# NAAN MUDHALVAN(IOT-PHASE III REPORT)
# IOT Based Air Pollution/Quality Monitoring


## COLLEGE : MADRAS INSTITUTE TECHNOLOGY OF,ANNA UNIVERSITY

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# PHASE 1: PROBLEM DEFINITION:

The project involves developing an IoT-based air quality monitoring system with the primary objective of providing real-time air quality data to the public through an accessible online platform. The goal is to create awareness about the impact of air quality on public health and the environment.

**KEY OBJECTIVES:**

1. **Data Collection:** Deploy IoT devices equipped with air quality sensors to measure critical parameters, including CO, NO2, SO2, O3, and VOCs.

2. **Real-Time :** Monitoring: Install these devices strategically across the target area to continuously monitor air quality.

3. **Data Transmission:** Establish efficient data transmission protocols for sending sensor data to a central server.

4. **User-Friendly Platform:** Develop an intuitive web or mobile platform where the public can access real-time and historical air quality data.

5. **Data Visualization**: Implement data visualization tools to present air quality information clearly.

6. **Alerting System**: Create an alerting mechanism to notify users when air quality levels exceed predefined thresholds.

7. **Public Engagement**: Encourage public engagement by providing educational content on the platform, explaining the significance of air quality, and promoting community involvement.

8. **Scalability**: Design the system to accommodate future expansion with additional sensors and monitoring locations.

9. **Python Integration**: Utilize Python for data analysis, processing, and platform development.

**DESIGN THINKING:**

1. **Understand User Needs:** Begin by understanding the perspectives and needs of potential users, including the public, environmentalists, and authorities. Explore the air quality challenges in the target area.

2. **Define the Problem:** Clearly define the core problem and project objectives based on user insights and identified pain points related to accessing air quality information.

3. **Generate Ideas**: Brainstorm creative solutions for the IoT monitoring system and the awareness platform, involving diverse team members in the ideation process.

4. **Prototype:** Build a simple prototype of the IoT device and user interface, focusing on core functionalities to gather feedback.

5. **Test and Iterate:** Collect user feedback during usability tests with the prototype and make necessary improvements based on insights.

6. **Develop the Solution**: Create the complete IoT-based monitoring system and user platform, aligning with defined objectives and user needs.

7. **Deploy and Launch:** Implement the system, deploying IoT devices and launching the user platform to make real-time air quality data accessible to the public.

8. **Evaluate and Improve:** Continuously monitor system performance, gather user feedback, and make ongoing improvements based on data analytics and stakeholder input.

9. **Iterate and Adapt:** Keep the user at the center of decision-making, be open to change, and consider expansion or additional features as needed to effectively raise public awareness about air quality.

**IMPORTANT COMPONENTS:**

Here are the important components for an IoT-based air quality monitoring system:

1. Sensor Devices
2. Data Transmission and Communication
3. Central Data Management System
4. Data Analysis and Processing
5. Alerting System
6. User Interface and Visualization
7. Geospatial Mapping

# PHASE 2: INNOVATION

- After thorough research and analysis, we arrived at an innovative solution to solve the above problem as detailed in phase 1 of our project.
- We will be using the ESP32 micro controller as well as Arduino UNO microcontroller as both these suit the best for our project.
- We made this choice because we only require data on the concentrations of CO 2 ,NO 2 and smoke in the desired atmosphere to be posted on a public platform.

**SENSOR**

- We use MQ135 sensor in our air quality monitoring system because it can effectively detect CO2,NO2 gases and smoke and provides valuable data for comprehensive air quality assessment ensuring environmental safety.

**CONNECTIVITY**

- Wi-Fi as it enables real time data transmission, allowing us to monitor air quality remotely

**CLOUD**

- We use Beeceptor it ensures scalability, data storage and analytics.

**PROTOCOL**

- HTTP: These are widely used protocols for transmitting data over the internet which are easy to implement and are supported by almost all web server.

**PUBLIC PLATFORM**

- We are going to design a website for Air quality monitoring

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