

Wearable Tracking Tags Test Privacy Boundaries at the U. of Washington

By RANDY DOTINGA

Seattle

It's 2 a.m. Do you know where Evan Welbourne is?

If the University of Washington graduate student is burning the midnight oil at the computer-science building on the campus here, finding him is as easy as logging on to a Web page. Whether he is walking down the hallway or lingering outside a professor's office, an invisible monitoring network tracks his location and reports back to a database.

Mr. Welbourne doesn't mind. He has agreed to take part in a university experiment designed to explore the myriad new and serious privacy concerns raised by tiny tags called radio-frequency identification, or RFID, tracking devices.

While RFID isn't a household word, the technology behind it has long been a part of the lives of just about every American.

The devices — chips with radio antennas — emit signals, and tracking them reveals the movement of people or things. Many stores use the technology to catch shoplifters at exits.

Now, because the tags can emit individual codes, companies are using them to track specific inventory items, credit cards, and ID badges. Conceivably, sensors could follow people throughout their daily lives.

But who should track whom? Where, when, and how? And what effect will this constant shadowing have on the trackers and the trackees?

To get answers, the University of Washington developed the RFID Ecosystem. It is an attempt to "create a future world where RFID's are everywhere," says Gaetano Borriello, a professor of computer science. At the moment, 140 antennas that pick up signals and 35 RFID readers that interpret data are monitoring five of the six floors in the university's Paul G. Allen Center for Computer Science and Engineering.

Many of the devices have been placed in conduits above hallways, making them virtually unnoticeable to anyone who isn't looking for them. An additional 16 readers and 32 antennas, which will cover the building's entrances, are on the way.

The project will grow to allow 100 to 150 computer-science students and faculty and staff members to track people — and allow people to track them — on the project's Web site. Mr. Welbourne, who plans to write a thesis about the project, eagerly signed up to have his privacy invaded.

The plan is to study the choices that participants make: How often will they track their own activities or those of others? If some selective blocking is allowed, will they allow certain people to see their comings and goings but not others? What information will they want to know?

Some information revealed by the RFID project can be trivial. "I occasionally check how often I've had coffee or when and with whom a particular meeting occurred, but usually only out of curiosity," Mr. Welbourne says.

But the project's managers are developing software that may add value to tracking. For example,

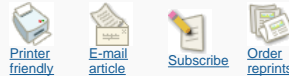
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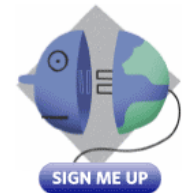
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Mr. Welbourne says, a program might be able to answer a question like this: "What Web sites did I visit and what files did I edit during the last database-group meeting when both Dan and Magda were in attendance?"

There are some privacy protections built into the experiment. Restrooms, elevators, and a giant atrium — all part of one large space — are off limits to monitoring in order to let people do some things, like answer calls of nature, privately.

Some aspects of protection are actually part of the experiment. Participants will be able to control who can see information about their movements and even instantly leave the network. The idea, Mr. Welbourne says, is to figure out whether people will tend to opt in or opt out: "Do users feel that the utility of an application justifies the potential loss of privacy?"

Reality vs. Hype

At least one other university has experimented with tracking technology. About six years ago, researchers at the University of California at San Diego created a system that allowed students to track one another's locations through Wi-Fi-enabled personal digital assistants.

Some students chose not to be tracked, says William G. Griswold, a computer-science professor at San Diego, while others expanded the level of access to their whereabouts. "We have many stories about how it created positive, serendipitous interactions" by allowing people to find one another on the campus, he says.

Lack of money killed off the project, but the same researchers are exploring other ways in which people react to machines that spot individual movements. One way is to change the messages on large public displays depending on who's walking by, and see what people do. Cellphones carried by students will alert the displays to their presence.

In Seattle the RFID project's early findings are that "technology itself is not an inherent risk to privacy, or at least not in any way that can't eventually be fixed," Mr. Welbourne says. For example, he says, an RFID tag could be designed to provide location information only to detection devices that use a specific password, making it impossible for strangers to surreptitiously track it.

But as with any technology, there are glitches and blind spots. The RFID antennas can "see" through some barriers, like a textbook, but not through others, like a human body.

Other potential problems include conflicting signals from multiple tags or the lack of communication between RFID sensors.

"A lot of this is about trying to separate reality from hype, and find what will actually work and what won't," says Jennifer King, a researcher who studies technology and privacy at the University of California at Berkeley School of Law. "RFID isn't as simple as everybody thinks it is."

In fact, it can make human relationships even more complex. "We discovered that even when someone grants another person the right to track them, they may be disappointed if that other person doesn't ask the system about their whereabouts," Mr. Welbourne says. They end up "feeling shunned in some way."

In other words, even if the computer knows where you are, there's no guarantee that anyone will care.

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