From EarthData to Action

Cloud Computing with Earth Observation Data for Predicting Cleaner, Safer Skies

- The air we breathe changes every hour.
- NASA's TEMPO satellite captures pollution data from space, ground stations record local air quality, and weather networks track wind, humidity, and temperature.

  But all this information is massive, scattered, and scientific.
  Ordinary people can't easily understand or use it.

  The result?
  We breathe the data every day — but never see what it means for our health.

Novelty and Uniqueness

Scalable & Modular Architecture:
The pipeline is designed to adapt to new datasets and parameters, enabling future integration of advanced analytics or prediction models.

Dynamic and Real-Time Updates:
The platform continuously fetches and updates data, ensuring up-to-date, location-specific insights rather than relying on static datasets.

Holistic Integration of Diverse Data Sources:
Unlike existing tools that focus only on weather or ground conditions, our system combines real-time weather, ground, and satellite data to give a comprehensive environmental snapshot.

Human-Centric Data Accessibility:
We transform complex scientific datasets into intuitive visual insights through an interactive web interface — making data usable even for non-experts .

Technical Pipeline

Trends

Research

Research

Data Collection

Data Pre Processing

Train model on different AQI parameters [NO2, HCHO, O3, PM]

Calculate and predict AQI values for present and near future.

Personalised alerts

Curated chatbot answers

Displaying past AQI trends

Live AQI values for given parameters

Use predicted AQI values, live data, past data and user information to execute various functionalities in the website.

