In [1]:

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

In [2]:

```
data = pd.read_csv("T1.csv")
```

In [3]:

```
#head funtion and tail funtion
data.head()
```

Out[3]:

	Date/Time	LV ActivePower (kW)	Wind Speed (m/s)	Theoretical_Power_Curve (KWh)	Wind Direction (°)
0	01 01 2018 00:00	380.047791	5.311336	416.328908	259.994904
1	01 01 2018 00:10	453.769196	5.672167	519.917511	268.641113
2	01 01 2018 00:20	306.376587	5.216037	390.900016	272.564789
3	01 01 2018 00:30	419.645905	5.659674	516.127569	271.258087
4	01 01 2018 00:40	380.650696	5.577941	491.702972	265.674286

In [4]:

```
data = data.rename(columns = {"Date/Time":"Date",
                              "LV ActivePower (kW)":"Active_Power",
                              "Wind Speed (m/s)":"Wind_Speed",
                              "Theoretical_Power_Curve (KWh)":"Theoretical_Power",
                              "Wind Direction (°)" :"Wind_Direction"
                             })
```

In [5]:

```
data.tail() #last 5 rows of the dataset
```

Out[5]:

	Date	Active_Power	Wind_Speed	Theoretical_Power	Wind_Direction
50525	31 12 2018 23:10	2963.980957	11.404030	3397.190793	80.502724
50526	31 12 2018 23:20	1684.353027	7.332648	1173.055771	84.062599
50527	31 12 2018 23:30	2201.106934	8.435358	1788.284755	84.742500
50528	31 12 2018 23:40	2515.694092	9.421366	2418.382503	84.297913
50529	31 12 2018 23:50	2820.466064	9.979332	2779.184096	82.274620

In [6]:

```
#shape of the dataset
data.shape
```

Out[6]:

```
(50530, 5)
```

In [7]:

```
#missing values

data.isna().sum()
```

Out[7]:

```
Date                0
Active_Power        0
Wind_Speed          0
Theoretical_Power   0
Wind_Direction      0
dtype: int64
```

In [8]:

```
#statisticak overview of the data
data.describe().T
```

Out[8]:

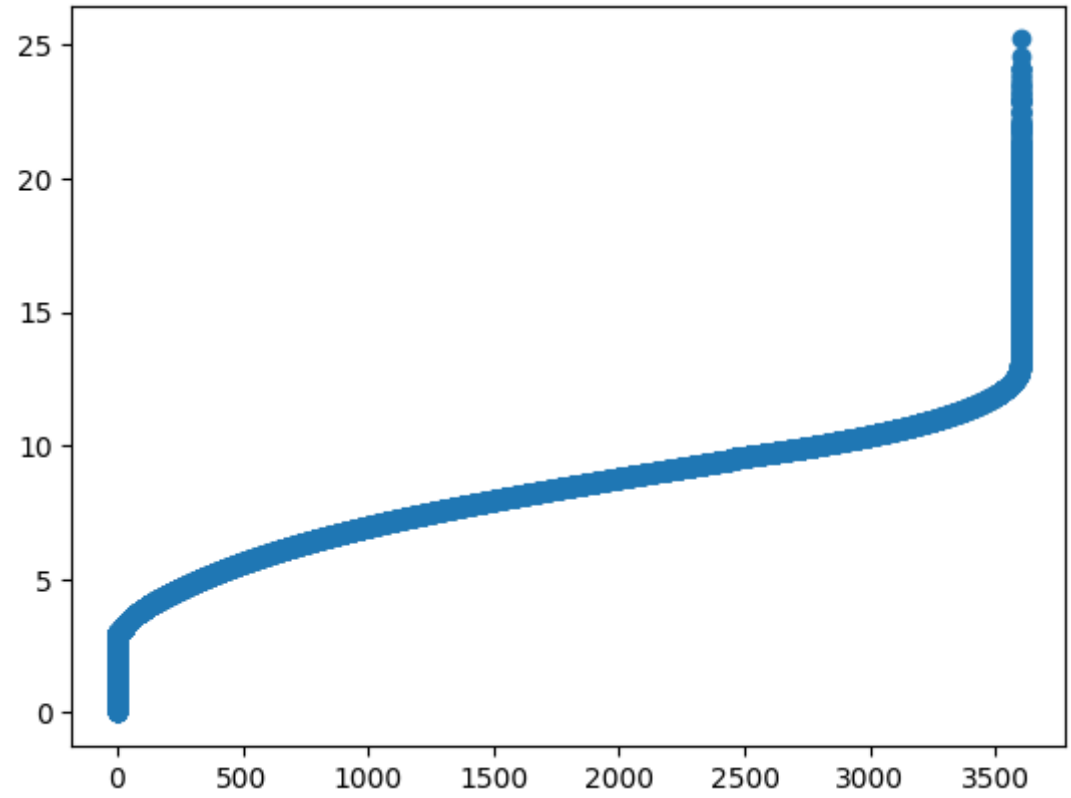
	count	mean	std	min	25%	50%	
Active_Power	50530.0	1307.684332	1312.459242	-2.471405	50.677890	825.838074	2482
Wind_Speed	50530.0	7.557952	4.227166	0.000000	4.201395	7.104594	10
Theoretical_Power	50530.0	1492.175463	1368.018238	0.000000	161.328167	1063.776283	2964
Wind_Direction	50530.0	123.687559	93.443736	0.000000	49.315437	73.712978	201

In [9]:

```
#scatterplot
plt.scatter(data['Theoretical_Power'],data['Wind_Speed'])
```

Out[9]:

```
<matplotlib.collections.PathCollection at 0x1e38e18f700>
```



In [10]:

```
#split the data

x=x = data[["Theoretical_Power", "Wind_Speed"]]
y=data["Active_Power"]
```

In [11]:

```
x=x = data[["Theoretical_Power", "Wind_Speed"]].values
y=data["Active_Power"].values
```

In [12]:

```
x
```

Out[12]:

```
array([[ 416.32890782,    5.31133604],
       [ 519.91751106,    5.67216682],
       [ 390.90001581,    5.2160368 ],
       ...,
       [1788.28475526,    8.43535805],
       [2418.38250336,    9.42136574],
       [2779.18409628,    9.97933197]])
```

In [13]:

```
y
```

Out[13]:

```
array([ 380.04779053,  453.76919556,  306.37658691, ..., 2201.10693359,
       2515.6940918 , 2820.46606445])
```

In [14]:

```
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)
```

In [*]:

```
from sklearn.ensemble import RandomForestRegressor

RFR= RandomForestRegressor(n_estimators = 750, max_depth = 4, max_leaf_nodes = 500, random_

RFR.fit(x_train,y_train)
```

In [*]:

```
x_test
```

In [*]:

```
#predcition on the test data
y_pred=RFR.predict(x_test)
y_pred
```

In [*]:

```
#predccition in the train data
pred=RFR.predict(x_train)
pred
```

In [*]:

```
#FInding accuracy

from sklearn.metrics import r2_score

acc=r2_score(y_test,y_pred)

acc
```

In [*]:

```
import joblib
joblib.dump(RFR, "Power_Prediction.sav")
```

In [*]:

```
joblib.dump(RFR, open(r'C:\Users\balas\Desktop\IBM BALA PROJECT\Project Development Phase\A
```