We Connect Everything to improve the quality of life

Healthy Campus

Smart City Solution

HKC 香港通訊

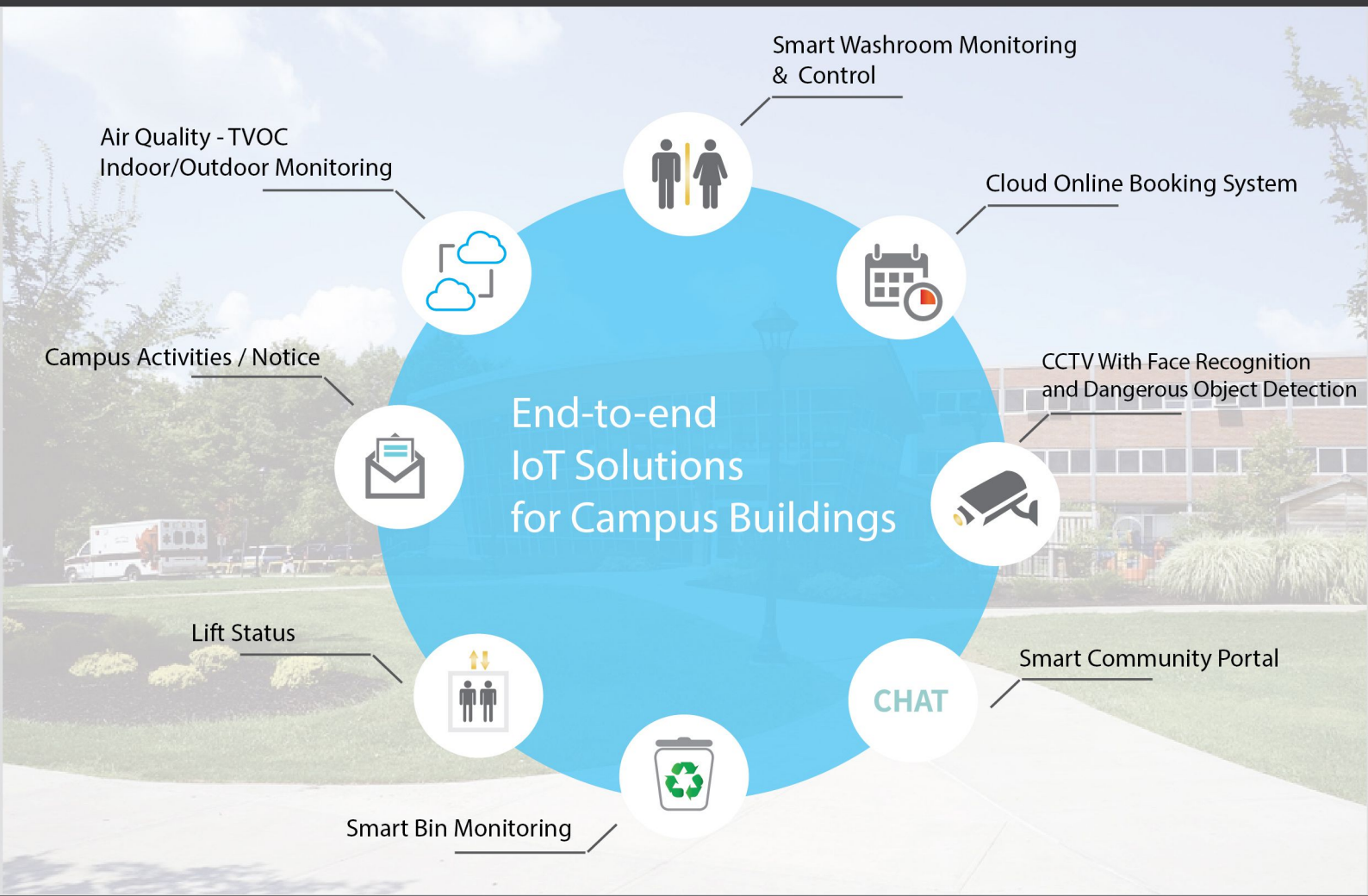
" Autonomous technologies, AI,
and internet of things"

