Team Name : Hackastra

Team Leader Name : Yash Deore

Problem Statement : 7-Developing an Algorithm for Air Quality Visualizer and Forecast App.

Team Members

Team Leader:

Name: Yash Deore
College:Pillai College of engineering, Panvel.

Team Member-1:

Name: Prathamesh Shingade
College:Saraswati Education Society's Saraswati College of Engineering, Kharghar.

Team Member-2:

Name:Sanskar Gharal
College: FR.C.Rodrigues Institute of Technology (FCRIT),Navi Mumbai

Team Member-3:

Name:Talha Mulani
College: Vivekanand Education Society Institue of Technology, Chembur

Brief about the Idea :

India breathes unevenly. While air quality tools continue to serve metro cities , over **70%** of our **population** is living in small towns and **rural** areas are left guessing.

People **don't know** what they're **inhaling**.

They don't get real-time **updates**.

No warnings when pollution spikes.

No forecasts during crop-burning or winter smog.

No health alerts for kids, the elderly, or farmers working outdoors.

This isn't just a data gap. It's a **health risk gap**.
With our team Hackastra we are building a bridge turning **invisible pollution** into visible **actions**.
So that everyone can breathe safely.

Opportunity should be able to explain the following:

What makes it different?

Most AQI platforms serve what's already visible big cities with existing sensors. Hackastra focuses on what's invisible ,the rural regions where no one is measuring the air, yet millions are breathing it.

How will it be able to solve the problem?

Hackastra combines AQI data from **CPCB**, historical trends from **Kaggle**, satellite overlays from **ISRO's Bhuvan**, and live weather inputs from **OpenWeatherMap**. It's designed to work in areas that are often ignored offering both real-time AQI and forecasts.

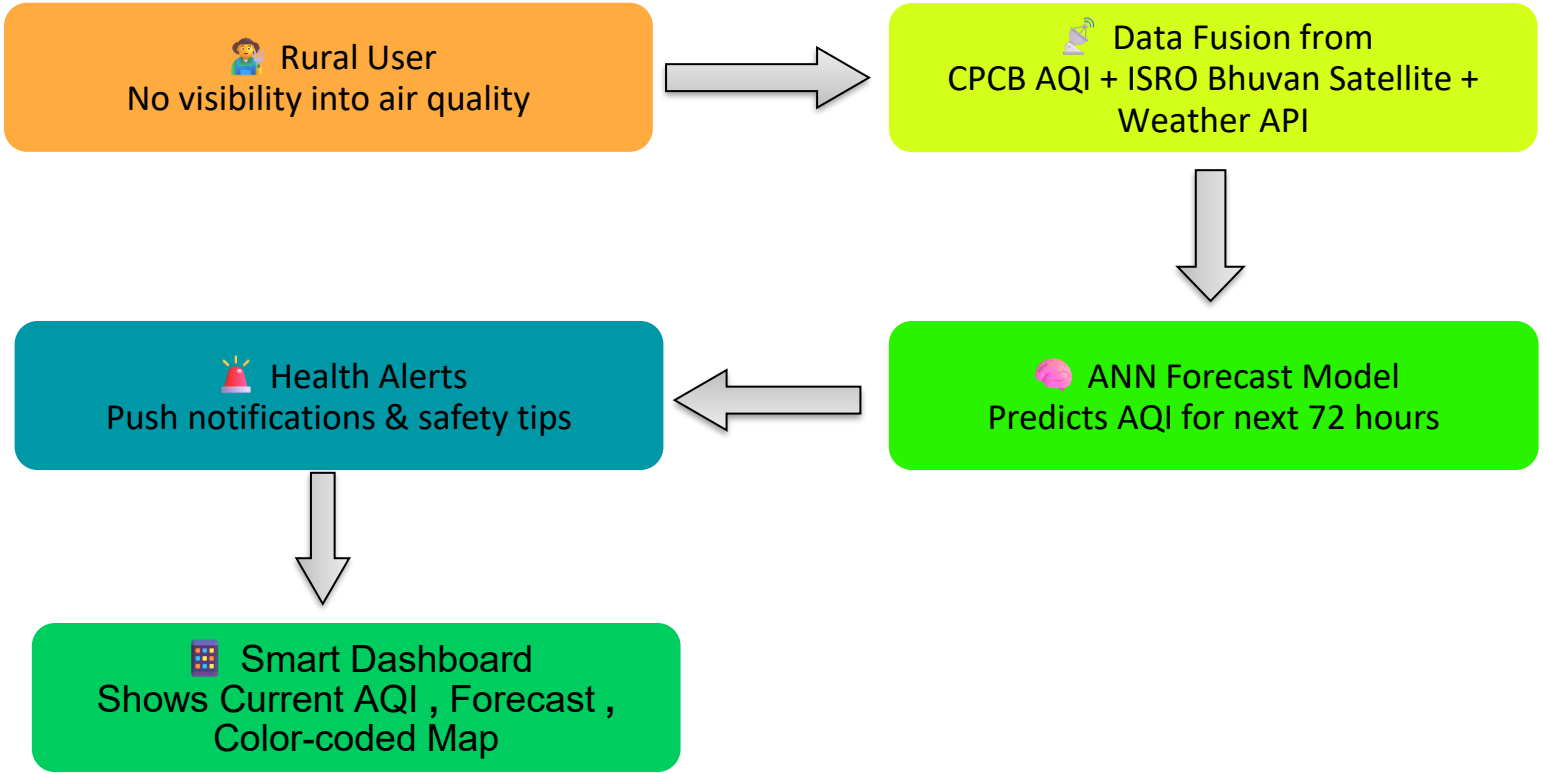
USP of the proposed solution:

