NTT DoCoMo

DoCoMo Newsletter

Mobility 15

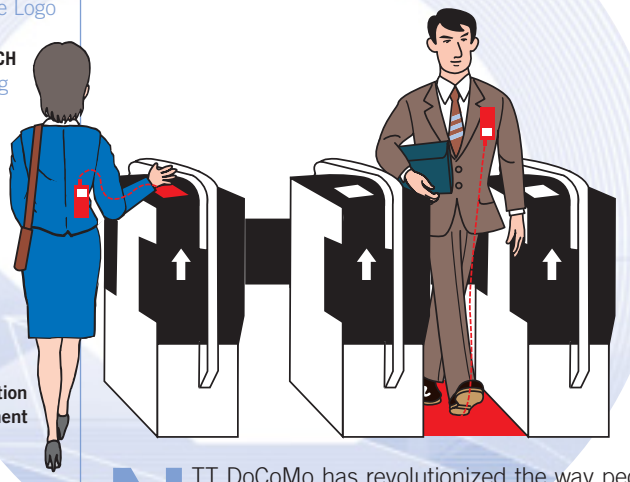
December 2007

BIMONTHLY

CONTENTS

FEATURE

Adding the Human Touch to Communication



Personal authentication & Payment

NTT DoCoMo has revolutionized the way people use their mobile phones over the last few years, introducing and successfully popularizing its Osaifu-Keitai™ services such as iD™ mobile-credit payment platform and DCMX™ mobile credit card to transform phones into lifestyle tools for payments, ticketing, booking and much more.

Now DoCoMo is planning to take contactless technology a big step further and enable people to do things like exchange business card info through a simple handshake, or pass through security doors with the mere touch of a finger, all the while leaving their phone—where the data is stored—in their pocket or purse.

This may sound a bit like science fiction, but DoCoMo is starting to turn such applications into hard science. The key development—the addition of the "human touch" to communication—promises to herald a new era of ubiquitous communications technologies, perhaps in as soon as five years.

Touch Communication

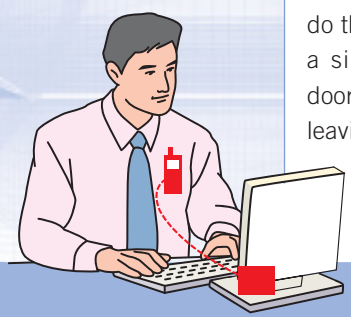
Working with start-up company Kaiser Technology, Inc., DoCoMo has developed a working prototype technology that actually uses the human body to transmit information through touch, rather than via wired, wireless or optical communications, according to Yuji Nakayama, Senior Research Engineer at NTT DoCoMo's Research Laboratories.

The technology, known as near-field intrabody communications, uses a tiny electrical field that exists on the surface of the human body to safely and harmlessly conduct information to and from devices—such as a mobile phone—via the human body.

It's less futuristic than it sounds: DoCoMo experimentally integrated the technology into a mobile phone and hundreds of visitors eagerly tried it out at the company's booth during the CEATEC (Combined Exhibition of Advanced Technologies) show in Japan this October.

"It was one of the most popular demonstrations of the entire show," says Nakayama.

Device unlocking



Safe and Simple, and at your Fingertips

"One of the first questions we got from people at the show was, 'Are you sure it's safe?'" relates Nakayama. "So we explained that the technology is not harmful because it uses the extremely weak but natural electrical field of the human body. Moreover, people using it feel absolutely nothing," he adds.

In fact, the field is so weak that it falls well below the safety levels stipulated in the Association of Radio Industries and Businesses' radio frequency-exposure protection standard, RCR STD-38.

The system itself basically consists of a sensor-chip module packed with functions but nonetheless is small enough to be embedded in a mobile phone. In a demonstration for *Mobility* at DoCoMo's Research Laboratories near Tokyo, Nakayama held a handset in his left hand and put his shoe on a plate connected to a transmitter. Immediately a "receiving data" message appeared on the phone screen and continued to display as he slid the phone into his shirt pocket. As soon as he took his shoe away from the plate, the data stream stopped.

