

Pollution Map of Indian Cities

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BSC COMPUTER SCIENCE AND DATA ANALYTICS

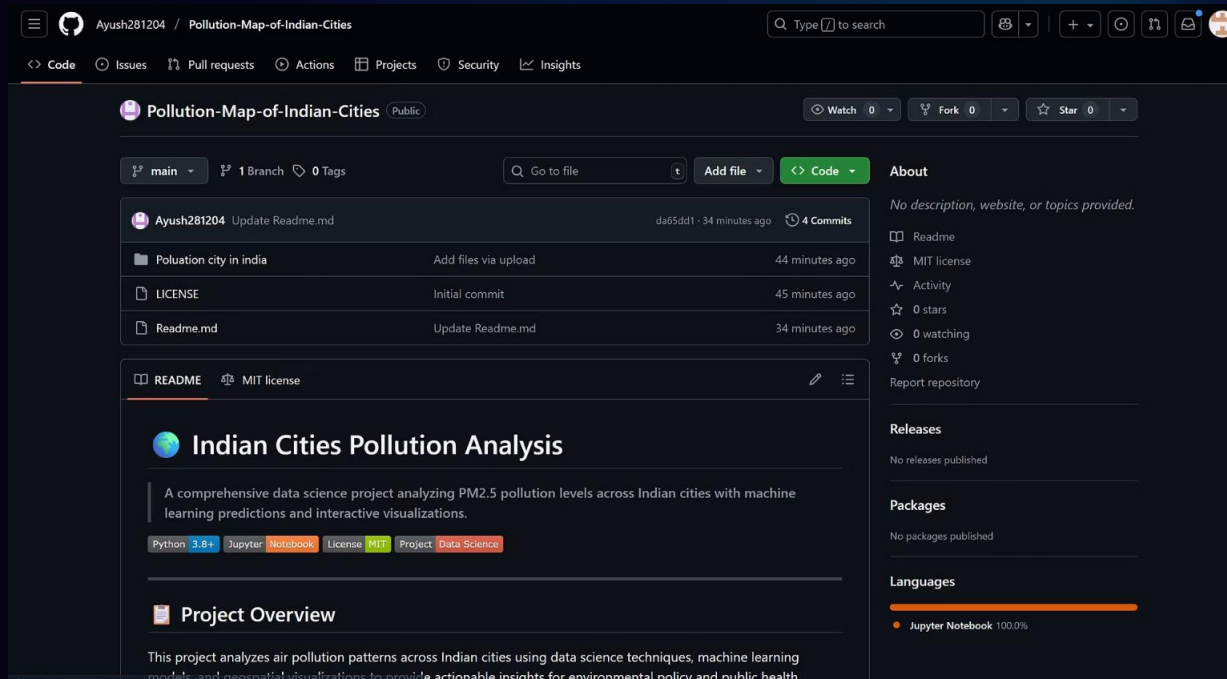
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GITHUB REPO LINK: <https://github.com/Ayush281204/Pollution-Map-of-Indian-Cities/tree/main/Poluation%20city%20in%20india>



Why Air Pollution Mapping Matters



1

Pinpoint **spatial hotspots** of pollution.

2

Identify **trends** over time.

3

Enable **targeted interventions**.

The Code Window

Files

main

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Poluation city in india

data

docs

images

notebooks

pollution_analysis.ipynb

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Readme.md

Pollution-Map-of-Indian-Cities / Poluation city in india / notebooks / pollution_analysis.ipynb

Ayush281204 Add files via upload 903b04b · 45 minutes ago History

Preview Code Blame 714 lines (714 loc) · 352 KB

Raw

Pollution Analysis - Indian Cities

Simple data analysis of PM2.5 pollution levels across Indian cities with visualization and insights.

```
In [14]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import folium
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import r2_score
import warnings
warnings.filterwarnings('ignore')

print("✅ All libraries loaded successfully!")
```

