GRIP : The Sparks Foundation

Data Science and Buissness Analytics

Author : Kuldeep Dwivedi

Task 1: Prediction using Supervised ML

In this task we have to predict the percentage score of a student based on the no of hours studied. The task has two variables where feature is the no of hours studied and the targer value is the percentage score.

In [1]:
```
# Importing all libraries required in this notebook
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

In [2]:
```
# Reading data from remote link
url = "http://bit.ly/w-data"
s_data = pd.read_csv(url)
print("Data imported successfully")

s_data.head(10)
```

```
Data imported successfully
```

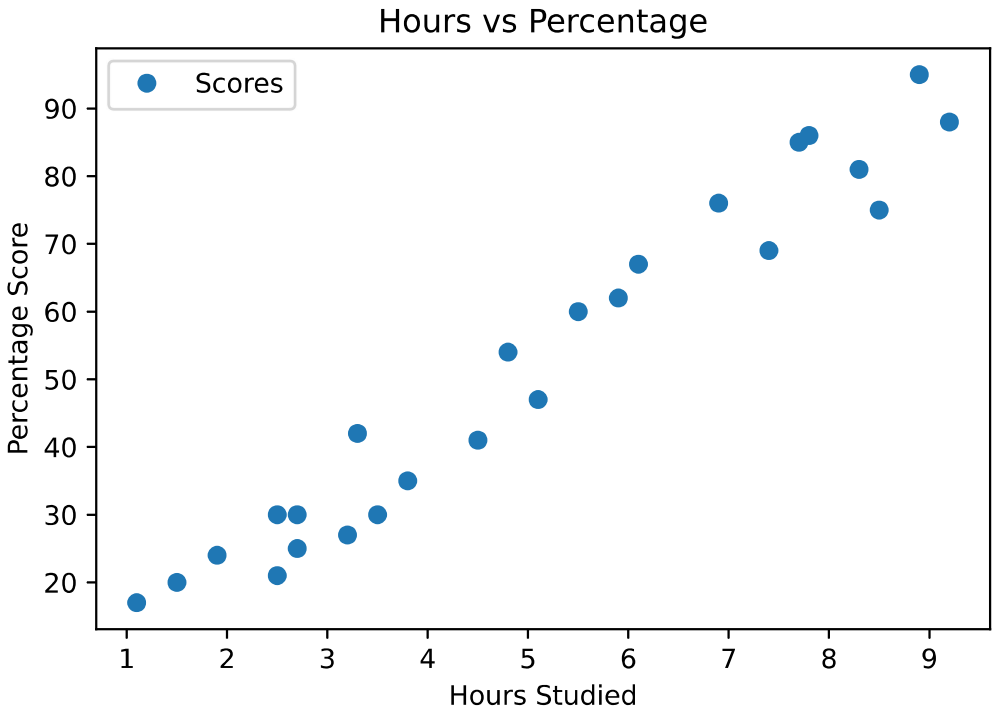
Out[2]:

	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

using scatter plot we can easily find out the theme of the dataset

In [3]:
```
# Plotting the distribution of scores
s_data.plot(x='Hours', y='Scores', style='o')
plt.title('Hours vs Percentage')
```

```
plt.xlabel('Hours Studied')
plt.ylabel('Percentage Score')
plt.show()
```



From the graph above, we can clearly see that there is a positive linear relation between the number of hours studied and percentage of score.

Preparing the data

The next step is to divide the data into "attributes" (inputs) and "labels" (outputs).

In [4]:
```
X = s_data.iloc[:, :-1].values
y = s_data.iloc[:, 1].values
```

Now that we have our attributes and labels, the next step is to split this data into training and test sets. We'll do this by using Scikit-Learn's built-in train_test_split() method:

In [5]:
```
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

We have split our data into training and testing sets, and now is finally the time to train our algorithm.

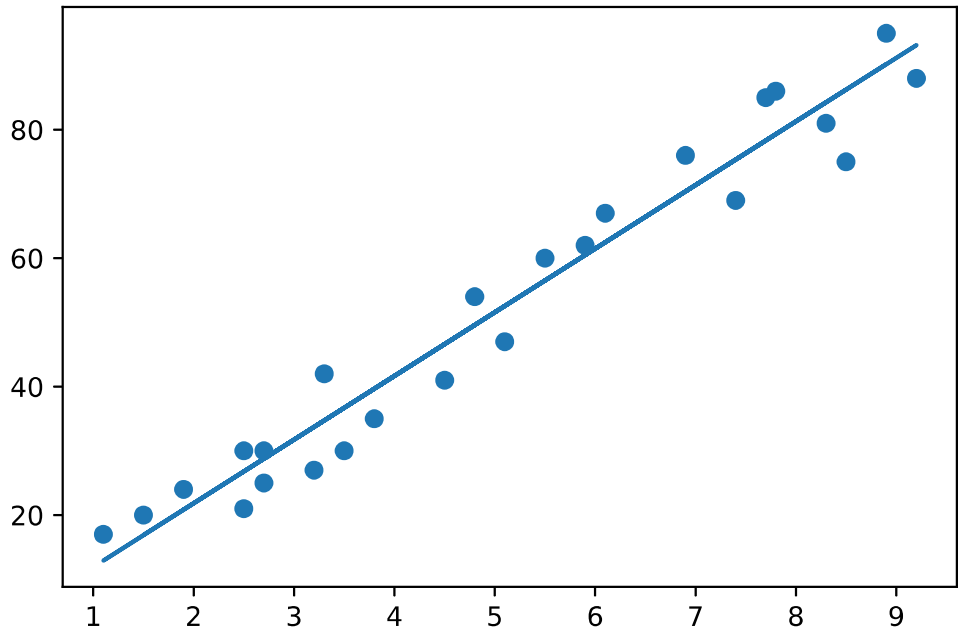
In [6]:
```
from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
regressor.fit(X_train, y_train)

print("Training complete.")
```

```
Training complete.
```

In [7]:
```
# 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 Predictions

Now that we have trained our algorithm, it's time to make some predictions.

In [8]:
```
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 [9]:
```
# Comparing Actual vs Predicted
df = pd.DataFrame({'Actual': y_test, 'Predicted': y_pred})
df
```

Out[9]:

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

	Actual	Predicted
4	62	60.491033

In [10]:
```
# You can also test with your own data
hours = 9.25
own_pred = regressor.predict([[hours]])
print("No of Hours = {}".format(hours))
print("Predicted Score = {}".format(own_pred[0]))
```

```
No of Hours = 9.25
Predicted Score = 93.69173248737535
```

Evaluating the model

The final step is to evaluate the performance of algorithm. This step is particularly important to compare how well different algorithms perform on a particular dataset. For simplicity here, we have chosen the mean square error. There are many such metrics.

In [11]:
```
from sklearn import metrics
print('Mean Absolute Error:',
      metrics.mean_absolute_error(y_test, y_pred))
```

```
Mean Absolute Error: 4.183859899002975
```