PROJECT REPORT

Title

AirSight
Understand. Predict. Act.

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1. Introduction / Idea Overview

Air pollution is a growing concern in urban areas and affects health, productivity, and daily decision-making. While air quality data is available through various platforms, it is often presented in the form of raw numbers that are difficult to interpret and act upon.

AirSight is a platform designed to bridge this gap by combining real-time air quality monitoring, short-term prediction, and clear action recommendations. The goal is to make air quality data practical and useful for individuals, institutions, and communities.

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2. Historic Problem Background

Historically, air pollution monitoring systems have focused on:

- Collecting pollution data

- Publishing AQI values on dashboards or government portals

However, these systems suffer from key limitations:

- Data is mostly **reactive**, not predictive

- Users are informed **after** pollution reaches harmful levels

- There is no guidance on **what actions to take**

- Institutions lack tools for **planning and prevention**

As urbanization increased, pollution began affecting not only health but also:

- School attendance

- Workplace productivity

- Outdoor activity planning

- Healthcare burden

Despite this, air quality platforms remained data-centric rather than decision-centric.

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3. Core Problem Statement

Although air quality data is widely available, it is not effectively translated into actionable insights. Individuals and organizations are unable to predict upcoming pollution levels or take timely preventive actions. As a result, responses to poor air quality are delayed, leading to health risks, operational disruptions, and inefficient planning.

The core problem is the lack of a **simple, predictive, and actionable air quality decision system**.

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4. Proposed Solution – AirSight

AirSight addresses this gap by:

1. Displaying **real-time air quality data**

2. Predicting **near-future air quality trends**

3. Providing **clear action recommendations**

Instead of asking users to interpret AQI numbers, AirSight focuses on answering:

- *Is the air safe today?*

- *What about tomorrow?*

- *What should I do?*

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5. Dataset and Data Strategy

To ensure reliability and clarity, AirSight uses a hybrid data approach:

- **Real-time Monitoring:** OpenAQ API
  Used for live pollution values (PM2.5, PM10, etc.)

- **Prediction Model:** World Air Quality Index (WAQI) historical data
  Used for training predictive models due to standardized AQI values

This separation ensures:

- Stable live monitoring

- Clean and reliable prediction training

- Better explainability

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6. Business Perspective

6.1 Why This Is Business-Relevant

Air pollution impacts daily operations:

- Schools must decide on outdoor activities

- Offices must plan travel and work-from-home policies

- Residential communities must guide residents

Currently, these decisions are made without predictive insight, leading to:

- Health risks

- Reduced productivity

- Unplanned disruptions

AirSight supports **better daily planning**, making it relevant for real-world adoption.

6.2 Target Users

- Schools and colleges

- Offices and co-working spaces

- Residential communities (RWAs)

- Local authorities

6.3 Value Proposition

AirSight helps organizations:

- Prepare in advance

- Reduce uncertainty

- Improve safety

- Make informed decisions with minimal effort

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7. Implementation Approach

7.1 System Architecture

1. Backend fetches live pollution data from OpenAQ

2. Historical AQI data from WAQI is used to train a prediction model

3. Prediction results are served via API

4. Frontend displays:

   o Current AQI

   o Predicted AQI

   o Recommended actions

7.2 Technology Stack

- **Frontend:** HTML, CSS, JavaScript

- **Backend:** Python (Flask)

- **Data Handling:** Pandas, NumPy

- **Prediction Logic:** Trend-based model (baseline ML)

- **APIs:** OpenAQ, WAQI

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8. Innovation Aspect

The innovation in AirSight lies not in collecting new data, but in **how the data is used**:

- Shifting from passive monitoring to proactive decision-making

- Combining prediction with guidance

- Focusing on real-world usability instead of raw metrics

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9. Future Expansion & Growth Plan

Phase 1: Product Enhancement

- User accounts

- City-specific dashboards

- Alert notifications (email / SMS / WhatsApp)

Phase 2: Institutional Adoption

- Dedicated dashboards for schools and offices

- Weekly and monthly reports

- API access for integrations

Phase 3: Advanced Intelligence

- Area-level (hyperlocal) predictions

- Indoor air quality integration

- Personalized health risk profiles

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10. Long-Term Vision (Unicorn Path)

In the long term, AirSight can evolve into a comprehensive **environmental intelligence platform** by:

- Serving enterprises and smart cities

- Partnering with health-tech and insurance companies

- Providing pollution risk analytics at scale

As adoption grows, the platform benefits from:

- Better data quality

- Improved predictions

- Higher trust and switching costs

11. Conclusion

AirSight addresses a real and growing problem by transforming air quality data into actionable insights. By focusing on prediction, clarity, and usability, the platform enables individuals and institutions to respond proactively rather than reactively. This makes AirSight not just an awareness tool, but a practical solution with strong real-world and business relevance.

One-Line Summary

AirSight turns air quality data into simple, predictive insights that help people and organizations make better daily decisions.