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Tracking Traffic with Cell Phones

A new project collects traffic data from GPS-enabled cell phones.

By Kate Greene

Researchers at the University of California, Berkeley, hope that drivers with GPS-enabled smart phones will help them gather more-accurate and up-to-date traffic data. Starting Monday, volunteers in the San Francisco Bay Area and around Sacramento will be invited to participate in a pilot program by downloading software that tracks their movements and transmits this information, via the phone network, back to a server at the university. In return, the volunteers will receive personalized traffic information on their cell phones.

The idea is simple, says [Alex Bayen \(http://www.ce.berkeley.edu/~bayen/\)](http://www.ce.berkeley.edu/~bayen/), a professor of civil and environmental engineering at the university. "Smart phones with GPS collect data from a regular commute and send it to a central system," he says. "The system puts the data into a mathematical model that estimates traffic in real time and then broadcasts it back to the Internet and phones."

The researchers' model combines traffic data collected from static road sensors as well as from volunteers' cell phones. Participants will receive personalized information such as travel-time estimates and traffic speeds along relevant routes.

Traffic monitoring is nothing new. Companies such as Inrix and Navteq accumulate traffic data using sensors embedded in streets and in toll booths, and from GPS sensors on vehicles like FedEx delivery trucks and taxis. This information is fed to in-car navigation systems and used by websites such as Google Maps, Mapquest, and traffic.com to provide live traffic data.

But the problem with existing systems, says Bayen, is that they only account for certain roads. Road-based traffic sensors show highway traffic conditions well enough, he says, but do not show conditions on many side roads. The Berkeley project, called [Mobile Millennium \(http://traffic.berkeley.edu/theproject.html\)](http://traffic.berkeley.edu/theproject.html), will fuse static sensor data provided by Navteq with cell-phone data from (hopefully) thousands of drivers across the Bay Area. Part of the project's goal, explains Bayen, is to better understand how to use traffic data collected by cell phones--essentially a giant sensor network--for traffic prediction.

The Mobile Millennium software was released to the public at a press conference attended by Bayen and representatives from Nokia (which recently acquired Navteq), the [California Center for Innovative Transportation \(http://www.calccit.org/\)](http://www.calccit.org/), and the California and U.S. Departments of Transportation. The software runs on Java-enabled cell phones with a GPS chip. This includes Nokia's N95 handset and the BlackBerry Pearl 8110 but not, currently, Apple's iPhone. The researchers recommend that people who use the software have an unlimited data plan because large amounts of data need to be streamed from each phone.

For some users, privacy will be a more serious concern, and the researchers are aware that success depends on people feeling safe enough to participate. Bayen says that the software automatically strips out identifying information from data uploaded from each phone. Furthermore, instead of transmitting data constantly, devices only transmit data when they pass through preprogrammed GPS locations, which the researchers call [virtual trip lines \(http://traffic.berkeley.edu/conference%20publications/virtual_trip_lines.pdf\)](http://traffic.berkeley.edu/conference%20publications/virtual_trip_lines.pdf). This separates traffic-flow data from the identity of a driver or her vehicle without impairing the quality of data that is gathered, Bayen says.

Scott Sedlik, vice president of product marketing at Inrix, says that virtual trip lines are a clever solution to the issue of privacy. "From a technology perspective, we think they're doing a creative implementation," he says.

Sedlik believes that GPS-enabled phones will ultimately play an important role in acquiring more-useful traffic data, but he also foresees some challenges. He points out that some people will always be reluctant to upload their location information to a remote server. Another problem, he notes, is that "an app like this is a huge battery drain."

Bayen agrees that GPS can sap battery life quickly and recommends that volunteers plug in their phones while driving. Nonetheless, he hopes that the prospect of receiving much better traffic data will encourage many people to give the software a try.

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Upcoming Events

[2009 Medical Innovation Summit \(http://www.ClevelandClinic.org/innovations/summit\)](http://www.ClevelandClinic.org/innovations/summit)

Cleveland, OH

Monday, October 05, 2009 - Wednesday, October 07, 2009

<http://www.ClevelandClinic.org/innovations/summit> (<http://www.ClevelandClinic.org/innovations/summit>)

[Cleantech Capital Summit \(http://www.infocastinc.com/cleantech\)](http://www.infocastinc.com/cleantech)

San Diego, CA

Wednesday, April 22, 2009 - Friday, April 24, 2009

<http://www.infocastinc.com/cleantech> (<http://www.infocastinc.com/cleantech>)

[MIT Sustainability Summit: Discovering New Dimensions for Growth](http://sustainabilitysummit.mit.edu/)

[\(http://sustainabilitysummit.mit.edu/\)](http://sustainabilitysummit.mit.edu/)

Cambridge, MA

Friday, April 24, 2009

<http://sustainabilitysummit.mit.edu/> (<http://sustainabilitysummit.mit.edu/>)

[The Front End of Innovation \(http://www.iirusa.com/feiusa/fei-home.xml\)](http://www.iirusa.com/feiusa/fei-home.xml)

Boston, MA

Monday, May 18, 2009 - Wednesday, May 20, 2009

<http://www.iirusa.com/feiusa/fei-home.xml> (<http://www.iirusa.com/feiusa/fei-home.xml>)

[MIT Sloan CIO Symposium: Sustaining CIO Leadership in a Changing Economy](http://www.mitcio.com/)

[\(http://www.mitcio.com/\)](http://www.mitcio.com/)

Cambridge, MA

Wednesday, May 20, 2009

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