

Smart intersections could cut autonomous car congestion

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In the not-so-distant future, city streets could be flooded with autonomous vehicles. Self-driving cars can move faster and travel closer together, allowing more of them to fit on the road—potentially leading

to congestion and gridlock on city streets.

A new study by Cornell researchers developed a first-of-its-kind model to control traffic and intersections in order to increase car capacity on urban streets, reduce congestion and minimize accidents.

"For the future of mobility, so much attention has been paid to [autonomous cars](#)," said Oliver Gao, professor of civil and [environmental engineering](#) and senior author of the study, which published in *Transportation Research Part B*.

"If you have all these autonomous cars on the road, you'll see that our roads and our intersections could become the limiting factor," Gao said. "In this paper we look at the interaction between autonomous cars and our infrastructure on the ground so we can unlock the real capacity of autonomous transportation."

The researchers' model allows groups of autonomous cars, known as platoons, to pass through one-way intersections without waiting, and the results of a microsimulation showed it increased the capacity of vehicles on city streets up to 138% over a conventional traffic signal system, according to the study. The model assumes only autonomous cars are on the [road](#); Gao's team is addressing situations with a combination of autonomous and human-driven cars in future research.

Car manufacturers and researchers around the world are developing prototypes of self-driving cars, which are expected to be introduced by 2025. But until now, little research has focused on the infrastructure that will support these driverless cars.

Autonomous vehicles will be able to communicate with each other, offering opportunities for coordination and efficiency. The researchers' [model](#) takes advantage of this capability, as well as smart infrastructure,

in order to optimize traffic so cars can pass quickly and safely through intersections.

"Instead of having a fixed green or red light at the [intersection](#), these cycles can be adjusted dynamically," Gao said. "And this control can be adjusted to allow for platoons of cars to pass."

More information: Mahyar Amirgholy et al, Optimal traffic control at smart intersections: Automated network fundamental diagram, *Transportation Research Part B: Methodological* (2019). [DOI: 10.1016/j.trb.2019.10.001](#)

Provided by Cornell University

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