KINGS ENGINEERING COLLEGE

PROJECT TITTLE: AIR QUALITY MONITORING

DEPARTMENT: B.E-BIOMEDICAL ENGINEERING

MENTOR NAME: MARY LALITHA

Team members:

Veera Ganesh S

Vishwa M

Vignesh S

Vigneshwaran N

Vetrivel N

Describe the project's objectives, IoT sensor deployment, platform and mobile app development, and code implementation:

PROJECT OBJECTIVES:

1. One primary objective of air quality monitoring is to safeguard public health by assessing and managing the levels of pollutants in the air. Monitoring helps identify and communicate potential health risks associated with air pollution, allowing for timely public warnings and interventions to protect vulnerable populations.

2. Air quality monitoring is essential for ensuring compliance with environmental regulations and standards. By tracking pollutant levels, authorities can enforce regulations, identify pollution sources, and develop effective policies to reduce emissions, thereby managing the environmental impact of human activities.

IOT SENSOR DEPLOYMENT:

1. Sensor Selection: High air quality sensors with capabilities to measure are selected. These sensors are connected to a microcontroller, such as Raspberry Pi, Arduino, or specialized IoT boards.

2. Sensor Placement: Effective air quality monitoring involves placing sensors in locations representative of the overall air quality, considering factors such as proximity to pollution sources, human exposure, and prevailing wind directions, to provide accurate and actionable data for comprehensive environmental assessment.

3. Power Supply: Sensors are connected to a stable power supply source, whether through direct wiring, battery, or solar panels, to ensure continuous operation.

4. Data Collection: Sensors continuously monitor the ambient air quality levels and send the data to a central platform at regular intervals (e.g., every minute).

PLATFORM DEVELOPMENT:

1. Architecture: The platform is developed using a combination of technologies such as Python and Flask for the backend, HTML, CSS, and JavaScript for the frontend, and a relational database (e.g., PostgreSQL) for data storage.

2. Data Collection: An API endpoint is created to receive data from IoT sensors. The received data is parsed and stored in the database. Data is timestamped for analysis.

3. Data Analysis: Air quality data is processed for real-time and historical analysis. Algorithms may be implemented to identify level spikes, sources, and patterns.

4. User Interface: The platform offers a web-based user interface where users can access real-time and historical air quality data. Users can filter data by location and time.

MOBILE APP DEVELOPMENT:

1. Cross-Platform Framework: A cross-platform mobile app framework like Flutter is used to build the app. This ensures compatibility with both Android and iOS devices.

2. Data Access: The app fetches data from the platform's API endpoints and displays it in a user-friendly manner. Users can view real-time air quality levels, historical data, and air quality source information.

3. Notifications: The app may include features to notify users of air quality level spikes in their vicinity, promoting real-time awareness.

CODE IMPLEMENTATION:

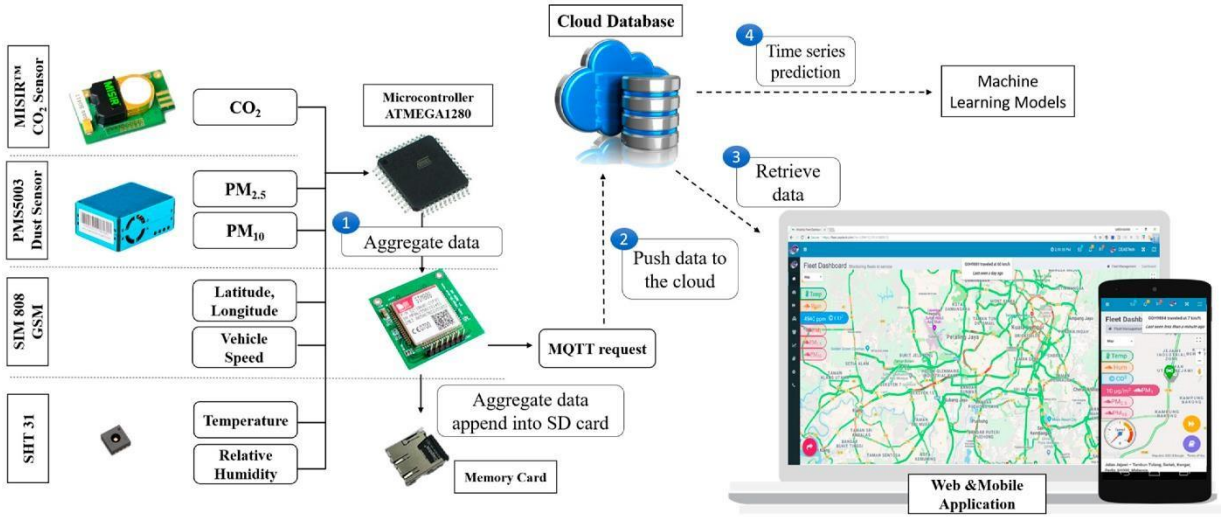
1. Python scripts are used for IoT sensor data collection and transmission. The script captures air quality data and sends it to the platform's API using HTTP requests. It can be executed on the IoT device.

