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Harnessing the power of the Internet of Things

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Published by Newsroom Editor (/digital-agenda/en/users/Newsroom) on 02/06/2014

Still an aspiration today, the 'Internet of Things' (IoT) will be a network of interconnected embedded systems, where everything from office supplies to fridges will be online. But as these systems grow in number, so does the challenge of connecting and exploiting them.

The iCore team is looking at how to empower and organise the IoT using virtual objects and cognitive technologies. The blueprint could eventually be used for smarter homes and offices, cleaner cities and better transport systems.

According to a study from Cisco Systems, there will be as many as 50 billion embedded systems and other portable devices connected to the internet by 2020. Because these systems are so inexpensive and the networks so pervasive, they could provide a wealth of data that industry could use to monitor and improve operations.

iCore aims to address some of the complexities posed by the technological heterogeneity coming from such huge numbers of connected devices. The focus is on how best to 'virtualise' interconnected objects and use cognitive technologies to provide services that meet consumer demand effectively and efficiently.

The team is building a cognitive blueprint that will be reusable for diverse applications. The process involves characterising virtual objects (VOs), composite virtual objects (CVOs) and real-world modelling of functional blocks that help IoT systems acquire situation-awareness and consequently assist end-users in their daily activities.

From real world to virtualisation

The first step sees the team investigating VOs, which are virtual representations of real-world objects like devices or sensors.

"Virtualisation helps hide the technological diversity of objects and provides opportunities for the semantic enrichment of object descriptions," explains iCore project coordinator Raffaele Giaffreda of CREATE-NET in Italy.

When various interoperable VOs are mixed together, CVOs with new and additional functionalities required by users are created – this "mash-up" forms the second level of investigations.

The so-called third "service level" matches user requests with VO and CVO service availability. "This level is able to adapt to changing situations and preferences," adds Giaffreda.

As municipalities, mid-size utility companies and transportation companies will be among the first to benefit from the IoT, iCore is looking at these sectors to create various test scenarios to validate its blueprint. These include trials in ambient assisted living, smart offices, smart transportation and

supply chain management.

The team also aims to carry out wider trials in smart tourism, smart security and smart asset management.

The iCore blueprint could help the IoT achieve its full potential by establishing the foundations and architecture for the seamless creation of innovative applications, as well as the general exploitation of IoT objects. iCore also builds on the ARM, the IOT Architecture Reference Model developed by IoT-A, the European Lighthouse Integrated Project on Internet of Things building blocks.

Big benefits

The new opportunities for innovative IoT services created by iCore stand to benefit businesses and consumers alike.

Day-to-day tasks like cleaning, home security, assisted living and resource usage and management could all be much easier if the full power of the IoT is harnessed. The kitchen will power down when no one is there or when its owners give the instruction online. The team also expects to remove some of the complexity from end-users through machine learning and cognitive technologies.

In the office, staff would become more productive as they avoid remedial tasks and office supplies are ordered on time. Manufacturers also stand to benefit as the resolution of interoperability issues will promote the use of their devices for new tasks. In fact, a whole new market will open up for anyone wanting to create value-added IoT services that are dynamically tailored to the user's situation and needs.

More info

- www.iot-icore.eu (http://www.iot-icore.eu)

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