

# Intel-Unnati- Industrial- Training-2024



Team SPARTANS

Members:-

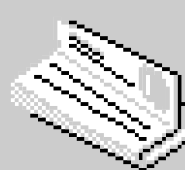
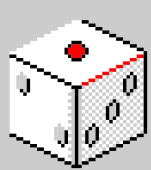
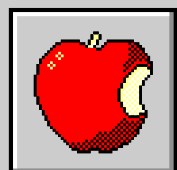


1.Tanisha Basu

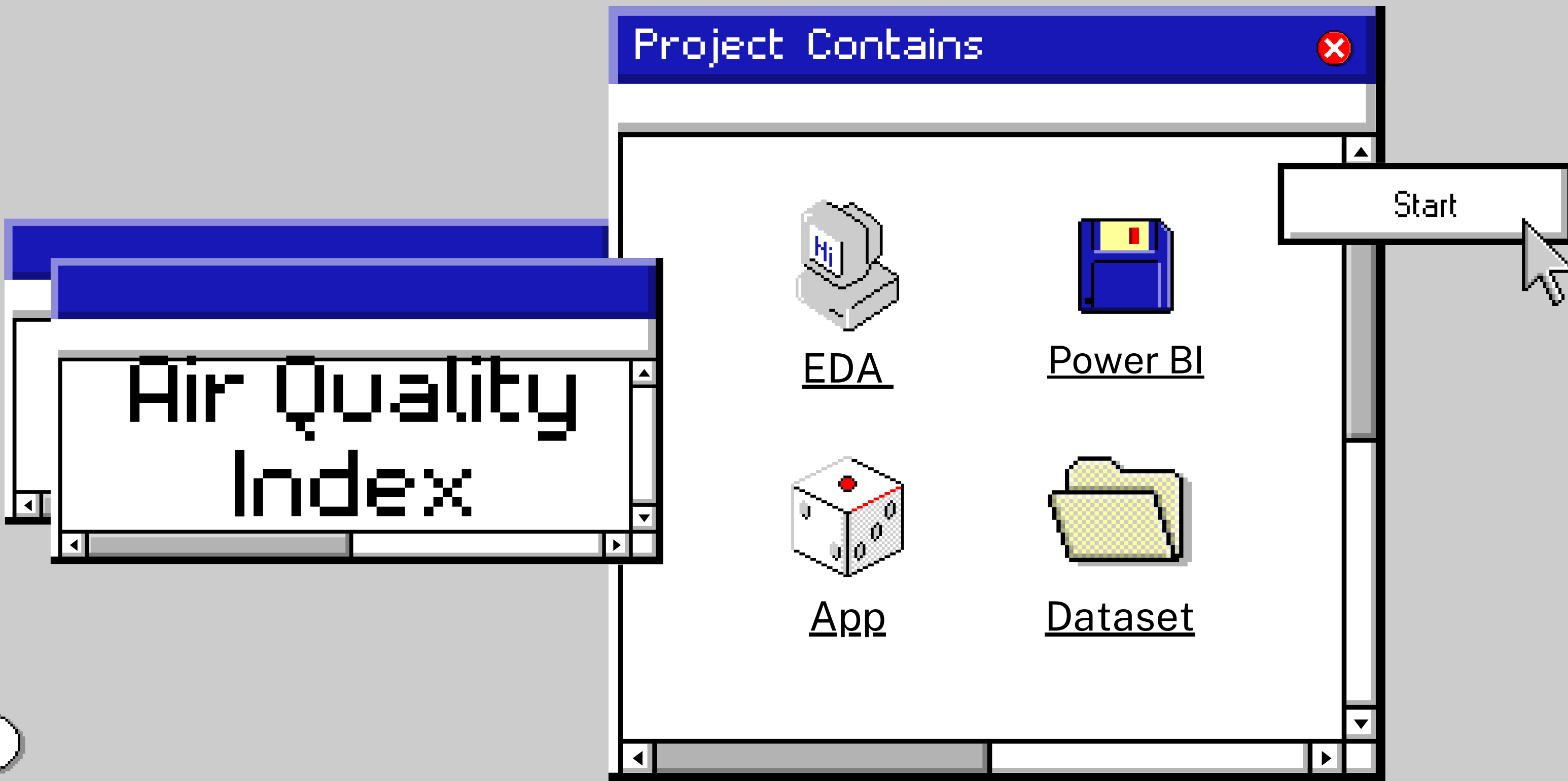
2.Jyotika Jayani

3.Shreyas Thacker

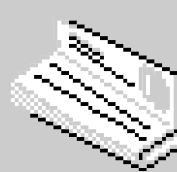
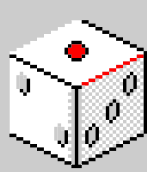
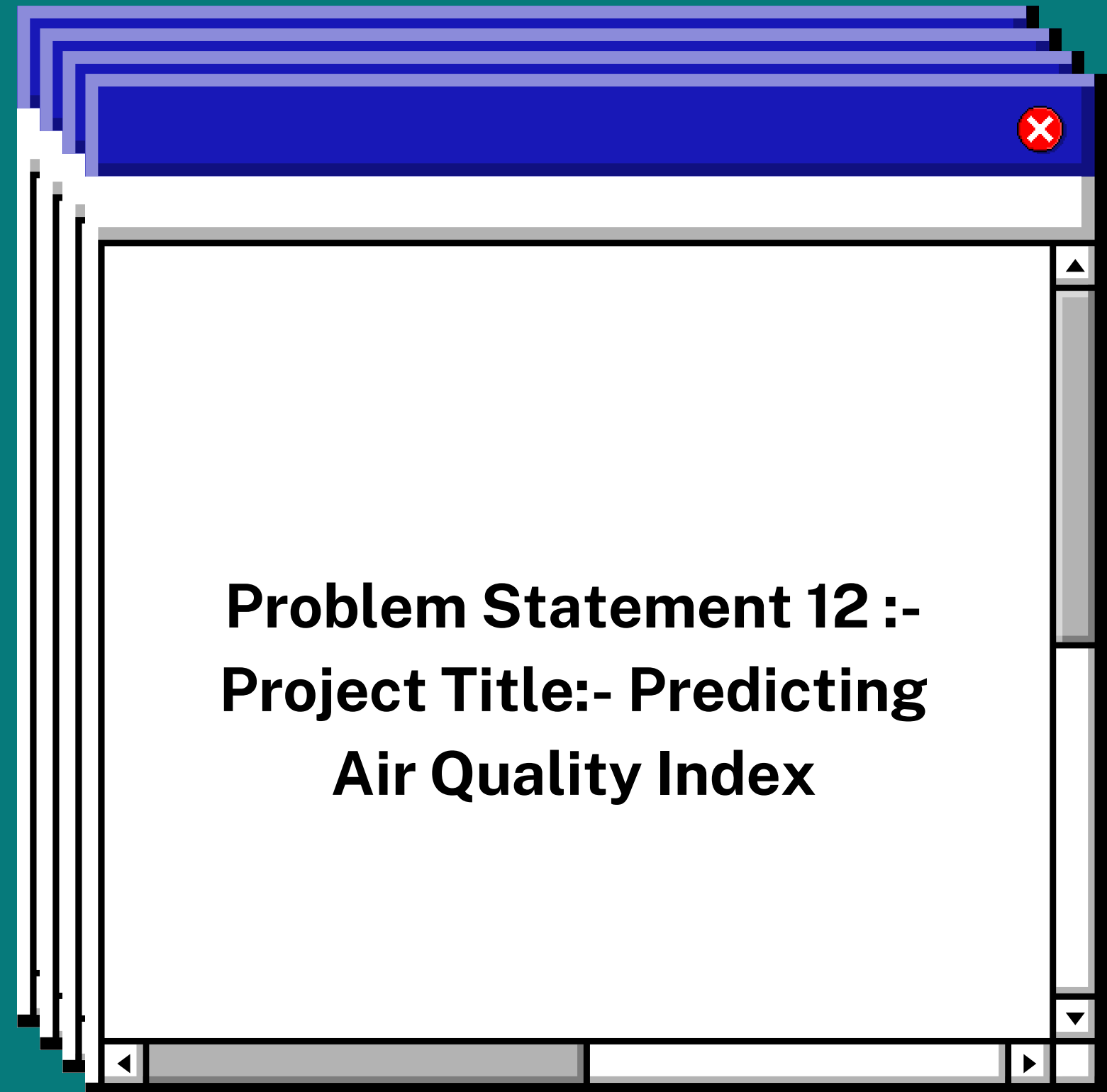
4.Harshit Ghosh



