train, y_test = train_test_split(X, y,train_size=0.80,test_size=0
```

Training the model

In [11]:
```
from sklearn.linear_model import LinearRegression
linearRegressor= LinearRegression()
linearRegressor.fit(X_train, y_train)
y_predict= linearRegressor.predict(X_train)
```

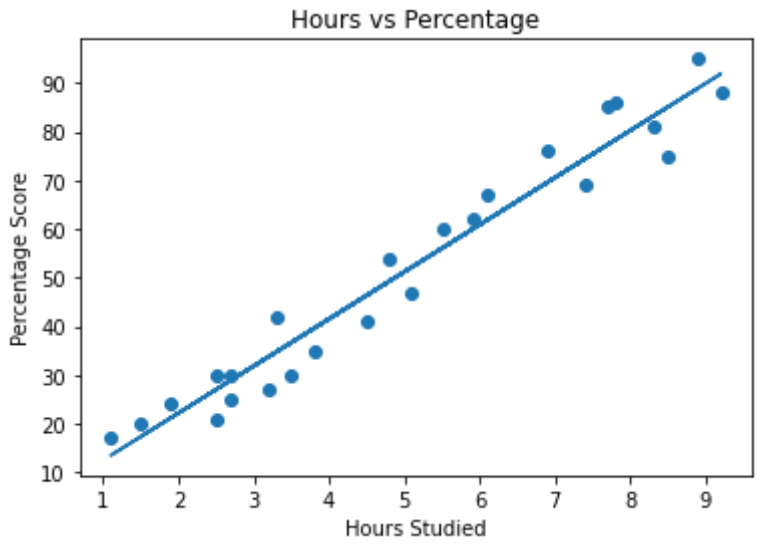
Training the Algorithm

In [12]:
```
regressor = LinearRegression()
regressor.fit(X_train, y_train)

print("Training complete.")
```

```
Training complete.
```

In [13]:
```
line = regressor.coef_*X+regressor.intercept_
# Plotting for the test data
plt.scatter(X, y)
plt.plot(X, line);
plt.title('Hours vs Percentage')
plt.xlabel('Hours Studied')
plt.ylabel('Percentage Score')
plt.show()
```



Checking the accuracy scores for training and test set

In [14]:
```
print('Test Score')
print(regressor.score(X_test, y_test))
print('Training Score')
print(regressor.score(X_train, y_train))
```

```
Test Score
0.9678055545167994
Training Score
0.9491209376364416
```

In [15]:
```
y_test
```

Out[15]:
```
array([81, 30, 21, 76, 62], dtype=int64)
```

In [16]:
```
y_predict
```

Out[16]:
```
array([28.96850337, 34.77775026, 52.20549094, 39.61878934, 17.35000959,
       33.80954245, 46.39624405, 88.99738793, 85.12455667, 36.71416589,
       28.96850337, 21.22284085, 49.3008675 , 61.8875691 , 78.34710196,
       56.0783222 , 77.37889414, 13.47717832, 74.4742707 , 91.90201137])
```

In [17]:
```
y_predict[:5]
```

Out[17]:
```
array([28.96850337, 34.77775026, 52.20549094, 39.61878934, 17.35000959])
```

In [18]:
```
data= pd.DataFrame({'Actual': y_test,'Predicted': y_predict[:5]})
data
```

Out[18]:

	Actual	Predicted
0	81	28.968503
1	30	34.777750
2	21	52.205491
3	76	39.618789
4	62	17.350010

In [19]:
```
print('Score of student who studied for 9.25 hours a dat', regressor.predict([[9.25]
```

```
Score of student who studied for 9.25 hours a dat [92.38611528]
```

Model evaluation Metrics

In [20]:
```
mean_squ_error = mean_squared_error(y_test, y_predict[:5])
mean_abs_error = mean_absolute_error(y_test, y_predict[:5])
print("Mean Squred Error:",mean_squ_error)
print("Mean absolute Error:",mean_abs_error)
```

```
Mean Squred Error: 1404.2200673968694
Mean absolute Error: 33.80918778157651
```