Air Quality Manager

Business Context Description

Project Overview

Air Quality Manager is an **IoT-based indoor air quality monitoring system** designed to track, analyze, and improve air quality inside buildings such as offices, schools, hospitals, and residential spaces.

The system collects real-time air quality telemetry from **indoor IoT sensors**, processes the data in the cloud, and provides monitoring, alerts, and device management through a web-based dashboard. The platform supports operational monitoring and proactive decision-making to maintain a healthy indoor environment.

Business Goals & Objectives:

- Monitor **indoor air quality in real time**.

- Detect unhealthy indoor air conditions.

- Notify responsible personnel about air quality issues.

- Support facility management and maintenance workflows.

- Enable technicians to monitor and maintain indoor sensors.

Stakeholders & Actors:

Operator / Facility Manager:

- Monitors indoor air quality dashboards
- Reviews alerts and trends
- Takes actions to improve indoor conditions (ventilation, occupancy control)

Technician:

- Manages indoor air quality sensors
- Checks device connectivity and data flow
- Troubleshoots and maintains devices

IoT Devices / Device Simulator:

- Indoor sensors measuring air quality parameters
- Continuously publish telemetry from indoor environments

Business Use Cases

Use Case 1: Real-Time Indoor Air Quality Monitoring

Actor: Individual user, Organization
Description: Users monitor current indoor air quality conditions across rooms or buildings using live data from IoT sensors.
Preconditions:

- Indoor sensors are installed and connected
- User has access to the dashboard

Postconditions: User sees live indoor air quality metrics.

Steps:

1. Indoor IoT devices publish telemetry data.

2. System processes incoming measurements.

3. User opens the web dashboard.

4. System displays real-time indoor metrics (PM2.5, PM10, CO_2, temperature, humidity).

Use Case 2: Indoor Air Quality Alerts

Actor: Operator / Facility Manager
Description: The system alerts users when indoor air quality exceeds safe thresholds.

Preconditions:

- Thresholds are configured
- Alerts are enabled

Postconditions: User receives an indoor air quality alert.

Steps:

1. System evaluates incoming indoor telemetry.

2. Thresholds are exceeded.

3. System generates an alert.

4. Alert is displayed in the dashboard in real time.

Use Case 3: Air Quality Recommendations

Actor: Individual user, Organization
Description: System provides actionable recommendations based on air quality levels.
Preconditions: User has enabled notifications and provided location data.
Postconditions: User receives recommendations to reduce exposure and improve air quality.

Steps:

1. System analyzes real-time air quality data.

2. System matches the data against predefined thresholds.

3. System generates tailored recommendations.

4. Recommendations are displayed in-app and via push notifications.

User Stories

1. As an **Operator**, I want to monitor indoor air quality in real time, so I can maintain a healthy indoor environment.

2. As an **Operator**, I want to receive alerts when indoor air quality is poor, so I can take corrective action.

3. As a **Technician**, I want to check indoor sensor status, so I can ensure reliable data collection.

4. As a **Technician**, I want to troubleshoot indoor devices, so I can minimize downtime.

5. **As a user**, I want to receive personalized tips to improve air quality, so I can reduce my exposure to pollutants.

Key Features

- Real-time indoor air quality monitoring.

- Indoor IoT device management.

- Notifications and alerts.

- Personalized recommendations.

- Role-based access (Operator, Technician).

- Web-based dashboard.

Business Value:

The Air Quality Manager system helps organizations maintain healthy indoor environments, improve occupant comfort and safety, detect ventilation issues early, and support informed facility management decisions through reliable indoor air quality data.