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# Knowledge Representation and Insights Generation from Structured Datasets



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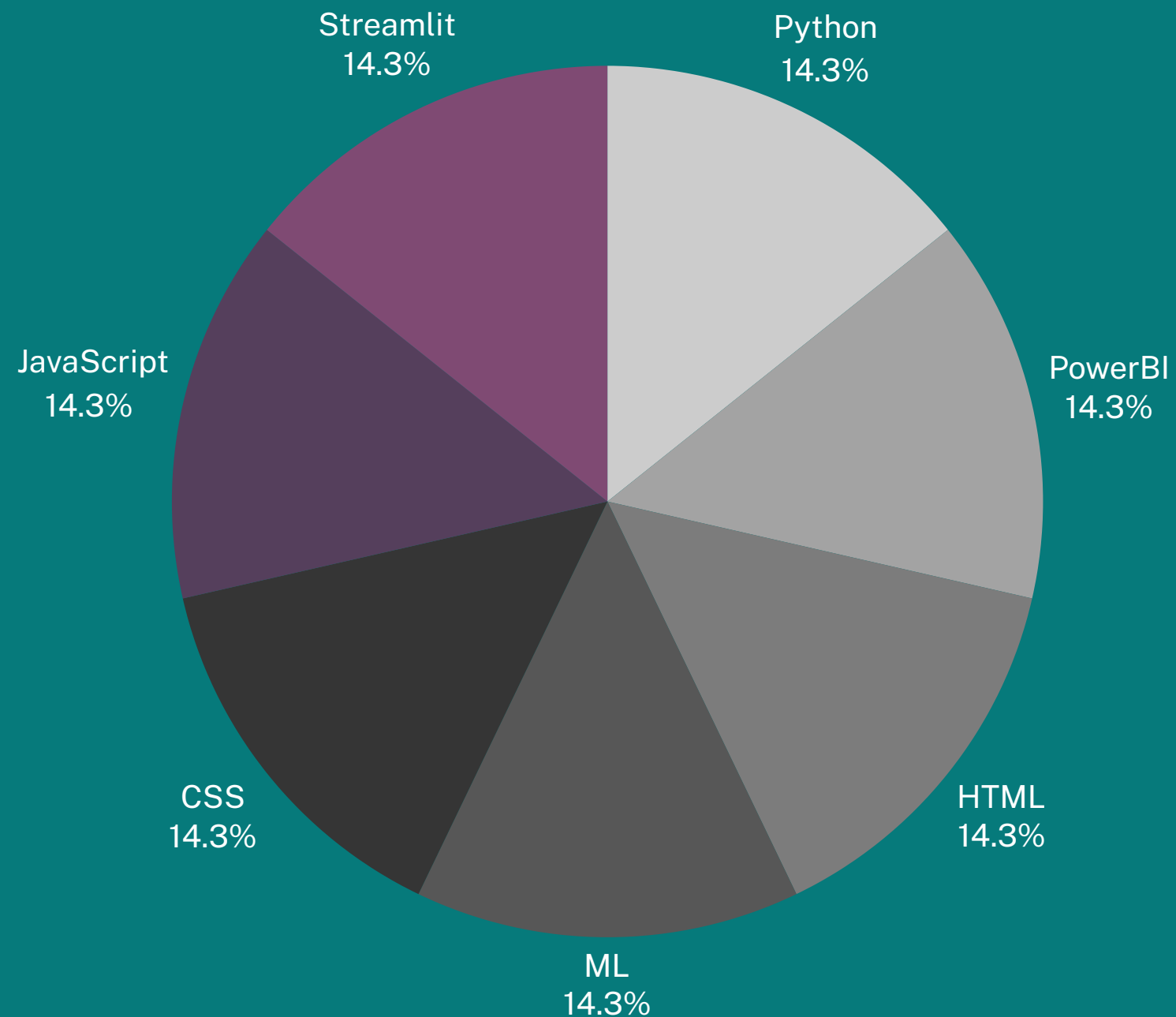
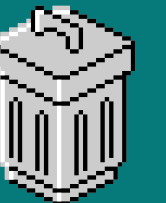
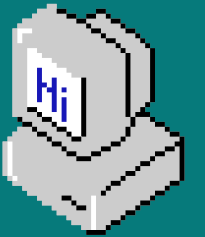
# Introduction

Air quality is a crucial aspect of environmental health, impacting human health and the ecosystem. This project focuses on analyzing an Air Quality Index (AQI) dataset to uncover patterns and insights, develop interactive dashboards, and create a user-friendly interface for a wider audience. The methodology, steps, results, and conclusions are detailed below.

**This project explores an Air Quality Index (AQI) dataset, aiming to:**

- Uncover patterns and insights: Utilize Exploratory Data Analysis (EDA) and machine learning algorithms to understand relationships and trends within the data.
- Develop interactive dashboards: Create compelling visualizations using Streamlit and Power BI to effectively communicate the findings.
- Design a user-friendly interface: Implement front-end technologies (HTML, CSS, JavaScript) to build an interactive AQI dashboard accessible to a wider audience.

