# MECE Framework for Pollution Analytics Project

## Introduction

The MECE (Mutually Exclusive, Collectively Exhaustive) framework is a structured approach used to ensure that all components of a project are clearly defined, without overlap, and cover every aspect comprehensively. In the context of the Pollution Analytics Project, this framework is applied to categorize and analyze air quality data efficiently.

## 1. Geographic Location

To accurately assess and analyze air quality, it is essential to categorize the data based on geographic locations. The following fields are used to define the locations:

1. **State:** The state within the country where the data is collected.
2. **Country:** The country associated with the state and city.
3. **City:** The specific city where air quality measurements are recorded.
4. **Address:** The detailed address within the city where the air quality data is collected.

This categorization ensures that all geographic locations are uniquely identified, allowing for precise analysis and reporting.

## 2. Air Quality Measurements - Contents

The air quality data is categorized into distinct pollutant types. Each pollutant type is analyzed separately to maintain clarity and avoid overlap:

1. **Ozone (O3) Data**: Information related to the levels of Ozone in the air.

2. **Carbon Monoxide (CO) Data**: Measurements of Carbon Monoxide levels.

3. **Sulfur Dioxide (SO2) Data**: Data regarding the presence of Sulfur Dioxide in the atmosphere.

4. **Nitrogen Dioxide (NO2) Data**: Analysis of Nitrogen Dioxide levels.

By categorizing pollutants into distinct groups, the framework ensures a clear understanding of each pollutant's impact on air quality.

## 3. Air Quality Measurement - Parameters

Each pollutant type is measured using the following parameters, which provide a comprehensive view of the air quality:

1. **Mean**: The average level of the specific pollutant (e.g., Ozone, CO) over a defined period. This parameter gives insight into the general air quality.
2. **1st Max Value**: The highest recorded value of the pollutant within the monitoring period. This metric is crucial for identifying peak pollution levels.
3. **1st Max Hour**: The exact hour when the highest value of the pollutant was recorded. This helps in understanding temporal patterns in air quality degradation.
4. **AQI (Air Quality Index)**: A standardized index that reflects the overall air quality concerning each pollutant. The AQI provides an easily understandable metric to assess how polluted the air is.

Each parameter is mutually exclusive to prevent data redundancy and ensure that all aspects of air quality are exhaustively covered.

## Conclusion

The MECE framework applied in this Pollution Analytics Project enables a structured and clear analysis of air quality data. By categorizing geographic locations, pollutants, and measurement parameters distinctly and exhaustively, the framework ensures accurate reporting and effective data-driven decision-making. This approach aids in identifying critical pollution sources, understanding their impact, and developing targeted interventions for air quality improvement.