✅ All libraries loaded successfully!

```
In [6]: df = pd.read_csv('../data/pollution_dataset.csv')
print(f"Dataset loaded: {len(df)} cities")
print(f"Columns: {len(df.columns)} features")
```

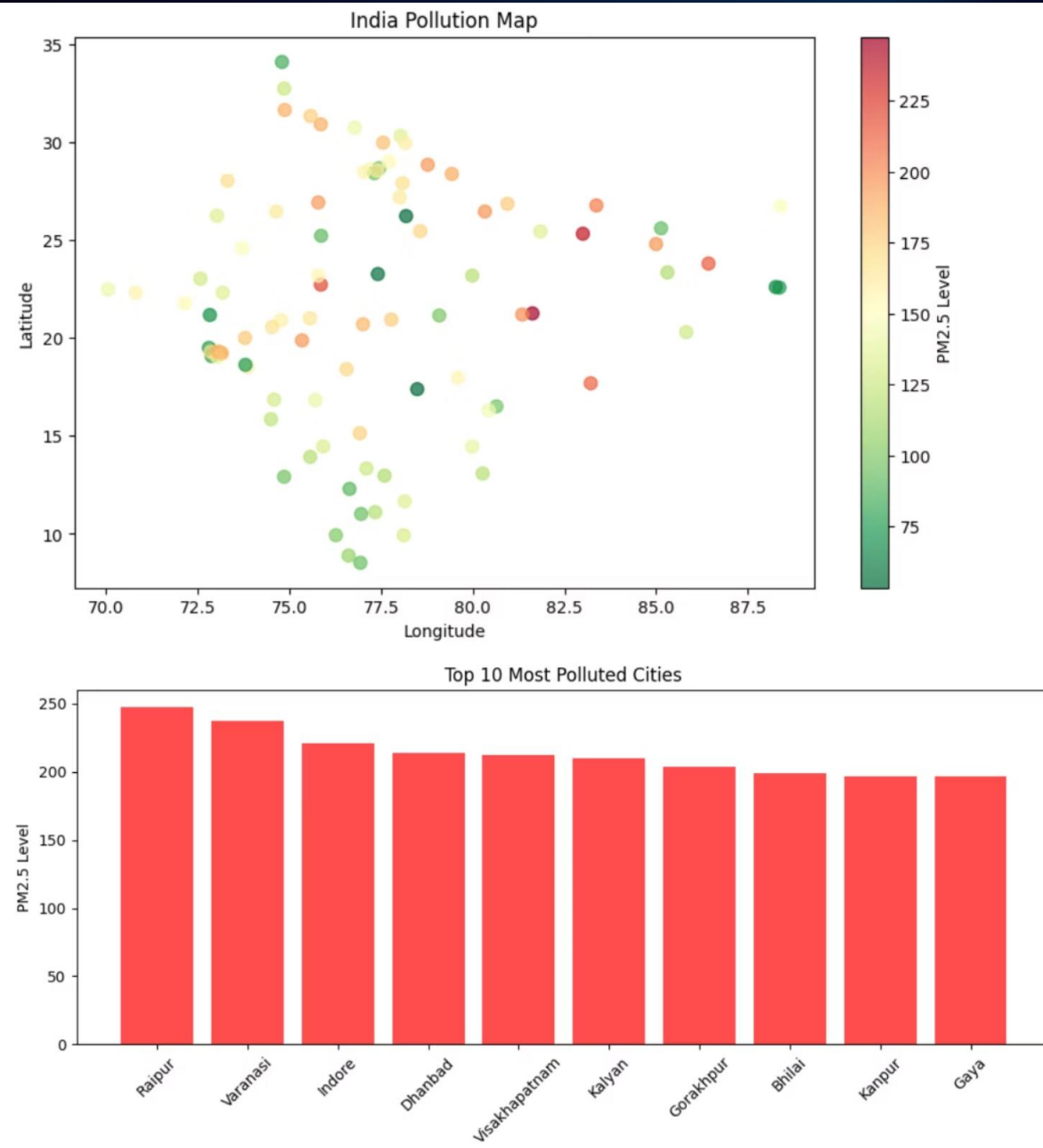
Dataset loaded: 95 cities
Columns: 15 features

```
In [5]: missing_data = df.isnull().sum()
print(f"\nMissing values: {missing_data.sum()}")
if missing_data.sum() > 0:
    print("Removing rows with missing data...")
    df = df.dropna()

print(f"\n🌫️ PM2.5 pollution range: {df['PM2.5'].min():.1f} to {df['PM2.5'].max():.1f}")
```