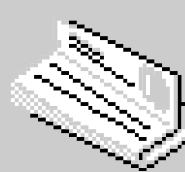
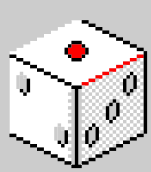
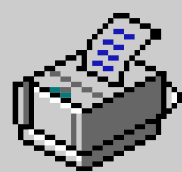
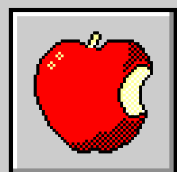
# Tools and Technologies:



**EDA and Machine Learning:** Python  
(Pandas, NumPy, Matplotlib, Seaborn, Scikit-learn)

**Interactive Dashboards:** Streamlit,  
Power BI

**Front-End Development:** HTML, CSS,  
JavaScript



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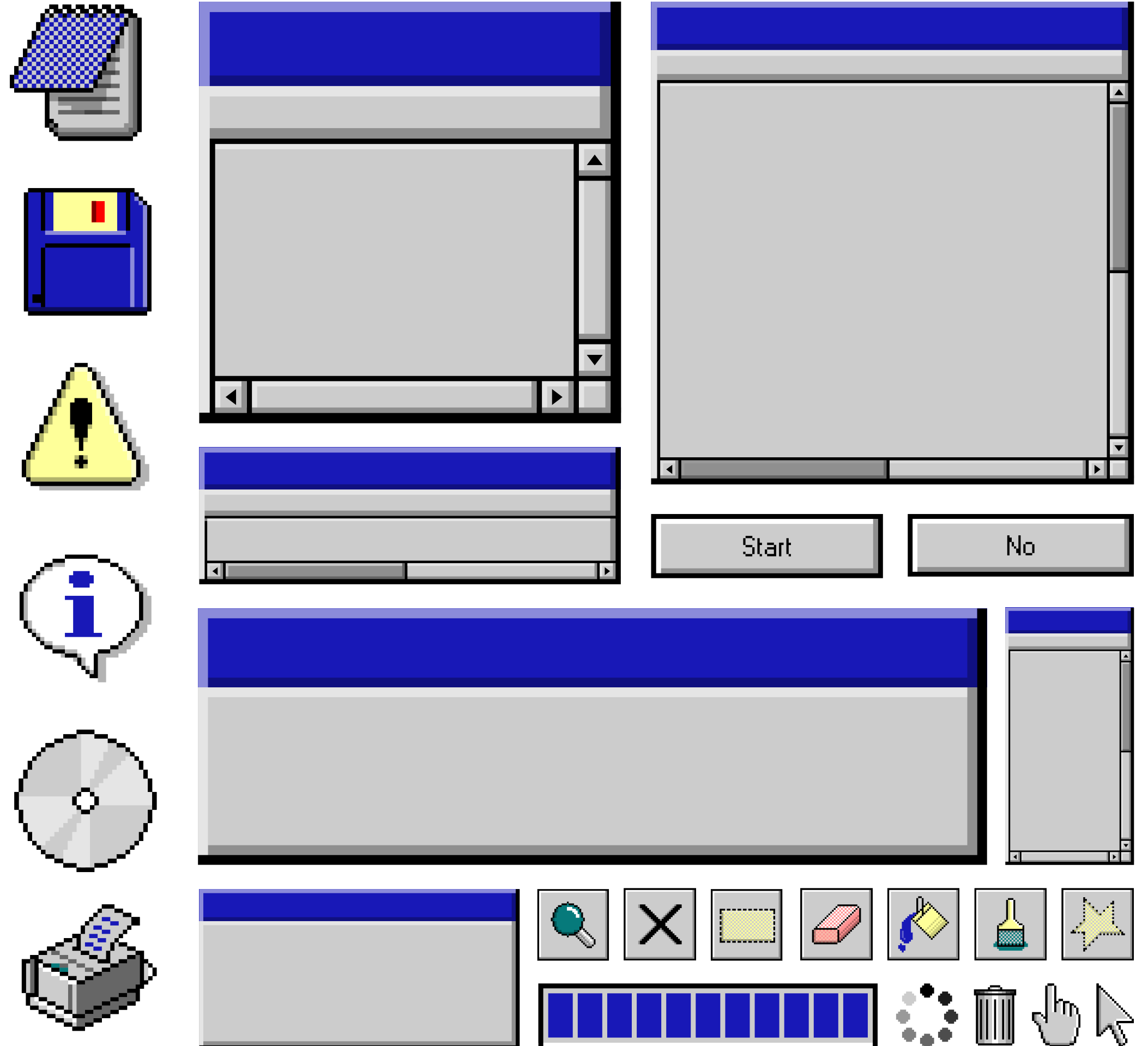
# Methodology



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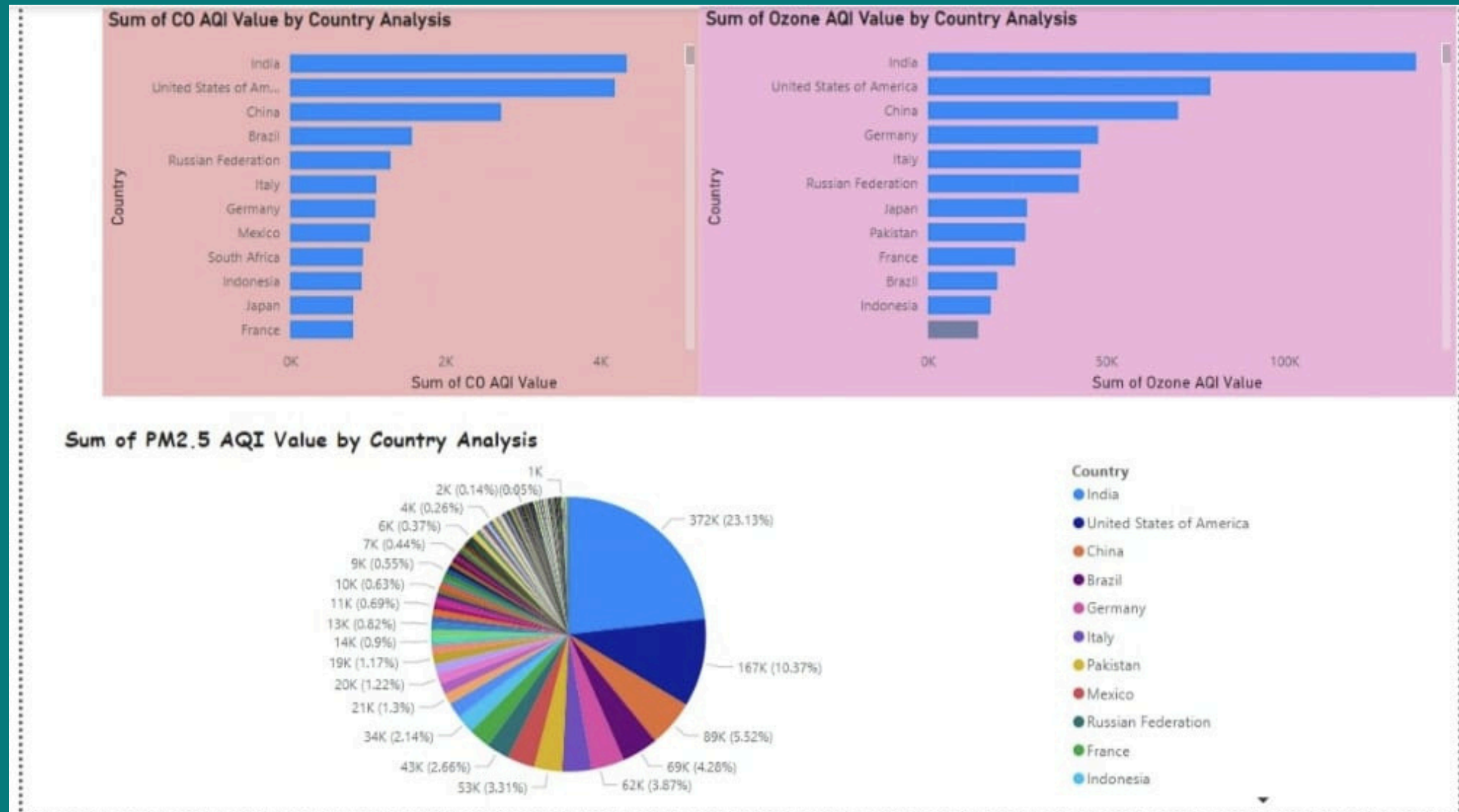
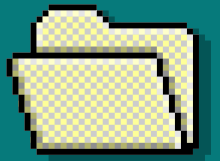
# 1. Data Preprocessing (Python):

- Employed EDA techniques to analyze and clean the AQI dataset.
- Utilized machine learning algorithms (if applicable) to identify patterns and improve data quality.

