

The Internet of Things will transform our everyday

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Information technology and electronics are becoming entwined with our everyday lives in industry, the service sector, transport, logistics, health care, housing, education, and our leisure time, almost without our noticing it.

The changes are already apparent to consumers in the energy sector, for example: remotely readable meters are rapidly becoming more common, enabling developments such as new pricing models that encourage the reduction of <u>carbon dioxide emissions</u>. The remote control of machines and devices is experiencing substantial growth and spreading to smaller and smaller appliances. Smart buildings use building automation to control their own functions to an ever greater extent, and remote health care applications are increasing apace with the ageing of the population.

"VTT is developing uID (universal Identification) technology with our Japanese partner, the University of Tokyo," says VTT Research Professor Heikki Ailisto. "This technology enables the identification and tracking of individual products, components, and food products. With uID, information on origin, manufacture, and history can be attached in the digital world to the most commonplace items over their entire life cycle. A timber plank, for instance, can be tagged with information on which forest the timber was cut from, where it was sawn, how many times it has been painted, and with what paints."

"Three big waves can be identified in telecommunications in the past century or so. First, the telephone connected 500 million places. The



mobile phone then connected 5 billion people. The Internet of Things will connect 50 billion devices, machines, and objects. Objects and packages that do not require an actual data connection can also be named and connected to background systems with the help of identifiers," says Ailisto.

Objects converse with each other, mobile phones identify our movements

<u>Ubiquitous computing</u> (ubi) and the Internet of Things (IoT) will revolutionise technology and business. VTT sees an opportunity in this revolution; an opportunity that it wants to grasp together with the industry and other actors. The goal is to create a technological operating environment and to build business on it.

VTT has been developing ubiquitous computing applications and basic technology in the OPENS (Open Smart Spaces) programme. The programme's achievements include the implementation of the interoperability platform Smart M3, which enables various appliances and objects in the home or office to "converse", understand each other, and share information. This interoperability platform, created for devices produced by different manufacturers for a variety of purposes, is based on so-called semantic technology, which defines a common "language" for devices and applications. The interoperability of devices promotes energy saving, comfort, and safety at home and at work. The solution was developed together by VTT, industrial partners, and universities in various national and European projects.

One way to make appliances and services feel "smart" for the user is to make them situationally aware. Situation and location awareness has already been put into practice in mobile communications devices and other appliances. VTT has brought a new dimension to awareness with



the solutions it has developed to enable additional recognition of the user's activities – is the user sitting, walking, or running? – and his or her method of travel – is the user travelling by train, bus, car, or bicycle? In this way the user can be offered the most appropriate services for the situation.

One example of interaction technology between man and machine is mixed and augmented reality, an area in which VTT has achieved globally significant results. Such applications include motion sensing input devices and 3D cameras for games and practical applications. Mixed and augmented reality as an interface for mobile phones, for example, is just breaking into the market and entering consumer consciousness.

The worth of business related to IoT technology and applications is rising by 30% each year, and by next year will reach EUR 300 billion. VTT is helping Finnish companies reap their share of this growth. Research in the field is continuing strongly, with a particular focus on the Internet of Things.

Provided by VTT Technical Research Centre of Finland

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