

Infosys Springboard Virtual Internship 6.0 Internship Completion Report

Team Details

(Do not mention any personally identifiable information like email ID, institute details, mobile phone number, etc.)

Batch Number: Batch 6.0

Title: AirAware: Smart Air Quality Prediction System

Start Date: 10 November 2025

Team Members:

1. Sahil Choudhary
2. Raunit Singh
3. Sneha Reddy
4. Likhita Karri
5. Fariha Naureen

Internship Duration: 40 Days (8 Weeks)

1. Project Title

AirAware: Smart Air Quality Prediction System

2. Project Objective

AirAware is an AI-driven air quality monitoring and prediction platform aimed at addressing the growing environmental and public health challenges caused by air pollution.

The primary objectives of this project are to:

- Monitor critical air quality parameters such as AQI, PM2.5, PM10, CO, NO₂, and SO₂ across multiple cities.
- Analyze historical and real-time air pollution data to identify long-term trends and seasonal patterns.
- Predict future air quality levels using machine learning models to enable early warnings.
- Visualize air pollution data through intuitive dashboards and graphical representations.
- Enhance public awareness and decision-making by classifying air quality into health-based categories.
- Support preventive actions for individuals, institutions, and policymakers through data-driven insights.

Overall, the project aims to convert complex environmental data into actionable intelligence using artificial intelligence and data analytics.

3. Project Description (Detailed)

AirAware is a smart, web-based air quality prediction system designed to analyze environmental pollution data and provide both current and future air quality insights.

The system works through the following pipeline:

1. Collection of air quality data from reliable datasets and APIs covering multiple pollutants and cities.
2. Preprocessing of raw data, including handling missing values, normalization, and noise reduction.
3. Exploratory data analysis to understand pollution patterns and correlations between pollutants.
4. Feature engineering to identify the most influential parameters affecting AQI.
5. Training of supervised machine learning models using historical pollutant concentration data.
6. Prediction of AQI values for upcoming time periods based on learned patterns.

7. Visualization of current, historical, and predicted air quality using charts, graphs, and dashboards.
8. Classification of AQI levels into standard health categories such as Good, Moderate, Poor, and Hazardous.

The system serves as both a monitoring and forecasting tool, enabling users to proactively respond to deteriorating air quality conditions.

4. Weekly Activity Plan and Completion

| Week | Planned Activities | Completed Activities |
|-------------|--|--|
| Week 1 | Requirement gathering, environmental study, problem analysis | Clearly defined problem statement, objectives, and system scope |
| Week 2 | Dataset identification and feasibility analysis | Selected validated air quality datasets and APIs |
| Week 3 | Data preprocessing and cleaning | Cleaned datasets, handled missing values, and standardized formats |
| Week 4 | Feature selection and exploratory data analysis | Identified key pollutant features influencing AQI |
| Week 5 | Machine learning model design and training | Implemented AQI prediction model |
| Week 6 | Model evaluation and optimization | Improved prediction accuracy through tuning |
| Week 7 | Frontend dashboard and visualization integration | Developed visual dashboards and graphs |
| Week 8 | Documentation, testing, and final review | Finalized project and prepared reports |

5a. Key Milestones

| Milestone | Description | Date Achieved |
|-----------------|--|------------------|
| Project Kickoff | Defined project goals, scope, datasets, and responsibilities | 10 November 2025 |
| Milestone 1 | Completed data preprocessing and validation | 20 November 2025 |
| Milestone 2 | Built and tested AQI prediction model | 5 December 2025 |
| Milestone 3 | Integrated ML model with visualization layer | 15 December 2025 |
| Milestone 4 | Completed documentation and evaluation | 31 December 2025 |

5b. Project Execution Details

The execution of the AirAware project followed a systematic and iterative development approach.

Initially, extensive research was conducted on air pollution indicators, AQI standards, and environmental monitoring systems. Relevant datasets were collected and examined to ensure accuracy and completeness.

