Machine Learning Project : Web Page Traffic Prediction Part1 using SkLearn Python Library

Step 1

Import all the packages and read the data from excel file using pandas and doing some exploratory data analysis Also install one more package xlrd for excel read using pandas using below command via pip

!pip install xlrd

In [ ]:

```
```

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
```

In [2]:

```
traffic_data=pd.read_excel('data.xlsx')
```

In [3]:

```
#Read the first five records of the data frame
traffic_data.head()
```

Out[3]:

	Returning User	New User	Page Loading Time(in sec)	Total Hits(per day)
0	10	10	10	20
1	20	10	20	30
2	30	5	30	35
3	40	60	10	100
4	50	50	20	100

Doing Some EDA(Exploratory Data Analysis)

In [4]:

```
#Check the shape of the data frame
traffic_data.shape
```

Out[4]:

```
(19, 4)
```

In [5]:

```
#Get the Information of the data frame
traffic_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 19 entries, 0 to 18
Data columns (total 4 columns):
 #   Column                     Non-Null Count  Dtype
---  ------                     --------------  -----
 0   Returning User             19 non-null     int64
 1   New User                   19 non-null     int64
 2   Page Loading Time(in sec)  19 non-null     int64
 3   Total Hits(per day)        19 non-null     int64
dtypes: int64(4)
memory usage: 736.0 bytes
```

In [6]:

```
#Check any missing value exits are not in a data frame
#So my data frame data is OK
traffic_data[traffic_data.isnull()].count()
```

Out[6]:

```
Returning User               0
New User                     0
Page Loading Time(in sec)    0
Total Hits(per day)          0
dtype: int64
```

In [7]:

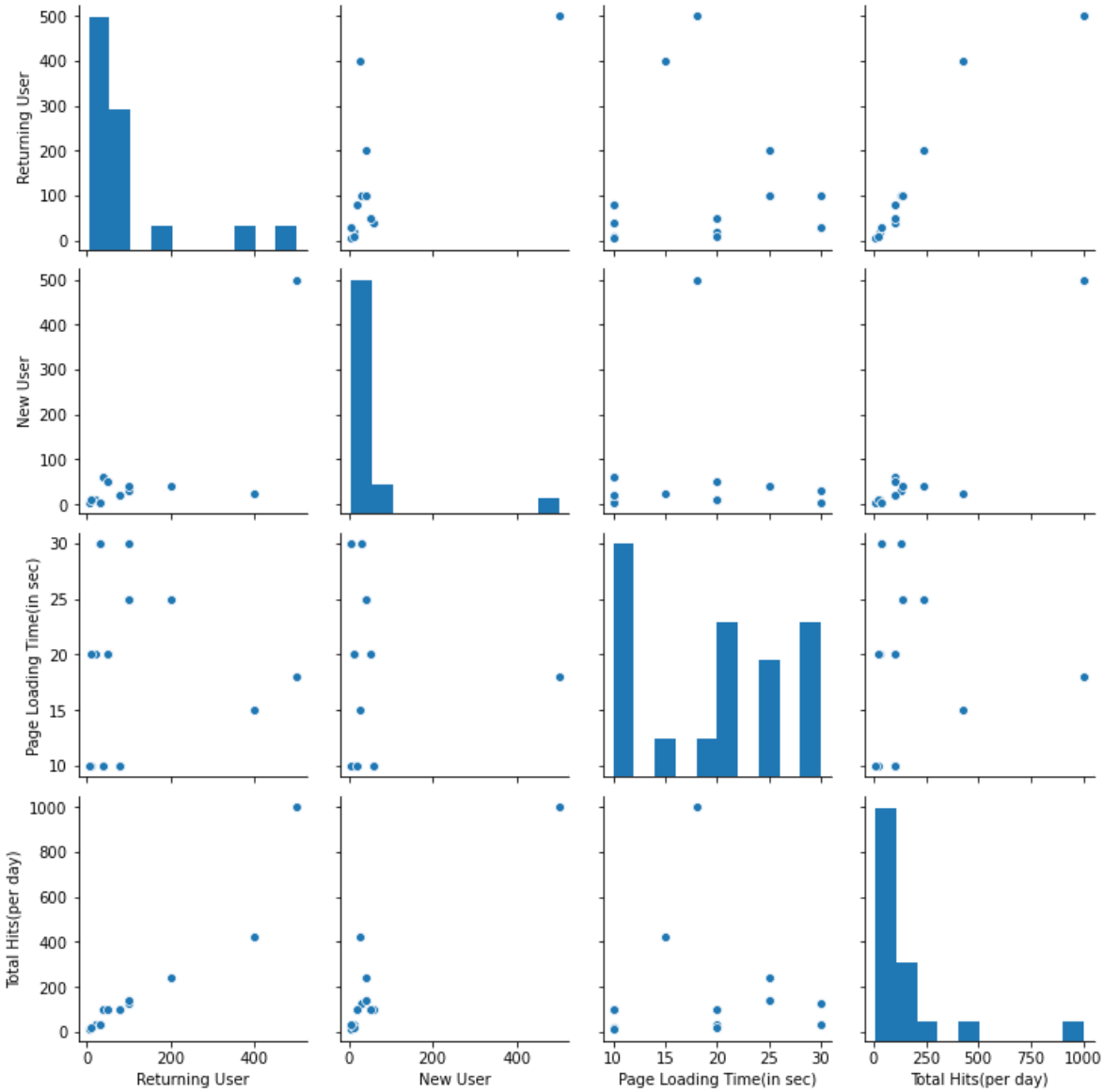
```
#Calculate Some Statistical Information Using describe function
traffic_data.describe()
```

Out[7]:

	Returning User	New User	Page Loading Time(in sec)	Total Hits(per day)
count	19.000000	19.000000	19.000000	19.000000
mean	102.368421	53.157895	19.368421	155.526316
std	132.144370	109.775156	7.804632	225.572695
min	5.000000	5.000000	10.000000	10.000000
25%	30.000000	10.000000	10.000000	35.000000
50%	50.000000	30.000000	20.000000	100.000000
75%	100.000000	45.000000	25.000000	135.000000
max	500.000000	500.000000	30.000000	1000.000000

In [8]:

```
sns.pairplot(traffic_data)
plt.savefig('traffic_pair_plot.jpg')
```

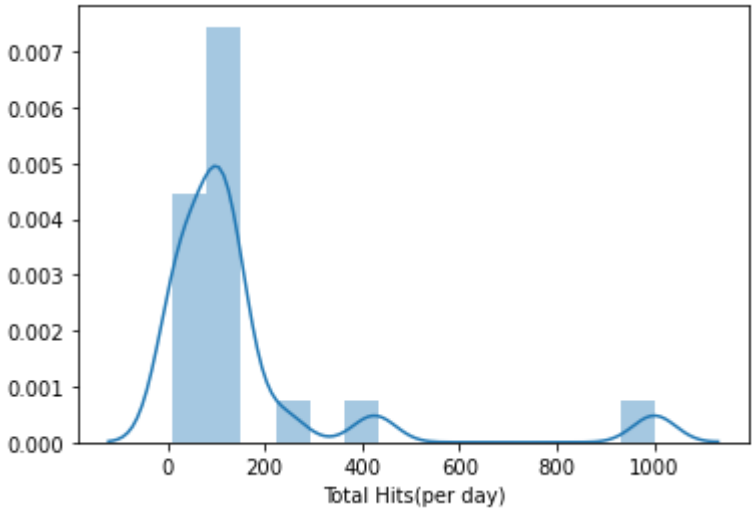


In [9]:

```
sns.distplot(traffic_data['Total Hits(per day)'])
```

Out[9]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x1aad9f81880>
```



