# INDIAN-AIR QUALITY INDEX ANALYSIS

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# INTRODUCTION

Air quality index analysis in India pollution poses a critical challenge in India due to rapid urbanization and industrialization. Our project focuses on analyzing the air quality index (AQI) to understand pollutant trends, spatial variability, and seasonal patterns. We aim to identify major pollution sources, monitor compliance with standards, and assess public health impacts. Through stakeholder engagement, we strive to foster collaboration for mitigating air pollution and promoting sustainability. Join us as we explore the dynamics of air quality and work towards a healthier future for India.

# OBJECTIVE

The air quality monitoring system serves as an all-encompassing solution crafted to gather, store, and scrutinize air quality data derived from diverse monitoring stations situated across various states and cities. The primary objective of this initiative is to furnish valuable insights into the air quality across different regions. Such information proves instrumental for environmentalists, policymakers, and the public at large, empowering them to make well-informed decisions about health and environmental matters.

# TABLE

The table contains the following columns

| | serialnumber [PK] integer | state character varying (50) | city character varying (50) | stationname character varying (100) | currentaqivalue double precision |
|---|---|---|---|---|---|
| 1 | 1 | Andhra Pradesh | Amaravati | Secretariat, Amaravati -... | 135 |
| 2 | 2 | Andhra Pradesh | Anantapur | Gulzarpet, Anantapur - ... | 62 |
| 3 | 3 | Andhra Pradesh | Chittoor | Gangineni Cheruvu, Chi... | 30 |
| 4 | 4 | Andhra Pradesh | Eluru | Eluru - APPCB | 95 |
| 5 | 5 | Andhra Pradesh | Guntur | Collectorate, Guntur - A... | 84 |
| 6 | 6 | Andhra Pradesh | Kadapa | RTC Bus Stand, Kadapa... | 102 |
| 7 | 7 | Andhra Pradesh | Kakinada | LMD Colony, Kakinada -... | 54 |
| 8 | 8 | Andhra Pradesh | Kurnool | Gandhi Nagar, Kurnool ... | 44 |
| 9 | 9 | Andhra Pradesh | Nellore | ZP Office, Nellore - AP... | 72 |
| 10 | 10 | Andhra Pradesh | Ongole | Ongole - APPCB | 88 |
| 11 | 11 | Andhra Pradesh | Rajamahendravaram | RTC Complex, Rajamah... | 73 |
| 12 | 12 | Andhra Pradesh | Srikakulam | New RTC Bus Stand, Sri... | 45 |
| 13 | 13 | Andhra Pradesh | Tirupati | Tirupati - APPCB | 107 |
| 14 | 14 | Andhra Pradesh | Vijayawada | Income Tax Office, Vija... | 97 |
| 15 | 15 | Andhra Pradesh | Visakhapatnam | GVM Corporation Offic... | 106 |
| 16 | 16 | Andhra Pradesh | Vizianagaram | Vizianagaram - APPCB | 23 |
| 17 | 17 | Andhra Pradesh | Yemmiganur | Yemmiganur - APPCB | 83 |

