

# Research reveals new plan to maximize rideshare availability by routing empty cars

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Time is money. Especially for rideshare drivers with companies like Uber and Lyft. New research in the INFORMS journal *Operations Research* looks at a new model for rideshare companies focusing on maximizing the availability of rideshares by optimally routing empty cars.

All rideshares start off waiting on a passenger... when a passenger arrives if an empty car is available, the passenger occupies that car and travels to their destination. If no empty car is available within a short period of time, the passenger abandons the rideshare method and tries an alternative form of transportation. So how do you ensure a car is available?

If an empty rideshare is available and the driver takes the passenger to the destination, the car is empty again, at which point a decision has to be made: should the driver stay there to hopefully find new passengers immediately or relocate without a passenger to a different place, risking time spent driving without a passenger and without getting paid?

Driving empty cars seems to be a waste of resources, but turns out to be necessary and imperative to maximize the availability of rideshare services in the presence of the geographic imbalance of passengers, according to the study conducted by Anton Braverman of Kellogg School of Management at Northwestern University, Jim Dai of The Chinese University of Hong Kong, Shenzhen and Cornell University, Lei Ying of the University of Michigan and Xin Liu of Arizona State

University.

The researchers have developed a model to control the flow of empty cars in a network of geographic locations, with different passenger demands, to optimize system-wide functionality. The algorithm directs an empty car after it drops off a passenger to a different location instead of waiting at the same location to match the geographic imbalance of passenger demands.

"You can calculate the availability of empty cars when they are requested and find new passengers quickly once a driver reaches a destination," said Braverman. "The new car flow control policy is based on historical data for time-dependent futurecast to anticipate route changes and direct cars accordingly."

This model assumes the cars are controlled by the company rather than allowing drivers to make decisions on their own.

"An incentive can be that the company will pay for fuel costs or a flat hourly salary when a car is driving empty, which has been recently experimented by several rideshare companies," said Braverman.

**More information:** Anton Braverman et al. Empty-Car Routing in Ridesharing Systems, *Operations Research* (2019). [DOI: 10.1287/opre.2018.1822](https://doi.org/10.1287/opre.2018.1822)

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