2. The platform's backend is developed in Python using the Flask framework. It includes routes for receiving data from sensors, storing it in the database, and serving data to the mobile app.

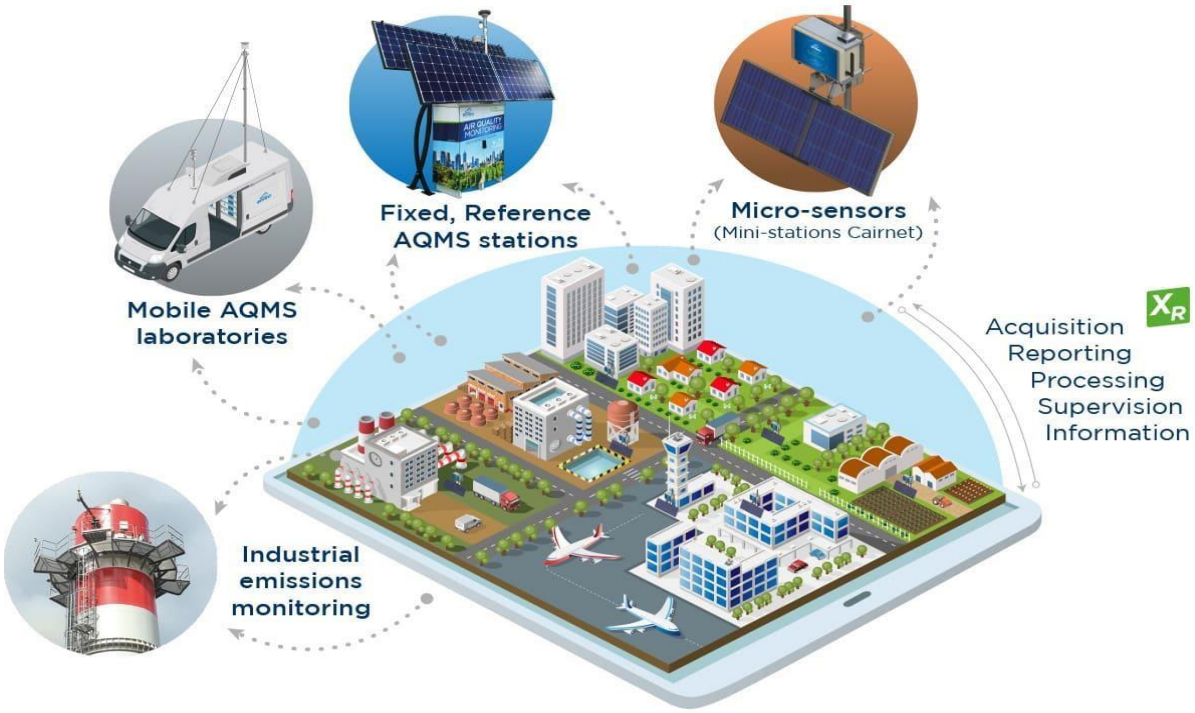
3. The mobile app is developed in Flutter, using Dart for programming. It includes code for making HTTP requests to the platform's API, displaying data, and providing a user-friendly interface.

Include diagrams, schematics, and screenshots of the IoT sensors, noise pollution information platform, and mobile app interfaces:

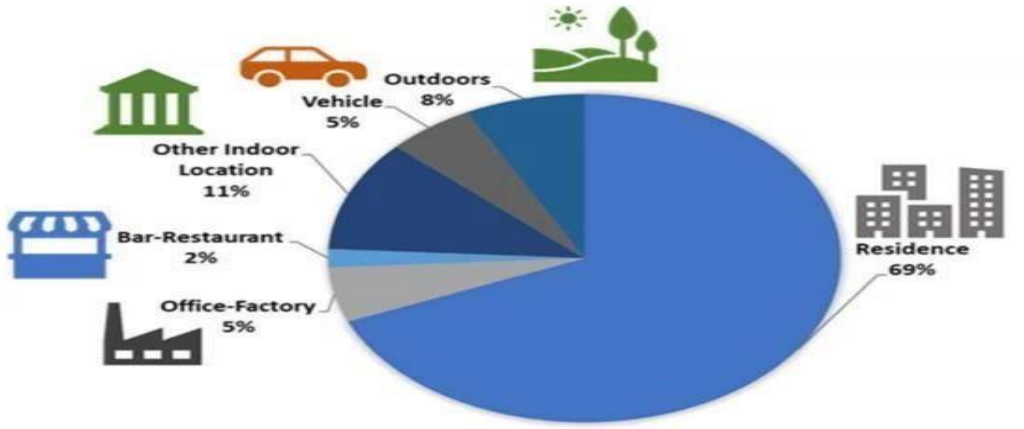
MAPPING FOR AIR QUALITY MONITORING SYSTEMS



AIR QUALITY MONITORING SYSTEMS



OVERCOMES FOR NOISE POLLUTION MONITORING SYSTEMS



IOT SENSORS DEPLOYMENT SCHEMATIC:

1. Create a schematic diagram showing the deployment of IoT air quality sensors at various locations within the urban area.
2. Mark sensor placement points on a map, indicating residential areas, intersections, industrial zones, and public spaces.
3. Include arrows to represent data transmission from sensors to the central platform.

AIR QUALITY INFORMATION PLATFORM DIAGRAM:

1. Design an architectural diagram of the air quality information platform.
2. Include components like IoT sensors, API endpoints, data processing, storage, and user interface. 3.Use shapes and arrows to illustrate data flow and interactions between components.

Mobile App User Interface Screenshots:

1. Capture screenshots of the mobile app's user interface to showcase its functionality and design.
2. Include screens displaying real-time air quality data, historical data, location filtering, and notifications.

EXPLAIN HOW THE REAL-TIME AIR QUALITY LEVEL MONITORING CAN RAISE PUBLIC AWARENESS ABOUT AIR QUALITY AND HEALTH IMPACT :

REAL-TIME DATA ACCESSIBILITY:

By providing real-time air quality level data through a user-friendly mobile app or web interface, the public gains access to up-to-the-minute information.

ALERTS AND NOTIFICATIONS:

The system can send alerts and notifications to users when air levels exceed certain thresholds. This immediate feedback helps individuals recognize and respond to poor air levels promptly.

EDUCATION AND AWARENESS:

The system can be accompanied by educational materials and tips on air quality and its effects on health and well-being.

DATA-DRIVEN DECISION MAKING:

Local authorities and urban planners can use the collected data to make informed decisions regarding to air quality regulation and urban development. For instance, the data can identify areas with consistently , leading to targeted mitigation efforts.

AIR QUALITY IDENTIFICATION:

Through advanced data analysis, the system can identify specific air quality sources and their patterns. This information can be used to target specific sources of air quality and address them effectively.

POLICY AND REGULATION ADVOCACY:

The system provides valuable data for advocacy and policy changes.

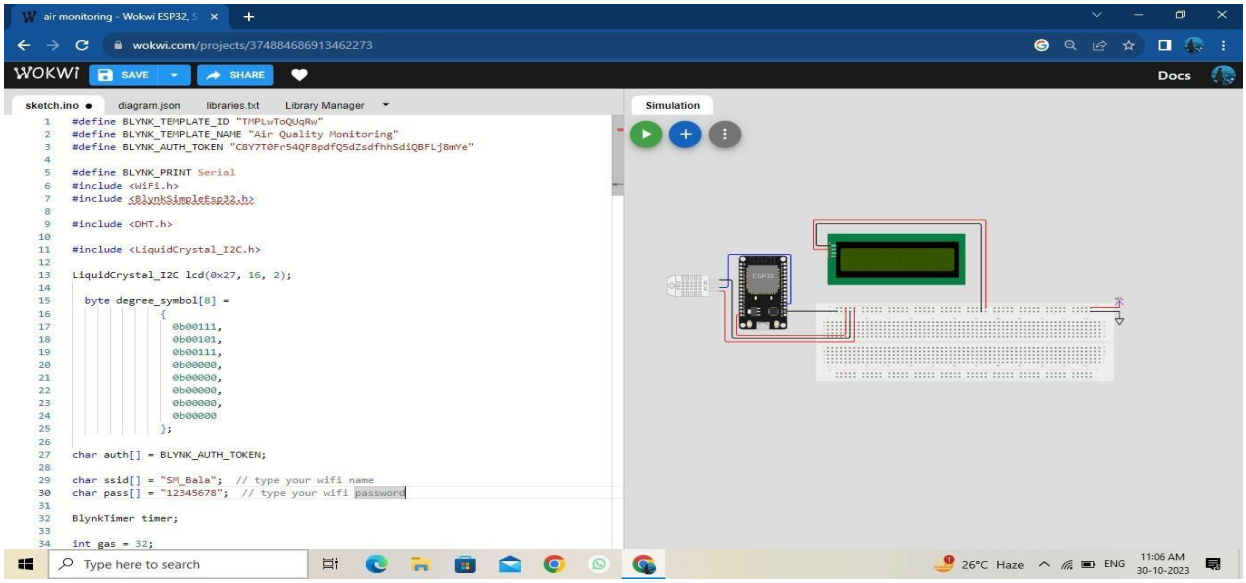
PUBLIC HEALTH BENEFITS:

