Mobile Phones Yield Traveler Advisory Data

By SEAN J. BARBEAU, NEVINE L. GEORGGI, and PHILIP L. WINTERS
Center for University Transportation Research, University of South Florida

PHOTO: FLORIDA DOT

The FL511 Traffic Management Center in Palm Beach, Florida. FL511 also has launched an iPhone application.

To promote safety and better serve the public, researchers at the University of South Florida have designed an improved traveler information mobile application to feature pertinent, timely alerts filtered and customized to real-time and historical individual travel behavior. Although Florida 511 (FL511) features live, extensive coverage of travel conditions on the Interstates, at the time of the project's end date, the website had not directly integrated public transportation information. FL511's subscription-based road and traffic condition alerts—delivered via text message, e-mail, or telephone call—are numerous, however. As a result, useful information often is lost in an avalanche of irrelevant alerts for roads the traveler does not use; accessing messages while driving can be hazardous. The researchers deployed TRAC-IT, a software system that collects data about a user's travel behavior and delivers real-time, location-based services via Geographic Positioning System (GPS)–enabled mobile phones, allowing the FL511 system to generate and deliver alerts more efficiently.

The project had three objectives: to increase the likelihood that alerts will influence a traveler's mode choice, departure time, route, or decision to take the trip; to provide real-time transit information via cell phones to current and potential transit riders; and to devise a method for sending pertinent text message alerts to a user's cell phone in a way that minimizes driver distraction.

The current travel alerts are static subscriptions that do not filter for the user's actual travel time and location or for past travel behavior. To determine how many e-mail and text messages are sent by FL511, the research team subscribed to alerts for I-75 and I-275 in the Tampa Bay area. From July 15, 2009, to December 31, 2010, a single user received 6,851 e-mails—60 or more e-mails per day—and even more text messages. Researchers were able to reduce the number of irrelevant alerts by applying path prediction technology, which creates a profile of a traveler's typical daily movements. TRAC-IT's mobile system enables GPS data collection and user notification; the server hosts spatial databases and creates real-time spatial predictions. Because the program does not depend on road network data, it can build a user travel history for transit riders, pedestrians, and bicyclists.

Researchers designed a clustering algorithm that uses location data from GPS-enabled mobile phones to determine a traveler's points of interest (POIs). The algorithm can process large volumes of GPS data efficiently and can signal areas of frequent traffic congestion or delay. Predictions are based on POIs, as well as on trip segmentation, driver destinations, and departure times.

Researchers also integrated transit estimated arrival data from Hillsborough Area Regional Transit's automatic vehicle location system with FL511 messages delivered to a single mobile interface. In addition, a prototype application, traffic text-to-speech, delivered traffic information only when the user was traveling below the established speed threshold or had stopped moving. Although GPS-enabled cell phones can support the tracking and prediction service, the cost on battery life is significant—especially on smart phones. The researchers also have created software that reduces the negative impact of location-based services on battery life significantly.

The team identified additional research needs before full-scale deployment; future research could extend TRAC-IT's use with smart phone platforms and could allow FL511 to integrate more real-time transit information and deploy more project technologies for improved personalized traffic information.

For more information, contact Sean Barbeau, CUTR Research Associate, at 813-974-7208 or Barbeau@cutr.usf.edu; Amy Datz, Florida DOT Project Manager, at 850-414-4239 or Amy.Datz@dot.state.fl.us; or visit the project website at www.nctr.usf.edu/2011/03/dynamic-travel-information-personalized-and-delivered-to-your-cell-phone-2.