CARROT HOME

We Connect Everything to improve the quality of life

Smart Washroom

Smart City Solution

HKC 香港通訊

" Autonomous technologies, AI,
and internet of things"

Solution includes:

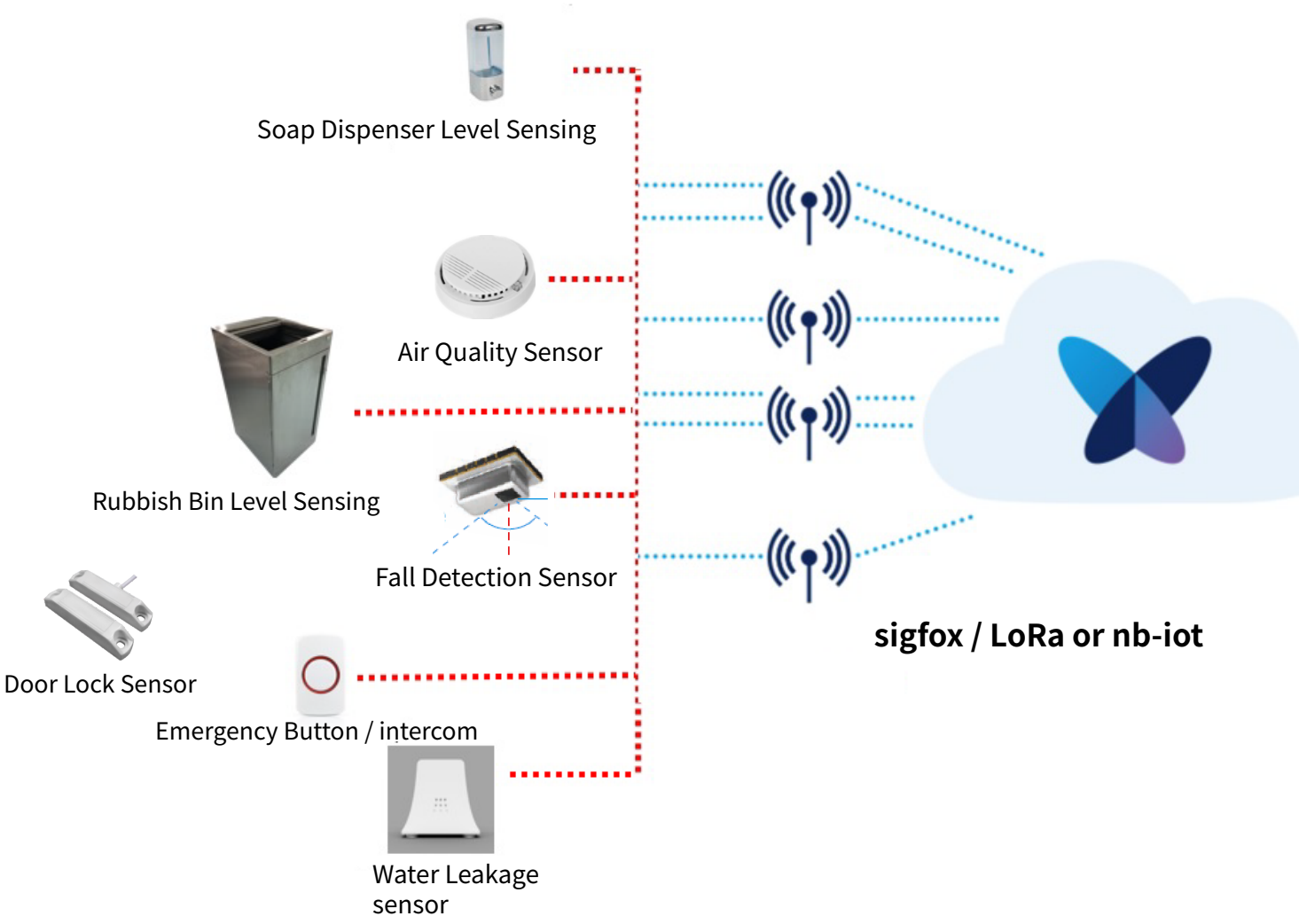
Cloud IoT platform for data analysis
Smart Bins, paper dispensers and soap supply with fill sensing
Smell, wetness, usage pattern and feedback sensors
Attendance monitoring system incl. soap supply and emergency clean call
Web base / Mobile Dashboard for Cleaner and Facility Manager
Fall Detection Sensor
Door Lock Sensor
Variety of UV-C light tubes suitable for toilet compartment disinfection

