Better visualizing of fitness-app data helps discover trends, reach goals

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Visualizing the routes a person walks can help determine why the person has

fewer steps on a given day of the week. Credit: University of Washington

Smartphone apps can track where we eat our meals, when we commute to and from work and how many minutes we exercise each day. Ten thousand steps today? Check.

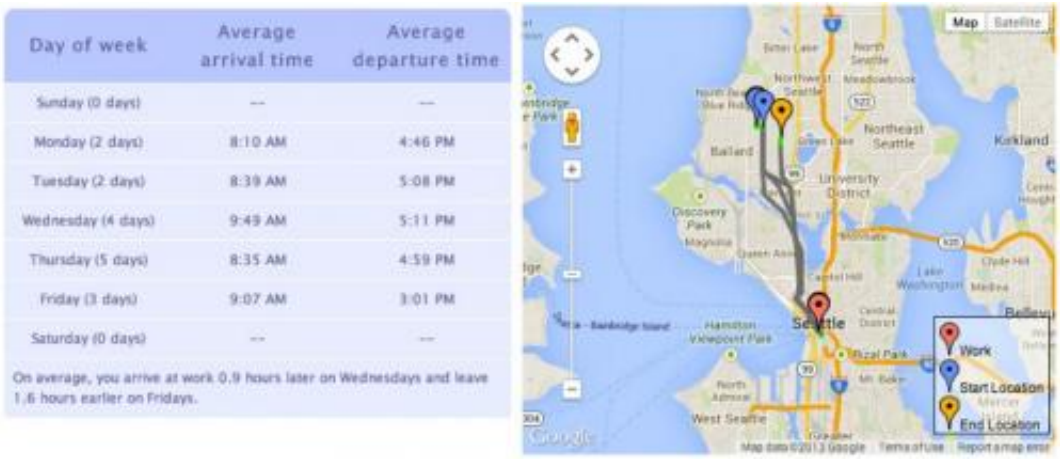
More people are opting to use their phones as "life-logging" devices, but is the data they collect actually useful? Massive amounts of information showing your life patterns over a week, month or year are going untapped because these applications don't have a way to interpret the data over the long term.

University of Washington researchers have developed visual tools to help self-trackers understand their daily activity patterns over a longer period and in more detail than current life-logging programs can offer. Their study found that people generally had an easier time meeting personal fitness and activity goals when they could see their data presented in a broader, more visual way.

"Personal activity tracking is getting more robust and there are more applications to choose from, but people often don't get any value from their data, because you can't see it displayed over time or in a larger context," said James Fogarty, a UW associate professor of computer science and engineering.

"We think visualizations like these are the future of how people will look back at their own data to find meaningful or actionable information."

The research team presented its findings in June at the Association for Computing Machinery's conference on Designing Interactive Systems in Vancouver, British Columbia.



Information about average work arrival and departure times helped some study participants understand their routines. Credit: University of Washington

Smartphone life-logging applications such as "Moves" and "Saga" that passively record location and physical activity are becoming more popular, as are other tracking tools like "FitBit," "FourSquare," "MyFitnessPal" and "SleepCycle." But while these programs are useful for tracking day-to-day workouts or activities, there isn't a way to help people pinpoint why they behave the way they do or what, specifically, they might do differently to meet their goals.

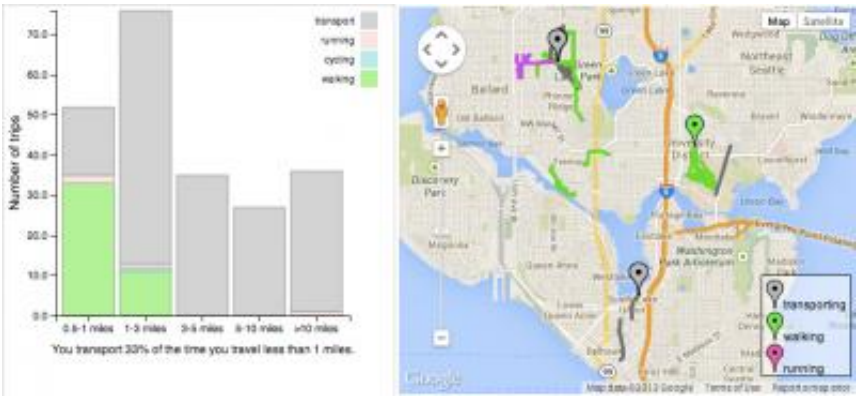
The UW team wants to anticipate what people want and need from these tools, and develop ways to provide them with insights into their behavior and factors that affect it.

"This is about learning how people want to engage with their data," said Sean Munson, an assistant professor of human centered design and engineering. "We really wanted to target a much more casual audience with this study because these tools are becoming much more common."

For the study, 14 West Coast participants ages 23 to 66 used the "Moves" application – recently acquired by Facebook – on their smartphones for one month last summer, passively recording types of activities and locations visited. During the month, the researchers interviewed participants several times about their preferences and ease of use.

Afterward, the researchers sliced into the data generated by each person to pull out "cuts," or subsets, to help participants explore their data and discover trends. Examples are the type of transportation chosen based on trip distance, or the average work commute time based on the weather that day.

They then displayed these relationships through a series of visualizations, including graphs, tables and maps.



Visualizing decisions to walk or use transportation can help people reflect on choices and identify adjustments they can make to their routines. Credit: University of Washington

All of the participants found the information to be more helpful in achieving fitness and activity goals than if they simply used the

smartphone app.

"Discovery about your patterns and habits happens when you see something you weren't expecting to see," said Daniel Epstein, a UW doctoral student in computer science and engineering. "Some participants already had an intuition about patterns in their lives, but it hit home for them when we started showing the supporting data to them in a visual way."

For example, one participant realized that if a destination was more than 3 miles away, she usually opted to drive instead of walk. Another realized that Tuesdays were by far his most active day of the week, prompting him to think about what promoted that behavior on Tuesdays.

The researchers hope these findings will influence the data analysis capabilities of life-logging applications. They have plans to develop tools that target specific aspects of a person's life, including reaching step goals and making healthy food choices.

Provided by University of Washington

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