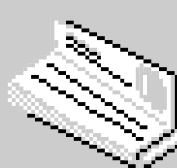
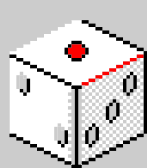
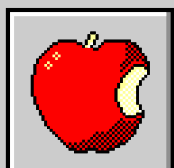




## 2. Power BI Dashboard:



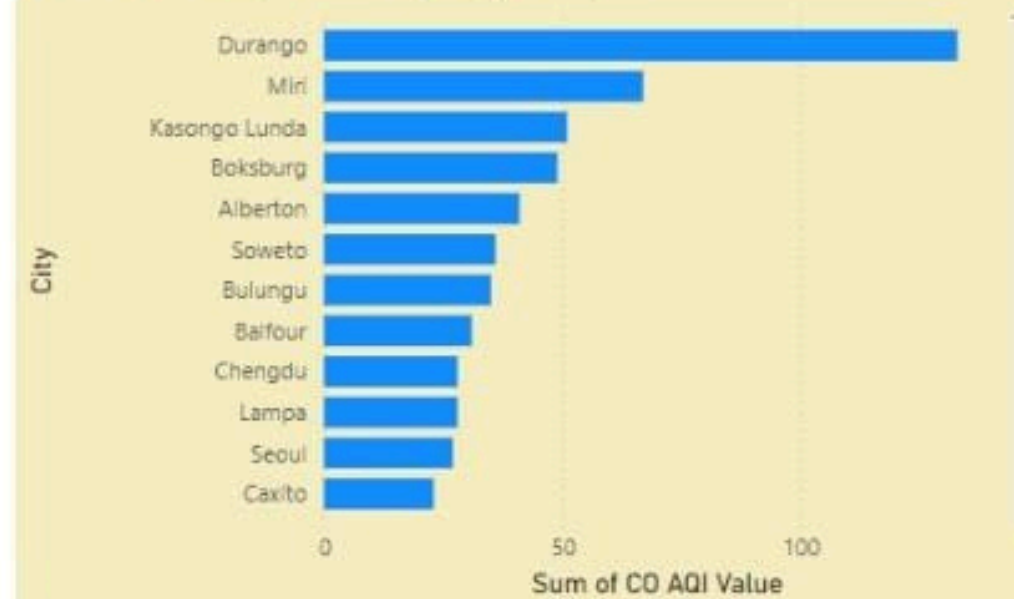
Interactive Air  
Quality Index (AQI)  
Dashboard



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# Time Series Analysis of CO and Ozone AQI Value

