Regression and Time Series Modelling

R Shiny Dashboard

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29A

Air Quality Data in India (2015 - 2020)

Air Quality Index (AQI) and hourly data across stations and cities in India

Dataset: https://www.kaggle.com/datasets/rohanrao/air-quality-data-in-india

The dataset contains air quality data and AQI (Air Quality Index) at hourly and daily level of various stations across multiple cities in India.

Columns

- City
  (**Ahmedabad, Aizawl, Amaravati, Amritsar, Bengaluru, Bhopal, Brajrajnagar, Chandigarh, Chennai, Coimbatore, Delhi, Ernakulam, Gurugram, Guwahati, Hyderabad, Jaipur, Jorapokhar, Kochi, Kolkata, Lucknow, Mumbai, Patna, Shillong, Talcher, Thiruvananthapuram, Visakhapatnam)**
- Date
- PM2.5, PM10, NO, NO2, NOx, NH3, CO, SO2, O3, Benzene, Toluene, Xylene
- AQI
- AQI Bucket

Data Quality Checks

- Missing Values: Checked for missing values in each column to ensure data completeness.
- Outliers: Identified and handled outliers in numerical columns.

Trends and Patterns

- Temporal Trends: Explored how sensor readings, flow rates, pressure, and temperature change over time.
- Correlations: Investigated correlations between different parameters.

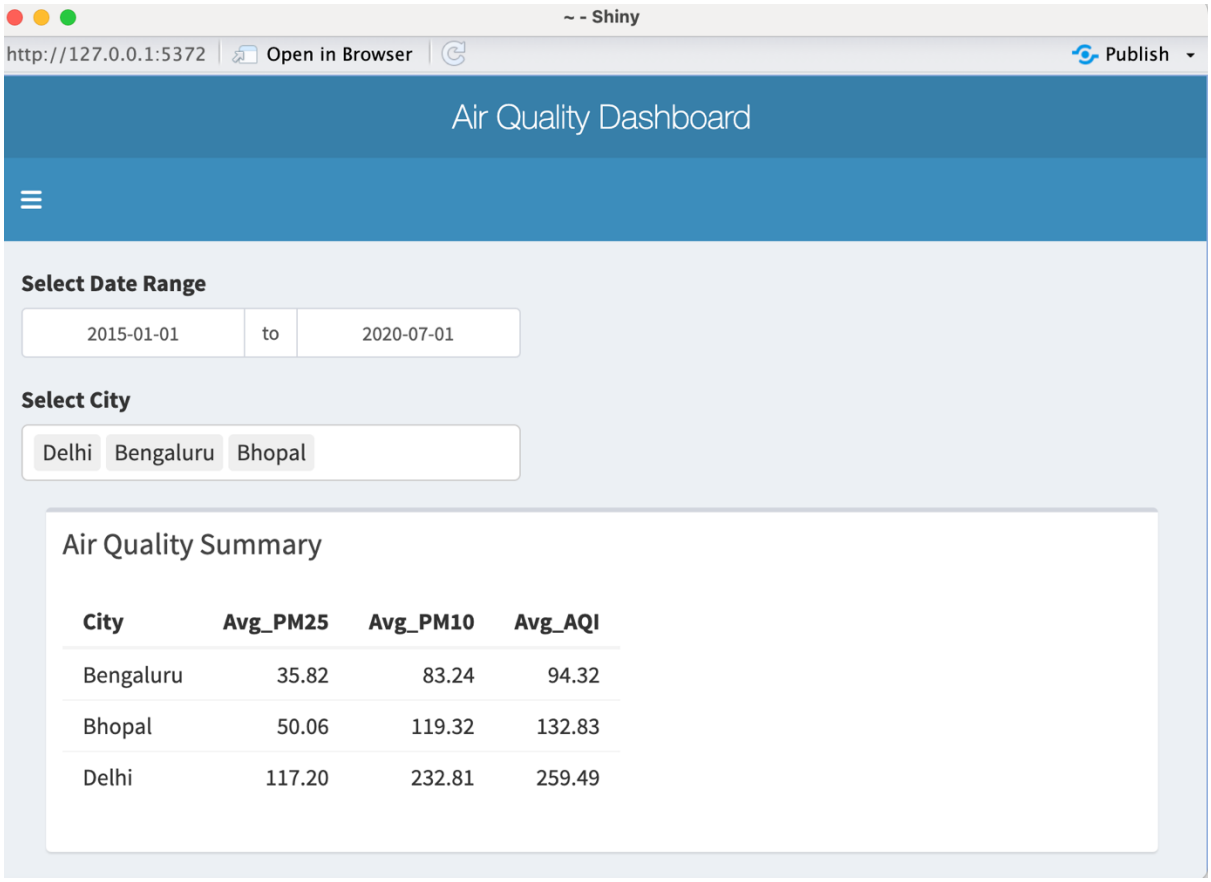
How does AQI change with time? Which city has worst AQI?

