Autonomous vehicles may lead to an increase in miles driven

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Credit: Mario Goebbels

Autonomous vehicles may reduce the number of vehicles a family needs, but may lead to an increase in total miles driven, say researchers at the University of Michigan Transportation Research Institute.

UMTRI researchers Brandon Schoettle and Michael Sivak examined U.S. National Household Travel Survey data that contained

comprehensive information about each trip made by a person within a selected household, including the exact start and stop times of each trip.

They found a general lack of "trip overlap" between drivers within a majority of households based on vehicle sharing. In other words, families rarely use more than one vehicle at a time.

The study is based on sharing of completely self-driving vehicles that employ a "return-to-home" mode, acting as a form of shared family or household vehicle. This would mean that driverless vehicles could operate without any passengers at all.

In the most extreme scenario, self-driving vehicles could cut average ownership rates of vehicles by 43 percent—from an average of 2.1 vehicles to 1.2 vehicles per household, the researchers say.

On the other hand, the shift could result in a 75-percent increase in individual vehicle usage—from 11,661 to 20,406 annual miles per vehicle (this increase in mileage does not include additional miles that would be generated during each "return-to-home" trip).

Schoettle and Sivak found that, on an average day, nearly 84 percent of households had no trips that overlapped or conflicted. Just under 15 percent of households had two drivers and less than 2 percent had three drivers with overlapping trips that created a conflict.

The researchers say their results represent strictly an upper-bound approximation of the maximum possible effects of self-driving vehicles on reductions in household vehicle ownership, given several unknowns: sufficient gaps between trips, acceptance and adoption of autonomous vehicles and possible vehicle-sharing strategies within households.