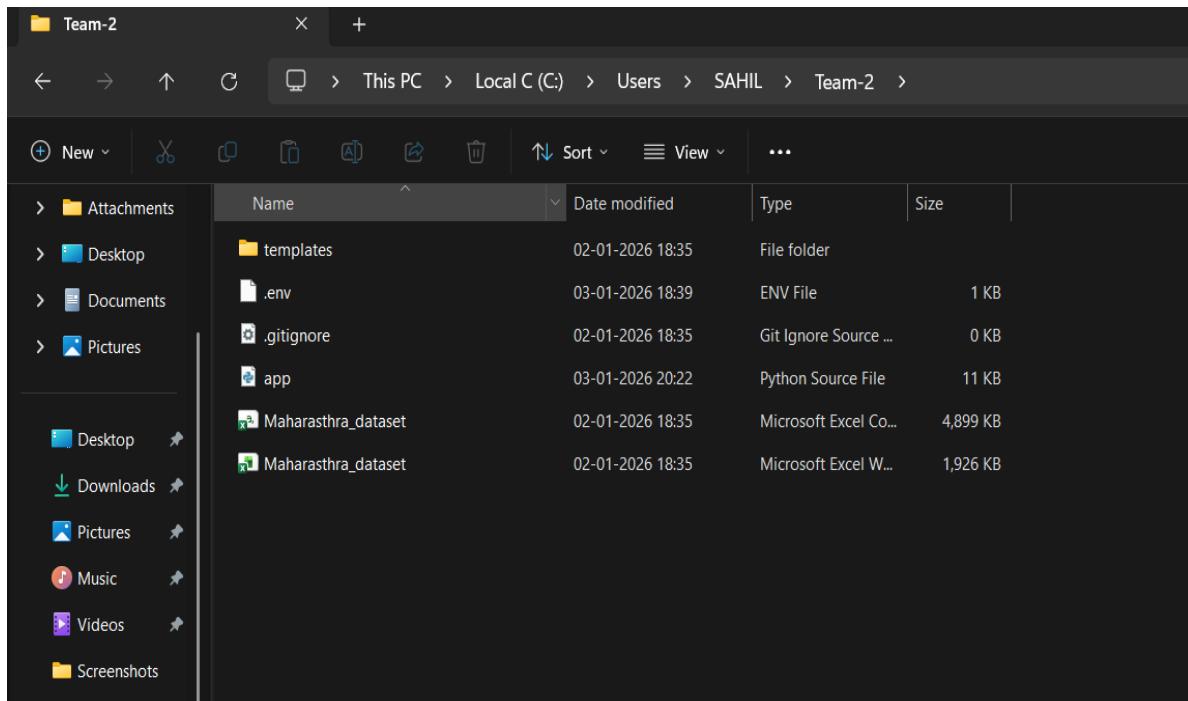
Data preprocessing techniques such as missing value imputation, normalization, and feature scaling were applied to improve data quality. Exploratory data analysis helped identify pollutant correlations and seasonal trends.

Machine learning models were trained using historical pollutant data, enabling the system to predict future AQI levels. The trained model was validated and optimized to ensure reliable and meaningful predictions.

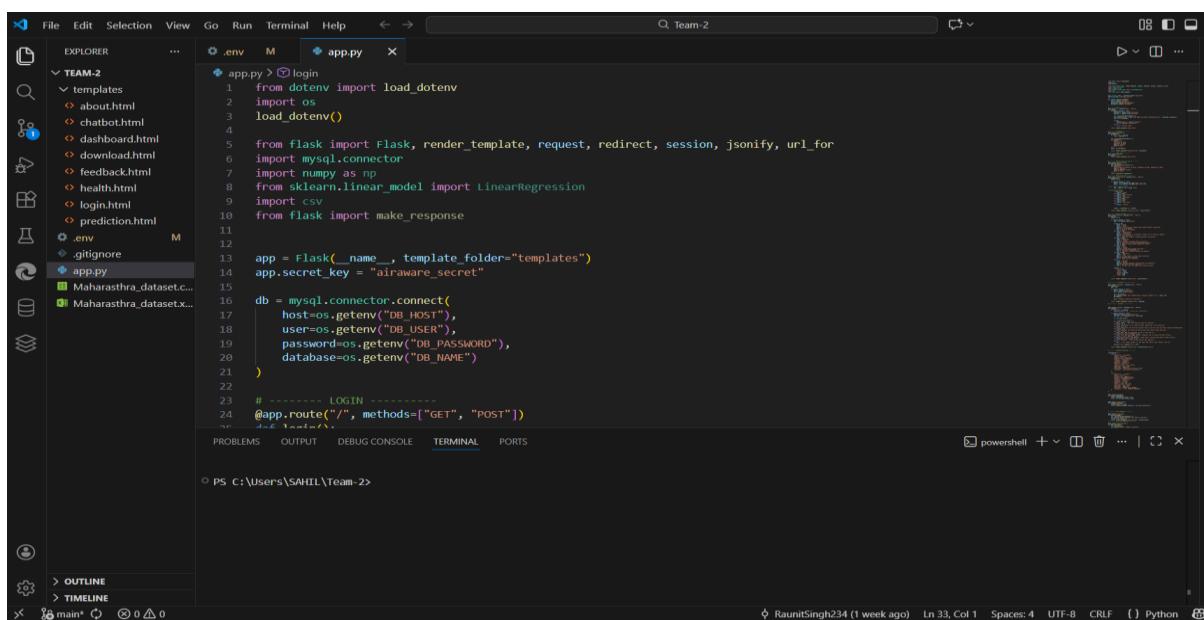
Simultaneously, a user-friendly web interface was developed to visualize air quality metrics through interactive charts and dashboards. Continuous testing and debugging ensured smooth integration and stable system performance.