AQI Calculation

$$I_p = \frac{I_{Hi} - I_{Lo}}{BP_{HI} - BP_{Lo}}(C_p - BP_{Lo}) + I_{Lo}.$$

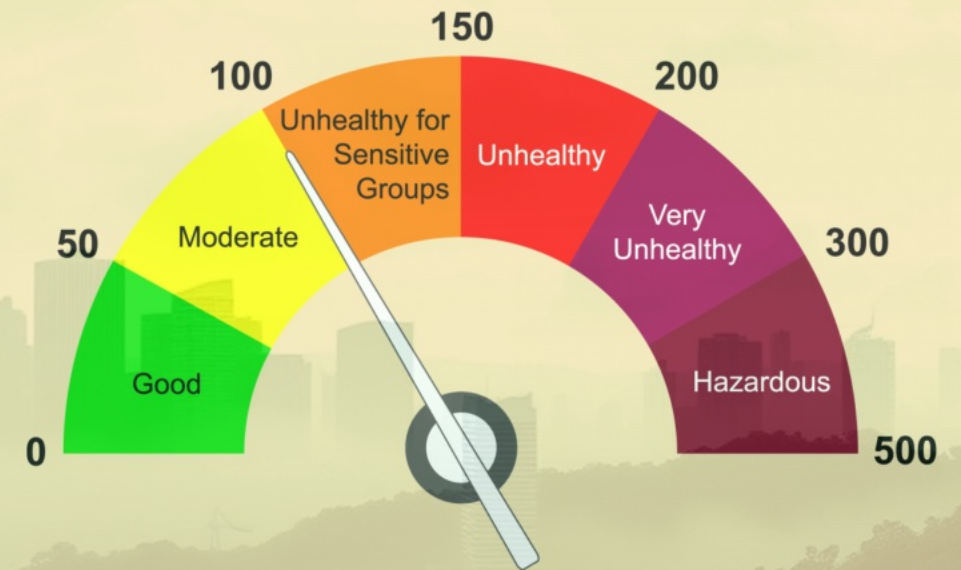Where I_p = the index for pollutant p

C_p = the truncated concentration of pollutant p

BP_{Hi} = the concentration breakpoint that is greater than or equal to C_p
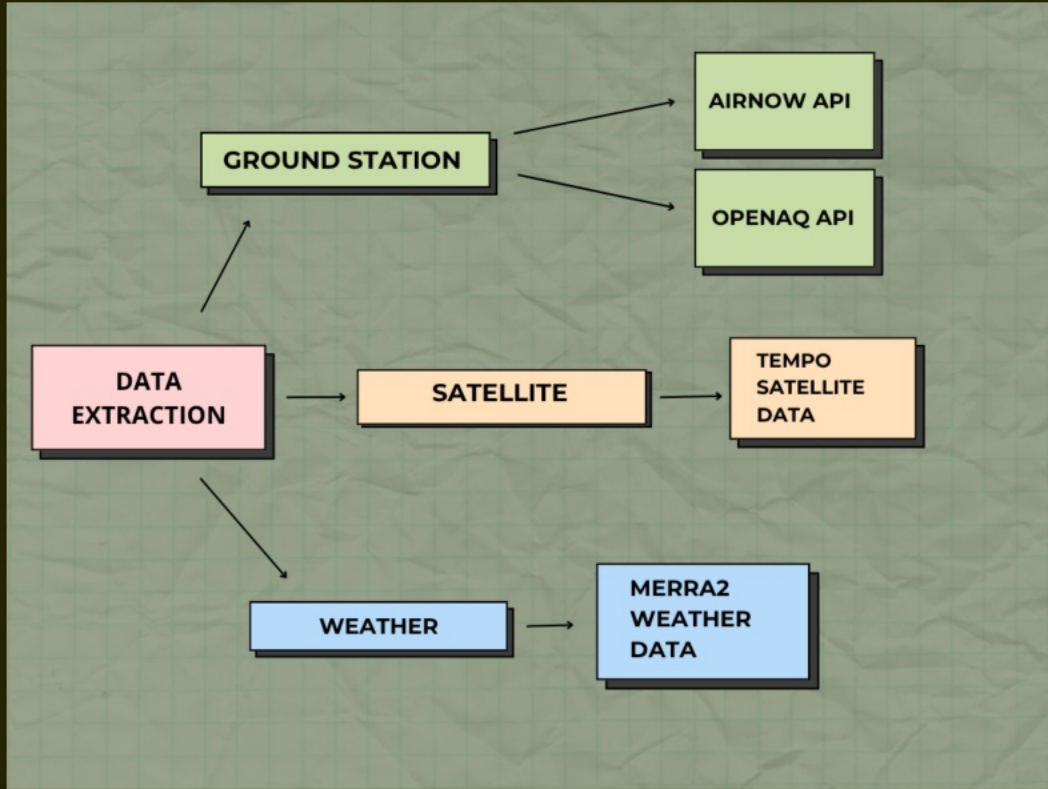
BP_{Lo} = the concentration breakpoint that is less than or equal to C_p

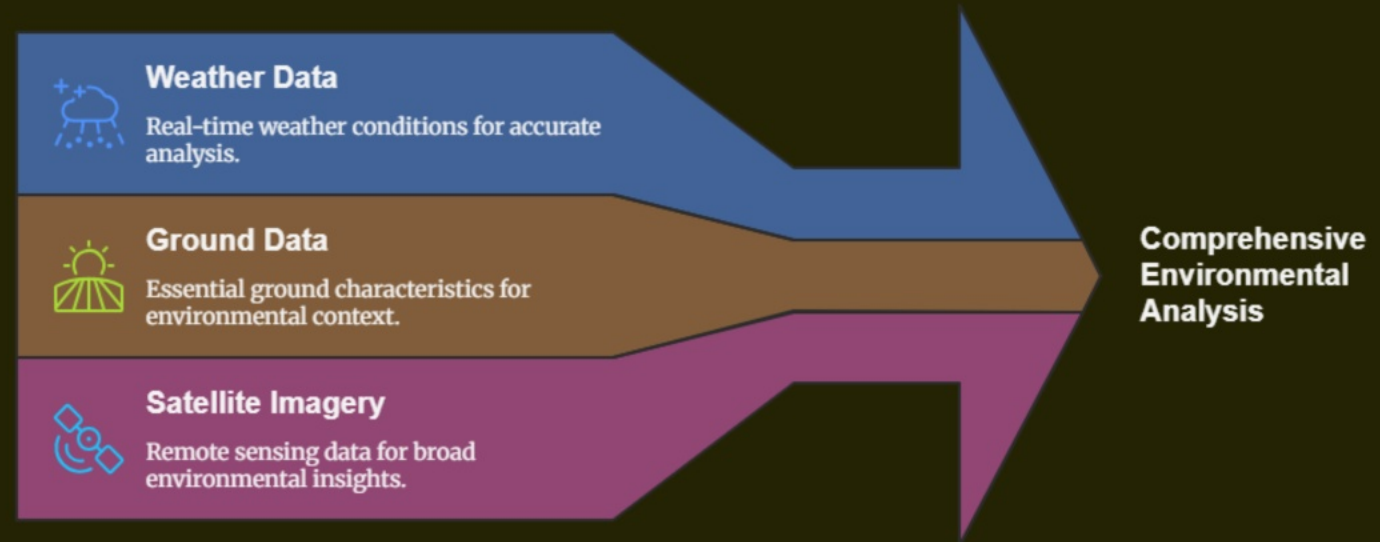I_{Hi} = the AQI value corresponding to BP_{Hi}

