**PROJECT TITLE- AIR QUALITY MONITORING-INTERNET OF THINGS**

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**PHASE-1**

**PROJECT DESCRIPTION:**

The AQM - IoT project aims to deploy IoT devices for monitoring air quality parameters. The project's primary goal is to collect real-time data on air quality and make it accessible to the public. By doing so, it seeks to raise awareness about the crucial link between air quality and public health. Key components of the project include defining project objectives, designing the IoT monitoring system, developing a data-sharing platform, and integrating these components using IoT technology and Python. Ultimately, the project aspires to empower communities with actionable air quality information to improve their well-being.

**DESIGN THINKING:**

**OBJECTIVES:**

* Air Quality Measurement: Implement IoT devices equipped with sensors to accurately measure air quality parameters, including but not limited to particulate matter (PM2.5 and PM10), gases (e.g., CO2, NO2), humidity, and temperature.
* Real-Time Data Collection: Establish a continuous data collection process to ensure the availability of up-to-date air quality information
* Public Accessibility: Create a user-friendly, publicly accessible platform or application where individuals can easily access real-time air quality information for their geographical area.
* Impact Assessment: Continuously evaluate the project's impact on public awareness, behavior change, and overall air quality improvement, making necessary adjustments as needed.

**IOT DESIGN DETAILS:**

* Sensor Selection: Research and select appropriate sensors for each air quality parameter based on accuracy, sensitivity, and cost.Ensure sensors are capable of providing real-time data and can operate in the target environmental conditions.
* Hardware Design: Develop the hardware for the IoT devices, including the sensor integration, power management, microcontroller, and communication module. Design a durable and weather-resistant enclosure to protect the components from environmental factors.
* Geolocation: Include GPS or other geolocation capabilities to record the device's location accurately. Geotag collected data for precise mapping of air quality information.
* Weatherproofing: Design a robust and weatherproof enclosure to protect the device's electronics from moisture, dust, and UV radiation. Ensure proper ventilation to prevent sensor overheating.

**DATA SHARING PLATFORM:**

* Develop a protocol for transmitting data to a central server or data aggregation platform. Continuously monitor and validate the data collected by the deployed devices. Create a user-friendly and visually appealing design that is easy to navigate. Incorporate responsive design principles to ensure the platform works well on various devices, including desktops, tablets, and smartphones.
* Develop data visualization components such as charts, graphs, maps, and tables to display air quality data. Use color-coding and icons to quickly convey the air quality status (e.g., good, moderate, unhealthy) for different parameters.Provide options for users to select specific parameters, date ranges, and locations for data visualization. Allow users to save their location preferences, set up alerts, and track historical data.

**INTEGRATION APPROACH:**

* Ensures that each IoT device can establish a connection to the data-sharing platform. This typically involves device authentication and authorization. Choose an appropriate communication protocol based on factors such as data volume, range, power efficiency, and available connectivity options.
* Define a standardized data format or payload structure that the IoT devices will use to transmit data. This format should include information such as sensor readings, timestamps, device IDs, and geolocation data.
* Enable real-time data transmission from IoT devices to the platform. This can be achieved through continuous data streaming or periodic updates, depending on the use case. Implement data compression techniques to reduce bandwidth usage and improve transmission efficiency, especially for devices with limited connectivity or power constraints. Implement encryption and authentication mechanisms to secure data transmission. Use protocols like TLS/SSL to establish secure connections between devices and the platform.

**CONCLUSION:**

Thus the AQM project represents a significant step forward in addressing the critical issue of air quality and its impact on public health. Through the design and deployment of IoT devices for air quality monitoring and the creation of a user-friendly data-sharing platform, this project aims to achieve several important goals like Public Awareness, Environmental Impact etc. It empowers individuals and communities to take meaningful steps toward improving air quality, ultimately contributing to better public health and a cleaner environment. As the project evolves and expands, it has the potential to make a lasting positive impact on air quality worldwide.