the spark foundation

Data Science and Business analytics intern

Author: SAGAR RAJENDRA KALE

TASK 1: Prediction using supervised ML

In [12]:
```
#importing important libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [ ]:
```
Exploring the data
```

In [16]:
```
data=pd.read_csv("spark data.txt")
data.head()
```

Out[16]:

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

In [22]:
```
data.shape
```

Out[22]:
```
(25, 2)
```

In [23]:
```
data.tail()
```

Out[23]:

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

In [24]:
```
data.describe()
```

Out[24]:

	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

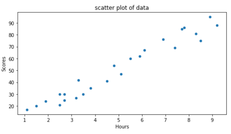
In [25]:
```
data.info()
```

```
<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
```

In [26]:
```
data.isnull().sum()
```

Out[26]:
```
Hours     0
Scores    0
dtype: int64
```

In [12]:
```
data.plot(kind='scatter',x='Hours',y='Scores',figsize=(8,4),title='scatter plot of data')
plt.show()
```



In [13]:
```
data.corr(method='pearson')
```

Out[13]:

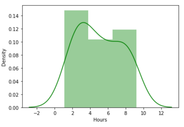
	Hours	Scores
Hours	1.000000	0.976191
Scores	0.976191	1.000000

In [15]:
```
hours=data['Hours']
scores=data['Scores']
```

In [16]:
```
sns.distplot(hours,color='green')
```

```
C:\Users\user\anaconda3\lib\site-packages\seaborn\distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

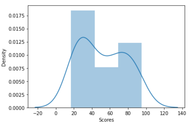
Out[16]:
```
<AxesSubplot:xlabel='Hours', ylabel='Density'>
```



In [37]:
```
sns.distplot(scores)
```

```
C:\Users\user\anaconda3\lib\site-packages\seaborn\distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

Out[17]:
```
<AxesSubplot:xlabel='Scores', ylabel='Density'>
```



Linear Regression

In [28]:
```
x=data.iloc[:,:-1].values
y=data.iloc[:,1].values
```

In [29]:
```
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 [30]:
```
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]
```

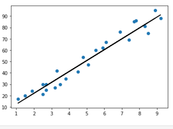
In [31]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=50)
```

In [35]:
```
from sklearn.linear_model import LinearRegression
reg=LinearRegression()
reg.fit(x_train,y_train)
```

Out[35]:
```
LinearRegression()
```

In [38]:
```
m=reg.coef_
c=reg.intercept_
line=m*x+c
plt.scatter(x,y)
plt.plot(x,line,color='black')
plt.show
```

Out[38]:
```
<function matplotlib.pyplot.show(close=None, block=None)>
```



In [56]:
```
y_pred=reg.predict(x_test)
actual_predicted=pd.DataFrame({'Actual_value':y_test,'Predicted_value':y_pred})
actual_predicted
```

Out[56]:

	Actual_value	Predicted_value
0	95	88.211394
1	30	28.718453
2	76	69.020122
3	35	39.273652
4	17	13.365436

In [57]:
```
sns.set_style("whitegrid")
sns.distplot(np.array(y_test-y_pred))
plt.show()
```

```
C:\Users\user\anaconda3\lib\site-packages\seaborn\distributions.py:2557: FutureWarning: `distplot` is a deprecated function and will be removed in a future version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

what will be the predicted score if a student studies for 9.25 hour/day?

In [58]:
```
h=9.25
s=reg.predict([[h]])
print("if a student studies for {} hours per day ,he/she will score {}% in exam.".format(h,s))
```

```
if a student studies for 9.25 hours per day ,he/she will score [91.56986604]% in exam.
```

Model evaluation from import metrics

In [67]:
```
from sklearn import metrics
```

In [68]:
```
from sklearn.metrics import r2_score
print("Mean Absolute Error:",metrics.mean_absolute_error(y_test,y_pred))
print('R2,Score:',r2_score(y_test,y_pred))
```

```
Mean Absolute Error: 4.591649530063285
R2,Score: 0.9710141413239942
```