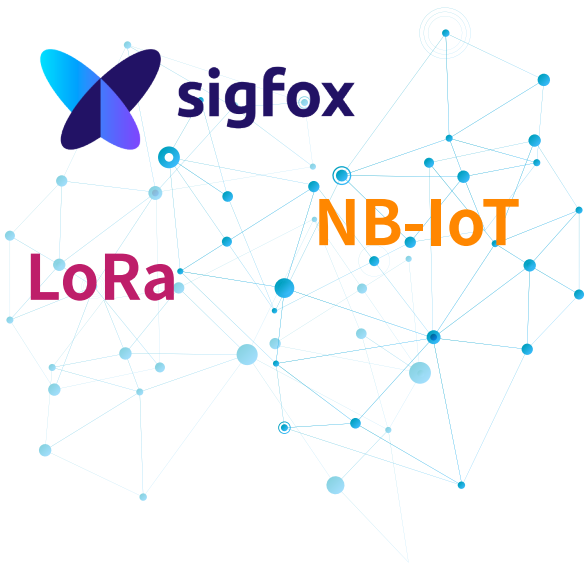
UPGRADES
Digital signage to display real-time vacancy and waiting time for all washrooms
Smart Mirror for information / commercials and washroom ratings
Control of exhaust fan units / air fresheners
Motor door opener
Other safety and intercom features

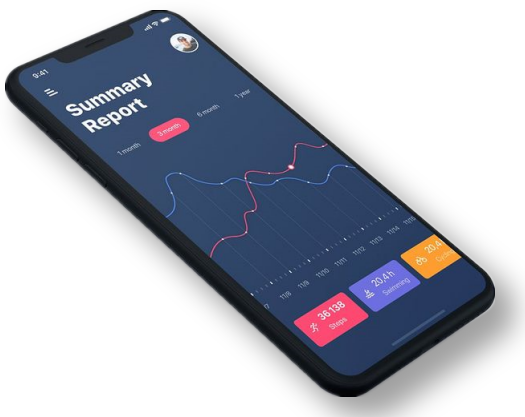
System Architecture

This application optimizes cleaning operations at building facilities by using IoT & AI technologies on data obtained in real-time and providing real-time alerting through web browser or mobile devices for cleaning operations to optimize facility management.

