AIR QUALITY MONITORING

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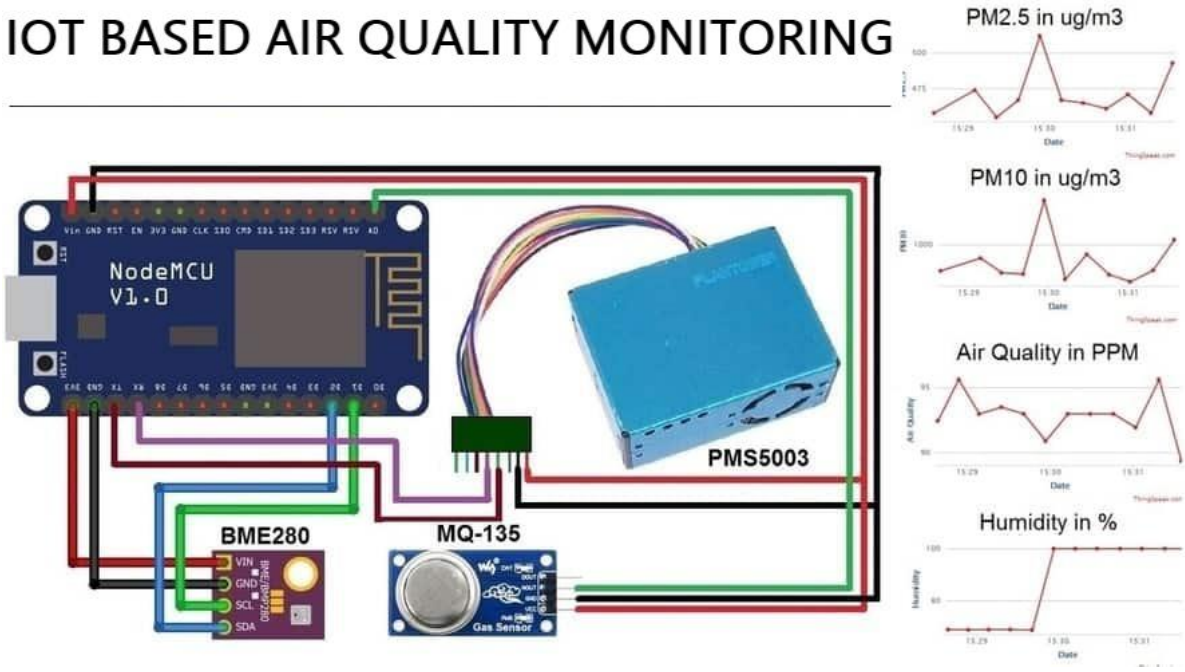
PHASE 2 DOCUMENT SUBMISSION

PROJECT : AIR QUALITY MONITORING

This is a simple prototype for an Environmental **IoT Air Quality Monitoring System** for monitoring the concentrations of major air pollutant gases. The system uses 3 sensors like **PMS5003 PM2.5 Particulate Matter Sensor, MQ-135 Air Quality Sensor, BME280 Barometric Pressure Sensor**. In this **IoT project**, we can monitor the pollution level from anywhere using computer or mobile.



PMS5003 PM2.5 Particulate matter sensor from Plantpower measure particle concentration in PM1.0, PM2.5 & PM10. This MQ-135 Air Quality Sensor measures concentrations of gases such as CO, CO2, SO2, and NO2 and gives the result in PPM (Part per Million). Similarly, BME280 Measures environmental Temperature, Pressure & Humidity.

INNOVATION IDEAS:

Monitoring air quality using IoT (Internet of Things) and online monitoring has become increasingly important in recent years due to growing concerns about air pollution and its impact on public health and the environment. Here are some innovative ideas and approaches for air quality monitoring using IoT and online monitoring:

Low-Cost Sensor Networks:

Develop a network of low-cost air quality sensors that can be deployed throughout a city or region. These sensors can collect real-time data on various air pollutants, such as particulate matter (PM2.5 and PM10), nitrogen dioxide (NO2), sulfur dioxide (SO2), carbon monoxide (CO), and ozone (O3).

Mobile Monitoring Stations:

Create mobile monitoring stations equipped with air quality sensors that can be mounted on vehicles like buses, bicycles, or drones. These stations can provide dynamic and location-specific air quality data, allowing for better tracking of pollution sources.

Crowdsourced Data:

Encourage citizens to participate in air quality monitoring by using smartphone apps and wearable devices. This crowdsourced data can supplement official monitoring and provide a more comprehensive view of air quality in different areas.

Predictive Modeling:

Combine IoT data with historical weather and pollution data to develop predictive models that can forecast air quality levels. This information can be used to alert the public and city officials to potential air quality issues in advance.

Integration with Smart Cities:

Integrate air quality monitoring into the broader framework of smart cities. Use IoT technology to connect air quality sensors with other smart city systems, such as traffic management, to mitigate pollution in real-time.

Real-time Alerts:

Develop a system that sends real-time air quality alerts to residents through mobile apps, text messages, or email. These alerts can provide recommendations on outdoor activities and precautions during periods of poor air quality.

Data Visualization:

Create user-friendly online platforms and dashboards that display air quality data in a visually appealing and easy-to-understand manner. Data visualization can help individuals and authorities make informed decisions.

Historical Data Analysis:

Store and analyze historical air quality data to identify long-term trends and patterns. This can be valuable for assessing the effectiveness of pollution control measures and predicting future air quality issues.

Environmental Impact Assessment: Implement IoT-based air quality monitoring in construction and industrial zones to continuously assess their environmental impact. This can aid in compliance with regulations and reducing harmful emissions.

Public Awareness Campaigns:

Use online platforms and social media to educate the public about air quality issues. Providing access to real-time data and information on how to reduce personal exposure to air pollutants can promote healthier behaviors.

Cross-border Collaboration:

Collaborate with neighboring regions or countries to create a regional air quality monitoring network. Air quality issues often transcend political boundaries, and regional cooperation can provide a more comprehensive understanding of pollution sources.

Machine Learning and AI:

Utilize machine learning and artificial intelligence algorithms to analyze air quality data and identify pollution sources or trends that may not be immediately apparent to human analysts.

Data Sharing and Open APIs:

Make air quality data accessible through open APIs (Application Programming Interfaces) to encourage third-party developers to create innovative applications and solutions based on the data.

Innovations in air quality monitoring using IoT and online monitoring can significantly contribute to better air quality management, public health, and environmental protection. Collaborative efforts among governments, organizations, and communities are crucial in implementing these ideas effectively.