Managing the 'Internet of Things

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Demonstration of a solar street light management system. Credit: Hong Kong Applied Science and Technology Research Institute

Researchers in Hong Kong have developed a software platform designed to manage and control devices for "Internet of Things" (IoT) systems. The platform can be tailored for everything from city management sensors and devices to controlling home appliances.

The Internet of Things (IoT) is an emerging technology in which smart devices are interconnected and communicate via the Internet. A limitless range of devices could be incorporated into the IoT, from refrigerators and TVs to cars and solar panels. However, there is currently no universal system for managing these devices and the data that is transferred between them.

"Many vendors focus on device manufacturing and provide good technologies for wireless connectivity between devices," explains Dr Billy Chan, senior manager of the Hong Kong Applied Science and Technology Research Institute (ASTRI). "But many existing systems lack an IoT management platform."

There is also no standard platform to leverage the development of IoT applications, which means that designers need to start from scratch with each new application. This is time consuming and costly.

ASTRI has developed the "IoT Management and Application Platform" (IMAP), which allows the connection of a local network of devices to the Internet, and provides remote management of devices and data through a simple and customisable web-based graphical user interface.

The system supports several technological standards for communication between devices, web interfaces and network architecture. This means it can be used on different platforms to support a diversity of devices and the development of IoT applications.

To demonstrate IMAP's capabilities, ASTRI has developed several "Smart City" applications. These include "Solar Street Light Management", a system designed to provide real-time monitoring and remote control of more than 3,000 street lights in target to reduce maintenance costs. This system has been implemented in partnership with two companies in Wuhan, China, and field trials have been

successful. It is now being deployed on a larger scale, with a target for city-scale deployment in the next few years. Other Smart City applications include "Environment Monitoring and City Management" and "Renewable Energy Device Management" (see below "Other Smart City applications").

Dr Chan says that the flexibility of the system means IMAP offers solutions on a smaller scale too. "IMAP can also support smart home applications to provide status monitoring, remote control, data collection and notifications for home appliances and devices," he explains.

Other Smart City applications:

Based on the Solar Street Light Management application, the ASTRI team can further develop an "Environmental Monitoring and City Management" application. The environmental monitoring system features different devices and sensors for deployment on street light poles, including air quality monitors that measure pollutant levels, sound sensors to detect noise levels, and temperature and humidity sensors. If the system senses that the weather is dry, the temperature is high and the air quality is poor, it can send commands to turn on roadside sprinklers to irrigate plants and trees, lower the temperature and improve the air quality.

The "Renewable Energy Device Management" system was designed and developed to remotely monitor and control solar power stations that provide green energy for city-operated facilities and devices, such as river/canal toll machines, bridge monitoring devices, bus stops, display boards, road signs and cameras.

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