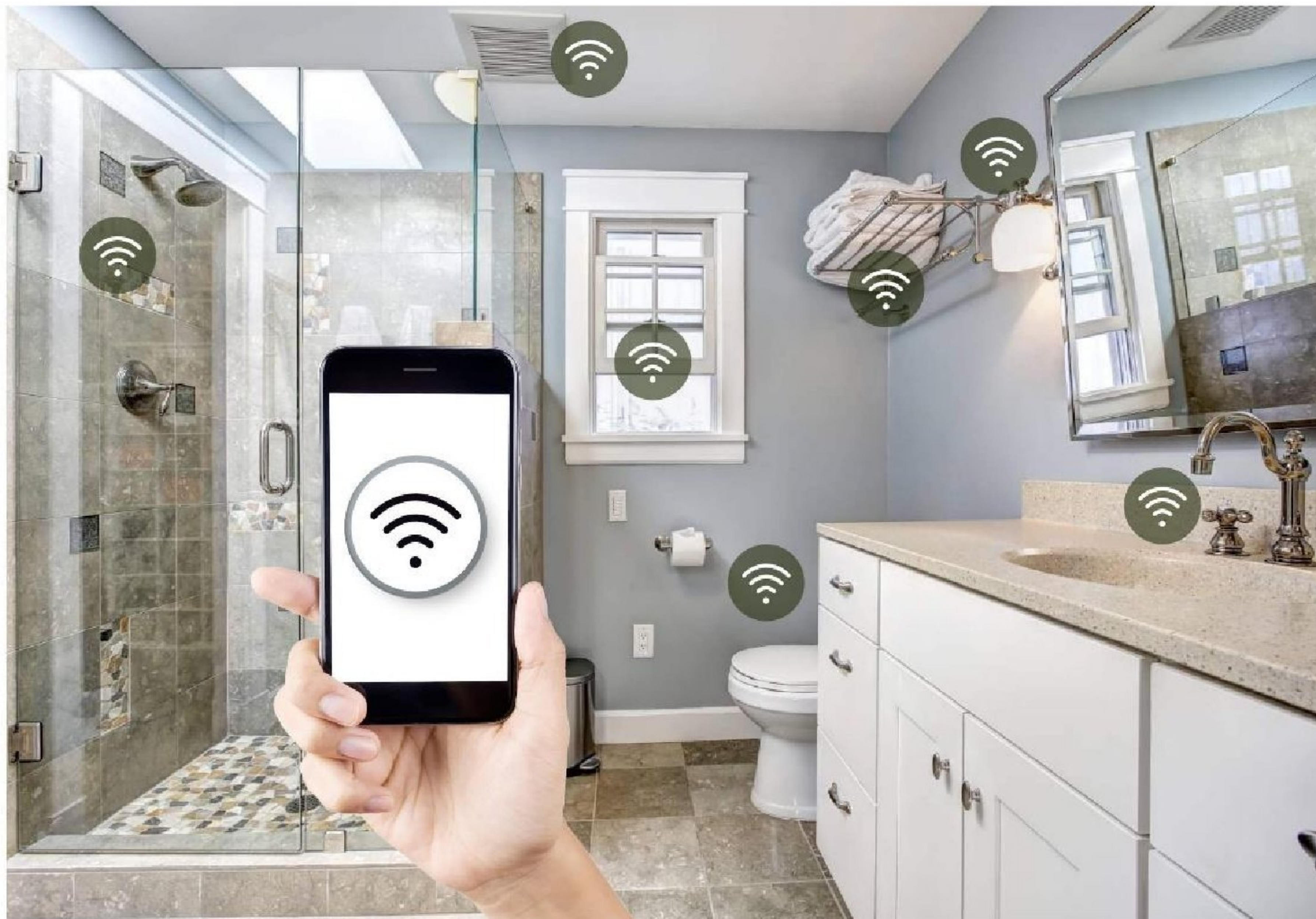


SMART PUBLIC RESTROOM PROJECT 3

Quintagroup experience in iot and, if you have something in mind, is ready to make any idea come true. Currently, the Internet of Things, or iot for short, solutions are changing the world significantly, thus, it has become very clear that there will appear more and more iot devices developed to facilitate routine processes by assisting mankind in a vast range of actions. As it is put by any resource, term IoT implies a network of objects - 'things'- that are interrelated by means of the Internet and have

sensors, software, and other technologies embedded to enable data transfer. In simple words, IoT means that a small object with sensors that gather information about, for example, air temperature can send these data to your air conditioner to “ask” it heat or cool the surrounding. In such a way, many processes become automated and do not require human attendance, and smart washroom is among the solutions that reduce the need for human interference.

HOW BENEFICIAL ARE SMART WASHROOMS?