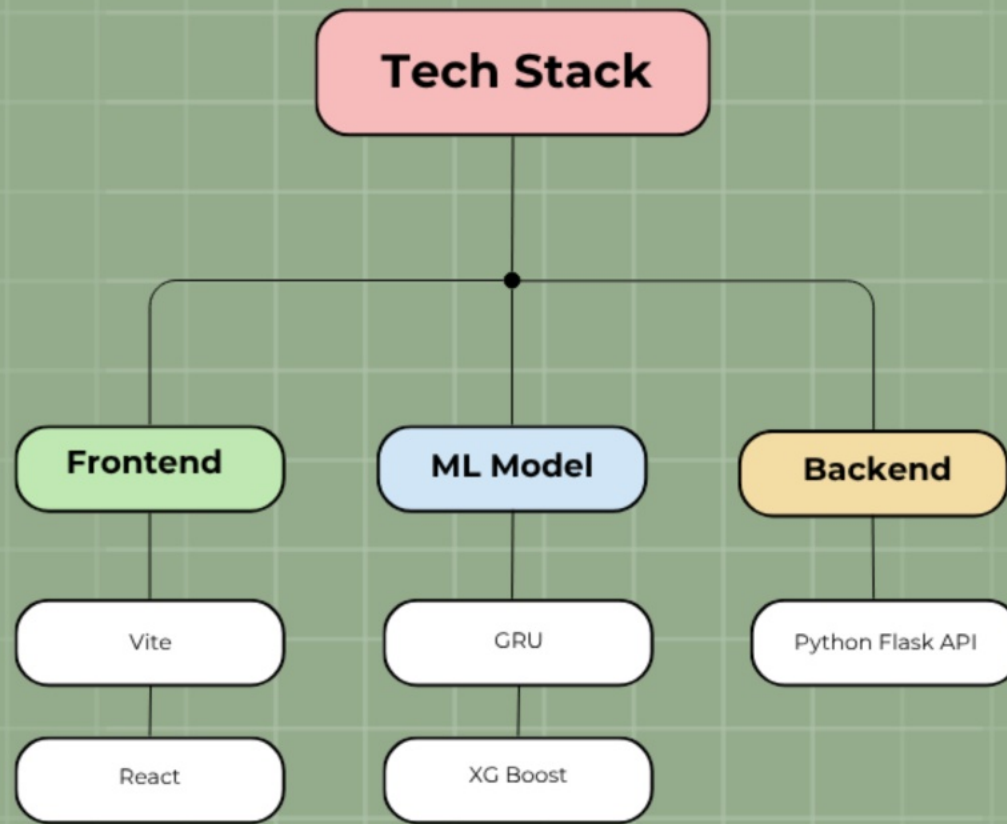I_{Lo} = the AQI value corresponding to BP_{Lo}

Data Extraction, Handling and Integration

Data Integration for Environmental Insights

Comprehensive Environmental Analysis

Weather Data
Real-time weather conditions for accurate analysis.

Ground Data
Essential ground characteristics for environmental context.

Satellite Imagery
Remote sensing data for broad environmental insights.

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