# (1)RETRIEVE ALL RECORDS FOR A SPECIFIC CITY (E.G., MUMBAI)

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

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

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

# (2)FIND THE AVERAGE AQI VALUE FOR EACH STATE.

```
SELECT State,round(AVG(CurrentAQIValue)) AS Avg_AQI
FROM airquality
GROUP BY State;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| State | Avg_AQI |
|---|---|
| Andhra Pradesh | 76 |
| Arunachal Pradesh | 64 |
| Assam | 94 |
| Bihar | 124 |
| Chandigarh | 69 |
| Chhattisgarh | 92 |
| Dadra and Nagar Haveli | 52 |
| Daman and Diu | 57 |
| Delhi | 290 |
| Goa | 42 |
| Gujarat | 122 |
| Haryana | 148 |
| Himachal Pradesh | 56 |
| Jharkhand | 98 |
| Karnataka | 69 |
| Kerala | 41 |
| Madhya Pradesh | 114 |
| Maharashtra | 122 |

# (3) IDENTIFY CITIES WHERE AQI IS ABOVE A CERTAIN THRESHOLD (E.G., AQI>200).

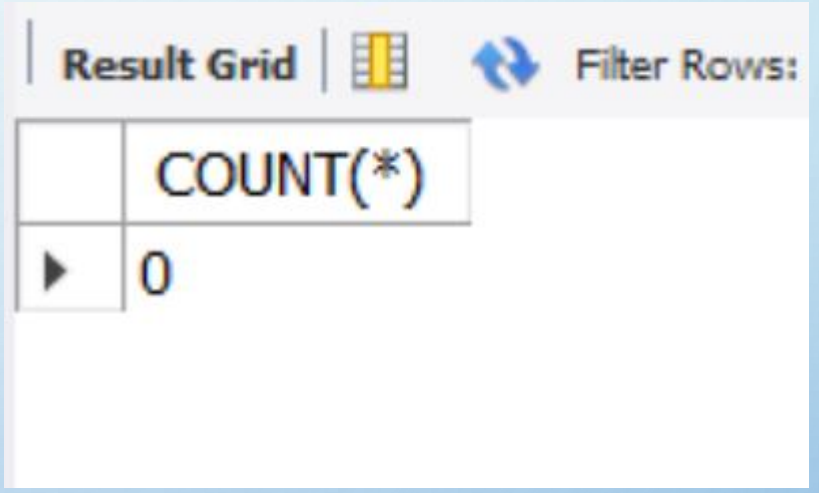
```
SELECT City,CurrentAQIValue
FROM airquality
WHERE CurrentAQIValue>200;
```

Result Grid | Filter Rows:

| City | CurrentAQIValue |
|---|---|
| Delhi | 318 |
| Faridabad | 204 |
| Ghaziabad | 315 |
| Noida | 239 |
| Delhi | 262 |
| Ahmedabad | 292 |
| Surat | 241 |
| Faridabad | 272 |
| Gurugram | 277 |
| Kalyan | 215 |
| Mumbai | 212 |
| Thane | 218 |
| Ghaziabad | 289 |
| Greater Noi... | 264 |
| Lucknow | 203 |
| Noida | 264 |
| Ghaziabad | 213 |

# (4)COUNT THE NUMBER OF RECORDS WITH INSUFFICIENT DATA?

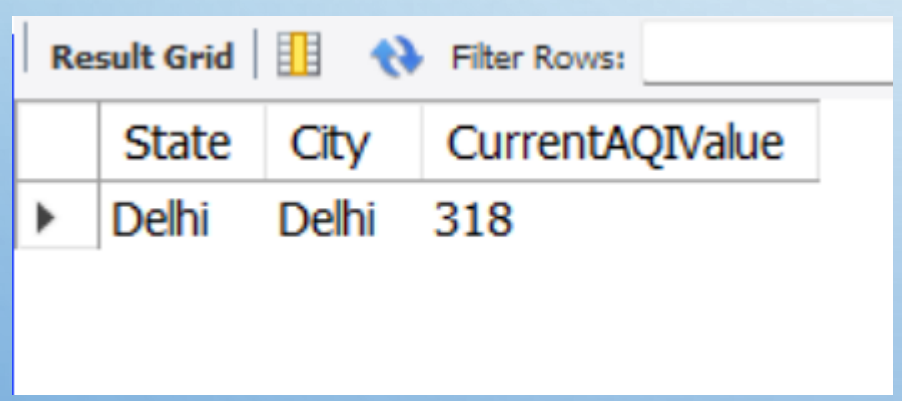
```
SELECT COUNT(*) FROM airquality
WHERE CurrentAQIValue IS NULL;
```




- There are no records with nulls.

# (5)FIND THE HIGHEST AQI VALUE ALONG WITH THE CORRESPONDING CITY AND STATE.