Real-Time Air Quality Maps: A Game Changer

This project uses GeoPandas with shapefiles and pollution data to create geospatial maps, marking Indian cities and coloring them based on their air pollution values.



- Interactive maps like AQICN and IQAir provide live AQI data for 100+ Indian cities.
- Visualizing pollution hotspots helps identify critical zones for intervention.
- Example: Patna, Ghaziabad, and Samastipur consistently show poor air quality, highlighted visually on these maps.

Seasonal and Spatial Patterns Revealed by Maps

Winter Spikes

Winter months see spikes due to stubble burning and temperature inversions trapping pollutants.

1

2

Traffic Congestion

Traffic congestion hotspots show localized high pollution on maps.

3

Metropolitan Disparities

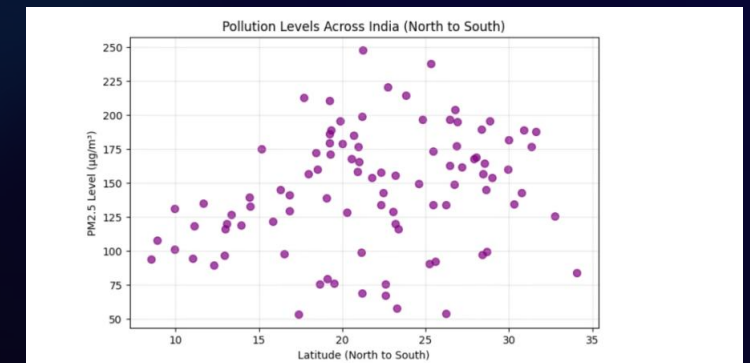
Mapping reveals significant pollution disparities even within metropolitan areas.

These visual insights from pollution maps provide a clearer understanding of when and where pollution is most severe, guiding targeted interventions.

Health and Environmental Impacts

Human Health

Chronic exposure linked to respiratory diseases, cardiovascular problems, and premature deaths. The visual impact of pollution maps empowers citizens and policymakers to understand these risks more acutely.



How Pollution Maps Drive Solutions



Targeted Policy

Real-time data supports targeted policy enforcement and public advisories.



Community Action

Enables community monitoring and citizen science participation.



Measure Effectiveness

Facilitates evaluation of pollution control measures' effectiveness.

By making the invisible visible, pollution maps become a powerful tool for driving accountability and change.


Case Study: Delhi's Air Quality Crisis and Response



Delhi's AQI often reaches hazardous levels, forcing school closures and health warnings. Mapping helped identify major pollution sources: vehicles, industry, and crop burning. This resulted in emergency measures such as odd-even vehicle rules and crop burning bans, showcasing the direct impact of data visualization on public policy.

Conclusion

- This project successfully demonstrates the visualization of pollution levels across Indian cities, highlighting the importance of environmental data analysis.
- It emphasizes how technology, data, and geospatial tools can be combined to create meaningful insights for public awareness and decision-making.
- The outcomes not only meet the defined objectives but also pave the way for future improvements such as real-time data integration, predictive modeling, and interactive dashboards.
- With further enhancements, this project can serve as a valuable tool for researchers, policymakers, and the general public.

 **Project Repository:** [GitHub – Pollution Map of Indian Cities](#)

Thank You!