"People were amazed when they saw it at CEATEC and lined up at our booth to try it out," says Nakayama, with a grin.

NTT DoCoMo's Nakayama (facing forward) talks about "touch communication" technology at CEATEC.

Tremendous Advantages

The technology holds huge promise because of its inherent advantages over today's wireless communications technologies, especially in terms of security. Since it uses only a tiny amount of power, has a very short range, and can be stopped immediately by breaking contact, the technology is more secure than Bluetooth® or Wi-Fi. Furthermore, neither interference nor frequency allocation is a big issue, which is welcome news for applications developers and service providers, Nakayama points out.

In Touch with the Future

So what are the potential applications for this exciting technology?

Of course, it is easy to imagine it would be applied in next-generation versions of DoCoMo's successful e-wallet and e-ticket services, such as walking through a ticket gate and just tapping a panel without ever taking out one's phone, or using one's finger to unlock a PC or enter a secure area (see p.1 graphics). The keywords here are convenience and security.

Beyond this, DoCoMo envisages a future where a mobile phone, while still nestled in one's pocket or purse, acts as hub or gateway for a range of ubiquitous communications applications between the user and, for example, IC tags or a range of other devices, as well as the mobile Internet. One of the most promising applications, believes Nakayama, is mobile phones with specially equipped sensors that not only monitor body conditions, such as pulse and temperature, but continuously relay the data to the person's health provider.

Getting There

After just one year, DoCoMo is already taking long strides towards these applications, says Nakayama. At this point, no major obstacle has been encountered. DoCoMo is now working to further shrink and upgrade the module for embedding in phones and other devices. At the same time, engineers are working on boosting speed from the current 40Kbps to as fast as 1Mbps. At present, the system can be used only one way, either to transmit or receive, but two-way capability is being developed. Moreover, software is being devised to integrate the technology with hardware and applications. Nakayama is confident that these tasks can be accomplished sooner rather than later.

"We have already demonstrated the basic functionality needed to commercialize this technology. We are not talking about waiting another ten years—it's more likely a case of three to five years," he estimates.

International Research and Development

Near-field intrabody communications technology has attracted much interest in the international research community. A number of organizations are developing intrabody technologies in addition to DoCoMo and Kaiser Technology.

Nippon Telegraph and Telephone Corp., for example, has developed a similar technology called RedTacton. It also conducts through the human body, but uses a bigger sensor than that used by DoCoMo. In addition, the sensor's operation is based on electro-optic technology, and instead of an IC-chip module it uses a crystal that vibrates when receiving current from the body and a laser that turns the vibration into electrical signals. The technology is designed to carry much more data than DoCoMo's system, but the transmitters and receivers are not designed for embedding in devices.

Also in Japan, Matsushita Electric Works has developed the Touch Tsushin System (*tsushin* means communications) that transmits data with the touch of a finger. The user wears a wristband equipped with an electrode that sends a very weak electric current through the hand for the transmission of data to and from various devices.

Research institutions such as the Korea Advanced Institute of Science and Technology, as well as other corporations including Sony Corp., also are putting their fingerprints on the field of intrabody communications.

Thanasis Katsiroubas, chief executive of Bulgarian mobile operator GLOBUL, a DoCoMo partner, and Grisha Ganchev, honorary president of football team PFC Litex, announced a sponsorship agreement in early August to put the i-mode™ logo on Litex jerseys and the team's stadium in Lovech for the next three years.

The partnership coincides with Bulgaria's first anniversary of i-mode, the world's most popular mobile platform for e-mail and Internet services. Litex's first match with the i-mode logo came on August 11, when it met CSKA Sofia in its 2007/08 Bulgarian Championship opener.

The branding also includes a Litex i-mode site and a Litex-branded i-mode game created by Japanese game developer G-mode, both of which are being launched this year.

