PROJECT: SMART PUBLIC RESTROOM
PHASE-1

Project Objectives: Smart washrooms are among recent IoT solutions that are very soon to be implemented here and there. Such new generation restrooms are expected to significantly improve customer experience and employee well-being while also lower costs allocated to maintain equipment. Smart washrooms products do a lot. In particular, they maintain lavatory in the best condition by:

- Optimizing refills: no more worries that towels or soap will run out at the worst moment.
- Sending notifications when maintenance is needed: no need for employees to check the state of things every 30-60 minutes as they get alerted as soon as supervision is required.
- Tracking presence: less time in queues since users always know when there is an unoccupied cubicle, which guarantees that all cubicles are used more or less equally.
- Detecting and reporting smoking activities at no smoking area.
- Notifying when bins are full.
- Providing predictive analytics based on real time information tracking.

IOT Sensors Design:

Temperature Sensor: A thermometer sensor measures the body temperature; then, raw data were processed through our designed algorithm. The body temperature is a physiological index of vital signs and supplementary information related to women's health, such as menstruation, ovulation, and gestational period .The thermometer sensor was attached to the top of the bidet cover.

Gas Sensor: Within the toilet, the MQ-135 sensor detects smells. This MQ-135 sensor measures the amount of ammonia gas present in the toilet's air. Fig. 2. Simulation of gas sensor. The ammonia inside the toilet produces a nasty odour. It has a strong odour that can be detected at concentrations more than 5 parts per million (parts per million).The ventilation fans are automatically switched on when the ammonia concentration in the toilet surpasses the predetermined threshold of 5 ppm; however, if the concentration falls below 5 ppm, no action is performed.

SMART TAP: A touch-free tap ensures washroom users are protected from Legionella bacteria. The tap monitors water and pipes temperature and condition to alert the supervisor in case there is a risk of Legionella development.

Integration Approach: Smart public restrooms have several advantages! They can help save water with automated faucets and toilets. Plus, some even have occupancy sensors to manage crowd control. Smart restrooms = cleaner, touchless experience = less germs, more convenience, and improved hygiene.