Entering a New Era of Healthy Campus

In the developed countries, Information and Communication Technology (ICT) has been used as the unseparated parts to increase the quality of higher education. ICT can be used to fix and increase the quality of learning process, research, library, information services and university management. One of the ICT implementations is the using of internet technology that is integrated to all of things of daily life, that is called as Internet of Things (IoT). IoT is a structure in which objects, people are provided with exclusive identity and the ability to relocate data over a network without requiring two-way hand-shaking between human-to-human or human-to-computer interaction. IoT technology has been widely used for the development of smart home, smart campus, smart building and smart city.

Healthy Campus is a trendy application in the paradigm of the IoT. The concept of constructing a smart campus implies that the institution will adopt advanced ICTs to automatically monitor and control every facility on campus. The design and the implementation of healthy campus is different with others, depends on the campus needs.

To build a healthy campus, it needs to build the digital infrastructure inside campus that can give services so that it will be beneficial for all students. IoT which bases on the internet, uses a variety of information sensing identification device and information processing equipment, such as RFID, GPS and Sigfox etc. to combine with the internet to form an extensive network in order to achieve information and intelligence for entity.



System Architecture

This application works by using IoT & AI technologies on data obtained in real-time and providing real-time alerting through web browser or mobile devices for principal or teachers to optimize facility management.

Main Campus

sigfox

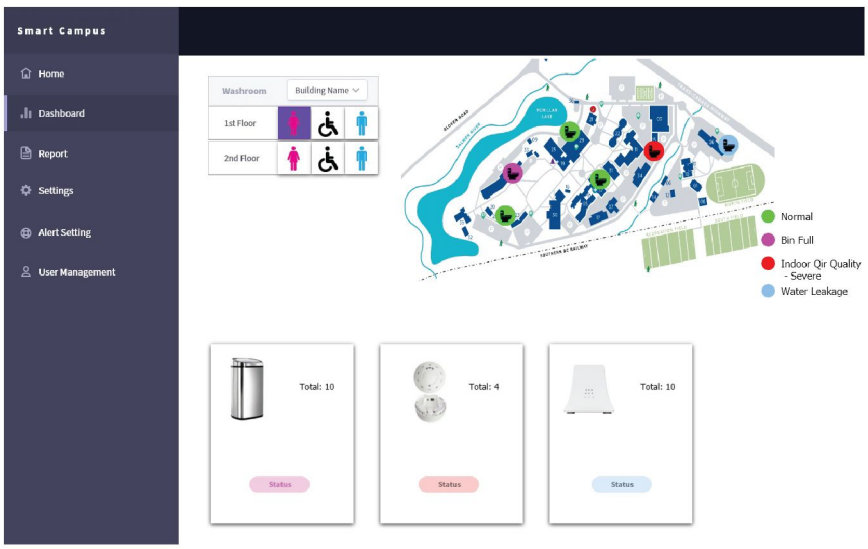
NB-IoT

Main Dashboard

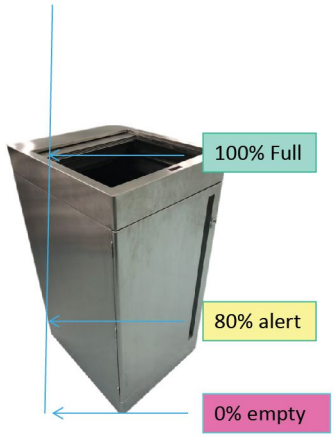
- Smart Washroom Monitoring & Control
- Air Quality TVOC Tracking
- Online Booking System
- Campus Activites & Notice
- CCTV Access Control

