SMART PUBLIC RESTROOM

Project Objectives:

1.Real-time Restroom Availability Information:

- Implement occupancy sensors to detect when a restroom stall is in use or vacant.

- Establish a system to update availability information in real-time.

2. Cleanliness Monitoring:

- Deploy cleanliness sensors to monitor the condition of the restroom (e.g., trash levels, cleanliness score).

- Integrate this data into the platform to provide users with up-to-date information.

3. Improved User Experience:

- This can involve intuitive user interfaces on both the web and mobile platforms.

- Consider including features like user reviews, ratings, or comments for restroom facilities.

4. Efficient Restroom Management:

- Utilize data from occupancy and cleanliness sensors to optimize cleaning schedules.

- Implement alerts for maintenance staff based on sensor data.

IoT Sensor Design:

1. Occupancy Sensors:

- Select and procure suitable occupancy sensors that can accurately detect stall occupancy.

- Determine the optimal placement of these sensors within the restroom.

2. Cleanliness Sensors:

- Choose sensors capable of measuring cleanliness indicators like trash levels, air quality, etc.

- Determine where these sensors should be placed for effective monitoring.

3. Sensor Power and Connectivity:

- Decide on power sources (battery, mains power, etc.) and connectivity options (Wi-Fi, Bluetooth, LoRa, etc.) for the sensors.

4. Data Processing and Transmission:

- Develop a protocol for the sensors to transmit data to the central platform.

- Implement data processing algorithms to ensure accuracy and reliability.

Real-Time Transit Information Platform:

1. Frontend Design:

- Design a user-friendly interface for both the web platform and mobile app.

- Include features for viewing restroom availability, cleanliness scores, and user reviews.

2. Backend Development:

- Create a robust backend system to handle data processing, storage, and retrieval.

- Ensure scalability to handle a potentially large number of restroom facilities.

3. Real-time Updates:

- Implement a mechanism for real-time updates from the sensors to the platform.

- Utilize technologies like WebSockets or MQTT for instant data transmission.

Integration Approach:

1. Sensor-Platform Communication:

- Decide on a communication protocol (HTTP, MQTT, etc.) for sending data from the sensors to the platform.

- Set up secure authentication mechanisms to protect data integrity.

2. Data Processing and Storage:

- Establish a data pipeline to process incoming sensor data and store it in a database.

- Implement algorithms for data aggregation and analysis.

3. User Interface Integration:

- Integrate the data streams into the web platform and mobile app interfaces for real-time display.

- Ensure consistent and accurate representation of restroom availability and cleanliness.

4. Testing and Validation:

- Rigorously test the entire system to ensure seamless integration between sensors and the platform.

- Conduct thorough validation to confirm that real-time data is being accurately represented.