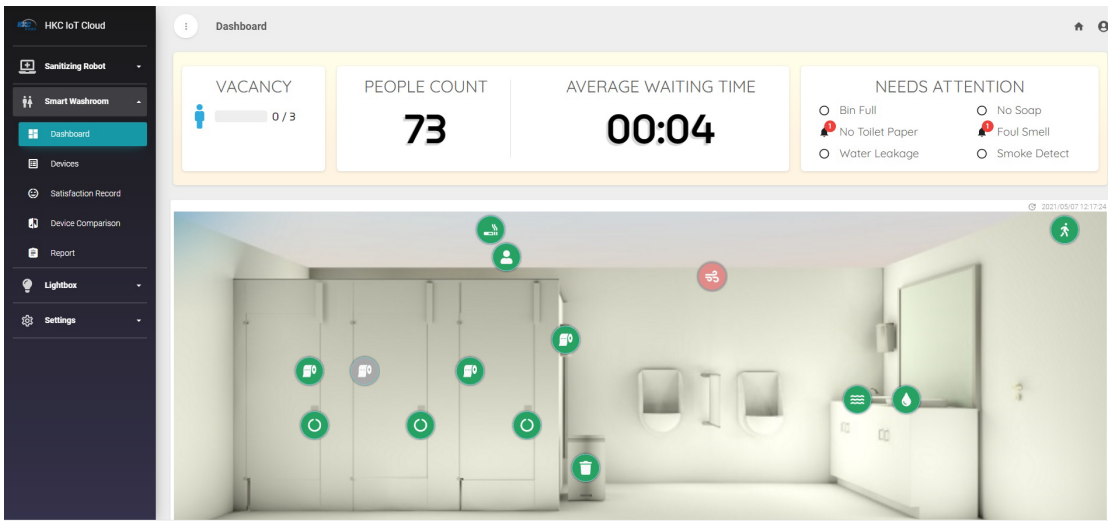
System Architecture diagram





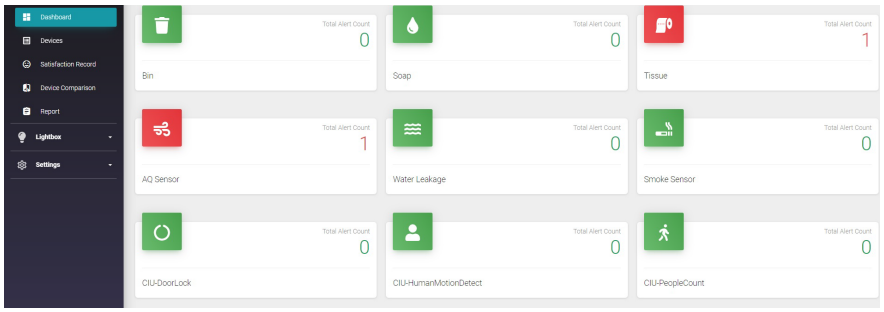


Main Dashboard



HOME :
-Vacancy
-People Count
-Average Waiting Time
-Needs Attention Alert
-Site Map

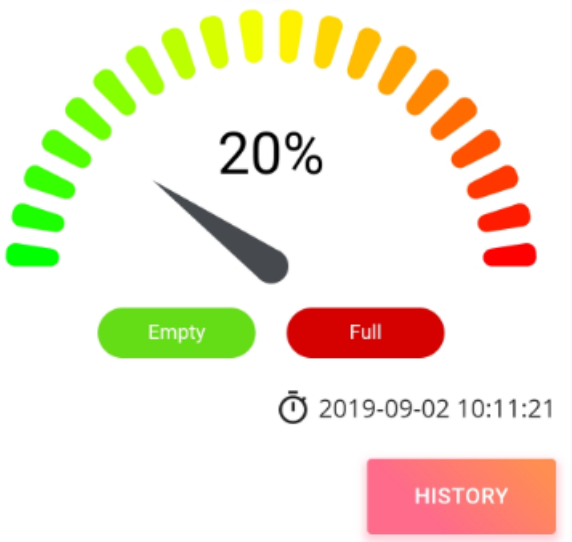
Alert Count :
1. Bin
2. Soap
3. Tissue
4. AQ Sensor
5. Water Leakage
6. Smoke Sensor
7. Door Lock
8. Human Motion Detection
9. People Count