```
SELECT State,City,CurrentAQIValue FROM airquality
ORDER BY CurrentAQIValue DESC LIMIT 1 ;
```

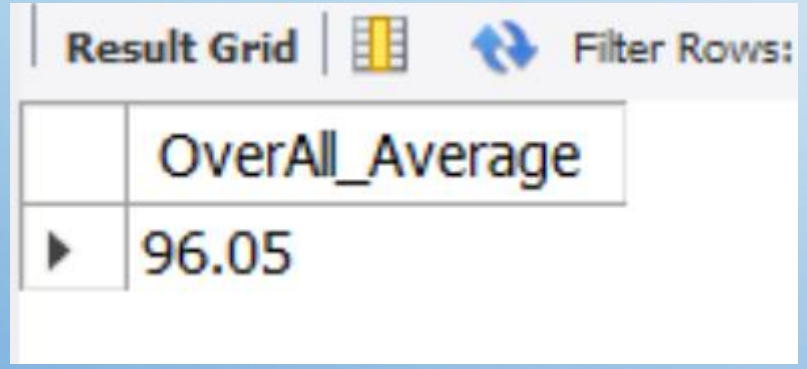



| State | City | CurrentAQIValue |
|---|---|---|
| Delhi | Delhi | 318 |

- From the output, we can conclude that the city of Delhi has the highest Current AQI Value.

# (6) CALCULATE THE OVERALL AVERAGE AQI FOR THE ENTIRE DATASET.

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




- From out put, we can conclude that the overall avg. AQI value is 96.05

# (7)RETRIEVE RECORDS FOR STATES WITH MORE THAN FIVE CITY.

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

Result Grid | Filter Rows:

| State | CityCount |
|---|---|
| Andhra Pradesh | 17 |
| Gujarat | 12 |
| Haryana | 19 |
| Himachal Pradesh | 12 |
| Karnataka | 19 |
| Kerala | 9 |
| Lakshadweep | 10 |
| Madhya Pradesh | 8 |
| Maharashtra | 24 |
| Odisha | 9 |
| Punjab | 9 |
| Rajasthan | 11 |
| Tamil Nadu | 18 |
| Telangana | 10 |
| Uttar Pradesh | 14 |
| 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;
```

Result Grid | Filter Rows: | Export:

| State | City | CurrentAQIValue |
|---|---|---|
| Andhra Pradesh | Chittoor | 30 |
| Andhra Pradesh | Kurnool | 44 |
| Andhra Pradesh | Srikakulam | 45 |
| Andhra Pradesh | Vizianagaram | 23 |
| Chandigarh | Chandigarh | 48 |
| Goa | Margao | 34 |
| Goa | Panaji | 32 |
| Gujarat | Morbi | 38 |
| Himachal Pradesh | Dalhousie | 48 |
| Himachal Pradesh | Dharamshala | 42 |
| Himachal Pradesh | Mandi | 47 |
| Himachal Pradesh | Paonta Sahib | 39 |
| Himachal Pradesh | Sirmaur | 44 |
| Himachal Pradesh | Solan | 45 |
| Karnataka | Bagalkot | 33 |
| Karnataka | Belagavi | 44 |
| Kerala | Alappuzha | 20 |
| Kerala | Ernakulam | 32 |

# (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;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Cor

| City | CurrentAQIValue | Categorize_AQI_Values |
|---|---|---|
| Amaravati | 135 | Unhealthy For Sensitive Group |
| Anantapur | 62 | Moderate |
| Chittoor | 30 | Good |
| Eluru | 95 | Moderate |
| Guntur | 84 | Moderate |
| Kadapa | 102 | Unhealthy For Sensitive Group |
| Kakinada | 54 | Moderate |
| Kurnool | 44 | Good |
| Nellore | 72 | Moderate |
| Ongole | 88 | Moderate |
| Rajamahe... | 73 | Moderate |
| Srikakulam | 45 | 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;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

