

Robotic cars must prove that they are safer than human drivers on the road



Google, Tesla and Uber are spending millions in a race to make autonomous cars, or cars that drive themselves. But until then, they still have something to prove: that this new technology will not let dangerous robot drivers take over the roads.

“Sometimes I hear [the] industry talk about autonomous vehicles as though they’re about to put the safest driver on the road,” says Nidhi Kalra, senior information scientist at the RAND Corp., a think tank that does research on global policies. “It’s more like putting a teenage driver on the road.”

In the self-driving world, safety is a complicated issue for a number of reasons. For starters, regulators will have to come up with a definition of “safe.” That could mean the machines must

drive flawlessly. It could also simply mean that they break fewer laws and get into fewer accidents than human drivers do.

Further confusing matters: companies are developing many different kinds of automation. Some cars help drivers with braking, parking and lane-changing. Other robotic cars will have full control, which is still several years away.

Establishing Safety Regulations

No single test can say a self-driving car is safe, says Steven Shladover. He's the manager of the Partners for Advanced Transportation Technology program at the University of California, Berkeley.

Shladover has been encouraging U.S. lawmakers and carmakers to follow the example of Germany's government. They sponsored research to determine how best to ensure the safety of automated driving systems. More research is needed to make sure cars can drive when faced with everyday traffic hazards, Shladover says.

The U.S. Department of Transportation has given Silicon Valley start-ups and carmakers some advice to help them build safer self-driving vehicles. But there is no federal law regulating the use of self-driving vehicles and driver-assist technology right now.

The U.S. government could stand back and allow companies to put more self-driving cars on public roads. That way, they could collect the necessary safety information, says Alain Kornhauser. He's an adviser for a team of car engineers at Princeton University.

Helping To Reduce Human Mistakes

Kornhauser and some other experts say that these vehicles could help reduce mistakes that humans make. That will make cars safer. There were 38,300 deaths and 4.4 million serious

injuries on U.S. roads in 2015 alone. It would be worth the risk to let autonomous cars roam more freely and “learn” faster, Kornhauser says.

Uber, the ride-sharing giant, briefly tested some self-driving vehicles on the streets of San Francisco. Soon, though, they agreed to stop after California’s regulators protested the lack of testing permits.

Testing cars on public roads "is essential both to gain public trust," says Chelsea Kohler, an Uber spokesperson. It also helps "improve the technology over time," she says.

Tesla Pushes Ahead Despite Deadly Accident

The dangers of this real-world testing became apparent last May. A Tesla Sedan S was using its Autopilot technology when it hit the side of a large truck looming ahead. The driver died in the accident.

Still, Tesla founder and CEO Elon Musk has pressed ahead with Autopilot. He announced in October 2016 that new Tesla Model S and Model X cars would be able to train their Autopilot technology at all times, even when it is technically switched off. The vehicles can then share their newly acquired knowledge with one another.

Another big challenge for carmakers: determining how long self-driving vehicles must be tested before they can be considered safe. These cars might need to drive hundreds of hundreds of billions of miles to acquire enough data on their safety, according to an April 2016 report from the RAND Corp. Existing test fleets of self-driving vehicles would take tens or even hundreds of years to drive this long. A fleet of 100 cars would have to drive 275 million miles without failure. That's equal to approximately 12.5 years of round-the-clock driving at 25 miles per hour to meet the safety standards of today’s vehicles. At the time of the fatal May 2016 crash, Tesla car owners had logged 130 million miles in Autopilot mode.

Driverless Cars Must Communicate With Human Drivers

One way to move along the testing phase would be for tech companies and carmakers to share their test data with each other, says Sebastian Thrun. He's a self-driving technology pioneer who formerly worked at Google. Not surprisingly, companies don't want to share this information.

However safety gets defined, humans need to be convinced that self-driving and driverless vehicles are a good thing.

Brian Lathrop is the senior manager of the Electronics Research Lab at Volkswagen Group of America. He says robotic cars must let people on the road know when a vehicle is in self-driving or driver-assist mode. An autonomous vehicle will also have to let its own driver know what it plans to do. It must give the person in the driver's seat a chance to regain control if necessary, Lathrop says.

It is difficult to think about a future when human drivers will share the road with robotic vehicles that have different capabilities, Lathrop says. It will eventually happen. But the technology will have to earn our trust — just like a teenager with a brand-new driver's license.