Visualizations

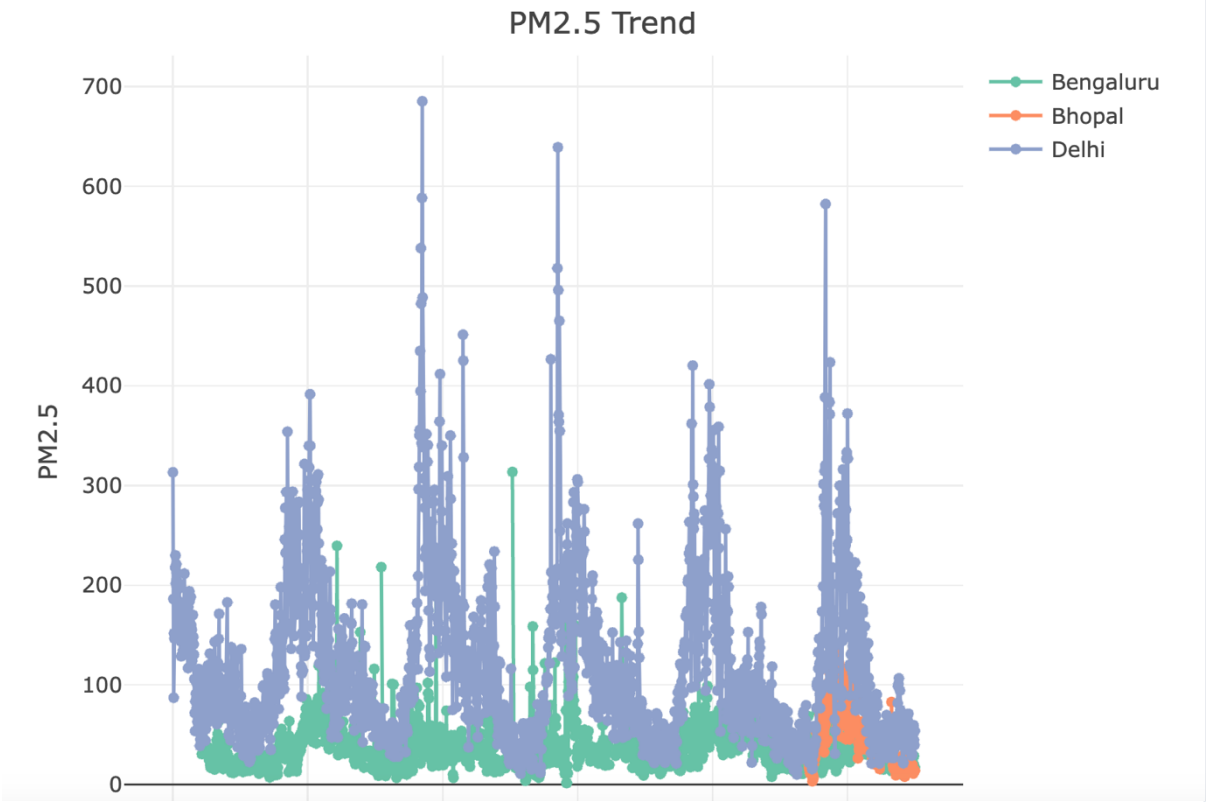
Time Series Plots: Plotted time series graphs for AQI, PM 2.5 and PM 10.

