The Sparks Foundation - Data Science & Business Analytics Internship

TASK 1 - Prediction using Supervised Machine Learning

In this task it is required to predict the percentage of a student on the basis of number of hours studied using the Linear Regression supervised machine learning algorithm.

Steps:

.Step 1 - Importing the dataset

.Step 2 - Visualizing the dataset

.Step 3 - Data preparation

.Step 4 - Training the algorithm

.Step 5 - Visualizing the model

.Step 6 - Making predcitions

.Step 7 - Evaluating the model

Author: Rupesh Padature

STEP 1 - Importing the dataset

In this step, we will import the dataset through the link with the help of pandas library and then we will observe the data

In [3]:

```
# Importing all the required libraries

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns

# To ignore the warnings
import warnings as wg
wg.filterwarnings("ignore")
```

In [4]:

```
# Reading data from remote link

url = "https://raw.githubusercontent.com/AdiPersonalWorks/Random/master/student_scores%20-%20student_sc
df = pd.read_csv(url)
```

In [5]:

```
# now let's observe the dataset
df.head()
```

Out[5]:

	Hours	Scores
0	2.5	21
1	5.1	47
2	3.2	27
3	8.5	75
4	3.5	30

In [6]:
```
df.tail()
```

Out[6]:

	Hours	Scores
20	2.7	30
21	4.8	54
22	3.8	35
23	6.9	76
24	7.8	86

In [7]:
```
# To find the number of columns and rows
df.shape
```

Out[7]:
```
(25, 2)
```

In [8]:
```
# To find more information about our dataset
df.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 [9]:
```
df.describe()
```

Out[9]:

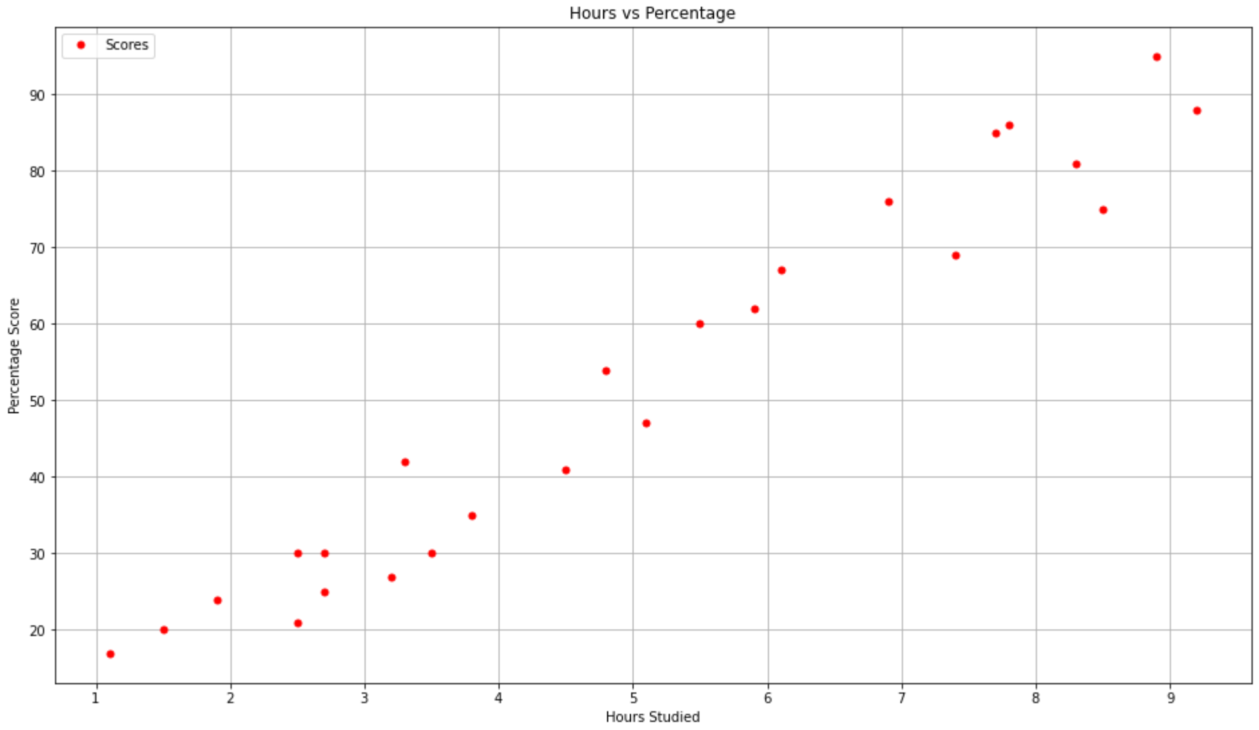
	Hours	Scores
count	25.000000	25.000000
mean	5.012000	51.480000
std	2.525094	25.286887
min	1.100000	17.000000
25%	2.700000	30.000000
50%	4.800000	47.000000
75%	7.400000	75.000000
max	9.200000	95.000000

In [10]:
```
# now we will check if our dataset contains null or missings values
df.isnull().sum()
```

Out[10]:
```
Hours       0
Scores      0
dtype: int64
```

Step 2 - Visualizing the dataset

In [11]:
```
# Plotting the dataset
plt.rcParams["figure.figsize"] = [16,9]
df.plot(x='Hours', y='Scores', style='.', color='Red', markersize=10)
plt.title('Hours vs Percentage')
plt.xlabel('Hours Studied')
plt.ylabel('Percentage Score')
plt.grid()
plt.show()
```



In [12]:

