



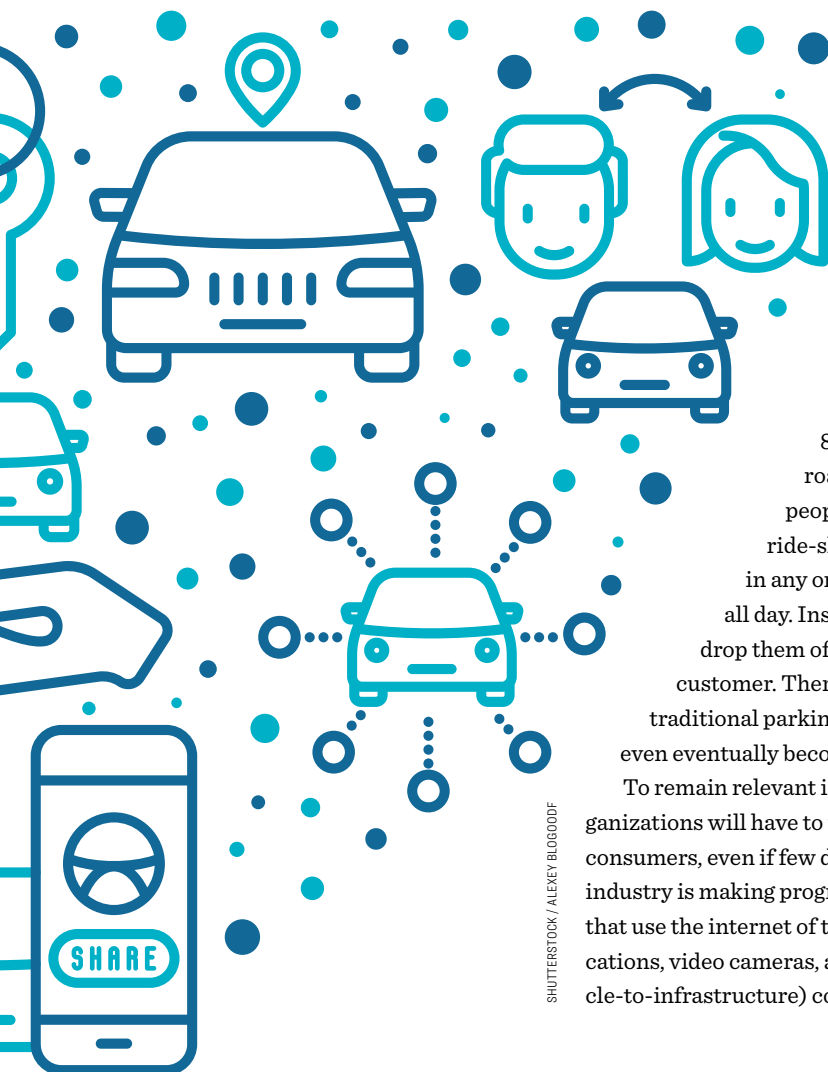
HIGH-TECH



How the internet of things (IoT) can help parking organizations navigate new automotive worlds ahead.

By Kyle Connor

NEW FRONTIERS



THE PROMISE OF SMARTER, more connected, and highly autonomous vehicles is exciting news for consumers. Who doesn't want a safer, more efficient, and more convenient driving experience? But for parking companies, the onset of self-driving cars—many of which are expected to operate as part of ride-shares—brings new challenges.

One study, published by *Business Insider*, shows that private car ownership in the United States alone will decrease by 80 percent by 2030, and the number of passenger vehicles on the road will drop from today's 247 million to 44 million.¹ With fewer people owning their own vehicles and instead relying on self-driving, ride-share vehicles for their journeys, cars will spend less time parked in any one place; they won't be in a driveway all night or a parking garage all day. Instead, they will continually drive around picking up passengers, drop them off at their destinations, and then move along to pick up the next customer. Therefore, parking may become a far less valuable commodity, and traditional parking companies that don't adapt will be at risk of losing patronage or even eventually becoming obsolete in their markets.

To remain relevant in the new automotive frontier, public and private parking organizations will have to find new ways to generate revenue and deliver greater value to consumers, even if few drivers rely on their own vehicles. Fortunately, the transportation industry is making progress in introducing innovative, new, smart parking solutions that use the internet of things to connect vehicles to various sensors, smartphone applications, video cameras, and other devices and infrastructure. This is called V2X (vehicle-to-infrastructure) communication technology.

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V2X is already showing great promise for transforming the way we park our cars and the way parking entities help us do so with utmost efficiency. Let's look at some of these IoT-powered V2X solutions and how they create new value for parking organizations and their patrons.

Cyber Valet Systems

Imagine this: a highly automated vehicle arrives at the entrance of your parking garage. The passenger gets out of the car and presses a button on his or her smartphone application, which engages an automatic parking system. The passenger heads off to work

while the vehicle seamlessly navigates itself through the garage and into an open parking spot, parking itself without a hitch. At the end of the workday, the passenger calls for the vehicle from the same app, triggering the car to drive itself out of the parking space and meet him or her at your garage's designated pick-up location or even at the front door of the passenger's workplace.

