India Air Quality Index Analysis

Objective

The Air Quality Monitoring System stands as an all-inclusive solution meticulously designed to collect, archive, and analyze air quality data sourced from a multitude of monitoring stations strategically positioned across different states and cities. At its core, this initiative is driven by the paramount objective of delivering invaluable insights into the prevailing air quality conditions across diverse regions. This wealth of information serves as a vital resource for environmentalists, policymakers, and the general public alike, equipping them with the knowledge needed to make enlightened decisions concerning health and environmental affairs.

Table Used : Indian Air Quality

SerialNumber	State	City	StationName	CurrentAQIValue
1	Andhra Pradesh	Amaravati	Secretariat, Amaravati - APPCB	135
2	Andhra Pradesh	Anantapur	Gulzarpet, Anantapur - APPCB	62
3	Andhra Pradesh	Chittoor	Gangineni Cheruvu, Chittoor - APPCB	30
4	Andhra Pradesh	Eluru	Eluru - APPCB	95
5	Andhra Pradesh	Guntur	Collectorate, Guntur - APPCB	84
6	Andhra Pradesh	Kadapa	RTC Bus Stand, Kadapa - APPCB	102
7	Andhra Pradesh	Kakinada	LMD Colony, Kakinada - APPCB	54
8	Andhra Pradesh	Kurnool	Gandhi Nagar, Kurnool - APPCB	44
9	Andhra Pradesh	Nellore	ZP Office, Nellore - APPCB	72
10	Andhra Pradesh	Ongole	Ongole - APPCB	88
11	Andhra Pradesh	Rajamahendravaram	RTC Complex, Rajamahendravaram - APPCB	73
12	Andhra Pradesh	Srikakulam	New RTC Bus Stand, Srikakulam - APPCB	45
13	Andhra Pradesh	Tirupati	Tirupati - APPCB	107
14	Andhra Pradesh	Vijayawada	Income Tax Office, Vijayawada - APPCB	97
15	Andhra Pradesh	Visakhapatnam	GVM Corporation Office, Visakhapatnam - APPCB	106
16	Andhra Pradesh	Vizianagaram	Vizianagaram - APPCB	23

1. Retrieve all records for a specific city (e.g., Mumbai) ?

```sql
SELECT * FROM airquality
WHERE city = 'Mumbai';
```

	SerialNumber	State	City	StationName	CurrentAQIValue
1	108	Maharashtra	Mumbai	BKC, Mumbai - MPCB	151
2	291	Maharashtra	Mumbai	Bandra, Mumbai - MPCB	212
3	413	Maharashtra	Mumbai	Worli, Mumbai - MPCB	196

2. Find The average AQI value for each state ?

```
SELECT state,
    AVG(currentaqivalue) AS avg_aqi
FROM airquality
GROUP BY state;
```

	state	avg_aqi
1	Andaman and Nicobar Islands	29.5
2	Andhra Pradesh	76.4705882352941
3	Arunachal Pradesh	64
4	Assam	94.5
5	Bihar	124
6	Chandigarh	68.6666666666667
7	Chhattisgarh	92
8	Dadra and Nagar Haveli	52
9	Dadra and Nagar Haveli and Daman and Diu	69
10	Daman and Diu	57
11	Delhi	290
12	Goa	41.6666666666667
13	Gujarat	122
14	Haryana	147.807692307692
15	Himachal Pradesh	56.2105263157895
16	Jammu and Kashmir	66.5

3. Identify cities where AQI is above a certain threshold (e.g.,, AQI>200) ?

```
SELECT City,CurrentAQIValue
FROM airquality
WHERE CurrentAQIValue>200;
```

	City	CurrentAQIValue
1	Delhi	318
2	Faridabad	204
3	Ghaziabad	315
4	Noida	239
5	Delhi	262
6	Ahmedabad	292
7	Surat	241
8	Faridabad	272
9	Gurugram	277
10	Kalyan	215
11	Mumbai	212
12	Thane	218
13	Ghaziabad	289
14	Greater Noida	264
15	Lucknow	203
16	Noida	264

4. count the number of records with insufficient data ?

```sql
SELECT COUNT(*) FROM airquality
WHERE CurrentAQIValue IS NULL;
```