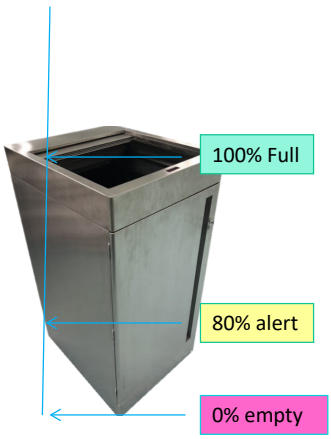


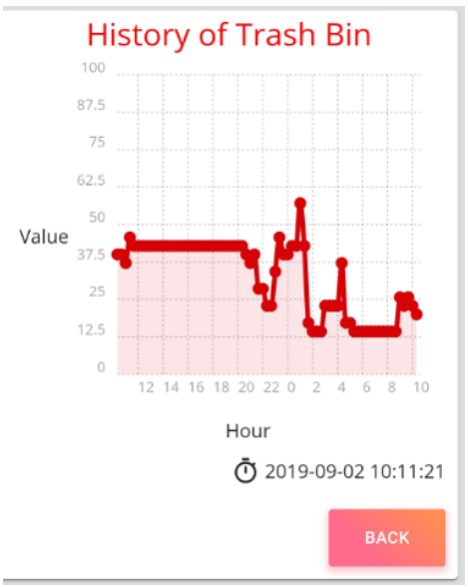
PAESSLER IoT

IoT Cloud Platform
Since the washrooms might cover a large geographical area, so the data is collected from sensors directly using low-power wide area network technologies, like sigfox / LoRa or nb-iot. The data is stored in a public or private cloud (for each customer) for analysis and reporting purpose.

Mobile Dashboard





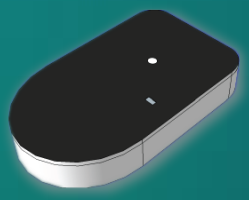


Specifications

The Smart Washroom solutions consists of three major components: the IoT sensors, the smart devices and the IoT cloud platform itself. The IoT sensors include:

Level Sensor

- Remoted monitor the level of soap, bin and tissue
- Tank/bin level sensing
- Expected battery Life 3-5 years*
- Low power network connectivity
- Real-time Data Analytics



Level Sensor

Water Leak Detector

- Reliable with no false alarms
- Solid gold-plated contacts
- Cool, small, clever design
- Waterproof IP67 and sending while floating
- Lasting over 10 years
- Loud alarm buzzer
- Movement or flip warning (accelerometer inside)
- End of leak detection and reporting
- Temperature threshold alarms (antifreeze, overheat)
- Incredible radio performance

Water Leak Detector

Air-Tracker

- Air-tracker is a solar powered an environmental sensor array
- It can measure following pollutant and environment characteristic :

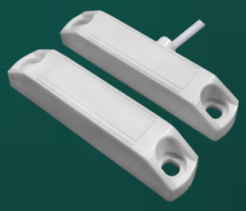
Gases: Carbon monoxide CO, Nitrogen dioxide NO2, Hydrogen H2 , Ammonia NH3, Ethanol C2H5, Methane CH4 , Propane C3H8, Iso-Butane C4H10 , Ozone, Sulfur Dioxide SO2, Carbon Dioxide CO2,
Particles: P2.5 and P10;

- Temperature sensor ; Humidity sensor
- Barometric Pressure sensor
- Sound Level to Monitor Noise Pollution
- Air-tracker equipped with Bluetooth Low Energy interface used for installation activation, firmware update and location reporting/positioning.

Air-Tracker

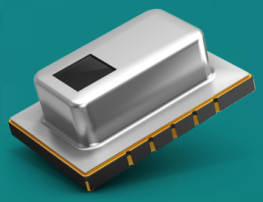
Door Lock Sensor

A door lock sensor can measure the duration of use for the stalls within a given time period and a moving average is computed. Then the queue time can be estimated from another sensor counting the number of people in the queue. If the estimated queuing time is long, users can opt to use another one nearby instead.



Door Lock Sensor

The Smart Devices include:



Fall Detection Sensor

Fall Detection Sensor
The thermopile infrared array sensor measures the temperature of the objects in the detection area. It is used by mounting under the ceiling for detecting the presence of humans. People stay or move around in the detection area. Thermal sensors can be used in systems for the detection of fall accidents or unusual inactivity, which is an important safety tool for people. Thermal sensor is favorable in comparison to usual methods like using a video camera or a wearable device which have some issues in privacy and convenience

