

Humans Are Slamming Into Driverless Cars and Exposing a Key Flaw

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The self-driving car, that cutting-edge creation that's supposed to lead to a world without accidents, is achieving the exact opposite right now: The vehicles have racked up a crash rate double that of those with human drivers.

The glitch?

They obey the law all the time, as in, without exception. This may sound like the right way to program a robot to drive a car, but good luck trying to merge onto a chaotic, jam-packed highway with traffic flying along well above the speed limit. It tends not to work out well. As the accidents have piled up -- all minor scrape-ups for now -- the arguments among programmers at places like Google Inc. and Carnegie Mellon University are heating up: Should they teach the cars how to commit infractions from time to time to stay out of trouble?

"It's a constant debate inside our group," said

Raj Rajkumar, co-director of the [General](#)

[Motors-Carnegie Mellon Autonomous](#)

[Driving Collaborative Research Lab](#) in

Pittsburgh. "And we have basically decided to stick to the speed limit. But when you go out and drive the speed limit on the highway, pretty much everybody on the road is just zipping past you. And I would be one of those people."

QUICKTAKE
Driverless Cars

Last year, Rajkumar offered test drives to members of Congress in his lab's self-driving Cadillac SRX sport utility vehicle. The Caddy performed perfectly, except when it had to merge onto I-395 South and swing across three lanes of traffic in 150 yards (137 meters) to head toward the Pentagon. The car's cameras and laser sensors detected traffic in a 360-degree view but didn't know how to trust that drivers would make room in the ceaseless flow, so the human minder had to take control to complete the maneuver.

"We end up being cautious," Rajkumar said. "We don't want to get into an accident because that would be front-page news. People expect more of autonomous cars."

Not at Fault

Turns out, though, their accident rates are twice as high as for regular cars, according to a [study](#) by the University of Michigan's Transportation Research Institute in Ann Arbor, Michigan. Driverless vehicles have never been at fault, the study found: They're usually hit from behind in slow-speed crashes by inattentive or aggressive humans unaccustomed to machine motorists that always follow the rules and proceed with caution.

"It's a dilemma that needs to be addressed," Rajkumar said.

It's similar to the thorny [ethical issues](#) driverless car creators are wrestling with over how to program them to make life-or-death decisions in an accident. For example, should an autonomous vehicle sacrifice its occupant by swerving off a cliff to avoid killing a school bus full of children?

California is urging caution in the deployment of driverless cars. It [published proposed rules](#) this week that would require a human always to be ready to take the wheel and also compel companies creating the cars to file monthly reports on their behavior. Google -- which developed a model with no steering wheel or gas pedal -- said it is "gravely disappointed" in the proposed rules, which could set the standard for autonomous-car regulations nationwide.

Fast Track

Google is on a fast track. It plans to make its self-driving-cars unit a [stand-alone business](#) next year and eventually offer a ride-for-hire service, according to a person briefed on the company's strategy.

Google cars have been in 17 minor crashes in 2 million miles (3.2 million kilometers) of testing and account for most of the reported accidents, according to the Michigan study. That's partly because the company is testing mainly in California, where accidents involving driverless cars must be reported.



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The most recent reported incident was Nov. 2 in Mountain View, California, Google's headquarters, when a self-driving Google Lexus SUV attempted to turn right on a red light. It came to a full stop, activated its turn signal and began creeping slowly into the intersection to get a better look, according to a report the company posted online. Another car stopped behind it and also began rolling forward, rear-ending the SUV at 4 mph. There were no injuries and only minor damage to both vehicles.

Robot-Car Stop

Ten days later, a Mountain View motorcycle cop noticed traffic stacking up behind a Google car going 24 miles an hour in a busy 35 mph zone. He zoomed over and became the first officer to stop a robot car. He didn't issue a ticket -- who would he give it to? -- but he warned the two engineers on board about creating a hazard.

"The right thing would have been for this car to pull over, let the traffic go and then pull back on the roadway," said Sergeant Saul Jaeger, head of the police department's traffic-enforcement unit. "I like it when people err on the side of caution. But can something be too cautious? Yeah."

While Google rejects the notion that its careful cars cause crashes, "we err on the conservative side," said Dmitri Dolgov, principal engineer of the program. "They're a little bit like a cautious student driver or a grandma."

More Aggressive

Google is working to make the vehicles more "aggressive" like humans -- law-abiding, safe humans -- so they "can naturally fit into the traffic flow, and other people understand what we're doing and why we're doing it," Dolgov said. "Driving is a social game."

Google has already programmed its cars to behave in more familiar ways, such as inching forward at a four-way stop to signal they're going next. But autonomous models still surprise human drivers with their quick reflexes, coming to an abrupt halt, for example, when they sense a pedestrian near the edge of a sidewalk who might step into traffic.

"These vehicles are either stopping in a situation or slowing down when a human driver might not," said Brandon Schoettle, co-author of the Michigan study. "They're a little faster to react, taking drivers behind them off guard."

That could account for the prevalence of slow-speed, rear-end crashes, he added.

Behave Differently

"They do behave differently," said Egil Juliussen, senior director at consultant IHS Technology and author of a study on how Google leads development of autonomous technology. "It's a problem that I'm sure Google is working on, but how to solve it is not clear."

One approach is to teach the vehicles when it's OK to break the rules, such as crossing a double yellow line to avoid a bicyclist or road workers.

"It's a sticky area," Schoettle said. "If you program them to not follow the law, how much do you let them break the law?"

Initially, crashes may rise as more robot autos share the road, but injuries should diminish because most accidents will be minor, Schoettle said.

“There’s a learning curve for everybody,” said Jaeger, of the Mountain View Police, which interacts more with driverless cars than any other law-enforcement unit. “Computers are learning, the programmers are learning and the people are learning to get used to these things.”

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