```
# we can also use .corr to determine the corelation between the variables
df.corr()
```

Out[12]:

	Hours	Scores
Hours	1.000000	0.976191
Scores	0.976191	1.000000

Step 3 - Data preparation¶

In [13]:

```
df.head()
```

Out[13]:

	Hours	Scores
0	2.5	21
1	5.1	47
2	3.2	27
3	8.5	75
4	3.5	30

In [14]:

```
# using iloc function we will divide the data
X = df.iloc[:, :1].values
y = df.iloc[:, 1:].values
```

In [15]:

```
X
```

Out[15]:

```
array([[2.5],
       [5.1],
       [3.2],
       [8.5],
       [3.5],
       [1.5],
       [9.2],
       [5.5],
       [8.3],
       [2.7],
       [7.7],
       [5.9],
       [4.5],
       [3.3],
       [1.1],
       [8.9],
       [2.5],
       [1.9],
       [6.1],
       [7.4],
       [2.7],
       [4.8],
       [3.8],
       [6.9],
       [7.8]])
```

In [16]:

```
y
```

Out[16]:

```
array([[21],
       [47],
       [27],
       [75],
       [30],
       [20],
       [88],
       [60],
       [81],
       [25],
       [85],
       [62],
       [41],
       [42],
       [17],
       [95],
       [30],
       [24],
       [67],
       [69],
       [30],
       [54],
       [35],
       [76],
       [86]], dtype=int64)
```

In [17]:

```
# Splitting data into training and testing data

from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y,
                            test_size=0.2, random_state=0)
```

Step 4 - Training the Algorithm

In [18]:

```
from sklearn.linear_model import LinearRegression

model = LinearRegression()
model.fit(X_train, y_train)
```

Out[18]:

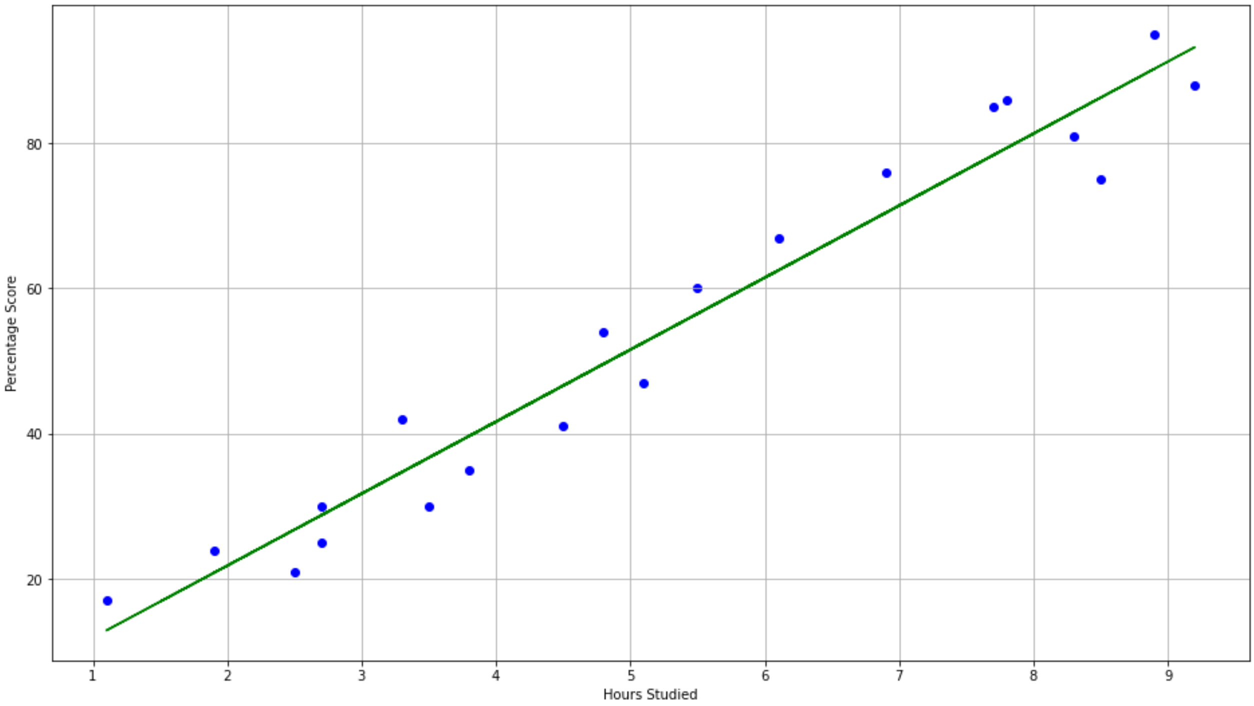
```
LinearRegression()
```

Step 5 - Visualizing the model

In [19]:

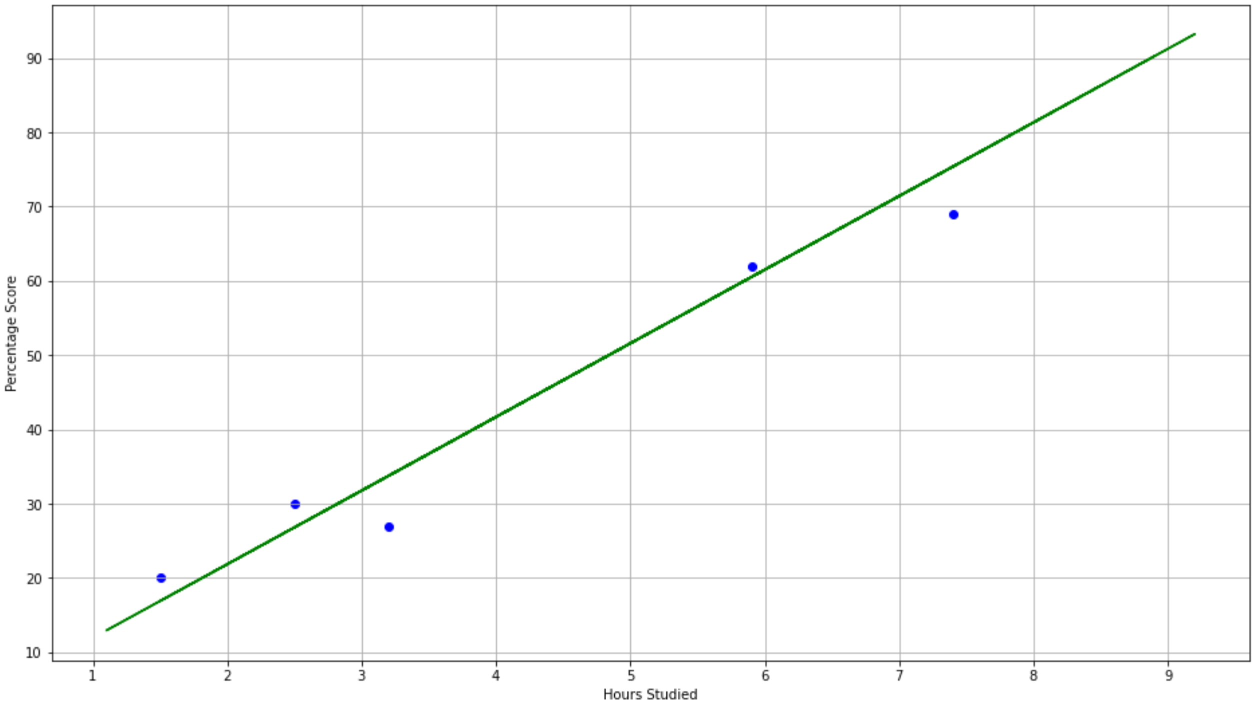
```
line = model.coef_*X + model.intercept_