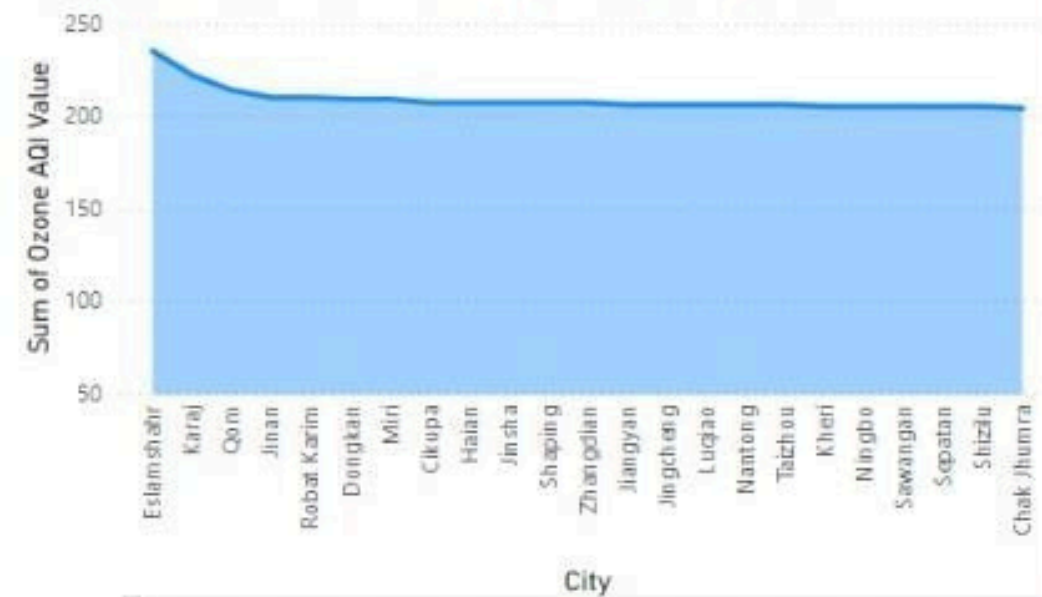
Sum of CO AQI Value by City Analysis



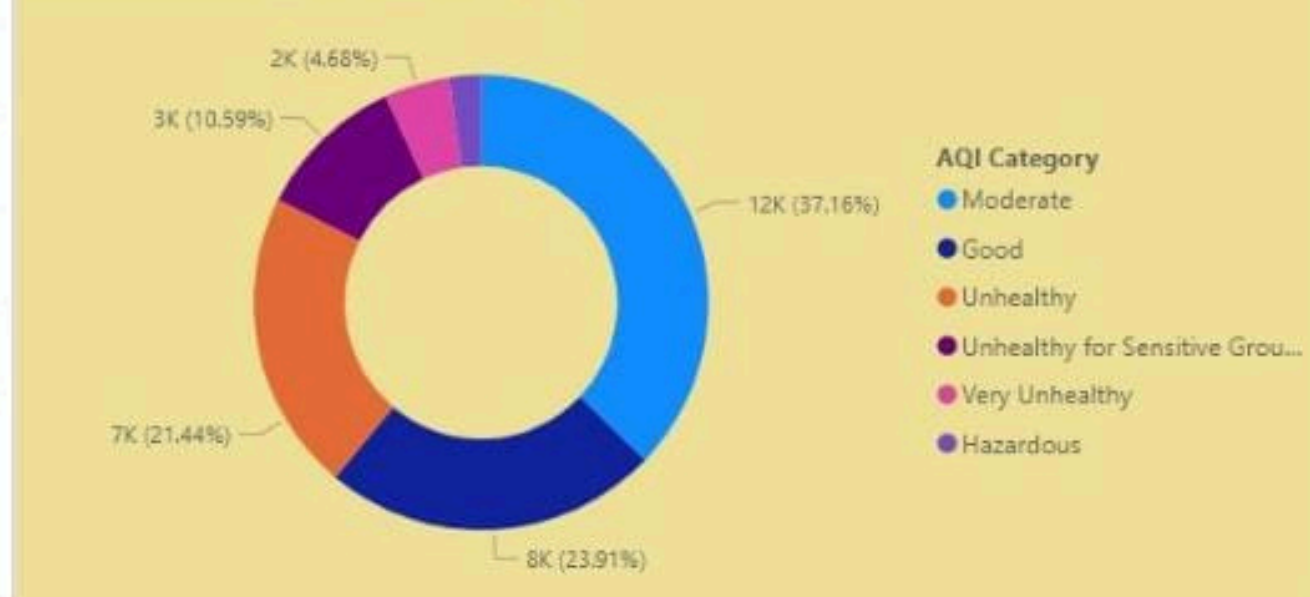
Sum of Ozone AQI Value by City Analysis



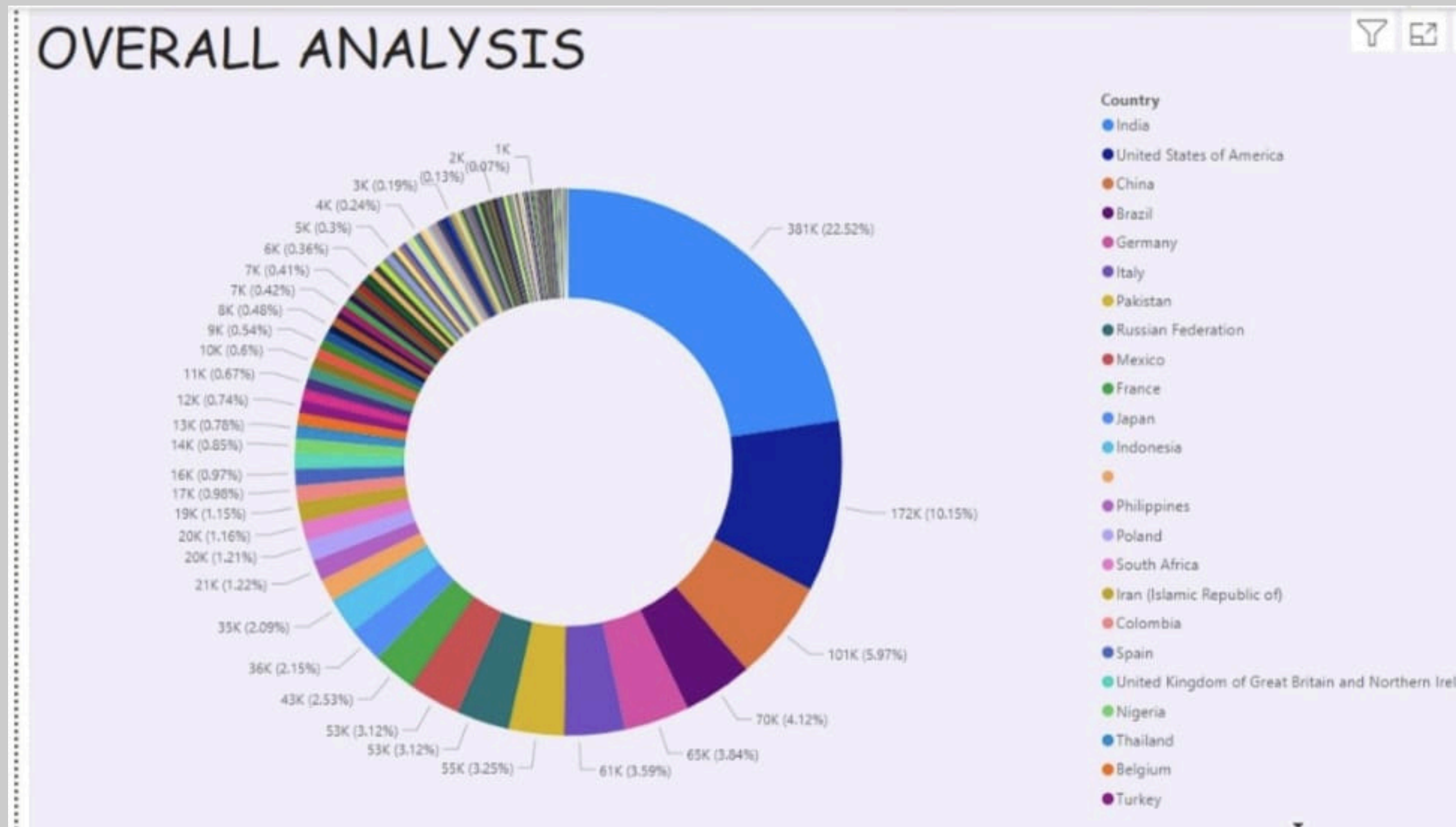
Sum of Ozone AQI Value by City Analysis



Sum of CO AQI Value by AQI Category



# AQI Comparison Across Locations



# Frontend Dashboard

:

Air Quality Prediction  
Web App Interface

## Air Quality Index (AQI) Prediction

PM2.5 ( $\mu\text{g}/\text{m}^3$ ):

24.00

OZONE (ppb):

30.00

CO (ppm ):

32.00

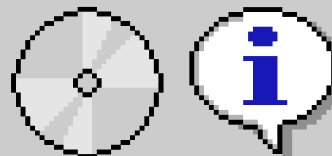
NO2 (ppb):