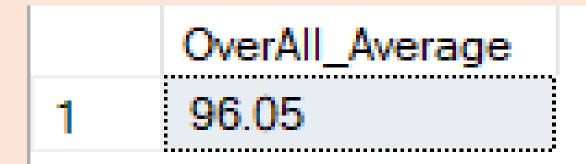| (No column name) |
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5. Find the highest AQI value along with the corresponding city and state ?

```
SELECT TOP 1 state, city, currentAQIvalue
FROM airquality
ORDER BY currentAQIvalue DESC;
```

	state	city	currentAQIvalue
1	Delhi	Delhi	318

6. Calculate the overall average AQI for the entire dataset ?

```sql
SELECT round(AVG(CurrentAQIValue),2) AS OverAll_Average
FROM airquality;
```

	OverAll_Average
1	96.05

7. Retrieve records for states with more than five city ?

```sql
SELECT State,Count(DISTINCT City) AS CityCount
FROM airquality
GROUP BY State HAVING Count(DISTINCT City)>5;
```

	State	CityCount
1	Andhra Pradesh	17
2	Gujarat	12
3	Haryana	19
4	Himachal Pradesh	12
5	Karnataka	19
6	Kerala	9
7	Lakshadweep	10
8	Madhya Pradesh	8
9	Maharashtra	24
10	Odisha	9
11	Punjab	9
12	Rajasthan	11
13	Tamil Nadu	18
14	Telangana	10
15	Uttar Pradesh	14
16	West Bengal	7

8. Find the cities in a specific state with AQI less than 50 ?

```
SELECT State,City,CurrentAQIValue
FROM airquality
WHERE CurrentAQIValue<50;
```

	State	City	CurrentAQIValue
1	Andhra Pradesh	Chittoor	30
2	Andhra Pradesh	Kurnool	44
3	Andhra Pradesh	Srikakulam	45
4	Andhra Pradesh	Vizianagaram	23
5	Chandigarh	Chandigarh	48
6	Goa	Margao	34
7	Goa	Panaji	32
8	Gujarat	Morbi	38
9	Himachal Pradesh	Dalhousie	48
10	Himachal Pradesh	Dharamshala	42
11	Himachal Pradesh	Mandi	47
12	Himachal Pradesh	Paonta Sahib	39
13	Himachal Pradesh	Sirmaur	44
14	Himachal Pradesh	Solan	45
15	Karnataka	Bagalkot	33
16	Karnataka	Belagavi	44

9. Categorize AQI values into different pollution levels ?

```sql
SELECT City, CurrentAQIValue,
CASE
    WHEN CurrentAQIValue <= 50 THEN 'Good'
    WHEN CurrentAQIValue <= 100 THEN 'Moderate'
    WHEN CurrentAQIValue <= 150 THEN 'Unhealthy For Sensitive Group'
    WHEN CurrentAQIValue <= 200 THEN 'Unhealthy For All'
    WHEN CurrentAQIValue <= 250 THEN 'Very Dangerous'
    ELSE 'Hazardous'
END AS Categorize_AQI_Values
FROM airquality;
```

	City	CurrentAQIValue	Categorize_AQI_Values
1	Amaravati	135	Unhealthy For Sensitive Group
2	Anantapur	62	Moderate
3	Chittoor	30	Good
4	Eluru	95	Moderate
5	Guntur	84	Moderate
6	Kadapa	102	Unhealthy For Sensitive Group
7	Kakinada	54	Moderate
8	Kurnool	44	Good
9	Nellore	72	Moderate
10	Ongole	88	Moderate
11	Rajamahendravaram	73	Moderate
12	Srikakulam	45	Good
13	Tirupati	107	Unhealthy For Sensitive Group
14	Vijayawada	97	Moderate
15	Visakhapatnam	106	Unhealthy For Sensitive Group
16	Vizianagaram	23	Good

10. Find cities with the lowest AQI values in each state and rank them ?

```
SELECT State,City,CurrentAQIValue,
RANK() OVER(PARTITION BY State ORDER BY CurrentAQIValue) AS
Ranks FROM airquality;
```

