THE SPARKS FOUNDATION
Data Science & Business Analytics
TASK 1 - Prediction using Supervised ML
To Predict the percentage of marks of the students based on the

Author - NIKHITH GOWDAA CS

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# IMPORTING THE REQUIRED LIBRARIES
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
```

```
# READING THE DATA
data = pd.read_csv('http://bit.ly/w-data')
data.head(5)
```

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

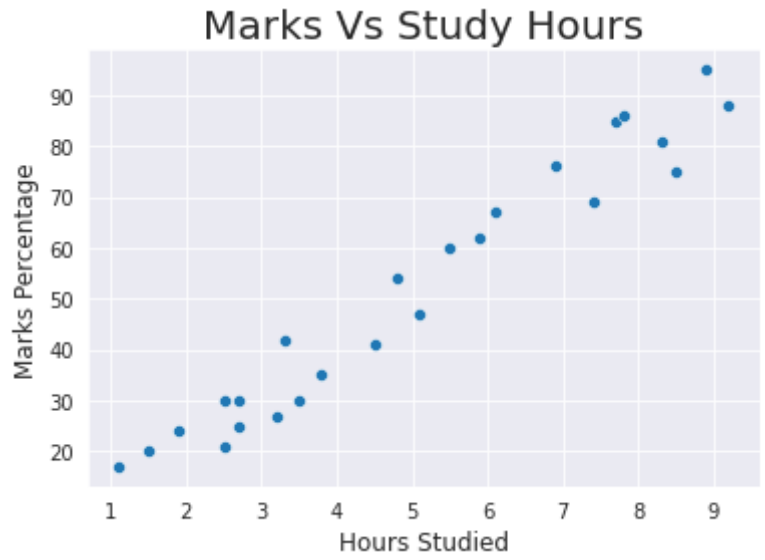
```
# CHECK IF THERE EXIST ANY NULL VALUE IN THE DATASET
data.isnull == True
```

```
False
```

There is no null value in the Dataset so, we can now visualize our Data.

```
sns.set_style('darkgrid')
sns.scatterplot(y= data['Scores'], x= data['Hours'])
plt.title('Marks Vs Study Hours',size=20)
```

```
plt.ylabel('Marks Percentage', size=12)
plt.xlabel('Hours Studied', size=12)
plt.show()
```



From the above scatter plot there looks to be correlation between the 'Marks Percentage' and 'Hours Studied', Lets plot a regression line to confirm the correlation.

```
sns.regplot(x= data['Hours'], y= data['Scores'])
plt.title('Regression Plot',size=20)
plt.ylabel('Marks Percentage', size=12)
plt.xlabel('Hours Studied', size=12)
plt.show()
print(data.corr())
```


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

It is confirmed that the variables are positively correlated.

```
#SPLITTING THE DATA

# Defining X and y from the Data
X = data.iloc[:, :-1].values
y = data.iloc[:, 1].values

# Spliting the Data in two
train_X, val_X, train_y, val_y = train_test_split(X, y, random_
```

```
#FITTING THE DATA INTO THE MODEL

regression = LinearRegression()
regression.fit(train_X, train_y)
print("---------Model Trained---------")
```

```
---------Model Trained---------
```

```
#PREDICTING THE PERCENTAGE OF MARKS

pred_y = regression.predict(val_X)
prediction = pd.DataFrame({'Hours': [i[0] for i in val_X], 'Pre
prediction
```

	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

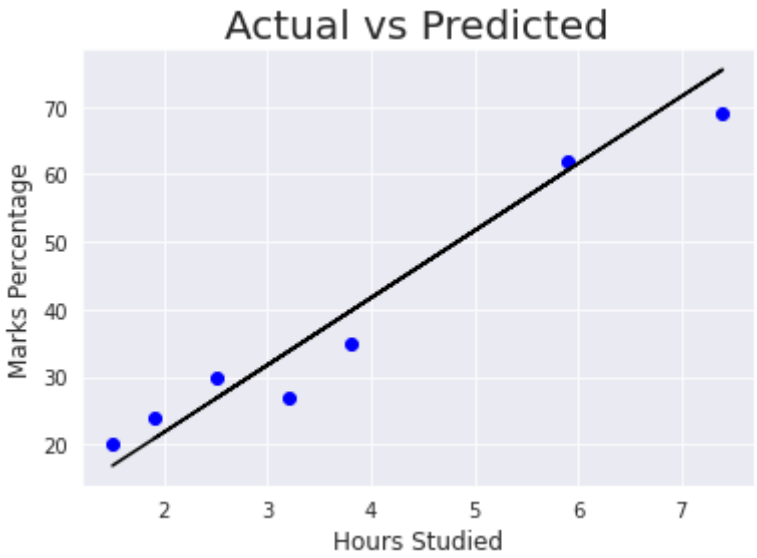
```
#COMPARING THE PREDICTED MARKS WITH THE ACTUAL MARKS

compare_scores = pd.DataFrame({'Actual Marks': val_y, 'Predicte
compare_scores
```

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

```
#VISUALLY COMPARING THE PREDICTED MARKS WITH THE ACTUAL MARKS

plt.scatter(x=val_X, y=val_y, color='blue')
plt.plot(val_X, pred_y, color='Black')
plt.title('Actual vs Predicted', size=20)
plt.ylabel('Marks Percentage', size=12)
plt.xlabel('Hours Studied', size=12)
plt.show()
```




```
#EVALUATING THE MODEL

# Calculating the accuracy of the model
print('Mean absolute error: ',mean_absolute_error(val_y,pred_y)
```

```
Mean absolute error:  4.130879918502482
```

Small value of Mean absolute error states that the chances of error or wrong forecasting through the model are very less.

```
#WHAT WILL BE THE PREDICTED SCORE OF A STUDENT  IF HE/SHE STUDI
```

```
hours = [9.25]
answer = regression.predict([hours])
print("Score = {}".format(round(answer[0],3)))
```

```
Score = 93.893
```

According to the regression model if a student studies for 9.25 hours a day he/she is likely to score 93.89 marks.