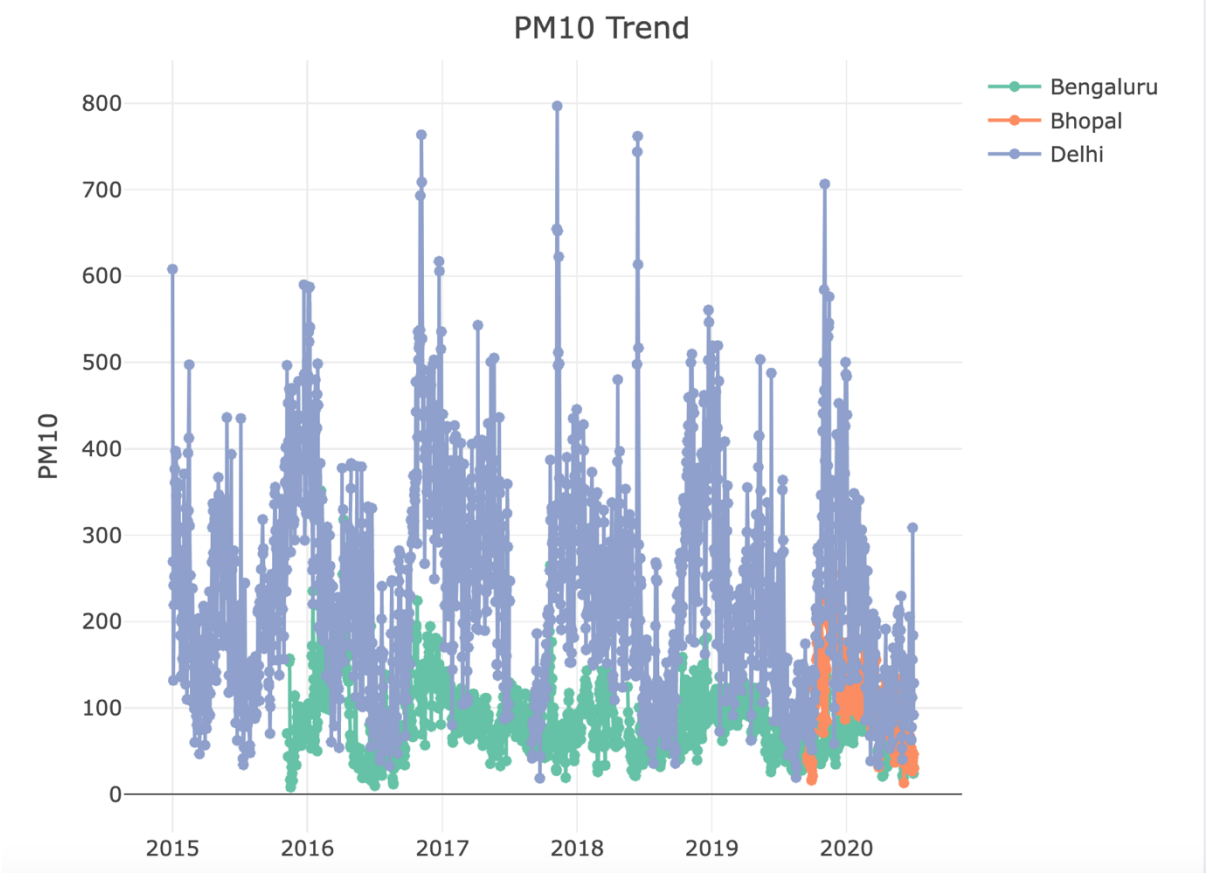
Statistical Analysis

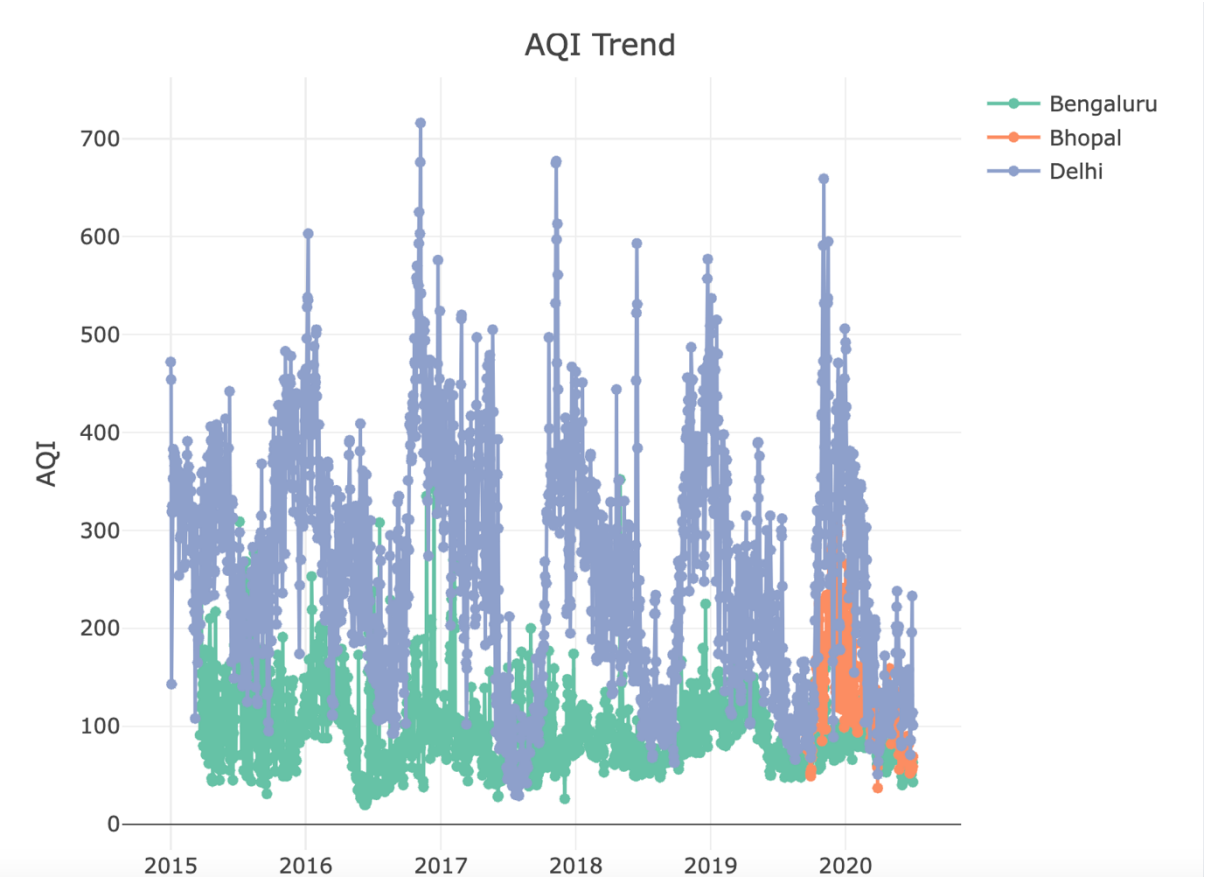
1. Descriptive Statistics: Calculate mean, median, standard deviation, and other summary statistics for AQI.
2. Hypothesis Testing: Performed hypothesis tests to compare different groups or conditions.



PM2.5 Trend


PM2.5 Trend
PM2.5
700
600
500
400
300
200
100
0
Bengaluru
Bhopal
Delhi


PM10 Trend
PM10
800
700
600
500
400
300
200
100
0
2015
2016
2017
2018
2019
2020
Bengaluru
Bhopal
Delhi



- The graphs show that air pollution for all cities was reduced in 2020 due to the covid 19 induced lockdown.

- The graphs also show pollution comparison of different cities. The same can be used to study initiatives in cities with less pollution and problems in cities with high air pollution.