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.

Smart washrooms analyze a lot of statistical data that come later helpful for trends and patterns tracking, which allows managing equipment placing in the most convenient way. When everything is located efficiently, maintenance is done on demand, and refills are attended timely - customer experience rapidly improves. It has been proved that around 66% of consumers

recommend this or that public place based on restrooms tidiness, thus, smart washroom solution presents all chances for business to boost its image.

OUTCOMES SMART WASHROOM SOLUTION BRINGS

There are indeed numerous positive outcomes entailed by the smart restroom solution application. All of them significantly improve work process and decision-making.

- Number of complaints reduces.
- Restroom users can easily feedback on any problems they spot.
- Equipment is well-maintained due to real time data usage.
- A supervisor is always aware of daily, weekly, and monthly statistics concerning equipment exploitation, thus, is able to make the best decisions regarding rooms layout.

In addition to the abovesaid, there already exist smart sinks, mirrors, and toilets that by means of artificial intelligence adjust by moving up and down depending on who is using them; regulate surface, water, and pipes temperature; gather data about equipment and surrounding environment. Moreover, using machine learning and LoRaWAN, it is possible to teach smart devices to predict user's behavior, develop situational awareness, automate many processes, and thus simplify routine. For example, you might want to have a face recognition system that automatically adjusts water temperature and pressure to your personalised settings when you are washing hands or having a shower. Such innovations will definitely bring more convenience into life.

PLACES WHERE THE SOLUTION CAN BE BEST APPLIED

Due to high people flow, queues, and often impossibility to predict usage frequency, some places are more relevant for smart washroom solutions application than others. Those places that would significantly benefit from smart devices introduction are:

- Transport hubs (airports, train stations, bus and tram stops, etc.)
- Conference/exhibition centres
- Music/sporting venues
- Shopping centres/malls
- Healthcare institutions

SMART PRODUCTS TO EQUIP RESTROOMS

There already exists a range of products developed with a specific purpose - to equip restrooms of the future. Those are internet-connected devices that considerably improve restrooms maintenance and use experience. Below comes the description of some of such appliances.

AVAILABILITY INDICATORS

By means of red and green light, indicators notify washroom users on cubicles availability, which, in turn, reduces congestion. Since it is not always clear whether there is a free cubicle, there might occur situations when stalls remain unoccupied while there is a long line and nobody wants to leave the queue to check if all the stalls are indeed occupied. Therefore, these indicators prevent such cases and release of the necessity to knock or to try doors.

SOAP DISPENSER

A smart internet-connected dispenser that ensures there is always enough soap for restroom users. It also helps avoid soap wastage by emitting the exact amount of soap a person needs to wash hands.

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.

SMART CLEANING SYSTEM

The system injects a portion of biocidal substance with every flush to kill bacteria and odors. Besides, the system can provide workers with information about use frequency and even the amount of toilet paper left.

IOT BASED HAND HYGIENE COMPLIANCE MONITORING - A SYSTEM TO IMPROVE HAND WASHING BEHAVIOR

Hand Hygiene Compliance Monitoring is a great example of a well-deployed IoT solution. Its concept implies monitoring the number of people entering a restroom and the number of people using soap to wash hands when leaving the room. Count is anonymous and is done with the help of sensors located at the entrance and under the soap dispenser. Received data are then analyzed and processed into statistics report which presents the handwash compliance percentage on the Hygiene Display Monitor to remind restroom users to wash hands every time they leave the room and improve their hand hygiene behaviour in such a way.

BENEFITS THE SYSTEM POSES

- Improvement of hand hygiene: each is encouraged to wash hands when leaving the washroom.
- Hand disinfection by sanitizer usage in hospitals to track hand hygiene compliance to help prevent hospital-acquired infections.
- Anonymity: separate individuals are not tracked, the system only counts the number of people entering and washing hands.
- Gamification of hand washing routine: people are not made to wash hands, they are simply stimulated to do that by showing the compliance rate and waking the desire to increase the percentage and see immediate changes in the graphs on a display.
- Availability of statistics on the number of employees who skip hand washing when leaving a restroom, which is crucial for any business, healthcare organization, and food industry.

IOT WILL CHANGE THE WORLD OF HYGIENE

Overall, smart washroom solution is one of those IoT solutions that enhance user experience, allow effectively manage workload, promote workers well-being, and take care of users' health. Therefore, very soon, it will be hard to imagine a restroom not stuffed with sensors, indicators, and displays. We at Quintagroup have expertise in IoT solutions development and are eager to make your home and life smarter. We are willing to contribute to world automation and be among those who generate and successfully implement IoT products using artificial intelligence, machine learning techniques, and LoRaWAN technology. Should you have any ideas, do not hesitate to [reach us](#) and share.