**AIR QUALITY MONITORING USING IOT**

**(AQM)**

**Problem definition:**

**Objective:** To set up an IoT device to measure air quality parameters and create a platform that provides real-time air quality information to the public for raising awareness and its impact on public health.

**Design thinking:**

**1. Select Air Quality Sensors:**

- Choose appropriate air quality sensors based on the parameters you want to measure (e.g., PM2.5, PM10, CO2, CO, NO2, SO2, O3, temperature, humidity, VOCs).

- Ensure the selected sensors are accurate, reliable, and suitable for long-term deployment.

**2. IoT Device Design:**

- Develop or select IoT devices that can host the chosen sensors and communicate data to a central server or cloud platform.

- Consider power sources (battery or solar), data transmission protocols (Wi-Fi, cellular, Lora WÀN), and enclosure design for outdoor or indoor placement.

**3. Data Collection and Transmission:**

- Integrate the selected sensors into the IoT devices to collect air quality data.

- Implement data transmission mechanisms to send data to a central server or cloud platform. Ensure secure and reliable data transfer.

**4. Cloud Platform or Server:**

- Set up a cloud platform or server to receive, store, and process air quality data. Implement a database to manage historical data records.

**5. Data Processing and Analysis:**

- Develop data processing algorithms to calculate air quality indices (e.g., AQI) based on collected sensor data.

- Analyze historical data to identify trends and patterns.

**6. Real-Time Visualization:**

- Create a web-based dashboard or mobile app that displays real-time air quality data in an easy-to-understand format.

- Include charts, maps, and other visualizations to engage users.

**7. Public Accessibility:**

- Make the air quality data publicly accessible through the dashboard or app.

- Provide user-friendly features for searching, filtering, and exploring data.

**8. Alerts and Notifications:**

- Implement alerting mechanisms to notify users when air quality levels exceed predefined thresholds.

- Offer options for users to receive alerts via email, SMS, or mobile app notifications.

**9. Community Engagement:**

- Encourage community involvement by allowing users to report air quality concerns or contribute data from their own devices.

- Promote community-driven initiatives to address air quality issues.

**10. Data Sharing:**

- Consider sharing anonymized and aggregated air quality data with local environmental agencies, research institutions, and government bodies to support policy decisions and research.

**11. Scalability:**

- Design the system to scale as more IoT devices are deployed to monitor air quality in additional locations.

**12. Maintenance and Calibration:**

- Establish a maintenance schedule for sensor calibration and device upkeep to ensure data accuracy.

**13. Security and Privacy:**

- Prioritize security measures to protect user data and the integrity of the air quality monitoring system.

- Address privacy concerns by collecting only necessary data and implementing privacy policies.

**14. Outreach and Promotion:**

- Promote the availability of air quality data through social media, local news, and community outreach programs.

- Collaborate with environmental organizations and health agencies to raise awareness.

In conclusion, implementing this system may require collaboration with environmental agencies, local government, non-profit organizations, and community volunteers. By making air quality data easily accessible and engaging the public, you can contribute to raising awareness and driving positive changes in air quality management and public health.