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Smart Cars are Getting Smarter: Legal Personhood for Self-Driving Vehicles

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PART I

INTRODUCTION

Artificial intelligence is prevalent in smart technology, reaching from the simple use of a cellphone to life-saving medical equipment. However, one application of artificial intelligence, self-driving cars, remains unregulated yet highly anticipated. Self-driving cars, or autonomous vehicles as used interchangeably, is an expanding market and technology. With many leading car manufacturers implementing limited artificial intelligence applications in their cars and announcing plans for future fully self-driving cars, self-driving cars may be closer to driving along American roadways than previously anticipated.[1]

Self-driving cars are an emerging technology with little to no regulation in development and use. Regulation is still not agreed upon at a national level, with differing opinions regarding potential liability issues and the amount of information that should be made public in the interest of protecting trade or design secrets. While a majority of states have begun to enact regulations that address the use of self-driving vehicles, uniformity at the federal and state level is currently not present.[2] The Federal Automated Vehicles Policy along with the United States Department of Transportation only provide guidance to states on recommendations for regulation, with no clear

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[1] Nick Kurczewski, *Cars that are almost self-driving,* US News (October 22, 2020), https://cars.usnews.com/cars-trucks/cars-that-are-almost-self-driving

[2] Lance Eliot, *Florida Eases Self-Driving Car Rules: Are States and Cities on the Hook for Mishaps?*, Forbes (June 18, 2019), https://www.forbes.com/sites/lanceeliot/2019/06/18/florida-eases-self-driving-car-rules-are-states-and-cities-on-the-hook-for-mishaps/?sh=185b8eda26c1

answer as to when legislation may be drafted or legislated at the federal level.[3] While fully self-driving cars are still in development, there is limited information as to the technology behind self-driving cars that has created a lack of transparency.[4]

As artificial intelligence continues to advance significantly and rapidly, the question of liability has been debated among engineering and legal communities alike. With the potential for artificial intelligence applications to express intent, and the capability for particular applications to take control away from humans, scientists and legal scholars have discussed and argued theoretical frameworks for how liability would be determined regarding the use of highly advanced applications.

One potential legal framework that the United States should ultimately adopt for the liability of self-driving cars is the notion of electronic legal personhood. The development, manufacturing, and use of self-driving cars is in need of stricter regulation. Potential benefits of stricter regulation will be explored through examining existing legal frameworks and potential legal frameworks as highlighted through the leading example of regulation by the European Parliament. [5] As machines that may be capable of expressing intent, registering emotion, and, as some research suggests, sentiency, self-driving cars should ultimately be deemed electronic legal personhood status in the United States.

With a focus upon fully automated self-driving cars involved in traffic accidents, the question of who should be liable in the case of a self-driving car accident will be addressed. Sections A and B will consider fully self-driving cars, and how traditional liability frameworks

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[3] Department of Transportation, *Preparing for the Future of Transportation: Automate Vehicles 3.0* (September 28, 2018), https://www.transportation.gov/av/3
[4] Matthew Cress, *The Black Box Problem*, Artificial Intelligence Mania (January 10, 2019), http://artificialintelligencemania.com/2019/01/10/the-black-box-problem/
[5] Andrea Bertolini, *Artificial Intelligence and Civil Liability* 33 (2020)

will not adequately address the question of who should be held liable. As the artificial mind of self-driving cars may evolve beyond original programming, and whereas the car will be conducting all of the driving with no assistance on behalf of the driver, traditional liability frameworks will not adequately address a scenario where action of the car is detached from both the manufacturer and the driver. Section C will consider the characteristics of legal personhood along with the potential for fully autonomous vehicles to express intent. Finally, Section D will consider a potential legal framework for a proportionate liability regime utilizing legal personhood status for self-driving cars as illustrated by the European model.

PART II

SELF-DRIVING CARS

Currently, the development of artificially intelligent machines requires some level of intelligence or special skill of a human. Despite artificial intelligence's widespread significance in today's technological advances, artificial intelligence development and application remains largely unregulated among the states and at the federal level. With a lack of transparency as to how self-driving cars function, American drivers remain skeptical toward the efficiency and function of self-driving cars. For example, a 2018 poll surveyed American drivers to determine that 54% were unlikely to use self-driving cars, 59% would be uncomfortable riding in self-driving cars, and 62% would be uncomfortable sharing the road with self-driving cars.[6] The increasing development, design, and manufacturing of self-driving cars has resulted in a need for stricter regulation and understanding as to how these cars will function. However, the

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[6] RJ Reinhart, *Americans Hit the Brakes on Self-Driving Cars*, Gallup (February 21, 2018), https://news.gallup.com/poll/228032/americans-hit-brakes-self-driving-cars.aspx

development of self-driving cars has also raised legal questions as to the involvement of a self-driving car in traffic accidents.

A. GENERALLY

Although self-driving cars may be considered a technology that will take years to become mainstream on American roadways, many car developers and manufacturers are making impressive gains in utilizing self-driving artificial intelligence. Self-driving cars have become the wave of the future for artificial intelligence, with a significant majority of car manufacturers now utilizing the technology for a future line of self-driving cars.[7]

There are five levels of self-driving cars anticipated to be dependent upon the ability to drive autonomously. Level 1 self-driving cars require driving with a driver assistance program of steering and/or acceleration.[8] This may include examples of self-driving features such as adaptive cruise control or lane keep assist. Level 2 self-driving cars have partial automation, where active safety features take a degree of the driving away, including features such as onboard cameras and radar sensors.[9] Level 1 and 2 self-driving cars are already being seen on roadways, with future lines of cars likely to utilize Levels 3-5.[10] Level 3 self-driving cars have conditional automation, where the car takes over driving controls and the driver is able to take his or her focus off of the road with the expectation that the driver can still intervene when the car requests an intervention.[11]

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[7] Sunny Betz, *The Top Sixteen Companies Paving the Way for Self-Driving Car Tech,* BuiltIn (September 17, 2020), https://builtin.com/transportation-tech/self-driving-car-companies
[8] Department of Transportation, *Preparing for the Future of Transportation: Automate Vehicles 3.0* (September 28, 2018), vi, https://www.transportation.gov/av/3
[9] Id.
[10] Id.
[11] Id.

Levels 4 and 5 of self-driving cars are expected to be the most advanced in terms of artificial intelligence and autonomous use. Level 4 self-driving cars have high automation, where cars take over all aspects of driving even if a driver does not intervene, with an ability to adapt to different weather conditions.[12] The final level of self-driving car would be the highest in capability. Level 5 self-driving cars will have full automation, where absolutely no intervention or driving is needed by the driver.[13]

Many of today's cars are utilizing technologies of Level 1 and Level 2 self-driving cars. One example, the Tesla Model S, includes a package of "self-driving aid" which includes full driving capability with autopilot, speed vehicle control, lane keep control, full parking ability and even a mode to summon one's car through an app on his or her phone.[14] Such technology is not as far into the future as many anticipate, but where Levels 3-5 of self-driving cars are concerned in terms of fully autonomous self-driving cars, the federal government anticipates gradual movement within the next decade. The National Highway Traffic Safety Administration ("NHTSA") established the years of 2016-2025 to utilize partial safety features in cars with self-driving capabilities, with a target of 2025+ for fully automated safety features.[15] In Europe, the current leading market for self-driving cars, the European Parliament does not anticipate fully automated Level 5 cars until 2030, with Level 3 or 4 cars on roadways between 2020-2030.[16]

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[12] Id.
[13] Id.
[14] Nick Kurczewski, *Cars that are almost self-driving,* US News (October 22, 2020), https://cars.usnews.com/cars-trucks/cars-that-are-almost-self-driving
[15] National Highway and Traffic Safety Administration, *Automated Vehicles for Safety* (2020), https://www.nhtsa.gov/technology-innovation/automated-vehicles
[16] European Parliament, *Self-driving cars in the EU: from science fiction to reality* (January 14, 2019), https://www.europarl.europa.eu/news/en/headlines/economy/20190110STO23102/self-driving-cars-in-the-eu-from-science-fiction-to-reality

B. LIABILITY FOR SELF-DRIVING CARS

I. LIABILITY GENERALLY

The federal government, the European Union, and car manufacturers have anticipated fully autonomous self-driving vehicles that require no driving nor intervention on behalf of a human. This has resulted in a question that has been raised by the NHTSA and the U.S. Department of Transportation alike: who is liable in the case of a traffic accident?[17] The current liability system for traffic accidents in the United States will become inefficient in light of evolving autonomous vehicle technology. Strict liability, or product liability law, establishes a chain of liability. Product liability of defects in vehicles establishes liability through the chain of the manufacturing of any product for damage that is caused by that product.[18] In the case where design or manufacturing defects are present in cars, the manufacturer-defendant would be liable when proof is offered toward the defectiveness of the car, with irrelevance as to whether the manufacturer exercised reasonable and great care in the making of the vehicle.[19]

II. APPLICATION OF LIABILITY FRAMEWORKS

Many ethical and legal scholars have considered product liability as the best option for accidents involving self-driving cars.[20] Product liability would place the liability with the developer and manufacturer of the self-driving car. In some states, product liability actions are available against automobile manufacturers for certain injuries. However, with product liability

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[17] Department of Transportation, *Preparing for the Future of Transportation: Automate Vehicles 3.0* 5 (September 28, 2018), https://www.transportation.gov/av/3

[18] Legal Information Institute, *Products Liability*, https://www.law.cornell.edu/wex/products_liability

[19] Id.

[20] Tiffany Y. Gruenberg, *Driving Cars will Likely Increase Product Liability Litigation*, The National Law Review (January 22, 2019), https://www.natlawreview.com/article/self-driving-cars-will-likely-increase-product-liability-litigation

there is also the problem of assumption of the risk.[21] Product liability in self-driving cars may

produce expensive lawsuits. Where a self-driving car may be advanced enough to be thinking for

its own, it may be difficult for a driver to claim that a manufacturer should be liable under this

system where drivers, or passengers in a fully autonomous car, are assuming the risk of riding in

an autonomous vehicle. Manufacturers may be able to claim potential "defects" as an aspect of

the artificial intelligence application that was a response to its environment or may not be

capable of providing a clear answer as to what the car was thinking at the time. This is referred to

as the black box problem, the notion that the artificial mind is akin to a black box where no one

is capable of truly understanding what it is thinking.[22]

　　Initially, it is likely that self-driving cars will increase product liability litigation.[23]

Reconstruction of an accident would likely be considered through the actions of the artificial

intelligence in the car. However, this leaves open the question of how to determine what artificial

intelligence is thinking.[24] With the technology of cars going beyond mechanical malfunctions

and primarily utilizing computational analytics, product liability suits would raise more questions

than answers regarding if there was a defect in the artificial intelligence, if it was reacting to its

environment, if it was acting upon original programming or if it was acting based upon its own

created artificial thought.[25] Due to this issue, it may be difficult for a potential plaintiff to prove

that the manufacturer was actually at fault. For example, a self-driving vehicle that has swerved

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[21] R.D. Hursh, *Liability of Manufacturer or Seller for Injury caused by Automobile or other Vehicle., Aircraft, Boat, or their Parts, Supplies, or Equipment* 78 A.L.R.2d 460 (2020, originally published in 1961)

[22] Matthew Cress, *The Black Box Problem*, Artificial Intelligence Mania (January 10, 2019), http://artificialintelligencemania.com/2019/01/10/the-black-box-problem/

[23] Tiffany Y. Gruenberg, *Driving Cars will Likely Increase Product Liability Litigation*, The National Law Review (January 22, 2019), https://www.natlawreview.com/article/self-driving-cars-will-likely-increase-product-liability-litigation

[24] Id.

[25] Id.

uncontrollably into oncoming traffic without intervention of the driver. A manufacturer may provide the argument that the car was not defective, but rather responding to its environment, and any passengers assumed the possibility for any accidents. It may be difficult under this scenario for a court to discern just what the car was registering in that moment while determining who should be liable.

In lieu of product liability litigation, many car accidents today are rectified through a no-fault insurance scheme. With a no-fault scheme, a driver's insurer will take the financial responsibility for injuries that occur by the driver, any passengers, and any pedestrians.[26] Benefits are allocated to the parties, avoiding litigation in the process.[27] With some states requiring an optional or mandatory no-fault scheme, many include a threshold of benefits – if injuries surpass a minimum threshold, then the ability to sue liable parties under traditional tort frameworks becomes available.[28] However, this insurance scheme is not uniform among the states. Benefits available vary, and such insurance is not considered mandatory dependent upon the jurisdiction, with some jurisdictions offering no-fault insurance on an optional basis.[29] Thresholds allow injured parties to sue drivers, for example, if injuries exceed what may be covered under insurance schemes. Current no-fault schemes would not adequately address the question of self-driving cars without a uniformity among the states that considers the possibility of excessive injuries not caused by the driver but rather the car itself.

The primary question regarding self-driving vehicles and liability is which party should be at fault in the case of a traffic accident. The U.S. Department of Transportation has estimated

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[26] David Slaughter, ¶ 861 No Fault Auto Insurance, 2003 WL 27386870
[27] Id.
[28] Id.
[29] Id.

that roughly 94% of accidents caused on American roadways are the result of human error.[30] The

infamous Uber case in Arizona was decided through the route of criminal liability, where the

safety driver in a self-driving Uber was found guilty of negligent homicide for being distracted in

a test vehicle and failing to brake before the car struck and killed a pedestrian.[31] However, this

does not address the question of *fully* autonomous vehicles. Where driver intervention is no

longer needed in self-driving cars, it is difficult to place criminal negligence on behalf of the

driver where the driver is detached from all driving responsibilities. Potential defendants can

claim that the car was doing all of the driving, and thus remains the problem of whether the

developer or the driver-passenger should be at fault.

With a significant majority of accidents caused by the driver, there is question as to how

self-driving will cut into the statistic of most accidents resulting from human error. Currently,

autonomous vehicles are a product of their developers. The cars act dependent upon the

information that is provided by the manufacturer and developer, process said information, and

then grow from that information. The actual level of knowledge on behalf of the car is unclear,

and likely will remain unclear for some time. As artificial intelligence in cars advance, human

choice may become completely detached from the driving. Current law regarding either product

liability or tortious and criminal liability routes are dependent mostly upon defect or human

error. With the potential for developers to avoid liability through the defect route due to

unknowns of artificial intelligence thinking, and the potential for drivers to avoid liability in fully

autonomous vehicles where driving intervention is neither needed nor expected, a new legal

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[30] Department of Transportation, *Preparing for the Future of Transportation: Automate Vehicles 3.0* (September 28, 2018), https://www.transportation.gov/av/3
[31] Kate Conger, *Driver Charged in Uber's Fatal 2018 Autonomous Car Crash,* The New York Times (December 7, 2020), https://www.nytimes.com/2020/09/15/technology/uber-autonomous-crash-driver-charged.html?searchResultPosition=1

liability framework is necessary in order to appropriately address the question of liability for self-driving cars.

As discussed in Section C, the notion of legal personhood would be established to a legal entity, not necessarily tangible, that would be capable of having rights and thus would be subject to certain responsibilities and expectations. For example, a corporation, considered a legal entity, may be held liable for the acts of the humans behind it. Here, there is potential for self-driving car to be held liable for the actions of the developer or manufacturer for fully autonomous vehicles. Artificial intelligence often reflects what it is told to believe. It may be capable of forcing decisions upon humans that they do not wish to make. The black box problem as discussed reasserts the notion that nobody truly understands how or what artificial intelligence thinks. Thus, the question remains: how can a machine's behavior be accounted for when we do not understand what it is thinking?

Even if artificial intelligence algorithms are behind the technology of self-driving cars, it is the artificial intelligence itself that would ultimately make the decisions in cases where cars are fully autonomous. Cars between the levels of 1-3 would have driver capabilities programmed. In some circumstances, driver intervention would be required in order for the car to make a decision, such as stopping at lights or making turns.[32] However, cars between the levels of 4-5 will not need any driver intervention, nor will cars expect it.[33] If this projection holds, the test of foreseeability may be increasingly more difficult to apply to self-driving cars as artificial intelligence will be making the decisions.

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[32] Department of Transportation, *Preparing for the Future of Transportation: Automate Vehicles 3.0* (September 28, 2018), https://www.transportation.gov/av/3
[33] Id.

Foreseeability, or rather the test of negligence, is a critical component of many tortious acts. The test largely determines whether the risk would be foreseeable if a reasonable person could foresee the probability of the risk occurring or if the person was on notice of the likelihood of danger to the party whom duty is owed.[34] If the injury could not have been reasonably foreseen, then there is no liability for negligence.[35] This traditional test does not adequately address the problem of who would be liable in a self-driving car accident. Drivers or passengers in a self-driving car would likely be on notice of the dangers a self-driving car may pose. The act of traveling in a car with no human assistance but instead controlled by computer algorithms would always consider the risk of a malfunction and potential accidents. A reasonable person could foresee the probability that a driverless car may cause an accident. Thus, a driver may always be liable under this scenario, as a reasonable person could reasonably foresee that accidents may happen in a car controlled by software.

A clearer legal framework is absolutely imperative for self-driving cars. A "one-size fits all" framework for artificial intelligence will not be satisfactory to expand upon the technological, ethical, and legal issues that self-driving cars present. The use of liability frameworks in existing American jurisprudence have largely been drafted in an era without the technological capabilities that artificial intelligence possesses. Different legal frameworks would be best applied to different applications of artificial intelligence, including self-driving cars.

Much of current American traffic liability law would not be satisfactory to answer the question of how autonomous cars should be treated in an age where cars themselves may be making the decisions. Regulation and guidance at the federal level is likely necessary in order to facilitate laws that now address autonomy of cars and driver liability. One such solution to the

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[34] Lopez v. Metro. Gov't of Nashville & Davidson Cty, 646 F. Supp. 2d 891 (M.D. Tenn. 2009)
[35] Id.

question of liability with self-driving cars is the suggestion of legal electronic personhood. Legal personhood itself is not so much about the "person" but rather what entity may be sued. As discussed further in Sections C and D, legal personhood may have the ability to address liability issues once Level 3+ self-driving cars are on American roadways.

C. PERSONHOOD CHARACTERISTICS AND INTENT IN SELF-DRIVING CARS

As previously discussed, the "person" in "personhood" does not necessarily mean that the liable party itself is a person. Rather, the person is an entity with its own legal capabilities, responsibilities, and standards.[36] Over time, legal personhood has changed. Affording legal personhood status to entities rather than people has been part of American jurisprudence since the 19th century. The case of Santa Clara County v. Southern Pacific Railroad Company established legal personhood status for corporations.[37] Within this case, the Supreme Court of the United States established that a corporation was akin to an artificial being that existed only in contemplation of the law and possessed only the powers conferred upon it, determined by the reason for its creation.[38] It is a legal fiction and category that has the potential to be expanded further, and the potential to be afforded to self-driving cars as a further extension of this legal category to artificial entities.

The legal notion of a corporation as person early in its formation was considered a tool for public policy.[39] The entity was created as a result of maintaining collective interests, and to expand dependent upon economic needs and social practices.[40] As a corporation is an artificial

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[36] Id.
[37] Antonio Lannì & Michael William Monterossi, *Artificial autonomous agents and the question of electronic personhood: a path between subjectivity and liability*, 26 Griffith L.J. 563, 577 (2018)
[38] Id.
[39] Id. at 576.
[40] Id.

being and intangible, it possesses the legal responsibilities and rights conferred upon it expressly or incidentally.[41] In essence, the machine remains a machine, with certain responsibilities attached. The corporation remains responsible for the actions of the humans behind the corporation. Legal personhood in the case of self-driving cars would namely refer to the question of liability. Legal capacity of artificial agents for liability could be on par with corporations, as an intangible entity created through a legal framework.[42] Increasing autonomy in self-driving cars may be enough to justify a status of a legal entity, as an entity that is capable of expressing intent, of making decisions, of acting, and of anticipating results.[43]

The characteristics of artificial intelligence are becoming fundamental to the transportation industry through self-driving cars. Self-driving cars are predicted to improve safety, lower environment emissions, raise productivity, increase mobility, and reduce congestion on roadways.[44] With misinterpretation between drivers and pedestrians a leading factor of causation on roadways, the question of self-driving cars expressing intent has been raised namely in expression.[45] Self-driving cars may be able to utilize non-verbal proactive communications to show intentions to other humans on the roadway – this may include flashing messages on the windshield of stopping, turning, or yielding, or even turning indicators.[46] This affords a level of transparency to the pedestrian and helps to facilitate trust. However, the question of intent goes beyond just how a car expresses itself to others on the road.

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[41] Id. at 578.
[42] Id.
[43] Id.
[44] Azra Habibovic et. all, *Communicating Intent of Automated Vehicles to Pedestrians,* Frontiers in Psychology (August 7, 2018), https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01336/full
[45] Id.
[46] Id.

A question raised among scholars, and science fiction films, is whether artificial intelligence can actually form and express intent or motivations. Intent itself would involve action of determining what the artificial agent wants to do or its result.[47] With little known of how the human brain works let alone the artificial intelligence brain, the concept of intent with artificial intelligence, particularly in self-driving cars, is difficult to comprehend. Additionally, intent is a critical element in many liability suits. With the difficulty of determining intent in artificial intelligence, this has resulted in a lack of an adequate liability framework as drivers of fully self-driving cars may never be held liable under existing law.[48]

There are different categories of intent, particularly in self-driving cars. Inscrutable intent is that artificial intelligence itself has intent, but humans do not know how to decipher what that intent is.[49] As previously discussed, it is difficult to ascertain just how artificial intelligence thinks, let alone what it intends. For example, the use of machine learning has utilized computer-based simulations that are similar to how a brain may function as a product of calculations.[50] The intent would be considered inscrutable if there is no available way to translate the calculations into words and sentences that would suggest the articulation of intent.[51]

Explicated intent requires a translation to determine the brain of artificial intelligence, and suggests developers are liable for what artificial intelligence thinks as they are the programmers.[52] This form of intent has been created with the purpose of providing an

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[47] Lance Eliot, *On the beguiling question of whether artificial intelligence can form intent, including the case of self driving cars,* Forbes (June 6, 2020), https://www.forbes.com/sites/lanceeliot/2020/06/06/on-the-beguiling-question-of-whether-ai-can-form-intent-including-the-case-of-self-driving-cars/?sh=5a9b1534448d

[48] Id.

[49] Id.

[50] Id.

[51] Id.

[52] Id.

explanation for what it is doing and thinking.[53] However, this form of intent does not answer the question of when artificial intelligence has gone beyond the developer's intention. Due to this possibility, many scholars suggest that regardless of intent, the liability should still remain with the manufacturer-developer even if the developer cannot determine just what the car was thinking at the time of an accident.[54]

Inserted intent is similar with the encoding of certain algorithms and choices at the behest of developers.[55] Intent is found within the computational codes of the artificial intelligence itself, as created by the developers.[56] Due to this category of intent, scholars suggest that the intent in the self-driving car itself would be a reflection of the intent within the human mind, as algorithms would be a reflection of the human developer's intent.[57] Thus, any kind of intent the self-driving car may express would be a direct growth of human intent.

Induced intent is the notion of humans implanting intent into artificial intelligence and the artificial intelligence deriving new intent from the programmed software.[58] This form of intent suggests that as the code changes the structural system of the artificial intelligence thought, the underlying intent would change and evolve as well, deriving a new form of intent that was not originally programmed by the developer.[59]

Finally, there is the concept of emergent intent, which would be removed from dependent intent on behalf of developers and a new form of intent formed by the artificial brain.[60] As the most independent category of intent, it would be considered the farthest removed from original

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[53] Id.
[54] Id.
[55] Id.
[56] Id.
[57] Id.
[58] Id.
[59] Id.
[60] Id.

developer intent as an independent intent.[61] In the case of self-driving cars, this has raised the question of how the intent and thought of the artificial intelligence should be managed. As means to identify intent in artificial intelligence currently does not exist outside of questioning developers on programmed algorithms and deciphering code, best practice would suggest that no matter the intent the self-driving car may express, the liability should remain the same.[62]

Questions remain as to whether there should be a distinction between liability from the original design of the artificial intelligence as compared to artificial intelligence that has self-learned to form intent. While the original programmed artificial intelligence would be a direct product of the manufacturer-developer, the potential for self-driving vehicles to form its own version of intent would suggest that the car is no longer subject to developer control but instead has created its own artificial mind. With the potential to form its own intent in the future, self-driving cars should still be awarded the same level of liability whether the car's action is a direct result of developer intent or its own created intent. The main issue behind this theory is the black box problem. Whereas it is unclear just how artificial intelligence processes algorithms and "thinks" for itself, it would be difficult to ascertain whether the self-driving vehicle was acting from a developer's intent or an outgrowth of such intent.[63] For liability to be treated similarly regardless of a self-driving car's original or created intent would avoid the difficult question of what the car is thinking, a problem that has yet to be solved not only in the scientific community but the legal community as well.[64]

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[61] Id.
[62] Id.
[63] Matthew Cress, *The Black Box Problem*, Artificial Intelligence Mania (January 10, 2019), http://artificialintelligencemania.com/2019/01/10/the-black-box-problem/
[64] Id.

It is unclear which route of intent lawmakers may consider. However, it is a possibility that the more advanced self-driving cars become, the more intent may become less human and more artificial. The higher the level of awareness in a self-driving car, the higher the likelihood for consciousness in self-driving cars. Even if artificial intelligence in self-driving cars gains consciousness one day, also referred to as the "singularity," humans may still be responsible despite the lack of understanding as to how an event could actually occur.[65] With the black box problem, it may be difficult for developers and drivers alike to foresee harm, or how artificial intelligence will make decisions.[66] As foreseeability is a major element in many tortious and criminal cases, current legal frameworks can have the effect of confusing and inconsistent outcomes, along with a discouragement of innovation in self-driving cars.[67]

D. POTENTIAL FRAMEWORK FOR LIABILITY IN SELF-DRIVING CARS

I.   LEGAL PERSONHOOD

Although legal personhood may not be immediately available to self-driving cars, it should be the ultimate legal framework adopted by legislation to address the issue of liability in self-driving cars. As discussed in Section B, current liability frameworks will eventually outgrow new artificial intelligence applications, namely self-driving cars. Current common law practice does not consider the middle ground between developer error and human error. As artificial intelligence continues to grow and potentially think for itself in fully autonomous vehicles, there is the possibility that traditional liability tests will no longer apply where the action of the car is

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[65] Lance Eliot, *If AI gains consciousness some say it will be self-driving cars,* Forbes (January 11, 2020), https://www.forbes.com/sites/lanceeliot/2020/01/11/if-ai-suddenly-gains-consciousness-some-say-it-will-happen-first-in-ai-self-driving-cars/?sh=51cc371323ae
[66] Matthew Cress, *The Black Box Problem*, Artificial Intelligence Mania (January 10, 2019), http://artificialintelligencemania.com/2019/01/10/the-black-box-problem/
[67] Lopez v. Metro. Gov't of Nashville & Davidson Cty, 646 F. Supp. 2d 891 (M.D. Tenn. 2009)

no longer in the hands of the developer or the driver. Self-driving cars very well might be capable of autonomy, intent, expression, and more. Legal frameworks need to consider liability issues for when self-driving cars go wrong. The potential for legal personhood in the future would be beneficial not only to drivers but to innovation as well.

As autonomy in self-driving cars increase throughout the next decade, it will be important to continuously update and adapt existing liability law to comply with the advances in artificial intelligence before fully autonomous cars are granted legal personhood status. Currently, a mixed-system approach would be beneficial. Adjusting and modifying current tests of causation, foreseeability, and intent could help address the issue of strict or product liability suits both stifling innovation of self-driving cars and creating confusion as to when a driver-passenger in a self-driving car would be liable where a traffic accident occurs. Nuances are needed in regard to when a human is operating a vehicle compared to when a vehicle is operating on its own.

II.   THE EUROPEAN APPROACH

It is important to discuss the first introduction for the idea of legal personhood for self-driving cars. In 2017, the European Parliament introduced the idea of legal personhood for self-driving cars, citing the foreseeability and autonomy of artificial intelligence.[68] The European Parliament established a need for safety-measures to be taken in the case of increasing prevalence of self-driving cars on the roadways.[69] With the potential for self-driving cars to operate in an unforeseeable manner, existing current laws required adaptation and modification.

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[68] European Parliament, *European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics,* European Parliament (February 16, 2017), https://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html?redirecthttps://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html?redirect
[69] Id.

The European Parliament addressed the fact that artificial intelligence is not just one application. Not one definition is capable of embracing all of the applications and potential uses of artificial intelligence.[70] The unpredictability of artificial intelligence in itself would thus create the need for civil and criminal law reform.

The European Parliament directly discussed the need to depart from "traditional liability theories" – such as strict liability, product liability, negligence notions, vehicular homicide or manslaughter, and more.[71] Instead, the European Parliament called for proportionate liability regime that would establish a compulsory insurance framework, and a potential for eventual legal status for self-driving cars in the long-term.[72] It is worth noting that the European Parliament made clear the suggestions are proposals, and not one potential framework is law. However, the European Parliament was the first to introduce the revolutionary idea of potential legal electronic personhood for self-driving cars.[73] This resulted in both praise and skepticism from ethical and legal scholars alike.

After the European Parliament's suggestion for legal personhood status for artificial intelligence was published, many scholars debated the implications. One suggestion, as previously argued, was that electronic legal personhood would not make robots virtual people but instead would allow self-driving cars to be treated on par with corporations.[74] The current liability model would eventually become defunct – meaning, where artificial intelligence becomes increasingly more autonomous, it would be prudent for the European Union to thus

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[70] Id.
[71] Id.
[72] Id.
[73] Id.
[74] Janosch Delcker, *Europe divided over robot 'personhood',* Politico (April 11, 2018), https://www.politico.eu/article/europe-divided-over-robot-ai-artificial-intelligence-personhood/

provide a version of legal personhood similar to corporations.[75] This would suggest that self-driving cars would have some legal rights and responsibilities that a human may have, but in the light of how corporations are treated.[76] Essentially, this model would not dehumanize humans but instead would revolve around accountability by holding artificial intelligence in self-driving cars accountable when traffic accidents occur.[77] An example would include a compulsory insurance framework that would be contributed to by developers and manufacturers.[78]

However, the argument against the legal personhood of artificial intelligence in self-driving cars was firm. Many scholars argued the issue of legal personhood would essentially result in a free-for-all for car developers. By placing the legal rights with the car, this would result in the absolving of all legal and ethical responsibilities of developers.[79] Developers would thus avoid responsibility for the actions of the machines, and virtually erase their legal liability altogether. Without the threat of liability, developers could thus cut corners in development, avoid proper safety measures in developing their cars, and create a further lack of transparency between manufacturer and purchaser as to how artificial intelligence works.[80] A machine would no longer remain a machine with a human behind its actions. Instead, machines would be at the same level as humans, which would have the potential of dehumanizing human rights altogether.[81] These sentiments are on par with the "Robotics Open Letter" addressing the European Union's suggestions, namely concerned that personhood would avoid liability altogether.[82]

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[75] Id.
[76] Id.
[77] Id.
[78] Id.
[79] Id.
[80] Id.
[81] Id.
[82] Robotics Open Letter, *Robotics Open Letter* (2018), http://www.robotics-openletter.eu/

The argument for or against legal personhood of artificial intelligence in self-driving cars extends beyond just Europe. Scholars have suggested that legal status of the most sophisticated robots and artificial intelligence applications could create a status of electronic persons.[83] Thus self-driving cars would be responsible for damage caused, where cars are fully autonomous and making decisions without human intervention. A potential framework would include a compensation or insurance scheme that would be contributed into by manufacturers and developers in order to address redress and damages where autonomous cars cause accidents.[84]

The relationship between manufacturer liability and personhood liability may be reconciled. There is a bundle of legal responsibilities that are awarded to both manufacturers and those with personhood status. Whereas a manufacturer holds a duty to market safe products, those with personhood status vary dependent upon the entity – for example, whether the entity is a person or a corporation, they are entitled to certain legal rights and responsibilities.[85] However, the need for a personhood status framework evolves from the inefficiency of a product liability suit for fully autonomous vehicles as discussed in Section B. Traditional manufacturer liability will not adequately address the actions of a self-driving car that become detached from the manufacturer. Legal personhood status would establish a limited liability system that avoids expensive litigation and addresses compensation for victims.

Other scholars have called for a middle ground between complete legal personhood and the status of a machine. Referring to the possibility that fully autonomous self-driving cars may

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[83] European Parliament, *European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics,* European Parliament (February 16, 2017), https://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html?redirecthttps://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html?redirect

[84] Id.

[85] Hoover v. New Holland North America, Inc., 100 A.D.3d 1495, 954 N.Y.S.2d 345 (4th Dep't 2012)

be a decade into the making, most artificial intelligence in self-driving cars would thus not be conscious or sentient.[86] Legal personhood status would assist in holding manufacturers and developers liable while also avoiding the potential for never-ending lawsuits and court battles that address liability concerns in different instances.

However, some human liability still needs to be in place. While eventually cars may be somewhat detached from their developers, that is presently not the case.[87] Thus, current liability systems should be adapted with a potential for legal personhood in the future.

There is little agreement as to which legal framework would be best. While some scholars argue that autonomy for artificial agents would cheapen human personhood, others have suggested that artificial agents in self-driving cars could potentially be intentional agents and capable of capacity for intent and more.[88] Legal personhood would thus need to be adapted in order to determine how it can be attributed to self-driving cars safely, without the threat of developers and manufacturers feeling as if they are absolved of liability in regard to accidents involving their self-driving cars.

The European Parliament Resolution of 2017 discussed further the implications of different legal frameworks regarding the issue of artificial intelligence. The European Parliament mentioned that a future instrument should in no way restrict the type or extent of damages that could be recovered, nor limit the forms of compensation.[89] A potential framework for strict

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[86] Visa A.J. Kurki & Thomasz Pietryzykowski, Legal Personhood: Animals, Artificial Intelligence and the Unborn (2017)

[87] Id.

[88] Visa A.J. Kurki, A Theory of Legal Personhood (2019)

[89] European Parliament, *European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics,* European Parliament (February 16, 2017), https://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html?redirecthttps://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.html?redirect

liability would prove a causal link between harmful functions of the car and the damage suffered and would not place focus on the negligence of the person.[90] Proportionality is thus the key. The level of instruction that is given to the artificial intelligence in a self-driving car and the degree of its autonomy would need to be a transparent process. Until legal personhood of cars, the liability should remain with the human with several options: insurance schemes for categories of robots, compensation funds, allowing limited liability of manufacturers, and specific legal status in the future for cars responsible for damage caused autonomously.[91]

III. LEGAL PERSONHOOD AS FRAMEWORK FOR SELF-DRIVING CARS

Within the United States, the legal framework should be similar to the European model and implemented rapidly and on par with the European Union. Despite that fully autonomous self-driving cars are five to ten years into the future, the degree of autonomy would be similar enough to a corporation – an intangible entity responsible for the actions of the humans behind it, maintaining a bundle of responsibilities of the relevant parties such as users, developers, and manufacturers.[92]

However, this still raises the question of how the cars would be held accountable. A registration system may be useful, federally and at the state level, in registering every self-driving car and keeping the developers and manufacturers public and accountable. As the European Union and some scholars have suggested, an insurance scheme could be beneficial in holding liable parties responsible, along with a damages fund. By requiring companies that

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[90] Id.
[91] Id.
[92] Konstantinos Amoiridis, *The timeline of e-personhood: a hasty assumption or a realistic challenge?,* Maastrrict University Law Blog (April 25, 2019), https://www.maastrichtuniversity.nl/blog/2019/04/timeline-e-personhood-hasty-assumption-or-realistic-challenge

develop self-driving cars to contribute to a fund for compensation and damages involving autonomous vehicles would assist in keeping manufacturers liable while also avoiding expensive and contentious strict or product liability suits. This would be best evidenced through a system similar to a no-fault regime, except mandatory and mandated at the national level.

