```python
[26]: import pandas as pd
```

```python
[27]: data=pd.read_csv(r"C:\Users\ASUS\Desktop\akira\Final!!.csv")
      data
```

[27]:

	PARAMETERS	SO2	CO	NO	NO2	NOX	NH3	O3	AQI	WS	WD	RH	SR	TC
0	01/01/2023	2.02	0.06	8.93	17.84	26.00	8.93	26.07	72	0.33	37.96	80.27	199.80	28.70
1	02/01/2023	1.63	0.12	8.89	17.74	26.00	8.89	25.97	81	0.47	33.84	82.50	189.10	28.11
2	03/01/2023	3.46	0.03	8.91	17.89	26.00	8.91	26.03	82	0.19	54.37	71.00	203.10	28.55
3	04/01/2023	2.79	0.11	8.88	17.77	26.00	8.88	25.95	79	0.54	40.44	78.11	205.20	28.25
4	05/01/2023	1.15	0.22	9.48	17.73	26.00	9.48	23.93	84	0.43	42.53	78.56	202.30	28.55
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
670	12/27/2024	3.53	0.53	1.45	5.34	6.68	1.45	36.20	66	0.80	151.19	83.99	98.19	30.23
671	12/28/2024	3.65	0.48	1.44	5.35	6.72	1.44	36.17	64	0.82	159.29	76.87	95.05	29.99
672	12/29/2024	4.64	0.49	1.42	5.35	6.58	1.42	36.21	60	0.82	148.56	78.66	100.60	30.42
673	12/30/2024	4.18	0.53	1.44	5.37	6.77	1.44	36.20	60	0.70	143.66	86.57	98.00	30.22
674	12/31/2024	3.67	0.62	1.42	5.35	6.61	1.42	36.19	60	0.72	163.21	77.02	96.68	30.12

675 rows × 14 columns

```python
[28]: data.isnull().sum()
```

```
[28]: PARAMETERS    0
      SO2           0
      CO            0
      NO            0
      NO2           0
      NOX           0
      NH3           0
      O3            0
      AQI           0
      WS            0
      WD            0
      RH            0
      SR            1
      TC            0
```

```python
[29]: data.head()
```

	PARAMETERS	SO2	CO	NO	NO2	NOX	NH3	O3	AQI	WS	WD	RH	SR	TC
0	01/01/2023	2.02	0.06	8.93	17.84	26.0	8.93	26.07	72	0.33	37.96	80.27	199.8	28.70
1	02/01/2023	1.63	0.12	8.89	17.74	26.0	8.89	25.97	81	0.47	33.84	82.50	189.1	28.11
2	03/01/2023	3.46	0.03	8.91	17.89	26.0	8.91	26.03	82	0.19	54.37	71.00	203.1	28.55
3	04/01/2023	2.79	0.11	8.88	17.77	26.0	8.88	25.95	79	0.54	40.44	78.11	205.2	28.25
4	05/01/2023	1.15	0.22	9.48	17.73	26.0	9.48	23.93	84	0.43	42.53	78.56	202.3	28.55

```python
[30]: data.isnull()
```

	PARAMETERS	SO2	CO	NO	NO2	NOX	NH3	O3	AQI	WS	WD	RH	SR	TC
0	False	False	False	False	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
670	False	False	False	False	False	False	False	False	False	False	False	False	False	False
671	False	False	False	False	False	False	False	False	False	False	False	False	False	False
672	False	False	False	False	False	False	False	False	False	False	False	False	False	False
673	False	False	False	False	False	False	False	False	False	False	False	False	False	False
674	False	False	False	False	False	False	False	False	False	False	False	False	False	False

675 rows × 14 columns

```python
[31]: data.isnull().sum()
```

```
[31]: PARAMETERS    0
      SO2           0
      CO            0
```

673	False	False	False	False	False	False	False	False	False	False	False	False	False
674	False	False	False	False	False	False	False	False	False	False	False	False	False