| State | City | CurrentAQIValue | Ranks |
|---|---|---|---|
| Andaman and Nicobar Islands | Port Blair | 27 | 1 |
| Andaman and Nicobar Islands | Port Blair | 32 | 2 |
| Andhra Pradesh | Vizianagaram | 23 | 1 |
| Andhra Pradesh | Chittoor | 30 | 2 |
| Andhra Pradesh | Kurnool | 44 | 3 |
| Andhra Pradesh | Srikakulam | 45 | 4 |
| Andhra Pradesh | Kakinada | 54 | 5 |
| Andhra Pradesh | Anantapur | 62 | 6 |
| Andhra Pradesh | Nellore | 72 | 7 |
| Andhra Pradesh | Rajamahendravaram | 73 | 8 |
| Andhra Pradesh | Yemmiganur | 83 | 9 |
| Andhra Pradesh | Guntur | 84 | 10 |

# (11)RETRIEVE THE STATES WHERE THE HIGHEST POLLUTION LEVEL IS RECORDED AND THE CORRESPONDING POLLUTION LEVEL.

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

Result Grid | Filter Rows:

| State | Highest_Value |
|---|---|
| Andhra Pradesh | 135 |
| Arunachal Pradesh | 64 |
| Assam | 112 |
| Bihar | 146 |
| Chandigarh | 91 |
| Chhattisgarh | 143 |
| Dadra and Nagar Haveli | 52 |
| Daman and Diu | 57 |
| Delhi | 318 |
| Goa | 59 |
| Gujarat | 292 |

# (12) IDENTIFY THE STATIONS WHERE THE POLLUTION LEVEL IS HIGHER THAN THE AVERAGE POLLUTION LEVEL ACROSS ALL STATIONS.

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

Result Grid | Filter Rows:

| State | CurrentAQIValue |
|---|---|
| Andhra Pradesh | 135 |
| Andhra Pradesh | 102 |
| Andhra Pradesh | 107 |
| Andhra Pradesh | 97 |
| Andhra Pradesh | 106 |
| Assam | 112 |
| Assam | 99 |
| Bihar | 113 |
| Bihar | 108 |
| Bihar | 117 |
| Bihar | 146 |
| Bihar | 136 |
| Delhi | 318 |

# (13) RETRIEVE THE NAMES AND POLLUTION LEVELS OF STATIONS IN THE NATIONAL CAPITAL REGION (NCR).

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

Result Grid | Filter Rows:

| State | CurrentAQIValue |
|---|---|
| Delhi | 318 |
| Haryana | 204 |
| Haryana | 190 |
| Uttar Pradesh | 315 |
| Uttar Pradesh | 239 |
| Delhi | 262 |
| Haryana | 272 |
| Haryana | 277 |
| Uttar Pradesh | 289 |
| Uttar Pradesh | 264 |
| Uttar Pradesh | 213 |
| Uttar Pradesh | 264 |

# (14) FIND THE MONITORING STATIONS IN SOUTH INDIA (ANDHRA PRADESH, KARNATAKA, KERALA, TAMIL NADU, TELANGANA) WITH POLLUTION LEVELS GREATER THAN 100.

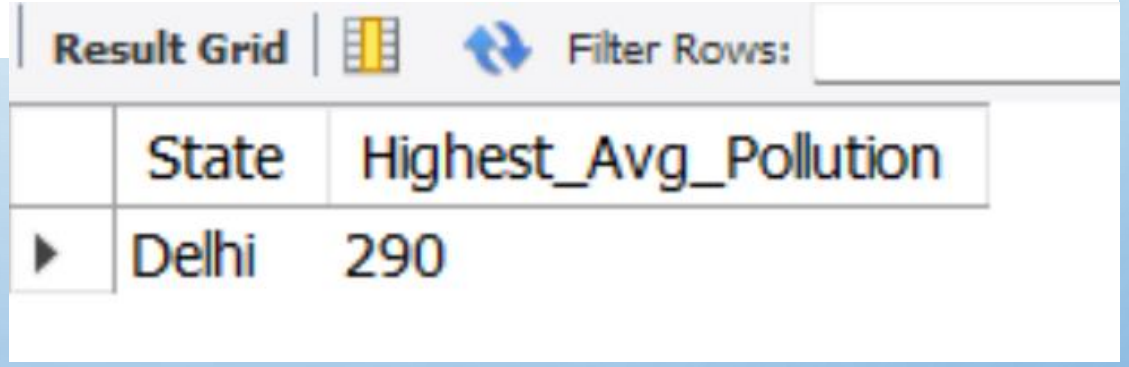
```
SELECT State,City,CurrentAQIValue FROM airquality
WHERE State IN ("Andhra Pradesh","Karnataka","Kerala","Tamil Nadu","Telangana")
AND CurrentAQIValue>100;
```

