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Can mobile phones predict our behavior? Three students accurately predicted the place where phone users were likely to go next. Their method could be used to develop new services and applications.

The daily dance of commuting and working - the famous French "métro, boulot, dodo" - hasn't changed much in the past few decades, aside from our new constant companions - mobile phones. They collect a host of data as we travel, particularly about the trajectories we follow. And because most of us aren't very adventurous, these data can also be used as a statistical basis from which to predict with a high degree of accuracy where we're likely to go next at any given point in time. Three EPFL PhD students have refined this idea, which could lead to new services and applications. On June 19, the accuracy of their predictions earned them first place in the Nokia Mobile Data Challenge, an international contest involving 108 teams from universities such as TU Berlin, Carnegie Mellon and Virginia Tech.

Where will I go next? This was one of the challenges Nokia put forth in its contest, and the one that the EPFL students chose to tackle. Nokia provided mobile phone data from 200 volunteers in Western Switzerland collected over the course of more than a year. The contestants had access to eight months' worth of partial data. The remaining data were used to verify the accuracy of their predictions.

The first task was to unveil the users' regular behavior. The data from the phones gave clues about the places the users visited; lots of Bluetooth devices in a particularly crowded spot, wifi networks that reappeared regularly, devices to which the users connected.

"The method is based on our habits," explains Juha Laurila, from Lausanne's Nokia Research Center. "If, for example, an event repeatedly occurs on a certain day of the week and a more or less identical hour of the day, then we have an element that allows us to statistically predict the user's movements."

To make the challenge even tougher, the students only had access to a limited amount of data - for example, they couldn't use the phones' GPS data. These constraints forced them to push the statistical techniques to their absolute limits. Starting with very piecemeal information, the three PhD students, Vincent Etter, Mohamed Kafsi and Ehsan Kazemi, were able to predict in most cases where the user would go next at any given point in time. "The goal was to glean as much information as possible from an incomplete data set," explains Laurila. "If we add things like GPS data, then we would have an even more powerful system."

Looking forward, these results could be used to develop new services and mobile phone applications, such as automatic traffic notifications, automatic messaging to warn of possible delays, improved agendas, and so on. According to Laurila and Daniel Gatica Perez, co-director of the contest at Idiap, the social sciences could also benefit from these kinds of analysis methods. "This procedure could be very useful for understanding people's habits and regular behavior, particularly in the field of computational social sciences."

Links

- Swiss Federal Institute of Technology Lausanne, EPFL
- Science Wire
- News from the Lab

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