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The Spark Foundation

Technical Task 1:- Predicting the Scores of a student based on study hours.

In this task we will predict the percentage that a student is expected to score based on the number of hours of study.This is we will use simple linear regression as it involve just two variables(Scores and hours)

Here,we start by importing the packages and loading the dataset.

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

Loading the dataset

In [2]:
```
dataset=pd.read_csv("student.csv")
```

In [3]:
```
dataset
```

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
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

Discovering the data insights to check attributes such as null values,datatypes,etc.

In [4]:
```
dataset.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 [5]:
```
dataset.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

Here we explore summary of statistics like total count of variables,minimum and maximum values,mean,25%,50% and so on

In [6]:
```
dataset.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

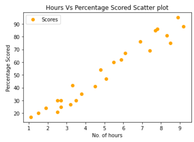
In [7]:
```
dataset.shape
```

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

Scatter plot which shows the relation between No. of hours studied and Percentage scored by a student

In [8]:
```
dataset.plot(x="Hours", y="Scores", xlabel="No. of hours", ylabel="Percentage Scored",style="o",
             c="orange", title="Hours Vs Percentage Scored Scatter plot")
```

Out[8]:
```
<AxesSubplot:title={'center':'Hours Vs Percentage Scored Scatter plot'}, xlabel='No. of hours', ylabel='Percentage Scored'>
```



Here we divide the data into features(inputs) and labels(outputs)

In [9]:
```
x=dataset.iloc[:,:-1].values
y=dataset.iloc[:,1].values
```

Here,we are splitting the original dataset into test and train dataset.

Here training dataset consist of 70% and testing dataset consist of 305 of original dataset.

In [10]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.3,random_state=0)
```

Here we are training our model on the train dataset

The values taken from the training dataset are trained using linear model algorithm.

In [12]:
```
from sklearn.linear_model import LinearRegression
model=LinearRegression()
model.fit(x_train,y_train)
```

Out[12]:
```
LinearRegression()
```

For plotting our linear regression line we compute the coefficient and intercept values.

In [13]:
```
model.coef_
```

Out[13]:
```
array([9.78856669])
```

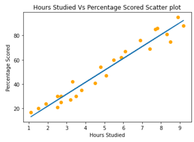
In [14]:
```
model.intercept_
```

Out[14]:
```
2.370815382341881
```

In [15]:
```
line=model.coef_*x+model.intercept_
```

Here,we are visualizing the result of the model that we have trained on training dataset.

In [16]:
```
plt.scatter(x,y,color="orange")
plt.title("Hours Studied Vs Percentage Scored Scatter plot")
plt.xlabel("Hours Studied")
plt.ylabel("Percentage Scored")
plt.plot(x,line)
plt.show()
```



In [17]:
```
print(x_test)
```

```
[[1.5]
 [3.2]
 [7.4]
 [2.5]
 [5.9]
 [3.8]
 [1.9]
 [7.8]]
```

Printing the predicted values and comparing with the actual values.

In [18]:
```
y_pred=model.predict(x_test)
```

In [19]:
```
data=pd.DataFrame({'Actual':y_test, 'Predicted':y_pred})
data
```

Out[19]:

	Actual	Predicted
0	20	17.053665
1	27	33.694229
2	69	74.806209
3	30	26.842232
4	62	60.123359
5	35	39.567369
6	24	20.969092
7	86	78.721636

Now,we check for the results

In [20]:
```
hours=[9.25]
own_pred=model.predict([hours])
print("No. of Hours = {}".format(hours))
print("Predicted Score = {}".format(own_pred[0]))
```

```
No. of Hours = [9.25]
Predicted Score = 92.91505723477056
```

In [21]:
```
from sklearn import metrics
print("Mean Absolute Error:", metrics.mean_absolute_error(y_test,y_pred))
print("Mean Squared Error:", metrics.mean_squared_error(y_test,y_pred))
print("Root Mean Absolute Error:", np.sqrt(metrics.mean_squared_error(y_test,y_pred)))
```

```
Mean Absolute Error: 4.419727808027652
Mean Squared Error: 22.96509721270043
Root Mean Absolute Error: 4.792191274636315
```

In [ ]:
```

```