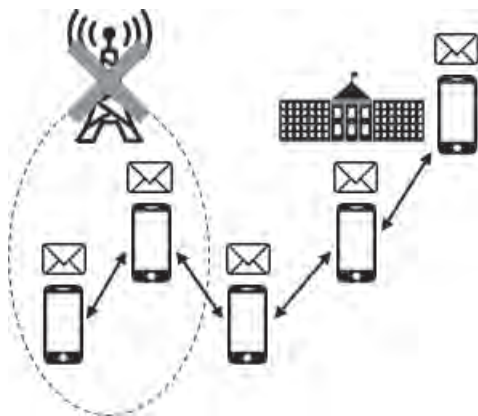


5-year memorial of Great East Japan Earthquake



Relay-by-Smartphone: Off-the-grid smartphone communication KOZO KEIKAKU ENGINEERING



From left, Masuto Nishiura of Spatial Communication Design Section, Business Development Dept. at Kozo Keikaku Engineering Inc., Yoshiyuki Senoo, executive officer, Social System Design and Marketing Dept. at Kozo Keikaku Engineering and Hiroki Nishiyama, associate professor, Graduate School of Information Sciences at Tohoku University YOSHIAKI MIURA

Securing post-disaster communication network

Many people had trouble connecting on mobile phones in the immediate aftermath of the Great East Japan Earthquake and tsunami on March 11, 2011. Destruction of communication infrastructure silenced some mobile phones, while massive numbers of calls and texts checking the safety of loved ones overwhelmed intact infrastructure, slowing and, in some cases, stopping cellular traffic.

There is a possibility that there may have been lives that could be saved if mobile phone services had properly operated. Such a situation can be improved with “Relay-by-Smartphone,” an off-the-grid smartphone communication technology that can boost connectivity, possibly saving lives.

Relay-by-Smartphone is a new method that enables data relay using multiple smartphones, even in situations in which mobile networks and public Wi-Fi are unavailable. With the method, packet data is sent via “Wi-Fi direct links” as smartphones pass each other, with the data eventually relayed to the designated recipients.

Jointly developed by Tohoku University, NTT Docomo Inc. and Kozo Keikaku Engineering Inc., the technology is to be released to the market as an SDK (Software Development Kit) in April.

Tohoku University, which led the development, conducted an experimental

disaster drill on its campuses in Sendai in October, in which it had students carry smartphones without SIM and Relay-by-Smartphone installed.

The students took photos and sent texts to the university disaster headquarters as they would in the event of a disaster.

In the drill, the university used NTT’s ICT-Car, which functions as a temporary mobile base station in case of a disaster. Relay-by-Smartphone helped send pictures and messages to the disaster headquarters from mobile phones located outside the coverage area of the base stations. The drill was successful, yielding results that could contribute to disaster risk reduction (DRR) and damage control in the future. More than 650 texts reached disaster headquarters. Those texts and pictures greatly helped the administrators understand the situation and take initial action.

“Last year’s drill convinced us that information delivery from individuals to relevant authorities is effective. It’s true this direction of communication is very important in the time immediately after a disaster. Later however, information delivery in the opposite direction is also important. For example, it is essential for a headquarters to send information, such as which evacuation venues have excessive amount of foods and water, to individuals.

Relay-by-Smartphone is useful in creating information flow both ways,” said Hiroki Nishiyama, an associate professor in the Tohoku University Graduate School of Information Sciences.

Using a drone simultaneously with smartphones with Relay-by-Smartphone installed makes it even more efficient, for instance, when it may take several days until damaged communication infrastructure is repaired. The drone may pick up an SOS message from someone buried in debris and relay it to disaster headquarters within the first 72 hours following a disaster (the likely threshold of survival after a disaster).

Unless Relay-by-Smartphone is used by many people, it will not be very helpful.

To maximize the effectiveness of the application, it also needs to be useful during non-emergencies. Yoshiyuki Senoo, executive officer at Kozo Keikaku Engineering, is aware of this necessity.

“Mobile phone carriers have excellent networks that enable high-quality communication; high-bandwidth and low-latency communication. But there are cases in which such communication quality is not required. In such cases, Relay-by-Smartphone can be a new communication service that supplements mobile phone networks, by building a simple infrastructure without any cost,” he said.