40.00

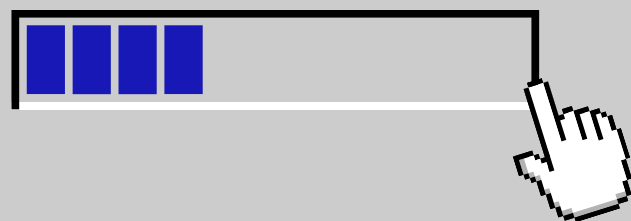
Predict AQI

Predicted AQI: 29.00  
Category: Good

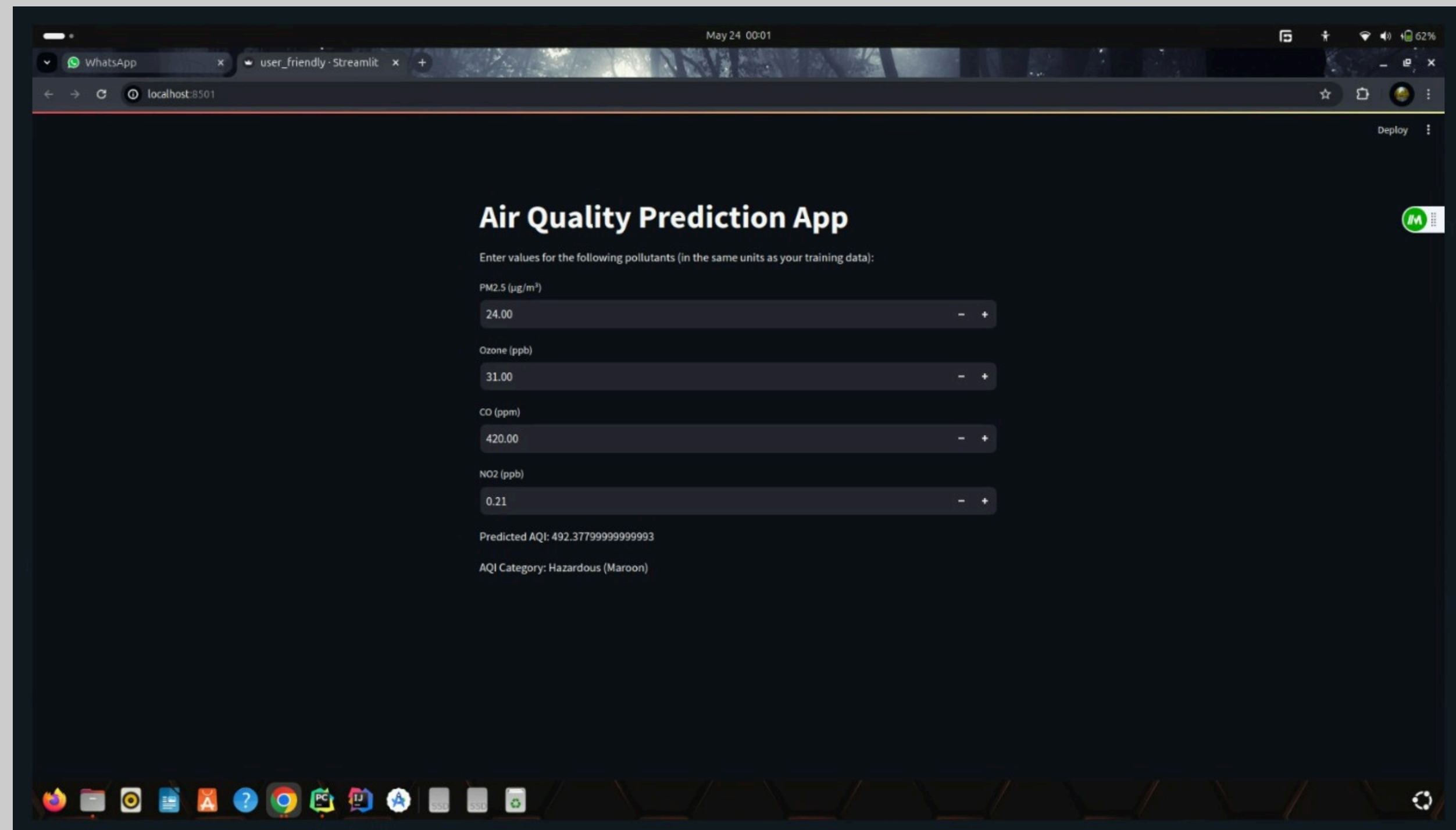




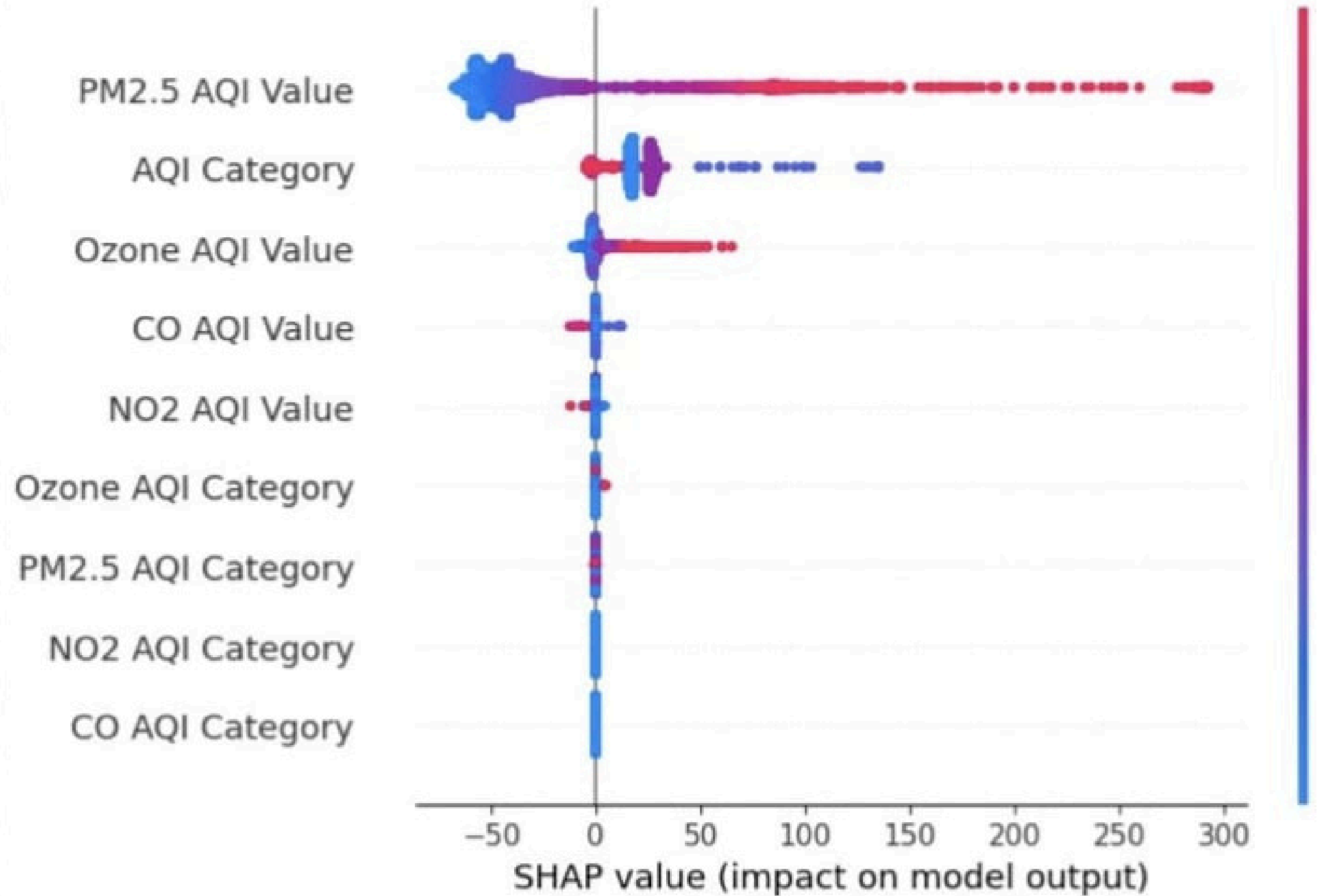
# Deployed Streamlit App:



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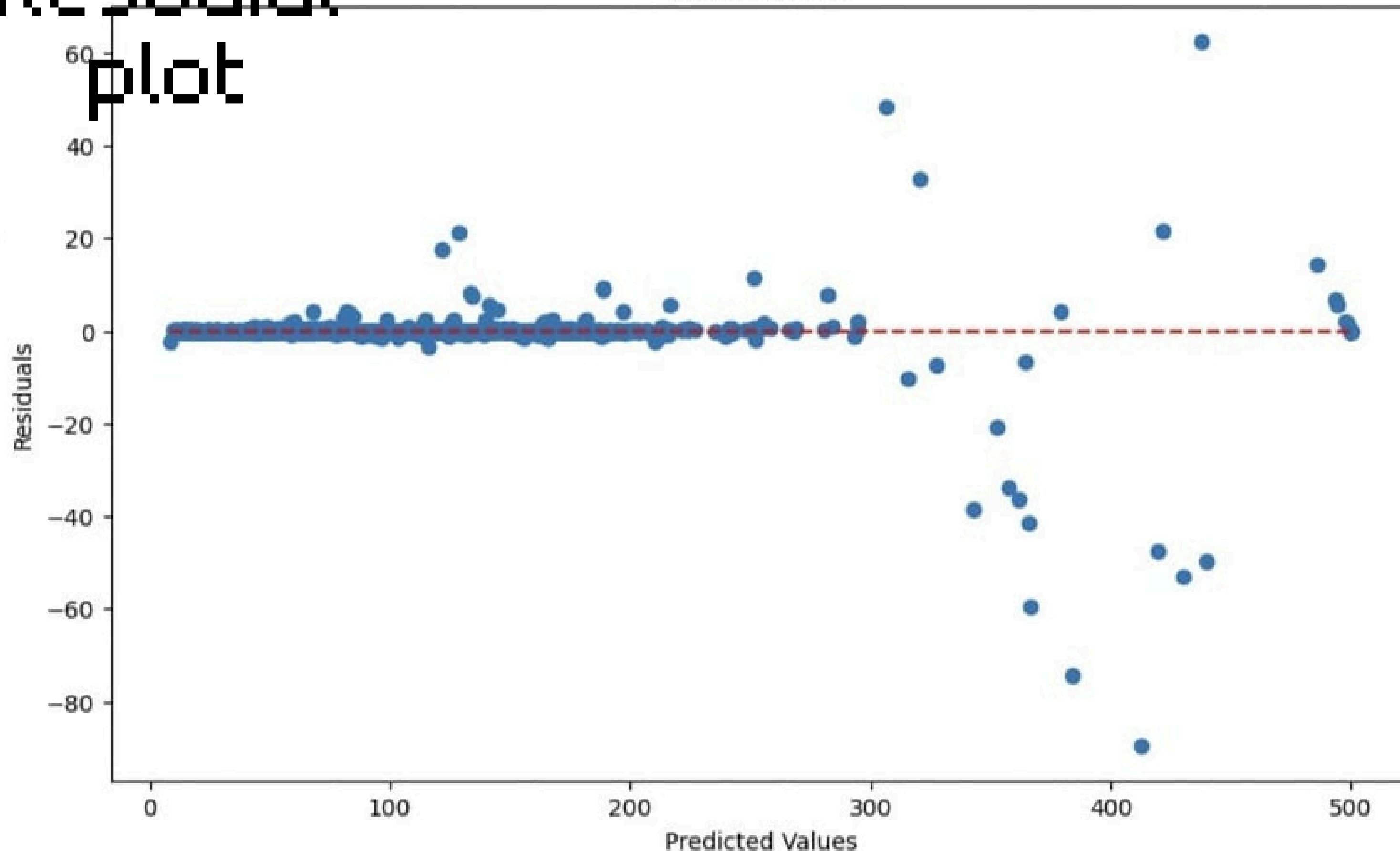


