Autonomous Vehicles in Court:

Judges’ Perceptions of AV Integration with the Justice System

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The introduction of autonomous vehicles (AVs) has been a topic of increasing interest within the academic, legal literature. AVs represent a monumental challenge for the legal system, as the integration of AVs into society is expected to disrupt a range of social and economic systems. The legal system will inevitably be responsible for adjudicating disputes within civil and even criminal law for cases involving AVs. Drivers, insurance companies, AV manufacturers, and government officials will all be looking to the legal system to settle these disputes and navigate this uncharted terrain.

Judges play an integral role in this process. While juries will certainly be responsible for determining the victor in many of these cases, judges can and will be the final arbiter of outcome in situations where a jury is not deemed necessary. Further, judges hold immense power within their courtrooms, and can determine what evidence is admissible, which experts are allowed to testify, and what procedures must be followed. While the legislature establishes the rules of the game, judges are the referees that interpret those rules and deem when and how to apply them.Recent scholarship has identified a need for judges to become conversant in the emerging technologies that are likely to become the focus of new cases[[1]](#endnote-1). However, until now, none of the academic literature has examined the perceptions and attitudes of judges regarding AVs.



Judges play a critical role in the introduction of any new technology. It is inevitable that new technologies are involved in unfortunate accidents or create conflict with existing technology. Because these new technologies are unfamiliar, there might be an initial temptation to blame that which is new, as only the presence of the new seems to have enabled the situation to occur. Looking at the introduction of the automobile during the early 20th century, when horse-drawn carriages were still omnipresent on the streets, judges were often tasked with the decision to attribute blame to an automobile or to a horse’s response to an automobile[[2]](#endnote-2). Although judges could have attributed blame to the new technology, they typically sided with the automobile, expecting carriage drivers to adjust to the new motorized traffic patterns. It is easy to see how blaming automobiles for disrupting horse traffic might have had a chilling effect on the introduction of this new technology.

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**Autonomous Vehicles and Liability**

According to the National Highway Traffic Safety Administration (NHTSA), there were 34,247 fatal car accidents in 2017[[3]](#endnote-3). Approximately 94% of accidents are caused by driver error, while the remaining 6% are caused by manufacturer defects in the automobile, environmental interventions, or for unknown reasons[[4]](#endnote-4). Driverless vehicles are primarily attractive because they would reduce, and perhaps eventually eliminate, accidents caused by driver error, resulting in a dramatic reduction in automobile fatalities every year[[5]](#endnote-5). At the same time, highly publicized cases of accidents involving AVs likely create suspicion toward this technology[[6]](#endnote-6).

However, this new technology creates a complication within the current legal framework. In an automobile accident with one or more AV players, it becomes less obvious as to which party bears the legal responsibility for the accident. Juries and the judicial systems will be required to determine whether a human being is at fault for an intervention, or perhaps a lack of intervention. Civil liability cases will determine whether AV manufacturers are at fault, or if the manu­facturers of their subcomponents are at fault. Artificially intelligent systems may be scrutinized for their decision making processes that resulted in one fatality to the benefit of another who was left unharmed. Adding to the complexity, these decisions must be incorporated into the existing legal framework in order to handle cases where an AV car collides with a non-AV driver.

Opinions are mixed regarding whether the existing legal framework is sufficient to adjudicate AV cases[[7]](#endnote-7). One option is to treat AVs like entirely new products, creating new laws to define what is expected of AV manufacturers and identifying guidelines for liability[[8]](#endnote-8). Other scholars have proposed ways of integrating AV technology into existing laws. For example, Duffy proposed existing canine law as a viable solution for AVs, citing that the owners are liable for their vehicles, but only if they had sufficient information about the vehicle to know that it was dangerous, and thus demonstrated negligence[[9]](#endnote-9). Colonna suggests that current liability cases provide guidance on how to adjudicate AV cases in the future[[10]](#endnote-10). For instance, elevators are automated transportation systems, and are largely out of the passengers’ control. Similarly, airplanes have been using autopilots for most of the 20th century, and trains and trams often run with minimal or no human supervision. Cases like this that involve liability are currently decided within the tort system[[11]](#endnote-11). Researchers have even proposed ‘no liability’ systems, where national insurance funds are created that are filled through taxation, which would remove potential liabilities from AV manufacturers and AV drivers while promoting AV production and adoption[[12]](#endnote-12).

Despite this ambiguity, states have begun to respond to the explosion in AV technology by proposing new legislation and issuing executive orders[[13]](#endnote-13). As of January 2020, 36 states and the District of Columbia have determined that self-driving vehicles are street legal in some capacity[[14]](#endnote-14). Currently, 87 laws have been passed across the country pertaining to AV use, with every indication that this trend will continue exponentially[[15]](#endnote-15).

Another common line of research inquiry for AV technology revolves around the issue of autonomy and privacy. Researchers have noted that AV technology might eventually curtail driver autonomy by removing features that would allow humans to take control over their vehicles[[16]](#endnote-16). Additionally, scholarly sources describe how AV data collection will likely include a driver’s destination history, future itinerary, and even more[[17]](#endnote-17). For example, information about where a car is parked could be interpreted to extrapolate personal information from an AV user, such as their overall level of wealth or their purchasing habits[[18]](#endnote-18). While it is currently unclear as to the scope of the information gathered or to whom access will be given, what is certain is that private industry and government organizations could have the ability to use this data inappropriately and to the detriment of end users[[19]](#endnote-19).

Given the diverse range of opinions and propositions regarding the integration of AVs into the legal system, determining what judges know about the issue would be illuminating for several reasons. First, there is currently a lack of research that assesses judges’ knowledge on the topic of AVs, or their perceptions of the current law in regards to AV issues such as liability or privacy concerns. This research is sorely needed in order to assess a population that will wield tremendous influence over the application of current law to cases involving AVs. Second, judges might have insight into which legal arenas are currently sufficient and which might need further elaboration. Third, assessing judges’ interest in AVs might allow for continued education, training, or outreach programs to be created, with areas of interest or knowledge deficiencies being focused upon.

**What do judges know about autonomous vehicles?**

To assess judges’ knowledge and beliefs regarding AVs, we conducted three focus groups during the second quarter of 2019. These focus groups involved judges who attended courses at the National Judicial College (NJC), an international center for judicial education associated with the University of Nevada, Reno. Judges came from different jurisdictions around the U.S. and were in Reno for the duration of two weeks to attend courses in general jurisdiction (a course for new judges), impaired driving case essentials, and an advanced specialty course devoted to traffic law. The opportunity to participate in a lunch-hour focus group was relayed to them by the coordinators of the respective course. For two focus groups, judges were invited to join the researchers in a nearby conference room following their lunch. For one of the three focus groups, we provided volunteer judges with a light lunch. No incentive or compensation for participants was provided. The three sessions started with 8, 11, and 6 judges though overall involved approximately a total of 30 judges. Because of the location and format of the groups, additional judges joined while the discussion was in process. Though demographic self-descriptions were not solicited, the group of judges was overwhelmingly white, but included one African American judge. About a quarter of our participants were women. Each meeting was approximately 45 minutes long.

The format involved the moderator asking broad questions that defined the topic of the discus­sion, though the judges occasionally took the discussion in directions not previously anticipated by the researchers. In each of the three sessions, two notetakers (a faculty member and a graduate student) recorded the content of the discussion, as audio recordings did not take place. The primary topics of discussion were the benefits and harms of AVs, privacy regarding AV data, cybersecurity and terrorism, current laws and the potential adoption of new laws, liability, and potential legal problems encountered in the future, especially during a time of transition when both non-autonomous and autonomous vehicles would share the road.

As a group, the judges were approachable, talkative, and engaged, and they showed considerable interest in the topic of AVs. While none of our judges had presided over an AV case before, they had an acute ability to take a broad topic related to AVs (e.g. liability), and narrow the scope of inquiry to its ethical considerations and its relation to existing legal frameworks. Interestingly, these groups of judges often touched upon the same topics of discussion that legal and behavioral scholars describe in the existing literature on AVs. Below, we provide an overview of our findings regarding judges’ attitudes towards AVs and their incorporation into society.

**Adoption, Benefits, and Harm**

Overall, our sample of judges was very optimistic about the integration of AVs into U.S. society as well as societies throughout the world. Although one judge expressed skepticism about whether or not people would adopt AVs, the rest seemed to take it for granted that AVs would be commonplace in the future. In fact, our judges expressed more optimism about the incorporation of AVs than most experts.

Our judges were also optimistic about the effects of this transition. As a whole, judges were keenly aware of the dangers of automobiles and were familiar with statistics about incidents of vehicle fatalities as well as causes of those fatalities. Virtually all our judges believed that AVs would be beneficial to society in that they would decrease traffic fatalities substantially and improve mobility for older Americans. In fact, during two of our focus groups judges highlight that they themselves would be a prime beneficiary of this new technology emphasizing their own advanced age. These observations lie in stark contrast with much of the existing research which instead focuses on humans losing their autonomy by delegating it to their vehicles[[20]](#endnote-20).

Judges also believed that AVs would be influential in the shipping and delivery industries, but were more cautious around this issue. They expressed concern about the loss of jobs and believed that training might be necessary to help displaced workers find alternative sources of employment. However, none of our judges stated that they were strictly opposed to the adoption of autonomous shipping or delivery trucks. Rather, they seemed to take it on faith that these changes were inevitable and that people would have to adapt to technological progress.

In sum, judges expressed views that appear to be common in the media and the general public. Beyond a fascination with the technology itself, judges quickly focused on the broader societal impact of this technology.

**Data, Privacy, and Security**

One common theme that arose in each of our focus groups was that of data, privacy, and security. The judges expressed concern over how the data generated by AVs would be managed. In particular, the judges were wary of companies that took too much control over the data that was generated, specifically in cases where that data might illuminate the causes behind an AV accident. One judge described how AV manufacturers might want to keep that data from the public eye, as a way of hiding their own culpability for the incident or as a way of maintaining trade secrets from other AV manufacturers. In multiple meetings, our judges brought up the idea of some federal organization akin to the NHTSA or the National Transportation Safety Board (NTSB) that would be responsible for regulating AV manufacturers and perhaps even providing guidelines for how the data from accidents could be retrieved, such as with a “black box” type system currently used in aircraft. This organization would allow the justice system access to some basic information about the AV at the time of the incident, such as location information, the speed at the time of the accident, and route information immediately prior to the accident. At the same time, one judge and experienced accident investigator pointed out that there is neither a commonly agreed-upon data format nor any consistent policy for data sharing with parties in the current legal system, despite the information being made available from different automotive manufacturers.

Our judges were unclear about who owned the data that was generated by AVs. It was presumed that AV manufacturers would control the majority of the data, but our judges lacked a strong central opinion about what those manufacturers could do with the data or what rights individual drivers had regarding the data that they specifically produced. Similarly, our judges were somewhat reticent regarding the issue of privacy of this data. Our judges compared this issue to other forms of technical data such as cellphone or personal computer data, where a warrant would have to be issued for the government to retrieve the information. However, they avoided specifying whether the warrant could be issued to an AV manufacturer for personal data without that person’s consent.

Perhaps the most important issue to judges was the issue of data security. In each of our meetings, at least one of our judges brought up the idea of cybersecurity and the hacking of AVs. This was described in terms of national security, with concern over whether an individual could hack an entire system of cars to cause large scale traffic accidents all over the country at the same time. It was also described in the sense of a so-called ‘lone wolf’ terrorist attack where someone programmed their car to deliver an explosive device or to simply run into a crowd of people. The cybersecurity issue seemed one of the most pressing concerns to our judges in regards to AV systems and the maintenance of their software systems.

