

# Data-analytics platform helps parking managers meet driver demand in high-traffic areas

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“We want to see, in the next five years or so, the amount of time you need to search for parking spot in a city drop from around 35 to 40 minutes, to less than five minutes,” says Smarking co-founder Wen Sang PhD '14. Credit: Massachusetts Institute of Technology

Many businesses in the financial, technology, and other industries have used data analytics for years to monitor and maximize profits. But there's been no such technology for the traditional parking industry—which has scores of data sitting idle in ticket machines, digital meters, and other places.

Now, MIT spinout Smarking is bringing data analytics to the parking industry. It aims to help parking managers keep their spots filled at all hours, and, potentially, to reduce the time drivers spend circling the block looking for that ideal space.

Co-founded by Wen Sang PhD '14 and Maokai Lin PhD '14, Smarking has developed a data-analytics platform that crunches available parking data to help parking managers monitor spaces and revenue in real-time. By pulling in data on external factors such as weather and events, the platform also predicts future demand, so managers can optimize staffing and adjust pricing to boost revenue.

Down the road, Sang says, the platform could also benefit drivers: As parking managers of cities, universities, airports, and other locations gain better understanding of demand, he says, they can better optimize distribution and pricing of parking. More optimized parking in busy areas means less time drivers spend search for parking, which should reduce carbon emissions and cut traffic congestion. Indeed, Donald Shoup, an urban planning professor at the University of California at Los Angeles and well-known "parking guru," has estimated that searching for parking spaces causes 30 percent of traffic congestion in cities.

"We want to see, in the next five years or so, the amount of time you need to search for parking spot in a city drop from around 35 to 40 minutes, to less than five minutes," Sang says.

Today, more than 80 independent parking operators, commercial real

estate owners and managers, airports, universities, hospitals, and municipal governments across the country are using Smarking.

In August, the company signed a contract with MIT. Now the Parking and Transportation Office will use Smarking to better understand demand patterns in different locations on campus, with aims of better distributing parking spots to where they're needed most and cutting down on emissions.

Lawrence Brutti, manager of MIT's Parking and Transportation Office, says Smarking is an especially "powerful tool" in light of the Institute's recently announced Access MIT program, which offers free unlimited subway and bus usage to the MIT community. The program also aims to cut parking demand by 10 percent to help reduce the number of cars on campus and lower commuter-related carbon emissions.

"It's an excellent tool to manage inventory as it's shrinking," Brutti says. "As we issue permits, we keep an eye on occupancy. [With Smarking] I can see that, say, MIT is at 85-percent capacity, and then I can look at individual parking areas so I can figure out where that capacity is. It helps me better balance the inventory, and better move people around to lots that work best for everyone."

## **Data-driven parking**

Today, there's no lack of parking data: Each time a car enters or exits a parking garage through an automated gate, for instance, information is saved about the time and date, the amount paid, and other information. Street meters and sensors that detect cars coming and going from a parking lot also capture data. "But no one has ever effectively leveraged that data to optimize parking," Sang says.

Smarking continuously pulls and analyzes data from those sources and

pushes it to the cloud. On a dashboard, clients see a visualization of their current parking spots and revenue, and future demand for the next hour and coming weeks. To make predictions about future occupancy and revenue, the platform crunches historical usage data and information about external factors, including holidays, events, public transportation options, and weather. For instance, people are less likely to drive in the snow but more likely to drive in the rain, Sang says.

A company, city, or organization that owns several parking garages can check all those metrics for each garage on one platform, which is important for maximizing profits. Smarking's prediction may show that one garage is at, say, 30 percent of its target monthly revenue goal, but two upcoming events may put that garage well over 100 percent by the end of the month. Clients also use the information to determine available monthly parking passes, adjust prices when demand is high or low, and potentially offer promotions to attract drivers at low-demand times. Facilities can also optimize staffing by reducing employee shifts during predictably slow times but bringing more employees in during busier times.

"We're helping clients pull their own data that's been sitting there for years, which helps them manage their assets better, foresee their demand, and basically make more data-driven business decisions," Lin says. "That's a big change for this industry."

This abundance of new parking information on one platform could also be useful to consumer websites and applications, Sang adds. Using Smarking, airports, for instance, can let flyers know if parking prospects will be bad or good on a given day, depending on travel predictions and weather, among other factors.

The platform has already helped with parking policy redesign to alleviate traffic congestion. In a recent partnership with the New Haven Parking

Authority, the city used Smarking to initiate a parking pricing program. It reduced parking in its less crowded areas, just a few blocks away from more popular areas. The hope is that long-term parkers will move to those areas, and visitors and other short-term parkers can find available parking more quickly in the popular areas. "We're building the back-end data software infrastructure to support all these consumer-based applications," Sang says.

## **Digitizing inventory**

The idea for Smarking came to Sang when he enrolled at MIT as a PhD student in mechanical engineering, and bought his first car. Excitement turned to annoyance when he couldn't find parking quickly and easily on campus. "The car turned into a burden, instead of leisure," Sang says.

Like any sharp MIT student, Sang researched the parking problem on campus and across the nation. Turns out, spaces exist for cars on campuses such as MIT, and in major cities such as Boston, but too many spots exist in low-demand areas, and vice versa. And despite scores of parking data available, there was no data-analytics engine to monitor parking "inventory" on a grand scale.

Consider the similar hotel and airline industries, Sang says: Popular booking sites like Kayak and Expedia source third-party inventory platforms to call up the number of hotel rooms and plane seats available for consumers. The same could be done for parking. "With that inspiration, we started looking to see if we can get into this market and establish a digitization of inventory movement that would eventually benefit consumers," Sang says.

Sang recruited Lin, a PhD student in operations research who was well-known around campus for his computer-science skills, having won the 2014 MIT Pokerbots competition in which students program an

autonomous pokerbot to compete against other teams. In summer 2014, Smarking entered the Global Founders' Skills Accelerator program (now MIT delta V), where they "got tremendous help" from mentors, classmates, and professors in building the company and developing a prototype for their first client—an airport that had provided them years of historical parking data.

In 2015, Smarking entered California's Y Combinator startup accelerator, where it attracted dozens more customers, before moving to San Francisco and employing an "MIT-heavy" team of talented alumni. "And hopefully, by next year, we can become the go-to company for businesses looking for intelligence tools in the [parking](#) industry," Sang says.

**More information:** [www.smarking.net/](http://www.smarking.net/)

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