Sensors and Appliances for Ubiquitous Services

Hakaru Kyuragi
Director of NTT Microsystem Integration Laboratories

The word "ubiquitous" has become extremely popular of late. We are certainly moving toward a world in which it is possible to access information networks such as the Internet at any time, from anywhere, but there is still a long way to go before information truly exists everywhere at the same time, as literally meant by ubiquitous. The ideal of a ubiquitous society is an environment that enables information to be accessed instantly, as needed, from any object around us. When that day comes, we will no longer even be conscious of being connected to a network.

Of course, if we were to collect information about everything in the world, we would need to handle an enormous amount of data. So, in order to pursue R&D efficiently we need to determine what information is most important and useful to us. In our efforts to develop devices that collect information, we are working on the development of sensors and appliances for ubiquitous services from two viewpoints.

- Sensors that can generate information that is valuable to humans
- Appliances that can generate new kinds of knowledge

The sensors will collect information that is essential and necessary for helping people manage their lives more securely and safely—for example, medical and health sensors for measuring blood pressure and blood sugar levels and preventing metabolic syndromes; biochemical sensors for inspecting food products that are capable of high-sensitivity detection of the pathogens that cause food poisoning; and structural imaging technology for diagnosing defects and deterioration in buildings.

The appliances will enable new ways of communication and lifestyles. One example is devices based on RedTacton, a technology for security and other applications that works through the natural body movement of touch, making use of the human body as a medium for signal transmission. Another example is single-chip fingerprint authentication modules that combine fingerprint detection and fingerprint pattern verification functions on a single chip and are capable of biometric authentication of objects that are not equipped with a processor.

We are now focusing a large part of our sensor development on applications in the promising areas of medicine, health, security, and disaster prevention. The next step for us is to deliver added value to the sensors we develop, by connecting them to networks. Examples of this include healthcare services built by connecting our sensors and other commercial sensors to networks. To achieve this goal, it is essential not only to develop sensors, but also to put together all the technology, experience, and expertise that we have cultivated to date—through tie-ups among all our research laboratories, enterprises, and group companies. In other words, this is the goal that will allow us to take maximum advantage of the strengths of the NTT Group.

Once we have the information infrastructure in place to deliver ubiquitous services, it will be a simple matter to connect together different kinds of sensors that collect different kinds of information. This will make it possible to utilize a greater variety of sensor-captured data and combine different kinds of data to create new services. When this happens we will surely be closer to a simple, convenient, and pleasant ubiquitous society.