Phase-2-:Innovation

AIR QUALITY MANAGEMENT

Introduction:

There are several relatively straightforward yet effective innovations using IOT in air quality management. Smart Air Quality Monitoring Station is the method used for now in air quality management

Overview of the innovations:

Create a cost-effective, IOT-based air quality monitoring station that can be easily deployed in various locations for real-time air quality data collection

IOT Sensors:

Particulate Matter (PM) Sensor: Measures PM2.5 and PM10 concentrations.

Gas Sensors: Detect pollutants like NO2, SO2, CO, and others.

Microcontroller:

Use a microcontroller (e.g., Arduino, Raspberry Pi) to interface with sensors, process data, and transmit it to the cloud.

Communication Module:

Incorporate a communication module (Wi-Fi, Lora, or cellular) to send data to a centralized server or cloud platform.

Cloud Platform:

Utilize a cloud platform (such as AWS, Azure, or Google Cloud) to collect and store air quality data.

Dashboard:

Create a simple web or mobile dashboard that displays real-time air quality data collected from the monitoring stations.

Innovation Steps:

Sensor Deployment:

Deploy the smart air quality monitoring station in strategic locations, such as urban centre, parks, or industrial areas using PM2.5 etc.

Real-time Data Collection:

The sensors continuously measure air quality parameters, and the microcontroller processes this data in real-time. Combine data from multiple sensors to provide a comprehensive view of air quality. Advanced algorithms can be used to fuse and analyse data to generate meaningful insights.

Data Transmission to Cloud:

Use the communication module to send processed data to the cloud platform securely. Create a user-friendly mobile app and web interface that allows users to access real-time air quality data from anywhere.

Geolocation and Mapping:

Use GPS data to map air quality across different locations. This feature can help users identify pollution hotspots and make informed decisions about their activities.

Cloud-Based Analytics:

Implement basic analytics on the cloud platform to identify patterns and trends in air quality data.

User-Friendly Dashboard:

Create a user-friendly dashboard accessible through a web or mobile app, allowing users to view real-time air quality information.

Automated Alerts:

Set up automated alerts on the dashboard or through notifications to inform users when air quality levels exceed predefined thresholds.

Public Engagement:

Share the air quality data with the public through the dashboard, raising awareness and encouraging individuals to take informed actions.

Scalability:

Design the system for scalability, allowing easy deployment of additional monitoring stations as needed.

Air Quality Index (AQI) Calculation:

Calculate and display AQI values, which provide a simple and standardized way to communicate air quality to the public.

IOT Connectivity:

Use low-power, long-range IOT communication protocols like LoRa or NBIoT for efficient data transmission, especially in remote areas.

Public Data API:

Offer an API for developers and researchers to access and use the collected air quality data for various applications.

Benefits:

. Affordability

. Accessibility

. Real-Time Monitoring

. Community Awareness

. Healthier Environment

. Public Health

. Early Warning Systems

. Climate Goals

. Compliance and Regulation