* IOT PROJECT – PHASE 1

PROJECT NAME – AIR QUALITY MONITORING

To design an IOT air quality monitoring system, you'll want to start with a clear problem definition and then move on to the design phase. Here's a high-level overview of the process:

\*\*Problem Definition:\*\*

1. Identify the Scope

Determine the specific area or location where you want to monitor air quality (e.g., a city, a building, a room).

1. Define Objectives

Clarify the goals of your monitoring system. Are you primarily concerned with pollution, allergens, or general air quality?

1. Regulatory Compliance

Check if there are any local or national regulations related to air quality monitoring that you need to comply with.

\*\*Designing the IoT Air Quality Monitoring System:\*\*

1. Sensor Selection

Choose appropriate air quality sensors based on your objectives. Common sensors measure parameters like particulate matter (PM2.5 and PM10), volatile organic compounds (VOCs), carbon dioxide (CO2), carbon monoxide (CO), ozone (O3), and nitrogen dioxide (NO2).

1. Data Communication

Decide how data will be transmitted from the sensors to a central system. Common options include Wi-Fi, cellular, LoRaWAN, or Zigbee.

1. Central Hub

Design a central hub or gateway where sensor data will be collected and processed. This could be a microcontroller, Raspberry Pi, or a dedicated IoT gateway device.

1. Data Storage

Choose a database system to store the collected data securely. Options include SQL databases, NoSQL databases, or cloud-based storage solutions.

1. Data Analysis

Develop algorithms or methods to analyze the air quality data in real-time. This may involve calculating air quality indices or triggering alerts based on predefined thresholds.

1. User Interface

Create a user-friendly interface for users to access and visualize air quality data. This could be a web dashboard, a mobile app, or both.

1. Alerting System

Implement an alerting system that notifies users or relevant authorities when air quality levels become unsafe or exceed set thresholds.

1. Power Management

Consider how sensors and devices will be powered. Battery-powered sensors may need efficient power management to extend their operational life.

1. Security

Ensure data security and privacy by implementing encryption, access controls, and secure communication protocols.

1. Scalability

Design the system to be scalable so that additional sensors or monitoring locations can be easily integrated in the future.

11.Maintenance and Calibration

Plan for regular maintenance and calibration of sensors to ensure accurate data.

1. Testing and Deployment

Thoroughly test the system in a controlled environment before deploying it in the target location.

1. Documentation

Document the system's design, components, and operating procedures for future reference.

1. Regulatory Compliance

Ensure that your system complies with any relevant environmental regulations and standards.

1. Cost Analysis

Consider the cost of implementing and maintaining the system, including sensor costs, data storage, and communication expenses.

Once you have a clear problem definition and a well-designed IoT air quality monitoring system, you can proceed with implementation, monitoring, and data analysis to address air quality concerns effectively.

PROJECT BY

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ECE 3RD YEAR

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