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

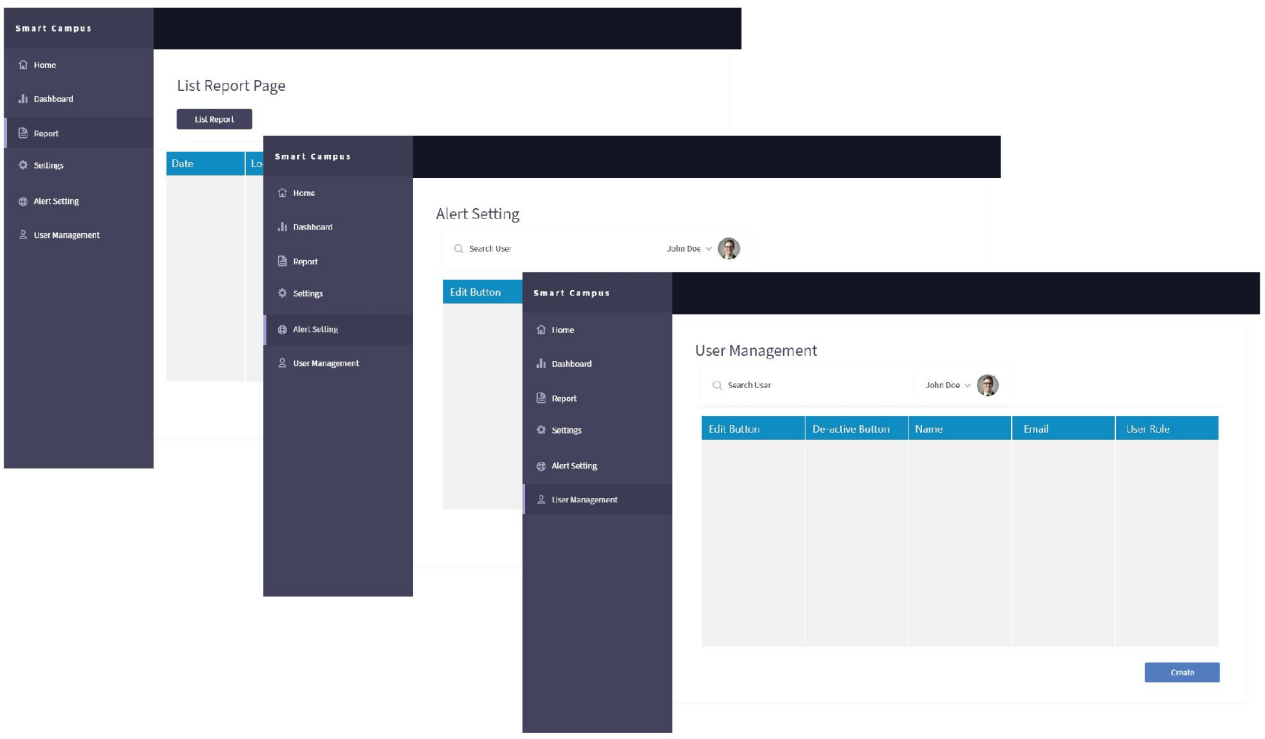
Smart Washroom Dashboard



Users can choose specific sensor located at which building and click in to see the real time data.



Real time status of Smart Bin , Indoor Smell Sensor and Water Leakage Alert, measurements can trigger action plans.



List Reports / Alert Settings and User Management Platform

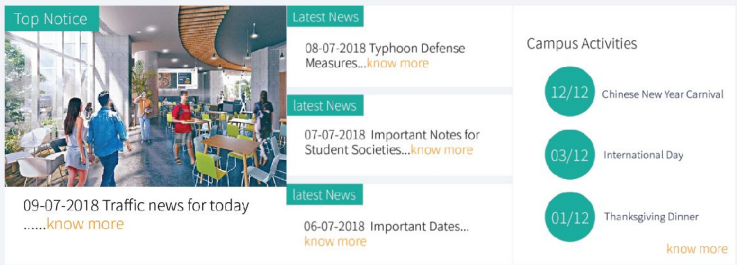
AirQuality - TVOC OUTDOOR MONITORING

Outdoor Air Quality Status

This Air Quality function shows the current outdoor total volatile organic compound (TVOC). The indicator colors are green (Clean Air), yellow (Moderate) and red (Severe).

