*** 北米連携センター定期報告***

2014 年 11 月 2 日

●地震検知・警報システムの開発への注力始めるテクノロジー業界

【Los Angeles Times, 2014/11/02】

地震検知・警報システムという分野では、日本が世界の最先端を行っていると考えられているが、米国は日本だけでなく中国、トルコ、メキシコなどに比べても、公共の地震検知・警報システム整備は遅れている。

その現状は、今年8月にカリフォルニア州ナパで起きた地震でも明らかになった。

地震検知・警報システムの構築にあたっては、信頼性の高い検知システムを構築するとともに、警報を受信できる端末、アプリも開発しなければならないが、地震検知システムとしては、UCB、カリフォルニア工科大学、ワシントン大学、米国地質調査所（USGS）が共同開発した「ShakeAlert」が存在する。

同システムは、ナパの地震でもいち早くその発生を検知することに成功しているが、その情報を利用できた人はわずかだった。

「ShakeAlert」プロジェクトは、警報をスマートフォン、タブレット、TV、コネクテッド・カーなどに発信できるシステムを構築したい意向だが、そのためには予算が 8000 万ドル不足しており、民間企業が警報システムを開発することに期待せざるを得ない状態にある。

これまで民間企業は、地震警報システムから利益を上げる方法が見つからなかったため、このようなシステムの開発には消極的だったが、近年は「インターネット・オブ・シングス（IoT）」への注目度が高まっていることに伴い、地震警報システムに目を向けるテクノロジー企業も増えている。

例えば、スマートフォンを使って施錠・解錠できるドアロックを作るロッキトロンは、震動センサで地震を検出し、警報を発信する方法の開発を進めているという。

また、USGS は、より多くのテクノロジー会社に地震データをリアルタイムで提供するための交渉を行っているとのこと。現在、USGS のデータを利用している民間テクノロジー会社はグーグルのみだが、同社も将来的に地震早期警報を発令できるようになるアプリの開発を進めている。

（参考）本件報道記事

Apps try to catch up to quakes; Since the Napa earthquake, state officials and tech firms intensify efforts on detection and alerts.

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1201 words
2 November 2014
Los Angeles Times
LATM
Bulldog Edition
AA-1
English

Among the many things the Bay Area learned from the August shaker near Napa is that UC Berkeley's earthquake warning system does indeed work for the handful of people who receive its messages, but most folks find out about a tremor only after it knocks them out of bed.

Silicon Valley has made apps that tell people when their Uber ride is approaching, their air conditioning has broken or a thunderstorm is brewing. Yet despite being home to the most devastating earthquakes in the country, the region does not have a high-tech earthquake alert system for the public.

But since the August temblor, more tech companies are trying to solve that problem. A few startups are developing apps that would quickly broadcast warnings of coming quakes to users on their smartphones, tablets or other gadgets. Already, the much-joked-about messaging app Yo has rolled out "Earthquake Yo" to hundreds of users.

In addition, established giants such as Cisco and Google are pouring resources into Internet-powered alert systems or quake detection technology. Other companies are taking unusual approaches to detect quakes; for example, a high-tech lock startup thinks the sensors it has on door locks could give an early warning of a temblor.

This is an area where the U.S. lags behind much of the world. China, Turkey, Mexico and Japan have had public earthquake detection and alert systems for years; Japan's is considered the most sophisticated in the world.

The challenges for California are twofold: to build a robust earthquake detection system, and to create devices and apps that receive an alert when a quake

strikes and send out warning messages to the public.

The Bay Area's best effort so far at detecting quakes is UC Berkeley's ShakeAlert, a collaboration with Caltech, the University of Washington and the U.S. Geological Survey to monitor quake activity in the state using a network of sensors. The system works by detecting so-called P waves, which move almost imperceptibly through the earth at almost twice the speed of a quake's destructive S waves, which shake the ground.

About five seconds after a quake strikes, the sensors send a message to a network of computers that geologists, researchers, BART and emergency responders have access to. The system cannot predict a quake -- currently no technology can -- but it can give people who live some distance from the epicenter a few seconds to head for safety, and it did that for a few people the morning of the Napa quake.

ShakeAlert, which started in 2012, has the earthquake detection piece of the puzzle, but not the devices and apps to deliver it to the public. Project developers say they want to build a system that would send alerts to smartphones, tablets, TVs and Internet-connected cars, yet the project has an $80-million shortfall and no dedicated public money. Private tech companies may be the only solution to create a high-tech earthquake alert system available to the masses before the next one hits, according to tech experts and geologists.

Indeed, the technology needed to send out alert messages using real-time data is relatively simple and has been around for years; think of the Amber Alert messages sent to cellphones when a child goes missing. So why hasn't a startup built an earthquake alert app yet?

Until recently, they couldn't make any money doing it. Earthquakes are "so unpredictable that you'd never know when you would get paid," said Shomit Ghose, a partner at Onset Ventures in Menlo Park, Calif.

What's changed? First, tech experts say, is the booming "Internet of things" business, which includes Web-connected home devices such as Nest, the smart thermostat owned by Google. Such devices connect to the Internet and send alerts to your phone or email, in addition to collecting data from your home such

as temperature and energy use.

A company could even add an earthquake warning system to the connected alarm systems, door locks, water meters or air conditioners they already are selling -- and add the earthquake detection piece as well. Smart devices could sense when the ground starts rumbling and send out mass alerts.

"And if you're willing to pay $9.99 per month for Spotify," said Paul Santinelli, a partner at Palo Alto venture capital firm North Bridge, "you probably are willing to pay $20 or $30 a year for earthquake disaster warnings."

That's what some tech companies are betting on. San Francisco startup Lockitron, which makes door locks that users can open with their smartphone, is creating knock vibration sensors that will alert a homeowner when someone is knocking at the front door. Since the Napa quake, co-founder Cameron Robertson has been exploring ways to use the vibration sensors to detect quakes and send alerts to customers.

"If you have 1,000 homes where the knock sensors start going off at the same time," that could be a warning sign of a quake, he said. When the knocking starts at homes near the epicenter, an alert could be sent out and homes farther away could have a bit of time to prepare, he said.

But the best quake detection technology remains the system set up by the USGS, and it is in talks with more tech companies to give them access to the once-proprietary real-time data from its earthquake sensors, the same data that the ShakeAlert system uses.

Right now, Google is the only tech company with an agreement to access the program's earthquake data feed. The search giant is working on an app that one day may include earthquake early-warning alerts.

It aims to "provide the public with information it needs to make informed decisions in times of crisis," a spokeswoman said.

In the meantime, some startups have come up with earthquake apps on the fly. Kyle Noble, a developer in North Carolina, spent a weekend building the

earthquake messaging app for Yo, the San Francisco-based startup that sends "Yo" messages to users. It wasn't an early warning, because the app connects to the USGS website that publishes earthquake activity at about a two-minute delay. But it got people's attention; the number of Earthquake Yo users jumped from 400 to 1,800 after the quake.

Noble said he built the app to help his dad, a humanitarian aid worker: "I figured the sooner he gets the alert, the sooner he can start preparing a response."

PHOTO: THE NAPA quake in August showed that the U.S. lags behind China, Turkey, Mexico and Japan in having public earthquake detection and alert systems. High-tech firms are trying to fill the void.;PHOTOGRAPHER:Noah Berger Associated Press;PHOTO: "IF you're willing to pay $9.99 per month for Spotify, you probably are willing to pay $20 or $30 a year for earthquake disaster warnings," one investor says.;PHOTOGRAPHER:Rich Pedroncelli Associated Press

Source: Los Angeles Times, 2014/11/02

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