6. Snapshots / Screenshots

Step 1: Opening the project folder containing all the main files such as app.py, templates,



Step 2: Opening the app.py file in VS Code to view the main Flask application code.



Step 3: Running the Flask app using the command python app.py in the terminal.

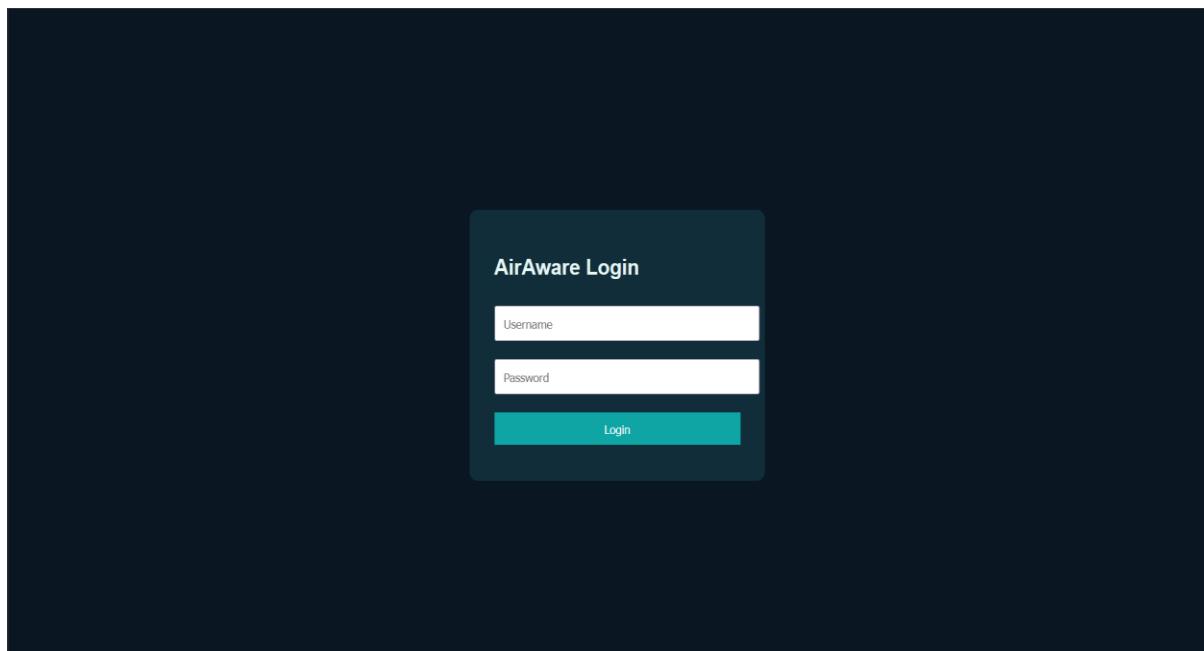
The screenshot shows the Visual Studio Code interface. On the left is the Explorer sidebar with project files like .env, app.py, and various HTML templates. The main area shows the code for `app.py`:

```
app.py > login
1  from dotenv import load_dotenv
2  import os
3  Load_dotenv()
4
5  from flask import Flask, render_template, request, redirect, session, jsonify, url_for
6  import mysql.connector
7  import numpy as np
8  from sklearn.linear_model import LinearRegression
9  import csv
10 from flask import make_response
11
12
13 app = Flask(__name__, template_folder="templates")
14 app.secret_key = "airaware_secret"
15
16 db = mysql.connector.connect(
17     host=os.getenv("DB_HOST"),
18     user=os.getenv("DB_USER"),
19     password=os.getenv("DB_PASSWORD"),
20     database=os.getenv("DB_NAME")
21 )
22
23 # ----- LOGIN -----
24 @app.route("/", methods=["GET", "POST"])
25 def login():
26     if request.method == "POST":
27         # Process login logic
28     else:
29         return render_template("login.html")
```

