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DEPARTMENT:ECE

PROJECT: SMART PUBLIC RESTROOM.

Introduction and requirements

Enhancing public restroom management through the installation of IoT (Internet of Things) sensors is a promising and innovative approacthat can significantly improve user experience, resource allocation and overall efficiency. Here we using some key aspects to consider when implementing this project:

1.Sensor Types: we Choosed appropriate IoT sensors to monitor occupancy and maintenance needs. For occupancy, we use motion sensors, infrared sensors, or even cameras (with privacy considerations). For maintenance needs, consider sensors that measure humidity, temperature, or detect issues like leaks and blockages.

2.Data Collection: IoT sensors will continuously collect data. Ensure that you have a robust data collection and storage system in place. Consider using cloud-based solutions for scalability and ease of access.

3.Data Privacy and Security: Given that restrooms are sensitive areas, prioritize data privacy and security. Implement encryption and access controls to protect the data collected by the sensors and ensure compliance with relevant data protection regulations.
Real-time Monitoring: Set up a real-time monitoring system that can alert facility managers when restrooms are nearing full occupancy or when maintenance issues are detected. This enables quick response and improves user satisfaction.

4.Predictive Maintenance: Use historical data and analytics to predict maintenance needs. For example, if the sensors detect a pattern of toilet paper running out at a particular time each day, the system can automatically generate maintenance requests or alerts

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5.User Feedback Integration: Consider integrating user feedback mechanisms into the system. This can include digital kiosks for users to report issues or give feedback on cleanliness and functionality.

6.Resource Allocation: Use the data collected to optimize resource allocation. For example, if occupancy data shows that certain restrooms are rarely used, you can allocate cleaning and maintenance resources more efficiently.

7.Energy Efficiency: Implement energy-efficient sensors and systems to minimize the environmental impact and reduce operating costs. For instance, sensors can control lighting and ventilation based on occupancy

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8.Maintenance Tracking: Maintain a digital record of all maintenance activities and repairs. This helps in tracking the history of issues and can be useful for future planning.

9.Accessibility: Ensure that the IoT system is designed with accessibility in mind. For example, consider incorporating features that assist people with disabilities in finding available accessible restrooms.

10.Cost-Benefit Analysis: Conduct a cost-benefit analysis to assess the return on investment (ROI) of the IoT sensor system. Calculate the potential savings in maintenance costs and improved user satisfaction.

11.Scalability: Design the system to be scalable. If the project is successful, you may want to expand it to more restrooms or even in other public facilities.

12.Compliance: Ensure that the installation and operation of IoT sensors comply with local regulations and building codes.

Public Awareness: Inform the public about the installation of IoT sensors in restrooms to address privacy concerns and build trust.

13.Maintenance Team Training: Train the maintenance team to effectively use the data provided by the IoT sensors and respond to maintenance requests promptly.

THank you