675 rows × 14 columns

```
[31]: data.isnull().sum()
```

```
[31]: PARAMETERS    0
      SO2           0
      CO            0
      NO            0
      NO2           0
      NOX           0
      NH3           0
      O3            0
      AQI           0
      WS            0
      WD            0
      RH            0
      SR            1
      TC            0
      dtype: int64
```

```
[32]: data_cleaned=data.dropna(inplace=True)
```

```
[33]: data.isnull().sum()
```

```
[33]: PARAMETERS    0
      SO2           0
      CO            0
      NO            0
      NO2           0
      NOX           0
      NH3           0
      O3            0
      AQI           0
      WS            0
      WD            0
      RH            0
      SR            0
      TC            0
      dtype: int64
```

```
[34]: x=data[['SO2','CO','NO','NO2','NOX','NH3','O3','WS','WD','RH','SR','TC' ]]
```

```
dtype: int64
```

[40]:
```python
from sklearn.linear_model import LinearRegression
reg=LinearRegression()
```

[41]:
```python
x_train.isnull().sum()
```

[41]:
```
SO2     0
CO      0
NO      0
NO2     0
NOX     0
NH3     0
O3      0
WS      0
WD      0
RH      0
SR      0
TC      0
dtype: int64
```

[42]:
```python
reg.fit(x_train,y_train)
```

[42]:
▾ LinearRegression ❶ ❷

LinearRegression()

[43]:
```python
from sklearn.neighbors import KNeighborsRegressor
from sklearn.model_selection import train_test_split
```

[44]:
```python
y_pred=reg.predict(x_test)
```

[45]:
```python
from sklearn.metrics import r2_score
r2_score(y_test,y_pred)
```

[45]: 0.6592058182266733

[46]:
```python
from sklearn.tree import DecisionTreeRegressor
model=DecisionTreeRegressor()
model.fit(x_train,y_train)
y_pred=model.predict(x_test)
```

[47]:
```python
from sklearn.metrics import r2_score
r2_score(y_test,y_pred)
```

[47]: 0.8147829337635636

```
[35]: y=data['AQI']
```

```
[36]: x.isnull().sum()
```

```
[36]: SO2     0
      CO      0
      NO      0
      NO2     0
      NOX     0
      NH3     0
      O3      0
      WS      0
      WD      0
      RH      0
      SR      0
      TC      0
      dtype: int64
```

```
[37]: from sklearn.model_selection import train_test_split
      x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.1)
```

```
[38]: x_train.shape
```

```
[38]: (606, 12)
```

```
[39]: x.isnull().sum()
```

```
[39]: SO2     0
      CO      0
      NO      0
      NO2     0
      NOX     0
      NH3     0
      O3      0
      WS      0
      WD      0
      RH      0
      SR      0
      TC      0
      dtype: int64
```

```
[40]: from sklearn.linear_model import LinearRegression
```

```
r2_score(y_test,y_pred)
```

[45]: 0.6592058182266733

[46]:
```python
from sklearn.tree import DecisionTreeRegressor
model=DecisionTreeRegressor()
model.fit(x_train,y_train)
y_pred=model.predict(x_test)
```

[47]:
```python
from sklearn.metrics import r2_score
r2_score(y_test,y_pred)
```

[47]: 0.8147829337635636

[48]:
```python
from sklearn.ensemble import RandomForestRegressor
model_rf =RandomForestRegressor(n_estimators=200)
model_rf.fit(x_train,y_train)
```

[48]:
```
        RandomForestRegressor          ❶ ❷

RandomForestRegressor(n_estimators=200)
```

[49]:
```python
from sklearn.metrics import r2_score
r2_score(y_test,y_pred)
```

[49]: 0.8147829337635636

[50]:
```python
import pickle
file=open('project_model.pkl','wb')
pickle.dump(model_rf,file)
file.close()
```

[ ]:

[ ]:

[ ]: