

ETHICS AND AUTONOMOUS VEHICLES:

Imagine this new twist on the trolley-car dilemma: your autonomous car is driving towards a family, on a collision course with them. Or, it could veer into a tree, causing you certain injury. What should your car do? The root of this question affects not only ethics, but also larger questions, including to whom your autonomous vehicle owes a duty.

- **To Whom Does Your Autonomous Vehicle Owe a Duty?**

- Some individuals believe that autonomous vehicles owe the highest duty of care to the public at large.

- *See, e.g.,* Dylan LeValley, Note, Autonomous Vehicle Liability—Application of Common Carrier Liability, 36 SEATTLE U. L. REV. 5, 6 (2013) (arguing that tort law should deem the manufacturers of autonomous vehicles to be “common carriers” that owe “the public the highest duty of care [and are] liable for even the slightest negligence”).

- The first autonomous vehicle lawsuit pled a theory of negligence against the manufacturer (rather than a strict product liability claim), and alleged that the manufacturer owed the plaintiff a duty to “hav[e] its Self-Driving Vehicle operate in a manner in which it obeys the traffic laws and regulations.

- *Nilsson v. General Motors*, 4:18-CV-00471, N.D. Cal., stipulation to dismiss with prejudice entered June 26, 2018; *see also* US Chamber of Legal Reform, “Torts of the Future: Autonomous Vehicles,” May 2018, https://www.ali.org/media/filer_public/6a/26/6a26ebc5-3dfa-4c60-b1ba-7e596819ef43/dc-656837-v1-torts_of_the_future_autonomous_emailable.pdf (describing the accident and GM report).

- In January 2018, the first known lawsuit against a manufacturer was filed over an accident involving an AV. In that lawsuit:

“a motorcyclist alleged that he suffered neck and shoulder injuries after a 2016 Chevy Bolt EV knocked him to the ground while traveling on a San Francisco street. General Motors (GM) and its Cruise subsidiary have had a permit to test autonomous vehicles on California roads since June 2015. The accident occurred in December 2017. According to the complaint, a driver was in the front seat, but operated the car in self-driving mode with his hands off the steering wheel. The operator instructed the Bolt to move from the center to the left lane. The complaint alleges that the motorcyclist, who was traveling directly behind the car in the center lane, attempted to move ahead and pass. As he did, the plaintiff alleges that the Bolt abruptly swerved back into its original lane, striking him and knocking him to the ground.

In a report GM filed with California's Department of Motor Vehicles, the automaker explained that the Bolt was driving in the middle lane when it saw a gap and attempted to merge into the left lane. When the minivan ahead of the Bolt in the center lane slowed down, the Bolt abandoned its attempt to merge left. As the Bolt was "re-centering" itself in the middle lane, the plaintiff was approaching the car, "lane-splitting" between the center and right lanes in slow, heavy traffic. As the motorcycle moved into the center lane, it "glanced the side of the Cruise AV, wobbled, and fell over," GM's report said. The San Francisco Police Department report indicates that the motorcyclist was at fault for attempting to overtake and pass another vehicle on the right before it was safe to do so, but the motorcyclist's attorney also says the police report supports the motorcyclist's version of the events.

The lawsuit named only GM as a defendant; it did not claim the Bolt's operator contributed to the accident. The sole claim at issue in *Nilsson* was negligence. Thus, the lawsuit was fashioned more like a traditional auto accident claim than a product liability claim alleging that a vehicle was defectively designed.

In his Complaint, Nilsson alleged that General Motors owed the plaintiff a duty to "hav[e] its Self-Driving Vehicle operate in a manner in which it obeys the traffic laws and regulations," and breached that duty "in that its Self-Driving Vehicle drove in such a negligent manner that it veered into an adjacent lane of traffic without regard for a passing motorist...."

- Others, however, have argued that autonomous vehicles should be limited or immune from liability.
 - Julie Goodrich, Comment, *Driving Miss Daisy: An Autonomous Chauffeur System*, 51 HOUS. L. REV. 265, 284 (2013) (arguing that because autonomous vehicles provide the same social benefits as vaccines—both reduce the incidence of physical harms—legislators should consider immunizing autonomous vehicles from civil liability under a legislative scheme like the National Childhood Vaccination Injury Act of 1986, which immunizes vaccine manufacturers from civil liability for unavoidable injury).
 - Kyle Colonna, Note, *Autonomous Cars and Tort Liability*, 4 CASE W. RES. J.L. TECH. & INTERNET 81, 102 (2012) (arguing that products liability will increase manufacturer costs and "hamper[] the entrance of autonomous cars into the marketplace," thus justifying a limitation of liability).
- Could the industry instead see a trend towards strict liability for autonomous vehicle manufacturers?

- Accidents involving autonomous vehicles are different than other automotive accidents: “Instead of a vehicle operator failing to see and respond to a pedestrian in the road, a machine operating the vehicle failed to interpret the signals its sensors received and process them in a way that averted the collision.” See “Can you sue a robocar?,” *The Atlantic*, Mar. 20, 2018, <https://www.theatlantic.com/technology/archive/2018/03/can-you-sue-a-robocar/556007/>.

- Ryan Abbott, *The Reasonable Computer: Disrupting the Paradigm of Tort Liability*, *GEO. WASH. L. REV.* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2877380 [<https://perma.cc/URJ4-L5FG>] (concluding that autonomous vehicle manufacturers would be subject to strict liability under current standards and proposing that liability instead be based on a negligence standard that treats the vehicle as a person).

- Andrzej Rapaczynski, *Driverless Cars and the Much Delayed Tort Law Revolution* 1, 9–10 (*Colum. Law & Econ.*, Working Paper No. 540, 2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2764686 [<https://perma.cc/XG3F-T3B5>] (arguing that “the advent of self-driving cars . . . is likely to force a comprehensive re-thinking of products liability,” resulting in “a large-scale return to the principle of strict manufacturers’ responsibility”).

- *Cf.* Sophia H. Duffy & Jamie Patrick Hopkins, *Sit, Stay, Drive: The Future of Autonomous Car Liability*, 16 *S.M.U. SCI. & TECH. L. REV.* 453, 479 (2013) (concluding that “[e]xisting laws governing vehicles and computers do not provide the proper means to assess liability for autonomous cars” and that the owner should be strictly liable for crashes).

- Similar Articles

- A Roadmap for Autonomous Vehicles: State Tort Liability, Automobile Insurance, and Federal Safety Regulations, *California Law Review*, 12/2017, <https://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=4381&context=californialawreview>

- US Chamber of Legal Reform, “Torts of the Future: Autonomous Vehicles,” May 2018, https://www.ali.org/media/filer_public/6a/26/6a26ebc5-3dfa-4c60-b1ba-7e596819ef43/dc-656837-v1-torts_of_the_future_autonomous_emailable.pdf

- **Can You Program Ethics Into An Autonomous Vehicle?**

- [Setting a Universal Moral Code for Autonomous Vehicles Can Be Tricky](#)

- Legislature and the U.S. Department of Transportation Have Not Addressed the Issue

- “[Ethical considerations are] unaddressed, for example, in legislation moving through Congress that could result in tens of thousands of autonomous vehicles being put on the roads. In new guidance for automakers by the U.S. Department of Transportation, it is consigned to a footnote that says only that ethical considerations are ‘important’ and links to a brief acknowledgement that ‘no consensus around acceptable ethical decision-making’ has been reached.”

- *See* “Morality, ethics of a self-driving car: Who decides who lives, dies?,” Detroit Free Press, Nov. 21, 2017, available at <https://www.freep.com/story/money/cars/2017/11/21/self-driving-cars-ethics/804805001/>

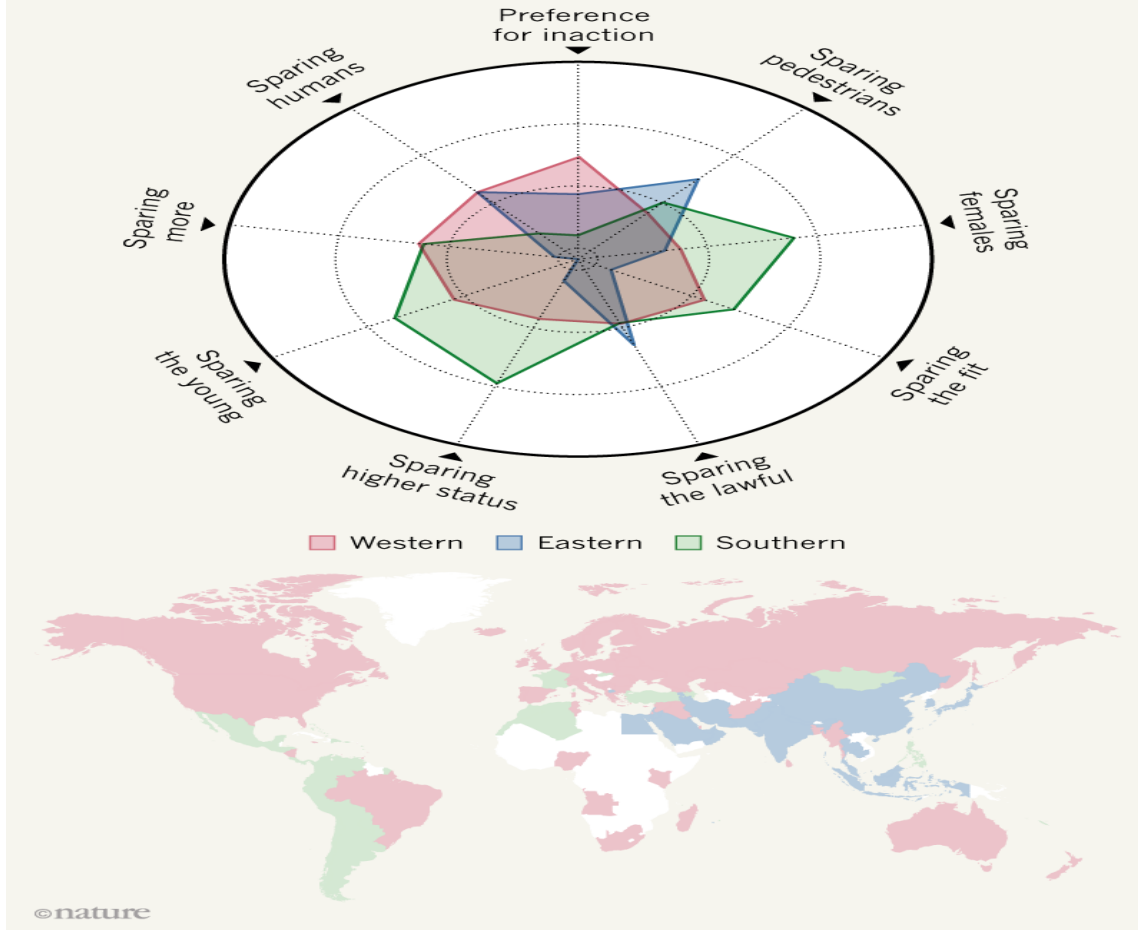
- People Are Generally Torn on How Autonomous Vehicles Should Make Ethical/Moral Decisions

- “When a driver slams on the brakes to avoid hitting a pedestrian crossing the road illegally, she is making a moral decision that shifts risk from the pedestrian to the people in the car. Self-driving cars might soon have to make such ethical judgments on their own — but settling on a universal moral code for the vehicles could be a thorny task, suggests a 2018 survey of 2.3 million people from around the world.”

- The survey reveals wide variations in ethical/moral principles:

MORAL COMPASS

A survey of 2.3 million people worldwide reveals variations in the moral principles that guide drivers' decisions. Respondents were presented with 13 scenarios, in which a collision that killed some combination of passengers and pedestrians was unavoidable, and asked to decide who they would spare. Scientists used these data to group countries and territories into three groups based on their moral attitudes.



- Similarly, an ethical paradox about self-driving cars exists: in surveys, people said that they wanted an autonomous vehicle to protect pedestrians even if it meant sacrificing its passengers — but also that they would not buy self-driving vehicles programmed to act this way. *See* <https://www.nature.com/articles/d41586-018-07135-0>
- Similar Articles:
 - A Study on Driverless-Car Ethics Offers a Troubling Look Into Our Values, *The New Yorker*, January 24, 2019, <https://www.newyorker.com/science/elements/a-study-on-driverless-car-ethics-offers-a-troubling-look-into-our-values>

OTHER POTENTIAL ISSUES FOR DISCUSSION:

I. Cities and States are Driving Autonomous Vehicle Regulations:

A. Ohio's Autonomous Vehicle Pilot Program will soon begin its testing phase in Athens, Columbus, Dublin, and Marysville. The cities have signed agreements to begin testing self-driving vehicles on neighborhood roads. *See* <http://www.cleveland19.com/2018/11/27/ohio-cities-move-forward-with-testing-self-driving-cars/>

1. Organizations like Drive Ohio have been popping up; Drive Ohio aims to "drive Ohio's preparation and leadership for the future of smart mobility." See <http://drive.ohio.gov/about-us/>

B. At the Same Time, Outdated Regulations Could Affect Autonomous Vehicles: Zoning regulations could become a severe impediment to growth as Autonomous Vehicles become more and more widely used.

1. For example, as Autonomous Vehicles become more prevalent, cars will not need to stay in a given spot outside an office all day while their owners are working.

II. Warnings and Notices: Makers of semi-autonomous vehicles hope to avoid liability by including the clearest and most accurate disclosures and warnings in users' manuals. However, in entering the world of fully autonomous vehicles, that option may not exist and manufacturers could face increased liability for defects.

A. Celine Crowson, a partner at Hogan Lovells, agrees: "With semi-autonomous, or driver-assisted, vehicles, there is still a situation where the liability arguably falls on the driver first, and then one looks at whether the manufacturer or service organization is at fault," Crowson said. "In those cases, the driver still has some interaction with the vehicle, but things will change as we move to fully autonomous vehicles."

III. P3 Connection: The Role of Infrastructure in Autonomous Vehicles

Autonomous and connected vehicles drive on roads, bridges and highways just like regular cars do, but they need additional infrastructure to work.

Autonomous, or self-driving, vehicles operate by onboard systems that can sense the environment around them and make decisions based on what's detected. They don't typically need additional infrastructure. Instead, they benefit from relatively simple road upgrades, such as better striping and pavement markings.

Connected vehicles, however, require an enhanced technology infrastructure to function. Fiber-optic cable, for example, is essential to handle the tremendous amount of data from connected vehicles that has to be collected, shared, stored and analyzed. Cellular telecommunications, roadside units with radio frequency and satellite communications

are also needed to accommodate the use of connected vehicles. See, e.g.; <http://drive.ohio.gov/about-us/>

IV. Insurance:

A. Applicability of different types of insurance for vehicles as they approach Level 5 autonomy

B. The Road Ahead for Autonomous Cars and Auto Insurance: <https://www.insurancejournal.com/news/national/2018/05/17/489282.htm>

C. How do we deal with rating issues surrounding how auto insurers rate drivers in Autonomous Vehicle situations?

V. Cybersecurity Concerns Related to Autonomous Vehicles

A. “As the Internet of Things (IoT) is an embedded feature that can help cars of the future navigate through busy roads, making split-second decisions, the risks of falling prey to a malicious hacker is likely the most significant concern manufacturers we face going forward.” See <https://www.tripwire.com/state-of-security/featured/self-driving-cars-cybersecurity-issues/>

B. Hacking fears and other gray areas of autonomous vehicles: “If a vehicle can be overridden through its infotainment system, the same scenario is equally—or even more—possible for autonomous vehicles. They are reliant on more software and require constant connectivity, which in turn opens up more windows that can potentially provide remote access.” See <https://www.cpomagazine.com/cyber-security/autonomous-vehicles-and-the-threat-of-hacking/>

C. More information: National Highway Traffic Safety Administration: Vehicle Cybersecurity. See <https://www.nhtsa.gov/technology-innovation/vehicle-cybersecurity>

1. 1.4M: Number of vehicles impacted by the first and only (at this time) cybersecurity-related recall, which occurred in 2015

- “NHTSA promotes a multi-layered approach to cybersecurity by focusing on a vehicle’s entry points, both wireless and wired, which could be potentially vulnerable to a cyberattack. A layered approach to vehicle cybersecurity reduces the possibility of a successful vehicle cyber-attack, and mitigates the potential consequences of a successful intrusion. A comprehensive and systematic approach to developing layered cybersecurity protections for vehicles includes the following:

- (1) A risk-based prioritized identification and protection process for safety-critical vehicle control systems;
- (2) Timely detection and rapid response to potential vehicle cybersecurity incidents on America’s roads;

- (3) Architectures, methods, and measures that design-in cyber resiliency and facilitate rapid recovery from incidents when they occur; and
- (4) Methods for effective intelligence and information sharing across the industry to facilitate quick adoption of industry-wide lessons learned. NHTSA encouraged the formation of Auto-ISAC, an industry environment emphasizing cybersecurity awareness and collaboration across the automotive industry.”

VI. Is this all for naught – do people even want to drive Autonomous Vehicles?

A. “Most Americans are terrified of riding in autonomous vehicles, according to a new survey released by AAA. And rather than getting more comfortable with the futuristic technology, people are becoming more afraid. According to the new survey, a whopping 71 percent of Americans say that they’re afraid to ride in a self-driving car, up from 63 percent who said the same thing in late 2017. AAA speculates that there’s a very obvious reason why the fear of self-driving cars may be going up: Autonomous vehicle technology is starting to kill people.” *See* <https://gizmodo.com/71-percent-of-americans-still-dont-trust-autonomous-car-1833284527>

B. In Arizona, Waymo’s Autonomous Vehicles have been subject to various attacks. *See* [Waymo's Autonomous Vehicles Are Reportedly Facing Ongoing Attacks in Arizona](#)