Believe it or not, this is a very real scenario. There are currently pilot programs underway for cyber valet systems that allow cars to park themselves without any assistance from a human driver. In France, Indigo's Camille Desmoulins parking garage is implementing an IoT system in which vehicles equipped with automatic parking technologies and on-board telematics can easily and safely park themselves.

Vehicle sensors interact with wireless connectivity, video cameras, and artificial intelligence (AI)-based solutions installed throughout the garage. Given that the average driver spends 17 hours a year searching for parking spots,² the convenience that cyber valet services offer to those with connected or highly automated vehicles is surely a compelling selling point for parking entities that are looking to innovate and continue to attract customers.

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V2X

Vehicle-to-infrastructure (V2X) allows vehicles to communicate with moving parts of the traffic system around them along with external systems such as buildings, streetlights, and cyclists. It uses a short-range, wireless system to communicate, is geared toward safety, and can be programmed to be aware of everything around it to prevent accidents. It can also be used to offer automatic payment for tolls, parking, and other fees. For a car with V2X to communicate with things around it, those things must also be V2X-equipped. It is currently available on some luxury vehicles but is expected to see widespread adoption in the next 20 years and play a prominent role in autonomous vehicles.

Source: Investopedia

The best part about such cyber valet systems is that it is possible to retrofit existing garages and lots with the right blend of technologies to enable self-parking. For example, a garage could add a combination of an IP communication infrastructure (Wi-Fi, LTE), edge/fog computing capabilities (which optimize bandwidth and minimize latency), and IP video cameras throughout the facility, all which communicate with vehicles and corresponding smartphone applications. In garages where it is easy to lose GPS signals, V2X radio, or dedicated short-range communications (DSRC) can facilitate vehicle location positioning so automated parking is accurate and safe.

Game Changers

Other emerging smart parking solutions that are gaining popularity in cities around the world include smartphone applications that allow drivers to identify and reserve available parking spots in real time. Using smartphone apps that leverage data from sensors and video cameras mounted on streetlights and parking meters, drivers are able to quickly and easily pinpoint open spaces around the city and view their parking rates and rules in advance. Parking organizations and enforcement agencies can leverage these same technologies to verify if users pay their parking fees. If a driver does not pay, the system can automatically bill them based on their license plate number and registration information. This can

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potentially generate additional profits for the city or the parking organization as it will be much more difficult for drivers to avoid fees and fines.

Further, services-to-vehicles platforms will arise as parking game changers. When electric vehicles first hit mainstream, many parking garages and lots introduced charging stations in an effort to differentiate themselves from the competition and attract more customers through value-added services. Similarly, the IoT will enable parking garages to transform themselves into services-to-vehicles platforms in which lot owners can schedule and provide services such as car washes, software upgrades, and battery charging while the vehicles are parked and their drivers or passengers are going about their days. This will create new sources of revenue beyond the typical pay-to-park fee.

Driving Additional Value from IoT

IoT-enabled technologies will enable parking organizations to attract patrons no matter how smart our vehicles become. But, there is even more value at stake. By collecting and aggregating the data the various applications, sensors, and devices capture, parking and transportation professionals can attain greater visibility into parking analytics, such as use and vacancy periods. For example, if a lot, garage, or street is exceptionally busy in the mornings, the parking company or city may decide to increase rates during that timeframe to recoup losses from ride-sharing vehicles that virtually never park. Or if a particular area in a lot is significantly underused, it is possible to justify turning it into a source of recurring revenue (such as a car wash or battery charging station).

Moreover, parking companies can monetize this data by selling it to third parties such as local governments and municipalities. With greater insight into the traffic and parking patterns around their cities, government

officials can make better decisions and optimize long-term plans. To put these savings into perspective, Somerville, Mass., expects that the self-parking system it is testing will free up 26 percent of space for other municipal uses. The city estimates that the free space will translate into \$100 million in total savings once the project is completed in 2030.

Further return on investment (ROI) is found in a number of areas. More efficient parking (less aimless-circling for an open spot) means better traffic flow, which translates to happier drivers and safer streets. Citizens are more productive in their days, which helps create more prosperous, healthier cities. Also, if a vehicle can drop off a rider and park itself, the need for close or nearby parking is reduced. This results in less necessary on-street parking, freeing up vital road space for emergency vehicles.

Rest assured, parking garages and lots aren't going anywhere anytime soon. However, as vehicles—and entire cities—become more connected and the move to completely self-driving cars becomes inevitable, parking professionals should begin planning for the future. There has never been a better time to explore new and emerging technologies and see how the IoT can give you the power to compete and win. **P**

Notes

1 www.businessinsider.com/no-one-will-own-a-car-in-the-future-2017-5

2 www.usatoday.com/story/money/2017/07/12/parking-pain-causes-financial-and-personal-strain/467637001



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