The terminal tab at the bottom shows the command being run:

```
PS C:\Users\SAHIL\Team-2> python app.py
* Serving Flask app 'app'
* Debug mode: on
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on http://127.0.0.1:5000
Press CTRL+C to quit
* Restarting with stat
* Debugger is active!
* Debugger PIN: 130-738-616
```

Step 4: Login Page



Step 5: Dashboard: AirAware



Step 6: AirAware about page

The screenshot shows the 'About' page of the AirAware system. It features a 'Welcome to AirAware' section with a globe icon, a brief description of the system's purpose, and its mission statement. Below this is a 'Features' section listing the system's capabilities.

Welcome to AirAware

AirAware is a smart air quality monitoring and prediction system. It helps users to understand pollution levels in their area and provides useful health advice based on AQI values.

The system uses real-time and historical air pollution data and presents it through interactive charts and dashboards. Users can also download data, chat with bot, change language and give feedback.

Our Mission

To create awareness about air pollution and help people take preventive health measures to stay safe.

Features

- Air quality analytics dashboard
- AQI based health advisor
- Smart chatbot
- Data download
- Language switch
- User login system

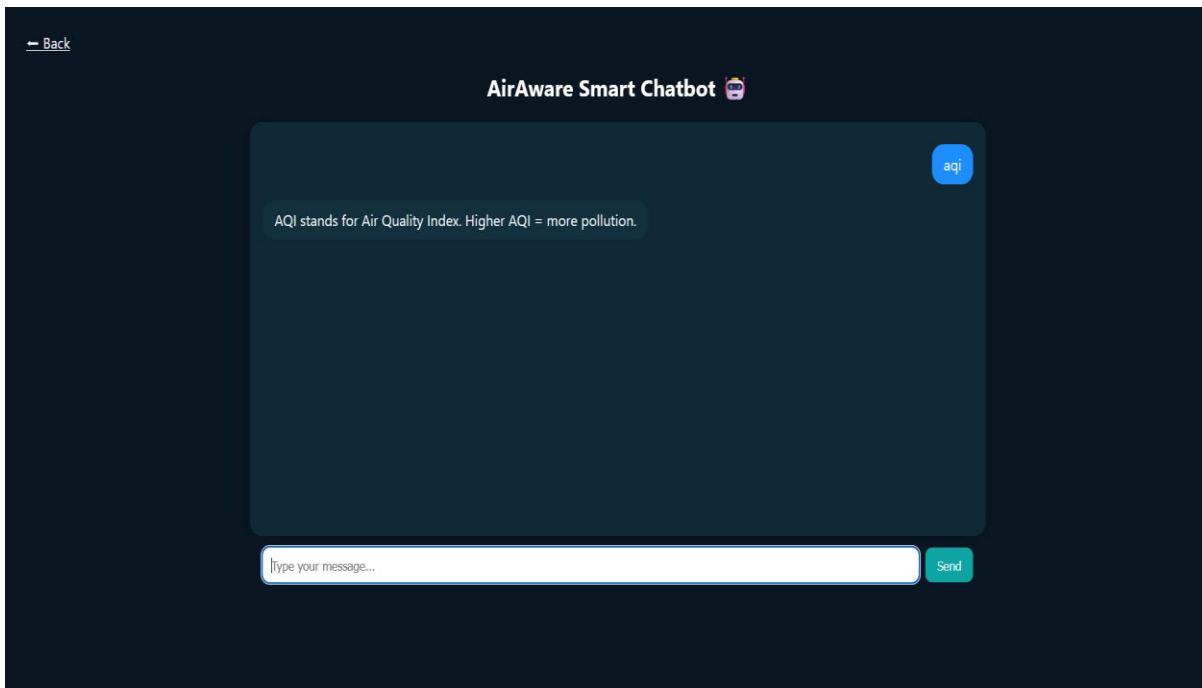
Step 7: Prediction

The screenshot shows a dark-themed mobile application interface titled "AQI Prediction". It has two input fields: "PM2.5:" and "PM10:", each with a dropdown arrow icon. Below these is a teal-colored "Predict" button. To the right of the button, the text "Predicted AQI: 260.0" is displayed in bold. At the bottom, the status "Status: Poor" is shown.

Step 8: Model gives Health Advisory according the AQI

The screenshot shows a dark-themed mobile application interface titled "Health Advisor". It features a top bar with a "Back" button and a "Health Advisor" title with a blue circular icon. Below this is an input field labeled "Enter AQI value" with a placeholder "Example: 135" and a "Get Health Advice" button. A horizontal line separates this from the main content area. In the content area, the text "Your AQI: 300" is displayed in bold. Below it, "Status: Poor" is shown in a yellow rounded rectangle. Under "Health Advice:", the text "Avoid heavy outdoor exercise." is listed. Under "Mask Suggestion:", it says "N95 mask recommended 😷". Under "Who is at risk?", it says "Children & elderly should stay indoors."

Step 9: Chatbot



Step 10: Feedback



Step 11: User can switch to Dark/Light mode



Step 12: User can also share the data via different platforms



7. Challenges Faced

During the development of AirAware, several challenges were encountered:

1. Variability in air quality data formats across different sources.