Campus Activities Notice / Cloud Online Booking System

Campus Activities/ Notice

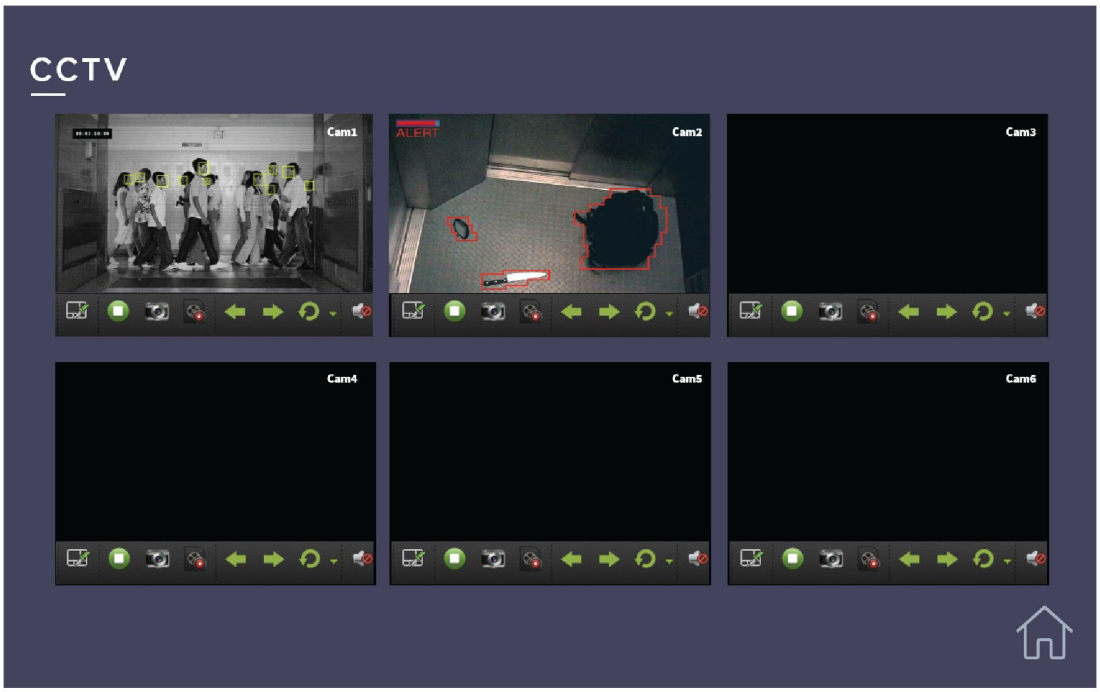


The campus news and electronic bulletin board is the front page of the Smart Campus Portal where a curated collection of news and public notices for all students are posted and updated by the management team.