Emergency Button

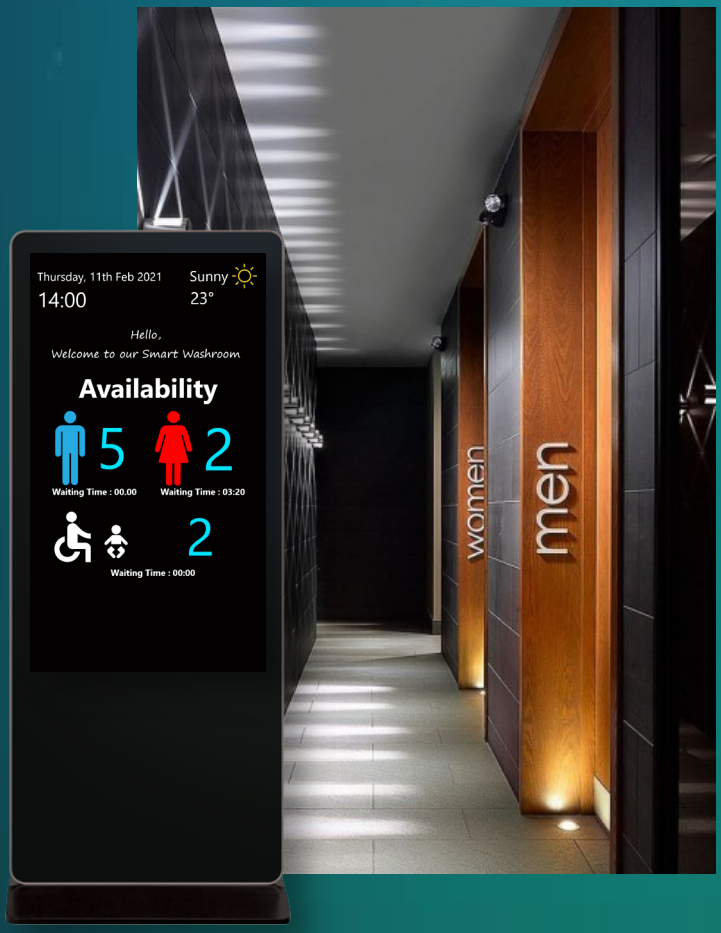
Emergency Button with Built-in Intercom
A one-press convenient button to alert the cleaners there is some emergency need of their services.
An optional IP-based intercom can also be included to talk to the facility management.

Smart Soap / Paper Dispensors

Smart Soap / Paper Dispensors Level Sensors
All toiletry supply dispensers can be fitted with level sensors to avoid interruptions on supply.

222nm Far UV-C Light Tube
Continuous low dose rate far UVC light in indoor public locations is a promising, safe and inexpensive tool to reduce the spread of airborne-mediated microbial diseases. Simple and standalone operation, no integration needed, human detection sensor and timer can control the light and sterilize when no one is using the toilet.

UV-C Light Tube

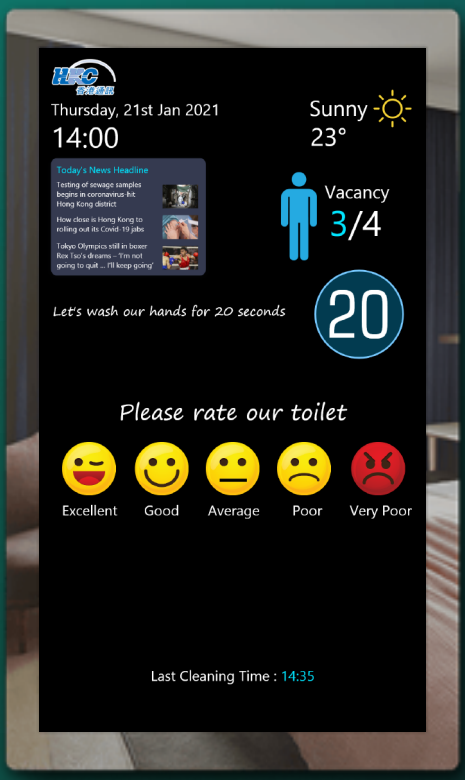


Digital Signage
Display real-time vacancy and waiting time for all washrooms

Smart Bins
One source of odor is from the bacteria growth in the trash can. The fill sensor can alert for the need of clean up. Smoke and heat detector can prevent fire hazards. An auto-opener and compactor (optional) can be used to reduce the smell and increase the trash capacity.

Smart Mirror
A useful information display that can also be used to collect user feedbacks

Smart Bins



Smart Mirror

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