

AIR QUALITY MONITORING SYSTEM

1. Project Objectives:

Real-time Air Quality Monitoring: The primary objective is to continuously monitor key air quality parameters such as PM2.5, PM10, CO2, NO2, and VOCs in real-time.

Data Sharing: Make the air quality data accessible to the public through a user-friendly platform.

Public Awareness: Raise awareness about air quality issues and their impact on public health by providing easily understandable and actionable information.

Health Impact Assessment: Explore options to provide information on how air quality levels can affect public health, such as providing health recommendations during high pollution periods.

2. IoT Device Design:

Sensor Selection: Choose appropriate sensors for each air quality parameter. Ensure sensors are accurate, reliable, and capable of real-time data collection.

Power Supply: Design power management systems for IoT devices to ensure continuous operation. Consider options such as battery power with solar panels or wired power sources.

Data Logging: Implement data logging capabilities on the IoT devices to store historical data, even when connectivity is temporarily lost.

Weatherproofing: Ensure that the IoT devices are weatherproof and can withstand various environmental conditions.

Mounting and Installation: Plan for secure and accessible installation of devices at suitable locations to capture representative air quality data.

Calibration and Maintenance: Develop a calibration schedule and maintenance plan to ensure accurate measurements over time.

3. Data Sharing Platform:

User Interface Design: Create an intuitive and visually appealing web-based interface that displays real-time air quality data in an easy-to-understand format. Include charts, maps, and other visualizations.

Data Accessibility: Ensure that the platform is accessible to the public, possibly without requiring user registration or login for basic information.

Historical Data: Include the capability to view historical air quality data to track trends and changes over time.

User Alerts: Implement alerts and notifications to inform users about significant air quality changes or when pollution levels exceed safe thresholds.

Educational Content: Provide educational content about air quality, health impacts, and steps individuals can take to protect themselves during poor air quality episodes.

AIR QUALITY MONITORING SYSTEM

4. Integration Approach:

Data Transmission Protocol: Choose a data transmission protocol suitable for your IoT devices and connectivity options (e.g., MQTT, HTTP, WebSocket).

Security Measures: Implement encryption and authentication mechanisms to ensure the secure transfer of data from IoT devices to the platform.

Data Processing: Determine how data will be processed on the IoT devices before transmission and on the platform upon receipt.

Cloud or Server Setup: Decide whether data will be processed and stored in the cloud or on your own server infrastructure.

Scalability: Plan for scalability as you may want to add more IoT devices and expand the coverage area in the future.

Monitoring and Alerts: Implement monitoring of data transmission to detect any issues promptly. Set up automated alerts for system administrators in case of failures.

Data Backup: Regularly back up the collected data to prevent data loss.

Testing: Thoroughly test the integration between IoT devices and the data-sharing platform to ensure data accuracy and reliability.