"The sponsorship agreement with Litex is an important step forward in the development of i-mode service in Bulgaria and is evidence of our efforts in support of Bulgarian football," said Katsiroubas. "One year after the launch of i-mode in Bulgaria, we are proud of its progress and we are happy that a club like PFC Litex is our partner."

GLOBUL's Katsiroubas and Litex players introduce new i-mode jerseys.

Litex, which won the Bulgarian Cup in 2001 and 2004 and the Bulgarian Championship in 1998 and 1999, frequently participates in European club tournaments, creating opportunities to provide greater exposure for the i-mode logo outside Bulgaria.

GLOBUL launched i-mode in September 2006, following an agreement between DoCoMo and COSMOTE Mobile Telecommunications S.A., GLOBUL's parent in Greece.

DoCoMo PARTNERS

GLOBUL-Sponsored Bulgarian Football Team Sports i-mode Logo

TELECOMMUNICATIONS RESEARCH By InfoCom Research, Inc.

Mobile Ad Market Expanding Rapidly

Mobile advertising has enjoyed steep growth in Japan, with expenditure nearly quadrupling to 39 billion yen (US$339 million) between 2003 and 2006, according to the Dentsu Communication Institute.

Although mobile ads accounted for only 11% of all Internet ads in 2006, their average annual growth rate of 57% surpassed the 44% rate of growth for total Internet ads during the same three-year period.

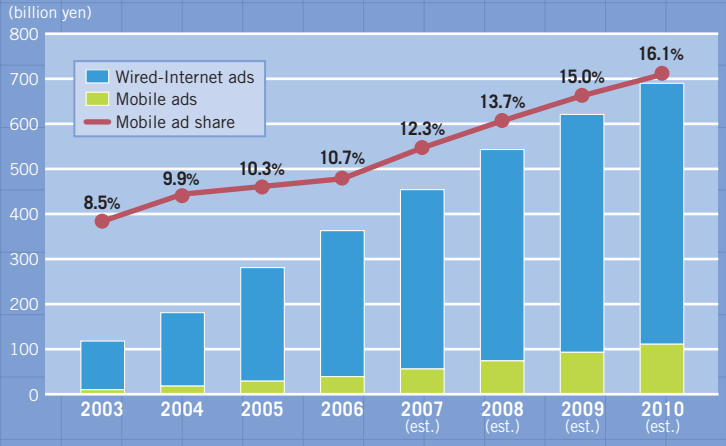
Mobile ads initially were used as banners in mobile e-mail magazines and direct mail sent to users' addresses. More recently, however, banners in mobile Internet sites have increased sharply as a result of an equally rapid increase in dedicated mobile sites in Japan, thanks primarily to DoCoMo's i-mode™ mobile Internet service.

According to the *Economist*, the global value of mobile ads is US$870 million. While this is just 3.6% of the US$24 billion Internet ad market, the potential for growth is huge considering that some 2.5 billion mobile phones are in use.

Just as wired-Internet ads have benefited from the expanded availability of bandwidth, flat-rate data billing plans and search engines, mobile ads will benefit from faster mobile technologies, such as HSDPA/HSUPA, and the resulting increases in mobile surfing and mobile site views.

Moreover, the growing use of mobile search engines should boost mobile ads over the medium term, while advertising combined with new services, such as mobile wallet and mobile TV, should expand the horizon for mobile ads over the longer term.

Rising Use of Mobile Ads in Japan



Source: Dentsu Communication Institute Inc.

Innovation Spotlighted at CEATEC JAPAN 2007

DoCoMo took the stage in early October at CEATEC JAPAN 2007, Asia's biggest telecommunication and electronics show, to exhibit the kind of innovative products and services that Japan has come to expect of its leading mobile operator.

Visitors showed great interest in DoCoMo's touch-activated "intrabody communication" technology, which uses the body as a physical link between devices to exchange data (see article on p. 1), as well as handsets equipped variously with wellness features, variable-display keypads, push-type information services and more.