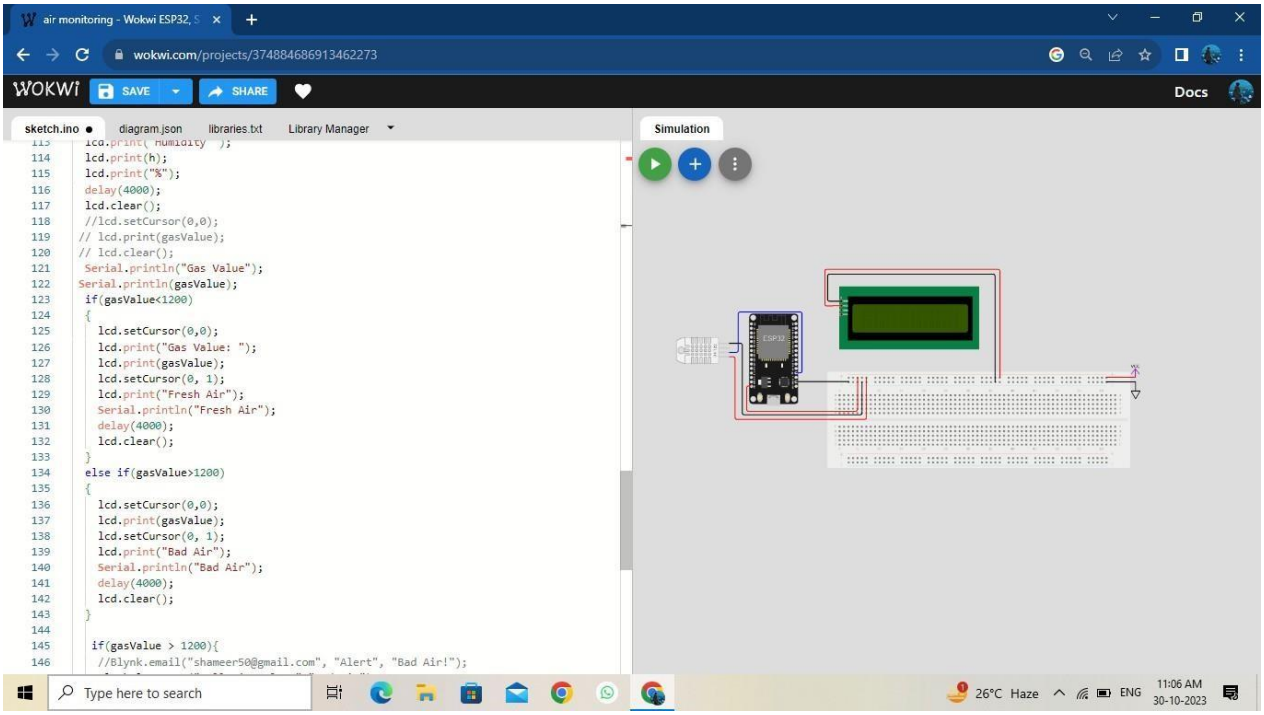
Public awareness and air quality will improve there life quality and quantity. People should aware of the air they are breathing.

POSITIVE IMPACT ON QUALITY OF LIFE:

Over time, the good air quality contributes to an improved quality of life for residents, as they experience less disturbance and stress, better sleep, and an overall more pleasant living environment.

WOWKI STIMILATION:





custom-type sensors play a vital role in addressing the unique challenges and requirements of specialized industries, enabling precise data collection and control, and ultimately contributing to the success of various projects and application.