# Plotting for the training data
plt.rcParams["figure.figsize"] = [16,9]
plt.scatter(X_train, y_train, color='blue')
plt.plot(X, line, color='green');
plt.xlabel('Hours Studied')
plt.ylabel('Percentage Score')
plt.grid()
plt.show()
```



In [20]:

```
# Plotting for the testing data
plt.rcParams["figure.figsize"] = [16,9]
plt.scatter(X_test, y_test, color='blue')
plt.plot(X, line, color='green');
plt.xlabel('Hours Studied')
plt.ylabel('Percentage Score')
plt.grid()
plt.show()
```



Step 6 - Making Predictions

In [21]:

```
print(X_test) # Testing data - In Hours
y_pred = model.predict(X_test) # Predicting the scores
```

```
[[1.5]
 [3.2]
 [7.4]
 [2.5]
 [5.9]]
```

In [22]:

```
# Comparing Actual vs Predicted
```

```
y_test
```

Out[22]:

```
array([[20],
       [27],
       [69],
       [30],
       [62]], dtype=int64)
```

In [23]:

```
y_pred
```

Out[23]:

```
array([[16.88414476],
       [33.73226078],
       [75.357018  ],
       [26.79480124],
       [60.49103328]])
```

In [ ]:

```
# Comparing Actual vs Predicted
comp = pd
```

In [28]:

```
.DataFrame({ 'Actual':[y_test],'Predicted':[y_pred] })
comp
```

Out[28]:

	Actual	Predicted
0	[[20], [27], [69], [30], [62]]	[[16.884144762398037], [33.73226077948984], [7...

In [25]:

```
# Testing with your own data

hours = 9.25
own_pred = model.predict([[hours]])
print("The predicted score if a person studies for",hours,"hours is",own_pred[0])
```

```
The predicted score if a person studies for 9.25 hours is [93.69173249]
```

Step 7 - Evaluating the model

In [26]:

```
from sklearn import metrics

print('Mean Absolute Error:', metrics.mean_absolute_error(y_test, y_pred))
```

```
Mean Absolute Error: 4.183859899002975
```