

Calculating the air quality Index of the SO₂,NO₂, RSPM Level

Python coding for calculating SO2 AQI level

```
import pandas as pd

import matplotlib.pyplot as plt
import seaborn as sns

# Read the data into a DataFrame
df = pd.read_csv("updated_project.csv")

# Check the information about the DataFrame
print(df.info())

# Display the first few rows of the DataFrame
def calculate_si(SO2):
    si=0
    if(SO2<=40):
        si=SO2*(50/40)

    if(SO2>40 and SO2<=80):
        si=50+(SO2-40)*(50/40)

    if(SO2>80 and SO2<=380):
        si=100+(SO2-80)*(100/300)

    if(SO2>380 and SO2<=800):
        si=200+(SO2-380)*(100/800)

    if(SO2>800 and SO2<=1600):
        si=300+(SO2-800)*(100/800)

    if(SO2>1600):
        si=400+(SO2-1600)*(100/800)

df['si']=df['SO2'].apply(calculate_si)
data=df[['SO2']]
```

calculating NO2 AQI Level

```
def calculate_ni(NO2):
    ni=0
    if(NO2<=40):
```

```

        ni=NO2*(50/40)

    if(NO2>40 and NO2<=80):
        ni=50+(NO2-40)*(50/40)

    if(NO2>80 and NO2<=380):
        ni=100+(NO2-80)*(100/300)

    if(NO2>380 and NO2<=800):
        ni=200+(NO2-380)*(100/800)

    if(NO2>800 and NO2<=1600):
        ni=300+(NO2-800)*(100/800)

    if(NO2>1600):
        ni=400+(NO2-1600)*(100/800)

    return ni
df['ni']=df['NO2'].apply(calculate_ni)
data=df[['NO2','ni']]
print(data)

```

calculating RSPM AQI level

```

def calculate_ri(RSPM_PM10):
    ri=0
    if(RSPM/PM10<=40):
        ri=RSPM/PM10*(50/40)

    if(RSPM/PM10>40 and RSPM/PM10<=80):
        ri=50+(RSPM/PM10-40)*(50/40)

    if(RSPM/PM10>80 and RSPM/PM10<=380):
        ri=100+(RSPM/PM10-80)*(100/300)

    if(RSPM/PM10>380 and RSPM/PM10<=800):
        ri=200+(RSPM/PM10-380)*(100/800)

    if(RSPM/PM10>800 and RSPM/PM10<=1600):
        ri=300+(RSPM/PM10-800)*(100/800)

    if(RSPM/PM10>1600):
        ri=400+(RSPM/PM10-1600)*(100/800)

    return ri
df['ri']=df['RSPM_PM10'].apply(calculate_ri)

```

```
data=df[['RSPM_PM10','ri']]
print(data)
df.to_csv("calcuated.csv")
```

output: It is calculated and store in csv file

Before calcuating

Stn Code	Sampling	State	City/Town	Location	Agency	Type of Location	SO2	NO2	RSPM/PM SPM
38	5/1/2010	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	9.6	17.16667	73.33333
38	7/1/2010	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.15	20.28333	61.33333
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	12.45	20.51667	75
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	10.75	18.18333	120
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	9.78	17.32	96.5
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	17.11667	20.86667	81.33333
38	2/2/2010	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.48333	20.66667	82.33333
38	4/2/2010	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	10.93333	18.65	79
38	9/2/2010	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.36667	19.5	96.66667
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.16667	18.38333	52.66667
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	10.18333	18.63333	50.66667
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.56667	21.48333	85
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.55	19.78333	88.66667
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	14.71667	22.33333	83
38	2/3/2010	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	9.633333	16.61667	94.66667
38	4/3/2010	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.38333	16.58333	118.3333
38	9/3/2010	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	12.7	22.13333	56
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	8.65	14.36667	53.33333
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.71667	19.36667	69.66667
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	10.18333	16.6	111
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	11.41667	20.15	58
38	#####	Tamil Nad	Chennai	Kathivakk	Tamilnad	Industrial	15.35	20.5	67.66667

Calculate value of ni,si,ri respective value of AQI level of SO2,NO2,RSPM/PM10

calculated - Excel (Product Activation Failed)

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1		Stn Code	Sampling	State	City/Town	Location	c Agency	Type of Loc	SO2	NO2	RSPM	PM	SPM	si	ni	ri					
2	0	38	5/1/2010	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	9.6	17.16667	73.33333	149.6667	12	21.45833	91.66667						
3	1	38	7/1/2010	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.15	20.28333	61.33333	150.3333	13.9375	25.35417	76.66667						
4	2	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	12.45	20.51667	75	114.6667	15.5625	25.64583	93.75						
5	3	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	10.75	18.18333	120	197.6667	13.4375	22.72917	113.3333						
6	4	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	9.78	17.32	96.5	216	12.225	21.65	105.5						
7	5	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	17.11667	20.86667	81.33333	159.3333	21.39583	26.08333	100.4444						
8	6	38	2/2/2010	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.48333	20.66667	82.33333	185.6667	14.35417	25.83333	100.7778						
9	7	38	4/2/2010	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	10.93333	18.65	79	179.3333	13.66667	23.3125	98.75						
10	8	38	9/2/2010	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.36667	19.5	96.66667	181.3333	14.20833	24.375	105.5556						
11	9	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.16667	18.38333	52.66667	125.6667	13.95833	22.97917	65.83333						
12	10	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	10.18333	18.63333	50.66667	128.3333	12.72917	23.29167	63.33333						
13	11	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.56667	21.48333	85	157	14.45833	26.85417	101.6667						
14	12	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.55	19.78333	88.66667	272.3333	14.4375	24.72917	102.8889						
15	13	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	14.71667	22.33333	83	197.3333	18.39583	27.91667	101						
16	14	38	2/3/2010	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	9.633333	16.61667	94.66667	193.3333	12.04167	20.77083	104.8889						
17	15	38	4/3/2010	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.38333	16.58333	118.3333	335.3333	14.22917	20.72917	112.7778						
18	16	38	9/3/2010	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	12.7	22.13333	56	173.6667	15.875	27.66667	70						
19	17	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	8.65	14.36667	53.33333	107.3333	10.8125	17.95833	66.66667						
20	18	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.71667	19.36667	69.66667	167.3333	14.64583	24.20833	87.08333						
21	19	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	10.18333	16.6	111	298.6667	12.72917	20.75	110.3333						
22	20	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	11.41667	20.15	58	222.3333	14.27083	25.1875	72.5						
23	21	38	#####	Tamil Nad	Chennai	Kathivakk	TamilNadi	Industrial	15.35	20.5	67.66667	279.3333	19.1875	25.625	84.58333						

calculated

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10/28/2023