Wellness handsets monitor health with sensors that measure footsteps, heart rate, body fat, halitosis (bad breath) and so on. On-screen applications ("widgets") allow users to input gender, height and weight data, or display renewing data such as step count or calories burned. With a wellness phone, a person can program workout goals (distance, time, etc.) and then jog to their favorite music, dieters can keep track of caloric intake and wellness data can be shared among family members via a linked server.

Variable-display keypads incorporating e-paper technology allow input via two Japanese syllabaries, as well as the English alphabet and numbers, and also enable the keypad display to switch to non-syllabary symbols for new applications, such as calculator operation.

New push-based services automatically provide useful information according to entries in the user's phone scheduler. As a result, the user doesn't have to spend time searching the Internet for needed information, such as car rentals and hotels prior to a business trip.

Wellness handset display

DoCoMo DATA

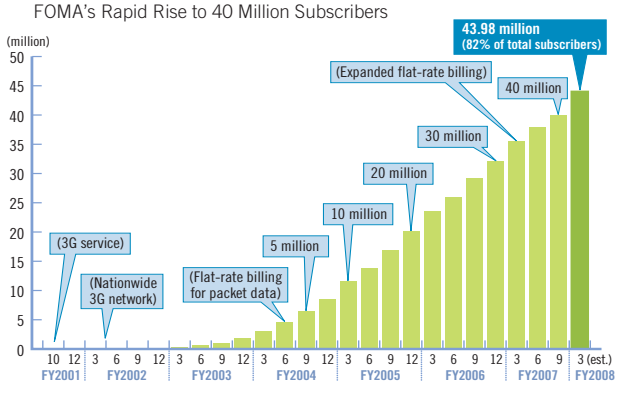
FOMA Service Surpasses 40 Million Subscribers

DoCoMo's FOMA™ 3G service surpassed 40 million customers on September 29, just 11 months after topping 30 million and six years since the service was launched in 2001.

FOMA, which now accounts for more than 75 percent of total DoCoMo subscribers, has led all domestic 3G services in net subscription growth for 41 consecutive months as of August, according to the Telecommunications Carriers Association, a 90-member industry organization in Japan.

DoCoMo, the world's largest operator of 3G mobile service based on W-CDMA technology, attributes the strong popularity of its 3G high-speed, large-capacity data transmission service to a wide variety of competitive discounts such as "Pake-hodai" and "Pake-hodai Full" flat-rate data-communication billing plans, diverse content, and services such as decoratively formatted Deco-mail™ e-mails and intuitive-motion "Chokkan Games," as well as FOMA's large lineup of handsets, broad coverage area and high-quality calls.

FOMA's Rapid Rise to 40 Million Subscribers



DoCoMo DATELINE

September 20, 2007 ▸ DoCoMo has established an office in Hanoi, Vietnam to enhance information gathering, explore business opportunities and strengthen relationships with government officials and corporate executives in the burgeoning Vietnamese market.

September 25, 2007 ▸ A new DoCoMo solution enables mobile devices using S60 3rd Edition and Symbian OS® to use i-mode™ services such as e-mail, web browsing and other advanced services. DoCoMo expects the solution to help expand the number of i-mode handsets offered outside Japan. The Bulgarian i-mode operator GLOBUL will be the first to launch handsets with this application.

October 10, 2007 ▸ DoCoMo and KT Freetel will set up a venture fund to invest in mobile and IT firms in South Korea from November. DoCoMo and KT Freetel will each invest 13.5 billion won (US$14.7 million) and fund manager KTB network 3 billion won (US$3.3 million).

October 11, 2007 ▸ ACCA Wireless submitted a license application for 2.5GHz base stations and the provision of broadband wireless services based on mobile WiMAX technology. DoCoMo previously agreed to an equity stake and to support network construction and related technologies.

October 26, 2007 ▸ From late November, DoCoMo's new Value Course will offer basic monthly charges that are 1,680 yen cheaper than conventional billing, and handset payments that may be spread out up to 24 months. Under the new Basic Course, customers will pay regular basic monthly charges but receive 15,750 yen discounts on handsets purchased under minimum two-year contracts. The schemes will be offered with 905i and later handsets.