AQI Index Analysis (Power BI)

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https://github.com/KumarBoste/AQI_Index_Analysis

Project Objective

The objective of this project is to analyze Air Quality Index (AQI) data across different years, states, and urban areas in India to understand pollution severity, identify high-risk regions, and determine the most dominant pollutants.

This dashboard aims to support data-driven environmental awareness and decision-making by presenting AQI trends, pollutant distribution, and regional comparisons in an interactive and visual manner.

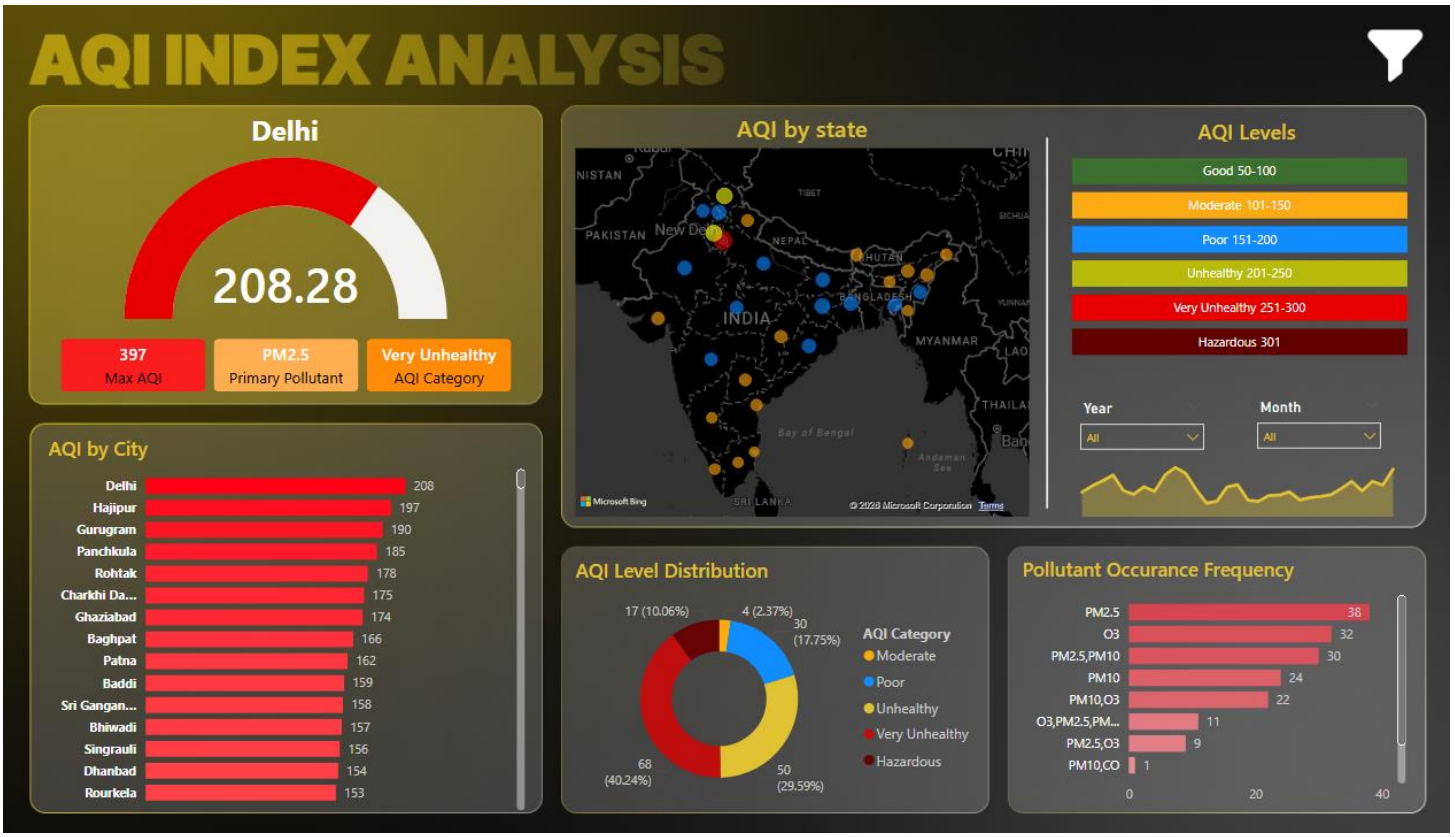
Problem Statement

Air pollution has become a major environmental and public health concern in India. However:

- AQI data is scattered and difficult to interpret for non-technical users.
- There is a lack of comparative insights across cities, states, and time periods.
- Identifying critical pollution hotspots and dominant pollutants is challenging without visualization.

This project addresses these challenges by transforming raw AQI data into meaningful, interactive insights using Power BI.

Dashboard



Data Visualization & Insights

1. Overall AQI Indicator (Gauge)

- Displays current AQI value for the selected filters.
- Example: Delhi AQI ≈ 208, categorized as Very Unhealthy.
- Highlights:
    - Maximum AQI recorded
    - Primary Pollutant (PM2.5)
    - AQI Category

Insight:

Major metropolitan cities consistently fall under Unhealthy to Very Unhealthy categories, indicating severe air quality concerns.

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2. AQI by City (Bar Chart)

- Ranks cities based on AQI levels.
- Cities like Delhi, Hajipur, Gurugram, and Panchkula show alarmingly high AQI values.

Insight:

Urban and industrial regions experience significantly higher AQI compared to smaller cities.

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3. AQI by State (Map Visualization)

Interactive map showing AQI intensity across Indian states. Color-coded markers represent pollution severity.

Insight:

Northern and central regions of India exhibit higher AQI concentration, especially during peak pollution periods.

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4. AQI Level Distribution (Donut Chart)

- Shows distribution across AQI categories:
    - Moderate
    - Poor
    - Unhealthy
    - Very Unhealthy
    - Hazardous

Insight:

A large proportion of observations fall under Unhealthy and Very Unhealthy, indicating prolonged exposure risks for residents.

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5. Pollutant Occurrence Frequency (Bar Chart)

- Displays frequency of pollutants such as:
    - PM2.5
    - PM10
    - O_3
    - NO_2
    - CO

Insight:

PM2.5 is the most dominant pollutant, making it the primary contributor to poor air quality across regions.

Interactive Filters Used

The dashboard includes dynamic filters for:

- Year – Analyze AQI trends over time
- State – Compare pollution levels across regions
- Area / City – Drill down into city-level AQI data

Benefit:

These filters allow users to perform custom, focused analysis and gain deeper insights instantly.

Conclusion

The AQI Index Analysis Dashboard effectively transforms complex air quality data into clear, actionable insights. Key conclusions include:

- Air quality in major Indian cities remains consistently unhealthy.
- PM2.5 is the most critical pollutant affecting AQI.
- Northern and metropolitan regions face higher pollution risks.
- Interactive filtering enhances usability and decision-making.

This project demonstrates the power of data visualization, analytical thinking, and Power BI storytelling, making it highly relevant for environmental analysis and public policy insights.