# Final Insights and Patterns from Dataset:

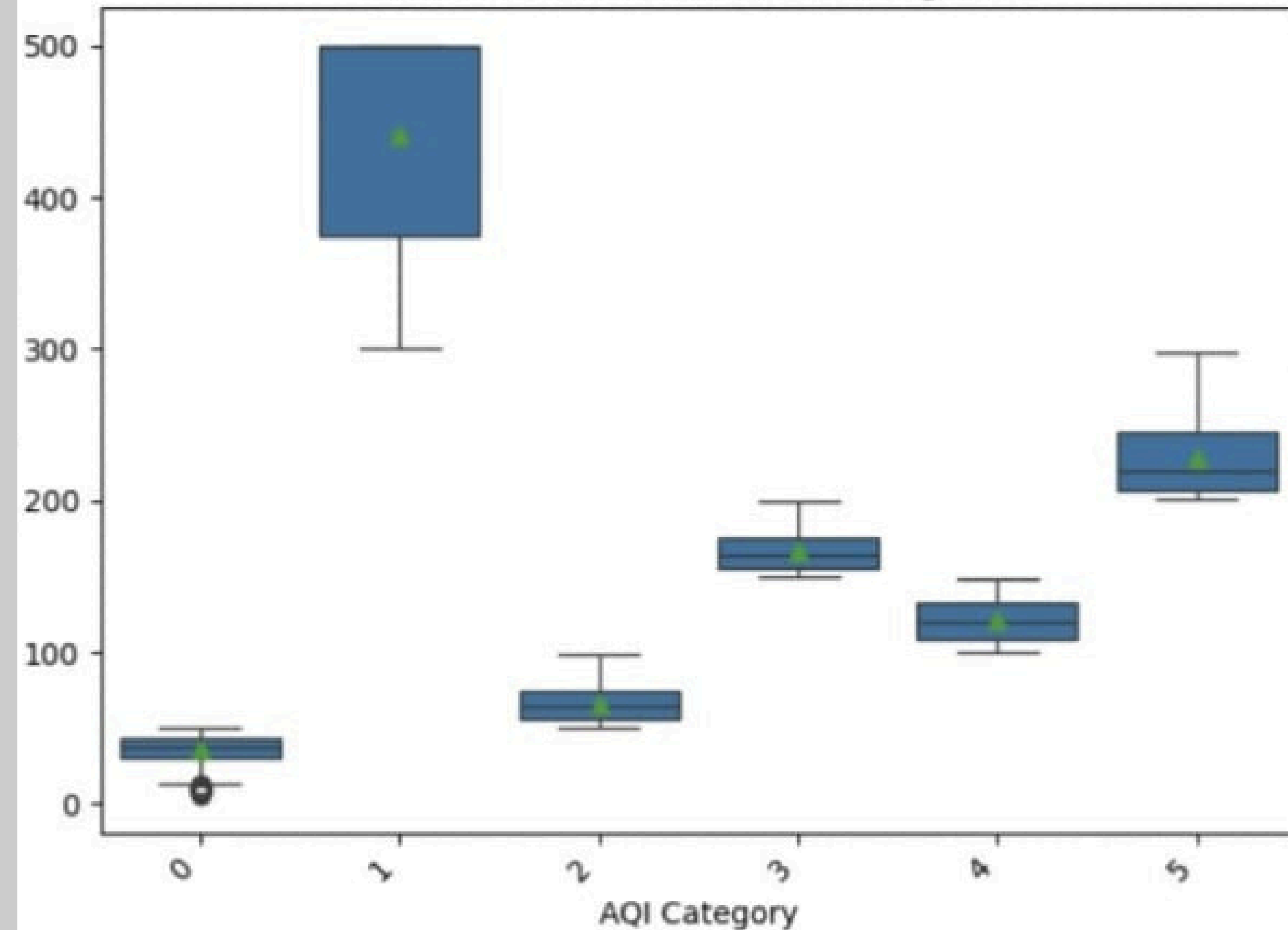


# Residual plot

Residual Plot



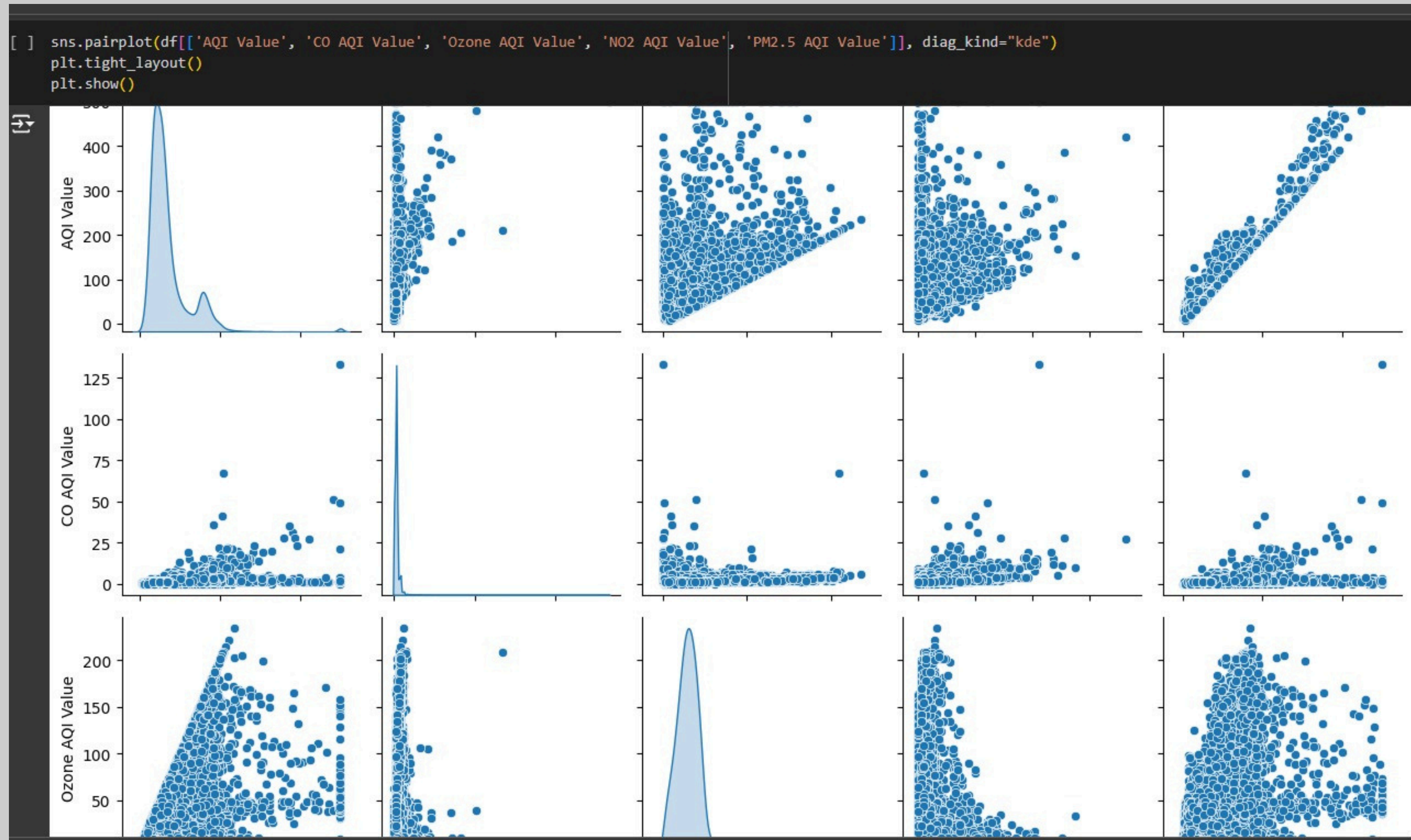
Distribution of AQI Across Categories



Distribution  
of AQI  
across  
Cateogary

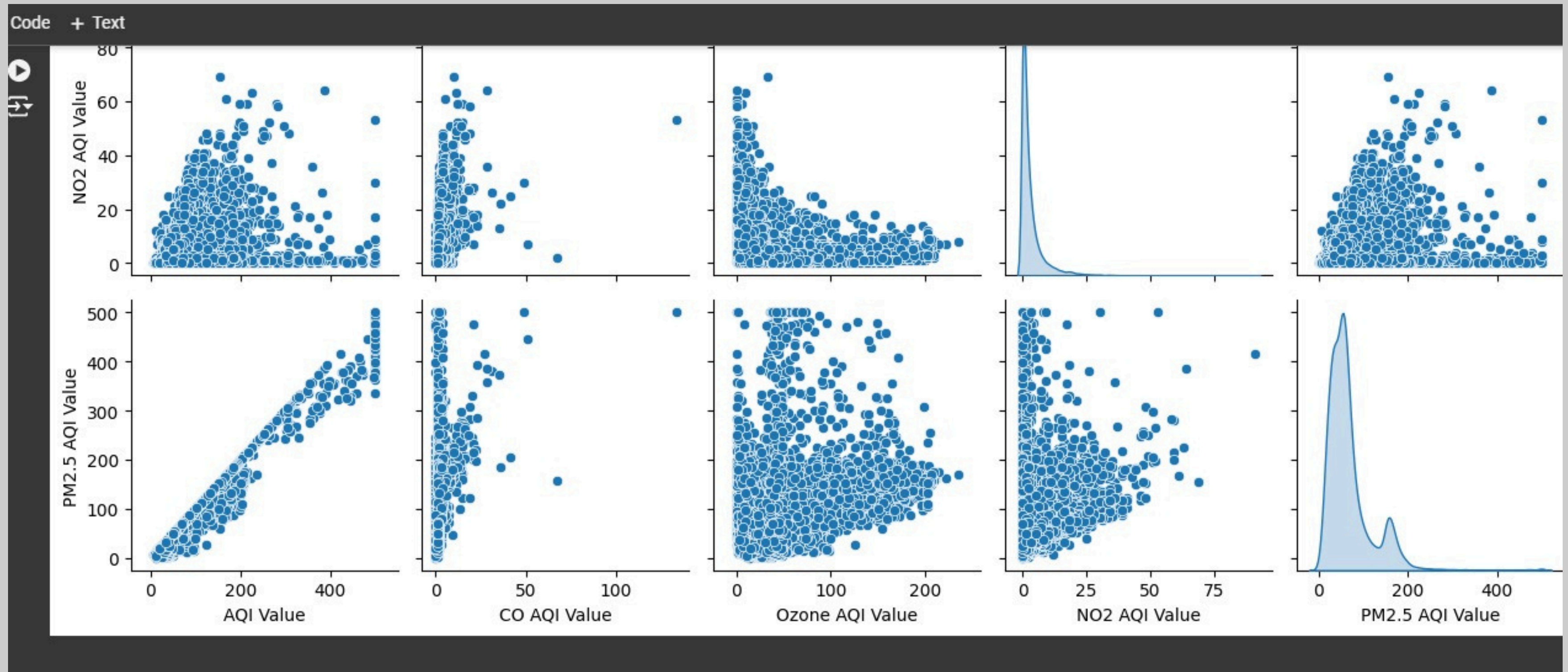


# EDA analysis of Pollutant AQI Value





# EDA analysis of Pollutant AQI Value



# Conclusion

From the insights and patterns, we concluded a comparative study on AQI based on city, category, location, and pollutants. The analysis reveals significant variations in AQI values across different regions and pollutants, highlighting areas with high pollution levels and those with better air quality. These insights can inform policymakers, environmental agencies, and the public about the state of air quality and help in devising strategies for air quality management and improvement.

The interactive dashboards and user-friendly interface further enhance the accessibility and understanding of AQI data, making it easier for a wider audience to engage with the findings and take informed actions towards improving air quality