2. Missing or incomplete pollution data affecting model accuracy.
3. Identifying the most impactful features influencing AQI.
4. Balancing model complexity with prediction performance.
5. Visualizing multidimensional environmental data effectively.
6. Managing large datasets efficiently.
7. Aligning predictions with official AQI classification standards.

These challenges were resolved through iterative refinement, testing, and optimization.

8. Learnings & Skills Acquired

The project resulted in comprehensive technical and professional learning:

1. In-depth understanding of air quality metrics and environmental standards.
2. Practical experience in data preprocessing and exploratory data analysis.
3. Hands-on exposure to machine learning-based predictive modelling.
4. Visualization techniques for environmental data interpretation.
5. System integration between ML models and frontend dashboards.
6. Debugging, optimization, and performance tuning.
7. Technical documentation and structured reporting skills.

The project significantly strengthened problem-solving abilities and AI application skills.

9. Testimonials from Team

Team Member 1: “This project enhanced my understanding of AI-driven environmental analysis and strengthened my skills in machine learning, data visualization, and system design.”

Team Member 2: “AirAware provided valuable hands-on experience with real-world datasets and helped me understand predictive modelling for environmental monitoring.”

Team Member 3: “This project improved my collaborative skills and deepened my knowledge of data preprocessing and analytical visualization.”

Team Member 4: “Working on AirAware boosted my confidence in applying machine learning to solve real-world environmental challenges.”

Team Member 5: “This internship strengthened my understanding of end-to-end project development and enhanced my teamwork and problem-solving abilities.”

10. Conclusion

AirAware: Smart Air Quality Prediction System successfully demonstrates the effective application of artificial intelligence and data analytics in addressing environmental challenges. The project delivers meaningful insights into air pollution trends, predicts future AQI levels, and supports proactive decision-making. It highlights strong teamwork, technical expertise, and the practical use of AI for social and environmental impact.

11. Acknowledgements

We sincerely thank **Infosys Springboard** for providing an excellent virtual internship platform and industry-oriented learning resources.

We extend our heartfelt gratitude to our mentor **Ms. Shakthi Gopalakrishnan** for her continuous guidance, valuable feedback, and encouragement throughout the internship.

We also thank our peers and team members for their collaboration and support, which contributed significantly to the successful completion of the AirAware project.