Broadly speaking, alongside any previously expressed optimism, judges identified a number of different arenas in which AVs would pose security and privacy challenges.

**Old Laws and New Technology**

The majority of judges stated without equivocation that new laws would need to be created to deal with issues related to AVs. This would result in large part from the fact that drivers cannot be assumed to be in control over their own vehicle; thus, determining who the responsible party was in an accident might become more difficult. However, a few of our judges believed that existing liability law might be able to cover some instances of AV accidents.

In general, the judges believed that the law would adapt to AVs by applying existing laws to this new technology, resulting in a standard-setting body of case law. This would occur in a transition phase while AVs were slowly adopted by the populous over time. As mentioned above, judges did point out that new federal legislation would need to be created, and they expressed concern over state laws being incompatible with one other. Judges believed that this would be the most difficult time for the judicial process because new law would just be evolving. Once AVs are normalized, judges believed that the judicial system will likely be adequately equipped to deal with AV cases.

In sum, although judges agreed that the judicial system would adapt, there was also agreement that there would exist some level of legal uncertainty which required a new body of law.

**Liability**

The judges predicted several areas of potential legal contention in regards to liability. Our judges specified the need for a ‘bright line distinction’ in liability cases, referring to whether the car or the human being is in control of the vehicle. One of our judges specified that if the vehicle is in control, then the vehicle is the driver, and it needs to be treated as such in cases related to attribution of blame. As such, it was clear that some of our judges believed that for fully autonomous vehicles, the liability would solely be the responsibility of the manufacturer. However, they wondered whether an AV user could be held liable for an accident if they had not yet updated the software for his or her car.

The judges stated that determining liability in cases could become increasingly complex, especially if many AVs were connected and transmitting information to one another. These cases could prove difficult to adjudicate, as AV systems not directly involved in the accident could nevertheless be complicit in negative outcomes. They also expressed concern that laws dictating liable parties might target AV manufacturers with “deep pockets,” rather than contracting companies responsible for AI systems or sensor manufacturers who might be more culpable but less financially affluent.

Additionally, the judges wondered if we would move to a system where only vehicles, rather than drivers, were insured. In a system such as this, it would be financially detrimental for a human to take control of an AV, even if it was behaving in an obviously irrational manner. However, at least in terms of trucking, our judges seemed to see this system as potentially bene­ficial, as it would remove the liability on trucking companies for fallible employees, who are most likely to cause damage for which the company would be deemed responsible.

One of the most common occurrences across our focus groups was the trend for judges to be cautious to make any sweeping assertions about liability, but rather preferred to examine liability on a case by case basis. This affirms the need within AV social science research for specific case vignettes rather than generic questions regarding fault. Matters of liability, especially responsi­bilities attributed to drivers, owners and manufacturers of a vehicle can only be investigated in specific contexts.

**New Laws and the Judicial System**

Judges in general believed that expert witnesses would be evaluated by juries in much the same way that they are now in other complex cases, such as trials involving medical, scientific, or technical witnesses. When asked if the “reasonable person” standard could be applied to cases with AVs, the judges believed that it was the duty of the attorneys to provide witnesses that could be persuasive and comprehensible.

One judge expressed concern that AVs might demonstrate a racial bias, where racial minority pedestrians would be more likely to be hit by an AV than white pedestrians. Specifically, the judge wondered if minorities were represented enough during the software development and was worried that the software developers might show some implicit bias that would be reflected in how the software interacted with the world.