	State	City	CurrentAQIValue	Ranks
1	Andaman and Nicobar Islands	Port Blair	27	1
2	Andaman and Nicobar Islands	Port Blair	32	2
3	Andhra Pradesh	Vizianagaram	23	1
4	Andhra Pradesh	Chittoor	30	2
5	Andhra Pradesh	Kurnool	44	3
6	Andhra Pradesh	Srikakulam	45	4
7	Andhra Pradesh	Kakinada	54	5
8	Andhra Pradesh	Anantapur	62	6
9	Andhra Pradesh	Nellore	72	7
10	Andhra Pradesh	Rajamahendravaram	73	8
11	Andhra Pradesh	Yemmiganur	83	9
12	Andhra Pradesh	Guntur	84	10
13	Andhra Pradesh	Ongole	88	11
14	Andhra Pradesh	Eluru	95	12
15	Andhra Pradesh	Vijayawada	97	13
16	Andhra Pradesh	Kadapa	102	14

11. Retrieve the states where the highest pollution level is recorded and the corresponding pollution level ?

```sql
SELECT State,MAX(CurrentAQIValue) AS Highest_Value
FROM airquality
GROUP BY State;
```

	State	Highest_Value
1	Andaman and Nicobar Islands	32
2	Andhra Pradesh	135
3	Arunachal Pradesh	64
4	Assam	112
5	Bihar	146
6	Chandigarh	91
7	Chhattisgarh	143
8	Dadra and Nagar Haveli	52
9	Dadra and Nagar Haveli and Daman and Diu	100
10	Daman and Diu	57
11	Delhi	318
12	Goa	59
13	Gujarat	292
14	Haryana	277
15	Himachal Pradesh	96
16	Jammu and Kashmir	72

12. Identify the stations where the pollution level is higher than the average pollution level across all stations ?

```sql
]SELECT State,CurrentAQIValue FROM airquality
 WHERE CurrentAQIValue > (SELECT AVG(CurrentAQIValue) FROM airquality);
```

	State	CurrentAQIValue
1	Andhra Pradesh	135
2	Andhra Pradesh	102
3	Andhra Pradesh	107
4	Andhra Pradesh	97
5	Andhra Pradesh	106
6	Assam	112
7	Assam	99
8	Bihar	113
9	Bihar	108
10	Bihar	117
11	Bihar	146
12	Bihar	136
13	Delhi	318
14	Gujarat	185
15	Gujarat	132
16	Gujarat	136

13. Retrieve the names and pollution levels of stations in the National Capital Region (NCR) ?

```sql
SELECT State,CurrentAQIValue
FROM airquality
WHERE City IN ('Delhi','Ghaziabad','Noida','Gurugram','Faridabad');
```

	State	CurrentAQIValue
1	Delhi	318
2	Haryana	204
3	Haryana	190
4	Uttar Pradesh	315
5	Uttar Pradesh	239
6	Delhi	262
7	Haryana	272
8	Haryana	277
9	Uttar Pradesh	289
10	Uttar Pradesh	264
11	Uttar Pradesh	213
12	Uttar Pradesh	264

14. Find the monitoring stations in South India (Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana) with pollution levels greater than 100 ?

```
SELECT State,City,CurrentAQIValue FROM airquality
WHERE State IN ('Andhra Pradesh','Karnataka','Kerala','Tamil Nadu','Telangana')
AND CurrentAQIValue>100;
```

	State	City	CurrentAQIValue
1	Andhra Pradesh	Amaravati	135
2	Andhra Pradesh	Kadapa	102
3	Andhra Pradesh	Tirupati	107
4	Andhra Pradesh	Visakhapatnam	106
5	Tamil Nadu	Chennai	109
6	Telangana	Hyderabad	128
7	Telangana	Sangareddy	119
8	Telangana	Nalgonda	114
9	Telangana	Hyderabad	103
10	Telangana	Rangareddy	108
11	Telangana	Warangal	124

15. Find the states with the highest average pollution levels ?

```sql
SELECT TOP 1 State, ROUND(AVG(CurrentAQIValue), 2) AS Highest_Pollution
FROM airquality
GROUP BY State
ORDER BY AVG(CurrentAQIValue) DESC;
```

	State	Highest_Pollution
1	Delhi	290

16. Find the states with the lowest average pollution level ?

```sql
SELECT TOP 1 State, ROUND(AVG(CurrentAQIValue), 2) AS Lowest_Pollution
FROM airquality
GROUP BY State
ORDER BY AVG(CurrentAQIValue) ASC;
```

	State	Lowest_Pollution
1	Andaman and Nicobar Islands	29.5

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Thank you