City Pulse Captured for Real-Time Tripping

Tracy Staedter, Discovery News


Now for the first time, researchers are working on a dynamic, public transportation program that could improve your commute.

The CityMotion project, being coordinated through the MIT-Portugal Program, will capture a variety of real-time digital data already being produced or recorded for other reasons and re-purpose it to enhance mobility in Lisbon and Porto.

Such a system could help make planning the best route easier for a range of people from city officials to disaster evacuation planners to supply-chain managers to average commuters.

The first application will be a customized trip planner in which citizens can choose their journey based on the quickest, cheapest or most environmentally friendly path possible.

"Every few minutes, we get a big chunk of data that says, 'at this point in the city there are this many people.' It's a method of sensing the city," explained Assaf Biderman, assistant director of the SENSEable City Laboratory at the Massachusetts Institute of Technology in Cambridge.

Biderman and colleagues at MIT have teamed up with researchers at the University of Porto, the University of Coimbra and the Instituto Superior Tecnico as part of the program's three-year timeline.

To sense congestion information in the cities, Biderman and his colleagues will pull data from sensors already distributed throughout a city.

For example, highways already have roadside sensors that regularly record the
passing of cars. Tollbooths are able to calculate the number of cars passing through, based on vehicles using radio frequency identification tags for automatic payments. Location information about bus, subways and trains is already captured by public transportation authorities to manage schedules.

And many cities already have a network of pollution sensors distributed throughout neighborhoods to monitor air quality.

Crowd information can also be gleaned from mobile phone use. Biderman and his colleagues from the SENSEable City Lab already initiated a separate project in Italy, called WikiCity Rome that produces an interactive map showing the location of people in real time based on anonymous and aggregated data collected from cell phones and GPS devices.

Processing the wide variety of sensed information involves customized algorithms that are able to strip the digital data down to its essential message (such as, "Is it the location of a bus?" or, "What is the amount of pollution on the north side of town?").

Once that information is discovered, it is plugged into computer models that can make predictions about traffic and crowd flow.

That way, when a user makes a query such as "what's the fastest route from A to B," the program can analyze the overall system to make the best prediction.

On one day, the fastest route might involve taking a bus because track maintenance is slowing down the subways. On another day, the fastest trip might be by foot, because a parade has closed down a main street used by the bus.

How the user gets the information has to do with the third and final layer: information dissemination.

"It will start on the Web, but ideally it could be on in-car navigation systems, mobile devices or interactive urban furniture," said Assaf

But before they get to that point, they'll have to overcome a couple of hurdles.

"I would find two big challenges. One is putting all of the data providers in agreement. The other big challenge is to make people interested in the system," said Carlos Lisboa Bento, professor of information engineering at the University of Coimbra in Portugal.

The team is working on moving toward agreements particularly with telecommunication and transportation partners. Getting the public interested will involve proving that there is a real advantage to the system.
"One important aspect is that she or he perceives that the system is safe in terms of privacy and security," said Bento.

At the end of three years, Biderman and his team hope to have those problems resolved.

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