Hackastra is rural first, forecast driven, and map integrated. It works even where sensors are missing **, blending satellite visuals, AI prediction, and hyperlocal health alerts into a lightweight, mobile-friendly platform.**

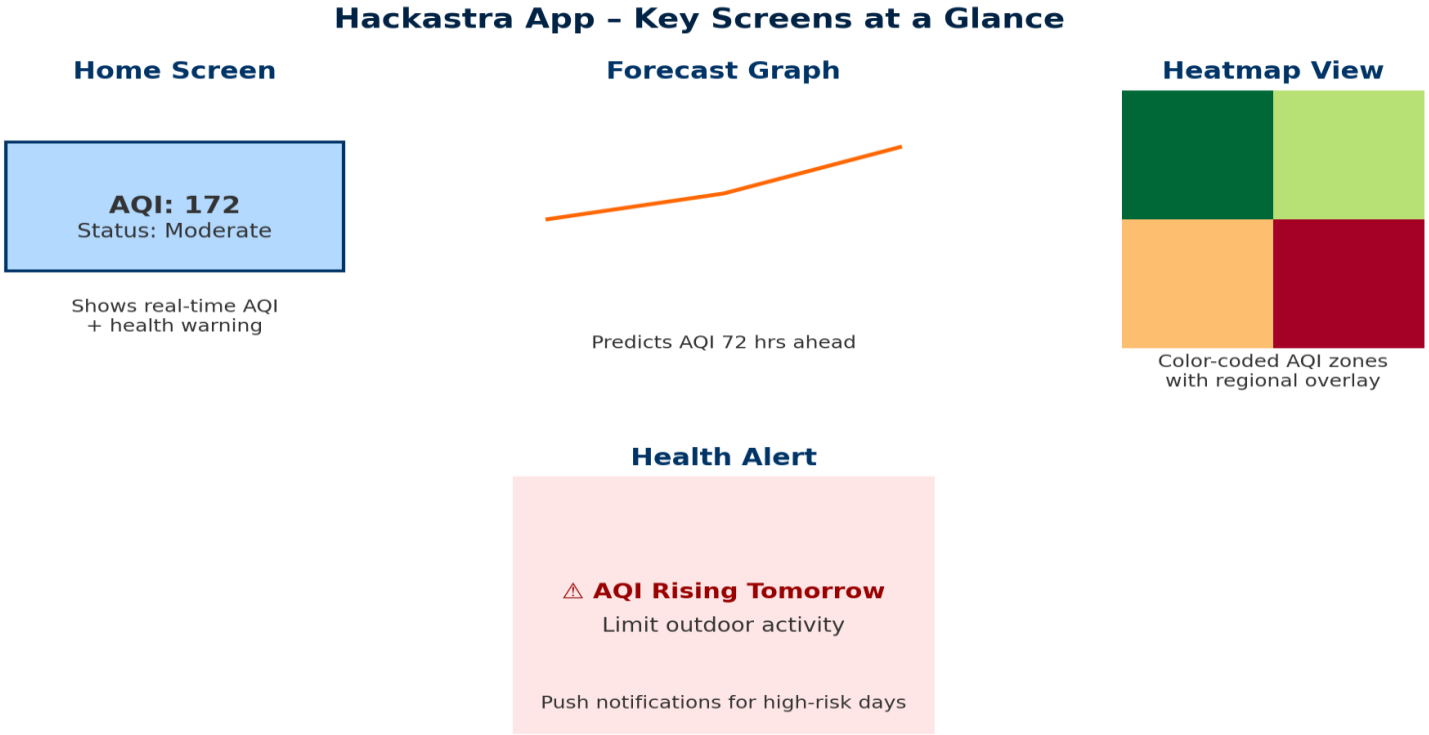
List of features offered by the solution:

- 🟩 **Real-Time AQI Detection:** Pulls location based AQI from CPCB or satellite fallback.
- 📈 **72-Hour Pollution Forecast:** ANN based predictions using past AQI + weather + seasonality.
- 🗺️ **Interactive AQI Heatmaps:** Visual zone based severity overlays (good to hazardous).
- 🧠 **Personalized Health Recommendations:** Tips like “Avoid jogging today” or “Wear mask” from fixed threshold values.
- 📊 **Historical Trends & Filters:** Line charts by location, pollutant, or time for awareness.
- 🚨 **Push Notifications:** Alerts when pollution is expected to spike in user’s area.
- 📌 **Pollution Source Mapping:** Optional satellite overlay of hotspots like traffic zones or crop fire belts.
- 🧩 **Lightweight & Rural Ready:** Designed for low bandwidth, scalable even in low-resource zones.

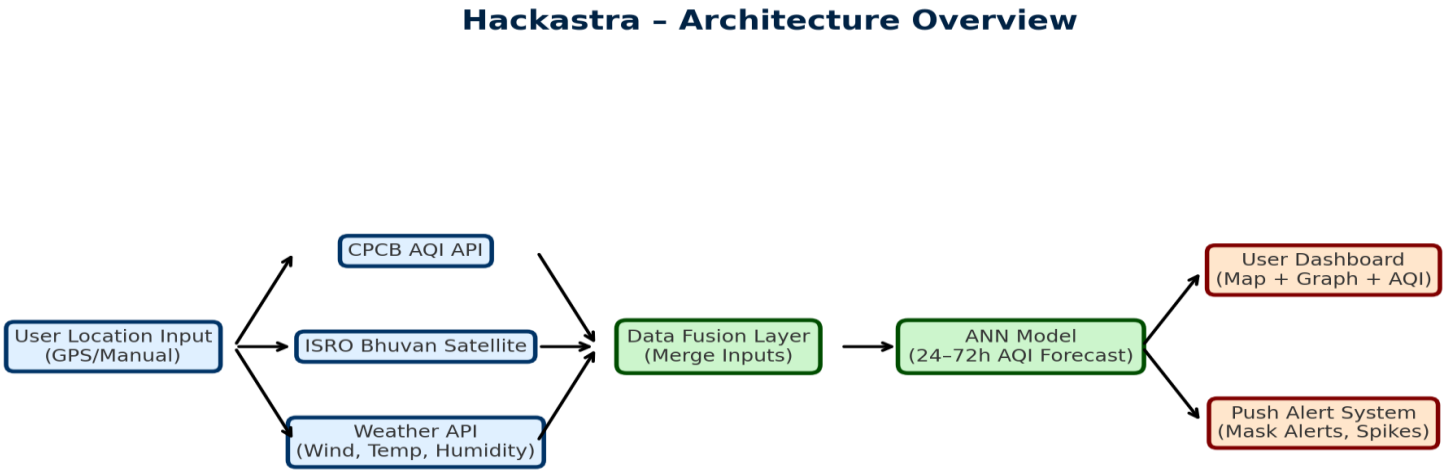
Process flow diagram or Use-case diagram:



Wireframes/Mock diagrams of the proposed solution (optional): We sketched this general UI in **Canva** to represent how a rural user would see the app.



Architecture diagram of the proposed solution: We designed this in Canva to show how Hackastra pulls data, processes it through ANN model and delivers useful AQI insights to users.



Technologies to be used in the solution:

Data Acquisition: ISRO Bhuvan (OCM-3 AOD), CPCB AQI, Weather API, Kaggle datasets

Data Processing: Pandas, NumPy

Modeling: TensorFlow/Keras (ANN for 72-hour AQI forecasting), Scikit-Learn

Backend: Flask, Firebase

Frontend/Visualization: Google Maps API, Seaborn/Matplotlib, Flutter

Estimated implementation cost (optional): At Largescale Application

- Cloud Hosting & Backend Services – ₹25,000 to ₹75,000
- Data API Access (AQI, Weather, Satellite) – ₹10,000 to ₹30,000
- App Development (Flutter/React Native) – ₹75,000 to ₹2,00,000
- AI Model Training & Infrastructure – ₹20,000 to ₹50,000
- UI/UX & Design Tools – ₹5,000 to ₹25,000
- Miscellaneous (Domain, Testing, Devices) – ₹10,000 to ₹30,000

Total Estimated Cost for MVP: ₹1,45,000 to ₹4,10,000

इसरो isro

Powered by H2S HACKATHON

BHARATIYA ANTARIKSH HACKATHON 2025

THANK YOU