RSC Team 2 Deliverable Documentation

Dashboard Overview & Technical Handoff

Objective

This document provides an overview of the final interactive dashboard developed by RSC Team 2 for Rise South City. The dashboard visualizes air pollution-related risks across South San Francisco and San Bruno by integrating environmental and health vulnerability data. It is designed as a tool to support community engagement and decision-making by identifying neighborhoods facing higher environmental and public health burdens.

Data Overview

We incorporated air quality and health vulnerability data to inform the dashboard's core functionality:

- Air Quality Data Sources:
  - Clarity Monitor Data (Oct 30, 2024 – Mar 31, 2025)
  - PurpleAir API Data (Mar 30, 2024 – May 3, 2025)
  - Historical PurpleAir Data (Dec 27, 2018 – Apr 9, 2025)
  - All air quality datasets were cleaned, merged, standardized using the EPA's AQI formula, and normalized to a 0–1 scale.
- Health Vulnerability Data:
  - Derived from CalEnviroScreen 4.0 and San Mateo County's All Together Better indicators
  - Normalized to a 0–1 Health Risk Index (HRI)

Composite Risk Score

The primary feature of the dashboard is the Composite Risk Score. This score combines:

- HRI (Health Risk Index)
- AQI (Air Quality Index)

Users can adjust the weighting between these components using an interactive slider:

$$\text{Risk} = \alpha \times \text{HRI} + (100 - \alpha) \times \text{AQI}$$

This interactivity allows exploration of how different priorities (health vs. environmental risk) affect community-level risk assessments.

Sensor Confidence Metrics

Two reliability scores help users understand the confidence level of sensor data:

- Consistency Score: How accurately a monitor predicts its own next-day PM2.5 using the prior seven days.
- Predictability Score: How well a monitor's reading aligns with nearby sensors on the same day.

Sensor locations are visualized on the map with color-coded markers indicating predictability, where darker hues represent more consistent data.

Address-Based Risk Lookup

Users can search for a specific address to view the estimated local Composite Risk Score and nearby sensor predictability. This feature is especially helpful for identifying potential environmental and health vulnerabilities at specific locations.

Additional Visualizations

The dashboard includes supplementary maps and charts to support interpretation:

- Risk maps by census tract
- PM2.5 daily trend graphs
- Contextual overlays (e.g., airport traffic, sensor locations)
- Sensor placement needs based on health vulnerability and data redundancy

These assets are stored in the figures/ folder and were used in presentations.

Visual Insights & Interpretations

The dashboard contains built-in commentary explaining:

- How risk scores are calculated and interpreted
- The meaning and significance of predictability indices
- Patterns linking air traffic and pollution, particularly during the COVID-19 period
- How sensor redundancy intersects with public health vulnerability to guide future sensor placement

FAQs

How do I run the dashboard locally?
From the project root directory, run: streamlit run code/streamlit_app.py

How is the dashboard deployed?
It is hosted via Streamlit Community Cloud. Connect the GitHub repo, specify code/streamlit_app.py as the main file, and Streamlit will handle deployment.

How do I update the dashboard?
Any updates pushed to GitHub will be automatically reflected in the deployed dashboard. No manual uploads are needed.

Where should new users begin?
Start with the GitHub README, which outlines installation, data structure, and walkthrough steps.