The judges were somewhat divided on the issue of intoxication and AVs. While most judges thought that AVs would reduce incidents of DUI and DWI, others questioned whether someone should be allowed to be intoxicated in a fully autonomous vehicle. Some of our judges believed that, because the car is presumably a superior driver, an intoxicated passenger is within their right to be driven home by a vehicle with no oversight. However, other judges believed that the primary passenger in an AV is the responsible party, and therefore must be coherent enough to take the reins from the AV in the event that it malfunctions. Within the available time, focus group discussions never reached consensus on this issue, suggesting that this might be a difficult hurdle for the legal system in the future.

**Emerging Problems and Future Opportunities**

Based on our conversations with judges, we have extracted several points of interest in regards to AVs and the judicial system.

* Additional laws must be created to deal with the future incorporation of AVs into society and the inevitable accidents that will occur as a result. There will be difficult questions ahead regarding liability in AV accidents, data privacy and security, and legal standards regarding substance use for AV “passengers.” New laws might be able to preempt some of these issues before they enter the courtroom. To the extent that new laws are being created, it is critical for judges to become familiar with these legal changes.
* The advent of AV technology implies massive changes for courts across the country. The majority of cases in front of municipal and similar courts (e.g., tribal courts) are related to traffic issues. Given that AV technology will make driving safer and rule violations less frequent, caseloads are likely to drop precipitously. This will imply a reduction in the funding and size of courts and their staff.
* The nature of the cases before the court will likely become much more complicated. This is due to the availability of objective AV data, which will render many liability cases more transparent as to which party is at fault and motivate parties to settle disputes with­out the involvement of the legal system. As a consequence, only the most complic­ated and difficult cases will be dealt with by the courts, thus putting greater demands on judges and legal personnel in terms of their expertise.
* Judges need more education in regards to AV technology and the types of issues that will arise in the near future. There is an excellent opportunity right now to educate judges before AVs have been widely adopted. Our judges seemed receptive to learning more about AVs as well as the legal, psychological, and philosophical issues that accompany the subject. Given the opportunity to learn more about the subject, based on our sample of judges, we would predict that many judges from around the country would be excited to participate in training and education related to autonomous vehicles.

**General Conclusions and Recommendations**

Even though the research team was often struck by how well-informed the judges in our focus groups were regarding AV technology, by their own admission judges need to learn more about the new legal challenges posed by AV technology. Therefore:

* It is important to offer opportunities for additional judicial education on this topic. The National Judicial College already offers a webinar dealing with this subject; however, it merely presents a 90 minute overview of the topic. Importantly, law students are more likely than ever to learn about legal issues involving technology and artificial intelligence in law school (e.g., Duke Law School). This likely provides future generations of judges with a better foundation to deal with such issues in the courtroom. However, in most cases it may be decades before any of today’s law students will join the bench. With techno­logical advancement and development being unrelenting, one must wonder whether their currently received training will still be adequate. Hence, we see no alter­native to offering contemporary training to judges to deal with contemporary techno­logical issues—such as the introduction of AVs. Judges should have the opportunity to expand their knowledge about AVs as part of the judicial education requirement that exists in most jurisdictions[[21]](#endnote-21).
* Although there has been a steady stream of scholarship on the intersection of the legal system and AV technology within the past few years, there is a surprising dearth of research that actually incorporates legal officials. Although we focused on broad questions for our focus group, there is certainly a necessity for additional research that focuses on finer points of the law. We would encourage future, in-depth research with judges in order to illuminate the thought processes of these decision makers and to give this topic the directed attention that it deserves.
* More specifically, through our focus groups, we found that our judges were reticent to make generalizations about liability and attributions of blame, and instead want indivi­dual cases with specific details. Researchers are just beginning to examine how people attribute blame and responsibility in regards to autonomous vehicle accidents, and arti­ficially intelligent systems more broadly[[22]](#endnote-22),[[23]](#endnote-23). We would encourage the continuation of this type of research as well as application to groups relevant to the legal domain, speci­fically, judges. While information about how humans attribute responsibility in the AV arena is valuable, judges are a key player in the determination of liability as well as potential civil remunerations, and should be examined in future research in regards to their attributions of blame in AV scenarios.

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