Step2

Now in second step i am going to seprate my target and feature variable

Target Variable

1-Total Hits

==========

Feature Variables are

1-Returning User

2-New User

3-Page Loading Time

In [10]:

```
target_data=traffic_data['Total Hits(per day)']
```

In [11]:

```
target_data
```

Out[11]:

```
0       20
1       30
2       35
3      100
4      100
5      130
6      100
7      140
8       10
9       20
10      35
11     100
12     100
13     130
14     100
15     140
16     240
17     425
18    1000
Name: Total Hits(per day), dtype: int64
```

In [12]:

```
feature_data=traffic_data.drop('Total Hits(per day)',axis=1)
```

In [13]:

```
feature_data
```

Out[13]:

	Returning User	New User	Page Loading Time(in sec)
0	10	10	10
1	20	10	20
2	30	5	30
3	40	60	10
4	50	50	20
5	100	30	30
6	80	20	10
7	100	40	25
8	5	5	10
9	10	10	20
10	30	5	30
11	40	60	10
12	50	50	20
13	100	30	30
14	80	20	10
15	100	40	25
16	200	40	25
17	400	25	15
18	500	500	18

Step 3

In step 3 ,I am going to build and train the linear regression model using sklearn library

In [14]:

```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
```

In [15]:

```
#This function split the data into training and testing sets
X_train,X_test,y_train,y_test=train_test_split(feature_data,target_data,test_size=0.3,rando
```

In [16]:

```
#Then Import Linear Regression Model
lm=LinearRegression()
```

In [17]:

```
#Now fit or train the linear regression model using fit method
lm.fit(X_train,y_train)
```

Out[17]:

```
LinearRegression()
```

In [18]:

```
#Now my model is ready for prediction ,So let's start
predicted_data=lm.predict(X_test)
```

In [19]:

```
predicted_data
```

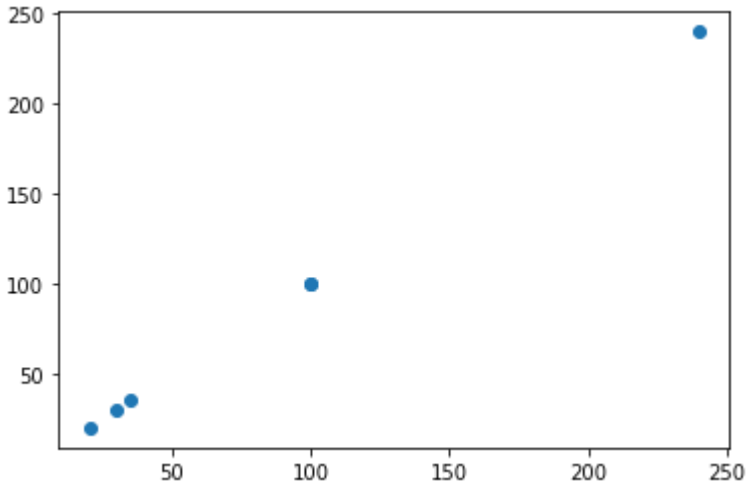
Out[19]:

```
array([100., 100.,  30.,  35.,  20., 240.])
```

In [20]:

```
#Now visaulize the actual data vs predicted data using scatter plot

plt.scatter(y_test,predicted_data)
plt.savefig('linear_regression.jpg')
```



In [21]:

```
#Now the above figure shows the linear regression model
```

Step 4 -Model Evaluation and Validation

Now in fourth step,I am going to evaluate the performance of linear regression using

1-Mean Absolute Error (MAE) is the mean of the absolute value of the errors:

2-Mean Squared Error (MSE) is the mean of the squared errors:

3-Root Mean Squared Error (RMSE) is the square root of the mean of the squared errors:

Let's calculate these by hand

In [22]:

```
#Import metrics from sklearn
from sklearn import metrics

# calculate MAE, MSE, RMSE
print(metrics.mean_absolute_error(y_test, predicted_data))
print(metrics.mean_squared_error(y_test, predicted_data))
print(np.sqrt(metrics.mean_squared_error(y_test, predicted_data)))
```

```
5.4474943074941016e-14
3.416293626877129e-27
5.844906865705499e-14
```

In [23]:

In [ ]:

In [ ]:

In [ ]:

In [ ]: