THE SPARKS FOUNDATION

DATA SCIENCE & BUSINESS ANALYTICS TASKS

TASK1: Prediction Using Supervised ML

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OBJECTIVE: Prdict the percentage of student based on number of hours studied

Imporatant Required libraries

In [2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
```

Dataset

In [3]:
```
url = "http://bit.ly/w-data"
data = pd.read_csv(url)
data.head(10)
```

Out[3]:

	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 [4]:
```
# checking the number of rows and columns in the dataset
data.shape
```

Out[4]:
```
(25, 2)
```

In [5]:
```
# checking for the number of elements in the dataset
data.size
```

Out[5]:
```
50
```

In [6]:
```
# type information of the file
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
```

Checking for the null values in data

In [7]:
```
# to identify the no of missing data
data.isnull().sum()
```

Out[7]:
```
Hours     0
Scores    0
dtype: int64
```

Checking for mean, median, maximum, minimum values of the dataset

In [8]:
```
data.describe()
```

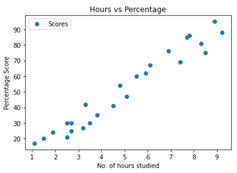
Out[8]:

	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

Plotting the data on graph

In [9]:
```
data.plot(x = 'Hours', y = 'Scores', style = 'o')
plt.title('Hours vs Percentage')
plt.xlabel('No. of hours studied')
plt.ylabel('Percentage Score')

plt.show()
```



The above graph shows that as the number of hours increases the percentage of the each student is also increased. The plot is positively linear.

Preparing the data

In [11]:
```
# accessing rows and columns by index-based
X = data.iloc[:, :-1].values
print(X)
```

```
[[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 [12]:
```
y= data.iloc[:,1].values
print(y)
```

```
[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]
```

In [13]:
```
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)
```

Training the Algorithm

In [14]:
```
from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
regressor.fit(X_train, y_train)

print("Training complete.")
```

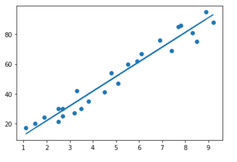
```
Training complete.
```

In [15]:
```
regressor.coef_,regressor.intercept_
```

Out[15]:
```
(array([9.91065648]), 2.018160041434683)
```

In [16]:
```
# Plotting the regression line
line = regressor.coef_*X+regressor.intercept_

# Plotting for the test data
plt.scatter(X, y)
plt.plot(X, line);
plt.show()
```



Making Prediction

In [17]:
```
print(X_test) # Testing data - In Hours
y_pred = regressor.predict(X_test) # Predicting the scores
```

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

In [18]:
```
# Comparing Actual vs Predicted
df = pd.DataFrame({'Actual': y_test, 'Predicted': y_pred})
df
```

Out[18]:

	Actual	Predicted
0	20	16.884145
1	27	33.732261
2	69	75.357018
3	30	26.794801
4	62	60.491033

In [19]:
```
hours = np.array([9.25])
hours_studied = hours.reshape(-1,1)
own_pred = regressor.predict(hours_studied)
```

In [20]:
```
print('If a student studied 9.25 hrs/day the score would be:', own_pred[0])
```

```
If a student studied 9.25 hrs/day the score would be: 93.69173248737538
```

Evaluating the model

In [21]:
```
from sklearn import metrics
print('Mean Absolute Error:',
      metrics.mean_absolute_error(y_test, y_pred))
```

```
Mean Absolute Error: 4.183859899002975
```