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Fighting Traffic Jams With Data

Researchers Develop Ways for Cars to 'Talk' to Each Other and Send Warnings

By ROGER CHENG

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A symphony of light-emitting diodes, smartphones, global positioning systems and mobile sensors may soon work together to help drivers avoid traffic jams.

Researchers from different universities are working on ways for cars to better communicate with each other and relay crucial driver information such as traffic speed, weather and road conditions. The data could be used to decipher faster routes. In the meantime, there are options for residents of big cities to check out live traffic feeds on their cellphones.

The aim is to address the growing problem of traffic congestion through improved communications between cars.


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Associated Press

Interest in clearing up traffic jams, like this one on the Pacific Coast Highway in Santa Monica, Calif., "has gone red hot" as the auto industry realizes it's a part of improving safety, says Thomas Little, a Boston University professor.

"The interest has gone red hot in the last year as the auto industry realizes this is a component of improving safety," said Thomas Little, a professor of electrical and computer engineering at Boston University.

The CarTel project, run out of the Massachusetts Institute of Technology, is one attempt to free up the jam. Hari Balakrishnan, a professor in the department of electrical engineering and computer science, has developed a system to capture massive amounts of traffic data.

Mr. Balakrishnan has outfitted a fleet of limousines and taxis with mobile sensors that pick up real-time information on the location and speed of the vehicles as well as the condition of the roads. The data are fed back to a central computer that calculates the traffic patterns and can predict the optimal route.

The professor, who previously wrote a program for algorhythmic stock trading, compared picking stocks to taking the right road to your destination.

"Just like security prices are variable, traffic is variable," he said. "Understanding that variability is crucial if you want to optimize driving times."

Mr. Balakrishnan said he saves an average 10 minutes or more on his local commute by using the system, compared with a standard online-mapping service. The time saved increased depending on distance.

Mr. Balakrishnan hopes to expand the project. The taxi and limousine operator currently has 50 cars feeding him data. But a more comprehensive program would only work with more sources. He plans to distribute to smartphones programs that can perform similar functions, relying on regular commuters who can download the programs online or sources such as Apple Inc.'s App Store.

Mr. Balakrishnan also has developed a quicker method of connecting to a Wi-Fi network. Computers typically take a few seconds to locate and link up with a hot spot. His technique can find and connect to a network in 400 milliseconds. That's important for cars who pass by Wi-Fi networks too quickly to connect. By accessing the hot spots, the cars can better transmit the data.

The information will eventually be distributed online, through smartphones and global positioning systems. Such a project could realistically work on a massive scale because many cars, and even more cellphones, are equipped with GPS equipment.

A joint project between Boston University, the University of New Mexico and the Rensselaer Polytechnic Institute is focused on the delivery of traffic and car information through flashing headlights, brake lights and traffic signals.

Researchers plan to use old infrared technology found in television remotes and apply it to new areas. Data can be modulated to travel with the light. It works for cars on the road because they are inherently lined up with each other, giving them perfect line-of-sight communication paths.

Mr. Little believes the ability for cars to talk with each other will be crucial for managing traffic and avoiding accidents. "We're improving automotive safety by allowing them to communicate," he said.

If a car ahead encounters ice or a major pothole, the data can be transmitted to the car behind, giving a warning on the road conditions. Or the sudden stop of a car in front could trigger an automatic braking system in the car behind.

Mr. Little has been able to transmit a low-bandwidth signal. He is working on a delivery system that can carry more data. The parts for the prototype came from an LED flashlight. "We're trying to prove you can do this inexpensively," he said.

Drivers looking for a quick update now can use their cellphones to look at live traffic feeds. The free program is created by closely held 3rd Dimension Inc., which takes video from local transportation-department cameras and broadcasts them through a mobile program.

The company has media partners that distribute the service. In New York, the program is known as the NBC New York Traffic Cam. Traffic feeds are available in nine major cities, including New York, Los Angeles, Houston and Detroit, and are typically promoted and distributed by a media partner such as NBC, a unit of General Electric Co..

Users can check out the feed on their phone or get text-message alerts sent to them. 3rd Dimension has plans to expand its geo-tagging capabilities, sending targeted ads or public-service announcements based on where the driver and car are.

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