Venue and Classroom Booking System

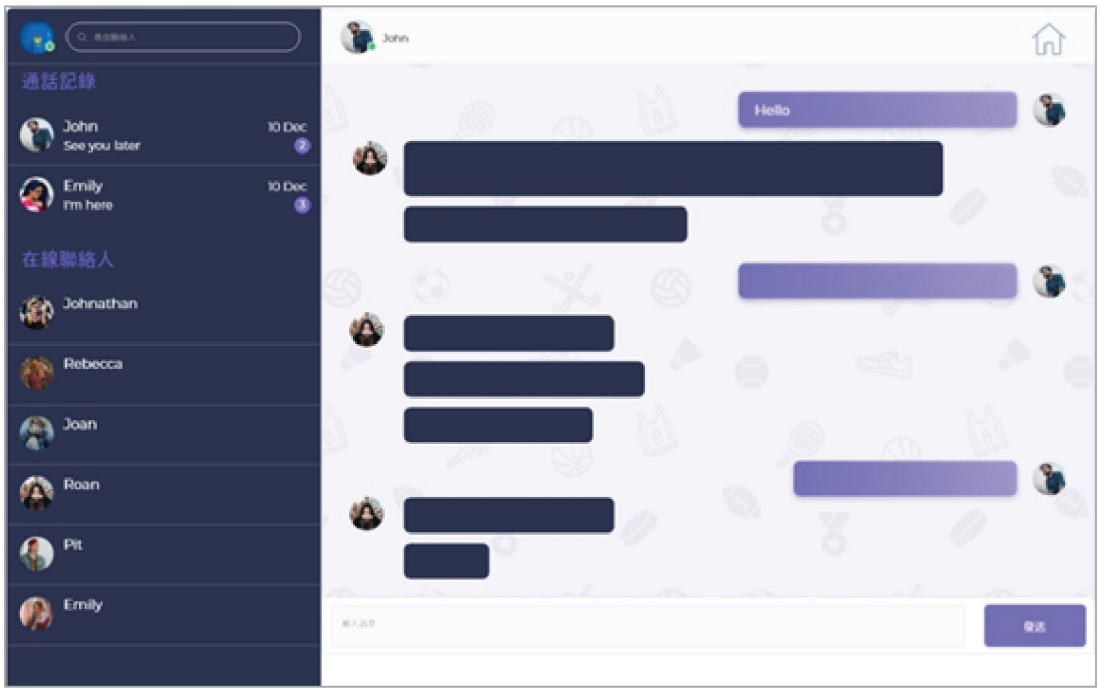
The Online Booking System for Smart Campus can help the students manage the booking of common facilities and resources automatically. Principals can define new facilities and give them different booking rules. At the time of the booking, the system can send unlock command to the smart lock to let in the students.

CCTV-Face Recognition & Dangerous Object Detection



The system supports the CCTV by automatically detect a "dangerous object" and rasie an alarm. It also supports face recognition access control of the campus.

Smart Community Portal



The chatroom app for the Smart Community Portal is where students can meet to organize communal activities and discuss topics of common interests, as well as helping manage and maintain the Student Association.

Specifications

The Smart Campus 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 trash bin
- 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

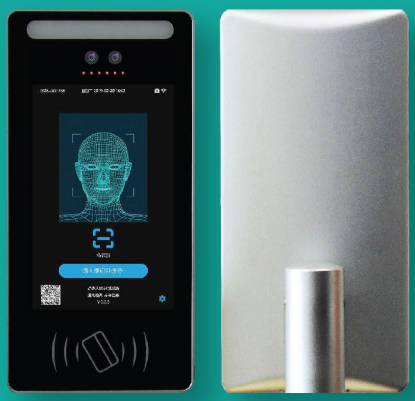
Air-Tracker (Outdoor/Indoor)

- Air-tracker is a solar powered 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



Face Recognition

The Smart Devices include:

Face Recognition / People Counting Subsystem

An AI system is used to count the number of users entering the facility at different time of day to ascertain the usage pattern at this location. The face recognition function of this subsystem can be used for access control and dangerous objects' detection and prevention.

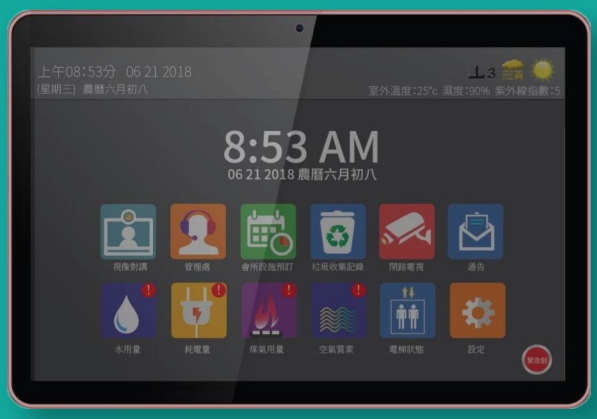
Smart Bins

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 Display System 10"

Smart Display System is to provide a Graphical User Interface (GUI) platform to display useful and relevant information throughout a Smart Campus.



Smart Display System

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