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| INNOVATION OF SMART PUBLIC RESTROOM |

1. **Data Collection**:
   * Gather data from sensors: Collect data from sensors installed on critical equipment. This could include temperature, pressure, vibration, humidity, etc. The more granular and real-time the data, the better the predictions will be.
2. **Data Preprocessing**:
   * Clean and preprocess the data: This involves handling missing values, outliers, and normalizing the data. Ensure that the data is in a format suitable for analysis.
3. **Feature Engineering**:
   * Identify relevant features: Extract meaningful features from the raw sensor data. These could be statistical measures, trends, or other characteristics that can help in making predictions.
4. **Model Selection**:
   * Choose an appropriate predictive maintenance model: Common techniques include regression models, time-series analysis, machine learning algorithms like Random Forests, Gradient Boosting, or even deep learning models like recurrent neural networks (RNNs) and long short-term memory networks (LSTMs).
5. **Training**:
   * Use historical data to train the model: Feed the model with labeled data (time of failure, sensor readings leading up to failure) to learn the patterns of equipment degradation.
6. **Model Evaluation**:
   * Validate the model: Use a separate dataset to evaluate the performance of the model. Metrics like accuracy, precision, recall, and F1-score can be used to assess its effectiveness.
7. **Threshold Setting**:
   * Determine maintenance triggers: Set thresholds for sensor readings that will signal when maintenance is needed. These thresholds should be determined based on the model's predictions and the acceptable level of risk.
8. **Integration with Existing Systems**:
   * Connect with maintenance management software: Ensure that the predictive maintenance system can communicate with existing management systems to trigger work orders and schedule maintenance activities.
9. **Real-time Monitoring**:
   * Implement continuous monitoring: Ensure that the system is capable of real-time monitoring and can trigger alerts or notifications when maintenance thresholds are met.
10. **Feedback Loop**:

* Continual improvement: Regularly update the model with new data to adapt to changing conditions and improve its accuracy over time.

1. **Deployment and Maintenance**:

* Deploy the model in a production environment and monitor its performance. Regularly update and retrain the model to adapt to changing conditions and improve its accuracy over time.

Remember, it's crucial to involve domain experts (e.g., maintenance engineers, data scientists, and equipment operators) in every step of the process to ensure that the predictive maintenance system aligns with operational needs and goals.