Result Grid | Filter Rows: | Export:

| State | City | CurrentAQIValue |
|---|---|---|
| Andhra Pradesh | Amaravati | 135 |
| Andhra Pradesh | Kadapa | 102 |
| Andhra Pradesh | Tirupati | 107 |
| Andhra Pradesh | Visakhapatnam | 106 |
| Tamil Nadu | Chennai | 109 |
| Telangana | Hyderabad | 128 |
| Telangana | Sangareddy | 119 |
| Telangana | Nalgonda | 114 |
| Telangana | Hyderabad | 103 |
| Telangana | Rangareddy | 108 |
| Telangana | Warangal | 124 |

# (15)FIND THE STATES WITH THE HIGHEST AVERAGE POLLUTION LEVELS.

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

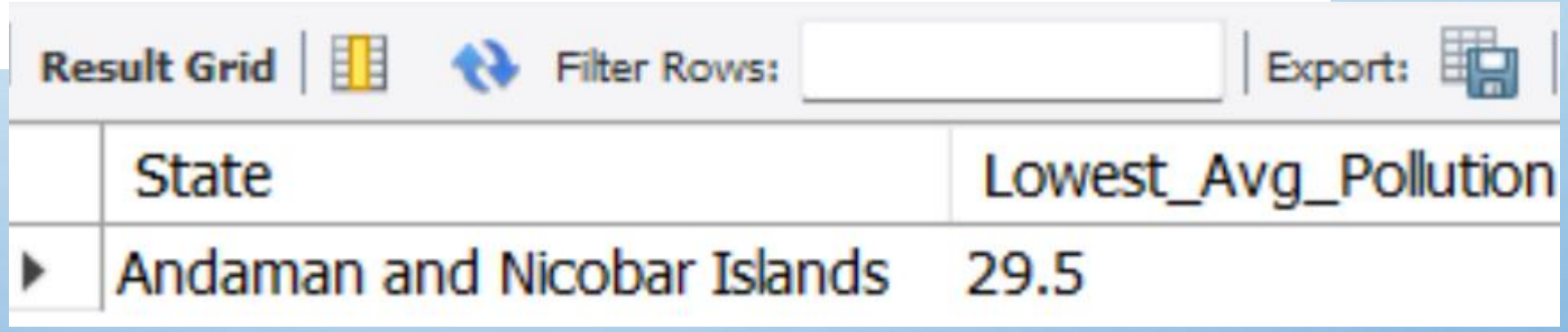



| State | Highest_Avg_Pollution |
|---|---|
| Delhi | 290 |

- Delhi is the city with highest average AQI value

# (16) FIND THE STATES WITH THE LOWEST AVERAGE POLLUTION LEVELS.

```
SELECT State,ROUND(AVG(CurrentAQIValue),2) AS Lowest_Avg_Pollution
FROM airquality
GROUP BY State
ORDER BY AVG(CurrentAQIValue)
LIMIT 1;
```




| State | Lowest_Avg_Pollution |
|---|---|
| Andaman and Nicobar Islands | 29.5 |

- The state Andaman and Nicobar Islands has the lowest average pollution levels.


THANK
YOU