A compulsory insurance scheme would not be too far-fetched dependent upon the U.S. Department of Transportation estimations. With 94% of fatal car crashes caused by human error, the Department of Transportation has recognized that autonomous vehicles will raise the question of just who should be responsible in the case of an accident.[93] A government-managed insurance fund scheme to a no-fault regime would provide compensation for injured individuals regardless of who may have truly been at fault.[94] The difference, however, is that the insurance scheme could be supplemented by a compensation fund that would largely be the product of manufacturer-developer contribution.

Requiring an economic mandate for manufacturer-developers has been argued to potentially dis-incentivize manufacturing for developers.[95] However, the fact remains that liability must be determined for self-driving vehicle accidents in order to keep pressure upon manufacturer-developer parties while also not discouraging innovation. Contributions to a compensation fund may be considered less expensive in the long-term compared to contentious lawsuits that are more than likely bound to occur once the question is raised of artificial intelligence in fully autonomous cars. Additionally, manufacturer-developers may be required to pay more money toward the compensation fund dependent upon safety records as a further

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[93] Theodore F. Claypool, *To Encourage Autonomous Vehicles in your State Create a No-Fault Insurance Pool*, The National Law Review (October 20, 2020), https://www.natlawreview.com/article/to-encourage-autonomous-vehicles-your-state-create-no-fault-insurance-pool
[94] Id.
[95] Id.

incentive for safety in fully autonomous vehicles.[96] Such a system may work as a tariff that reflects accident and safety rates, resulting in different premiums to be paid into the fund by manufacturers.[97] In the case of fully autonomous vehicles, there must be an entity responsible for compensating victims.[98] Awarding legal personhood status to self-driving cars, while enacting an insurance and registration scheme that would keep manufacturer-developers responsible, ensures that those involved in self-driving car accidents may receive compensation for their injuries.

These solutions may also result in higher transparency instead of stifling transparency in the development of self-driving cars. A registration system would contribute toward keeping developers visible, and not hiding behind the machines.[99] Utilizing this mechanism, legal personhood may even be an option through the existing law of agency. Autonomous agents would be enabled within the authority of the principal – i.e., the artificial intelligence of a self-driving car is enabled by its developer, to act upon its authority of what it is told to do.[100] The issue here may result in developers claiming that the car was not told to crash into another car, for example, which was beyond its scope of agency and thus, the principal-developer should not be held liable. It is yet to be seen whether this argument would be effective or not.

Ethical and legal scholars have been torn on the idea of legal personhood for autonomous vehicles, but there is one thing that is agreed upon – it cannot be the first legal framework to come from self-driving cars and its liabilities. Examples of potential liability systems were

[96] Id.
[97] Anastas Punev, *The Need for a Separate European Legal Framework,* Sage Journals (March 10, 2020), https://journals.sagepub.com/doi/10.1177/1781685820912043
[98] Id.
[99] Susanne Beck et all., *Issues of Privacy and Electronic Personhood in Robotics,* ERobotics (September 2012),
https://www.researchgate.net/publication/261350988_Issues_of_privacy_and_electronic_personhood_in_robotics
[100] Id.

suggested by the European Parliament in an effort to address the possibility that autonomous

vehicles may completely become autonomous in the future, detached from human thought and

action. The complete autonomy of self-driving cars that require no intervention or participation

from the driver have the potential to create a gap in current legal frameworks, where scienter

requirements like intent, foreseeability, and causation are critical. There are roughly twenty-nine

states with driverless car laws addressing self-driving on the roads – states such as Florida that

allow self-driving cars on public roadways, or Arizona that established an inattentive driver may

be held liable for death resulting from a self-driving car accident.[101] States such as Alabama and

Minnesota require minimum insurance coverage, title, and registration of self-driving cars.[102]

However, one common theme among states such as Michigan and Nevada is the limiting of

manufacturer liability for self-driving car accidents.[103] While some states have already applied

limited liability to manufacturer-developers, guidance at the national level is critically needed to

build a body of law that creates an actionable existence for self-driving cars.

Legal personhood for self-driving cars will not be the norm until potentially a decade into

the future. The more autonomous cars become, the more a legal framework that considers actions

beyond human control is needed. By utilizing electronic legal personhood in the future,

developers would be capable of being held liable without constantly being dragged into court to

decide liability issues. While liability issues will likely still remain no matter the legal

framework, legal personhood would help to facilitate costs and transparency between the

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[101] Lance Eliot, *Florida Eases Self-Driving Car Rules: Are States and Cities on the Hook for Mishaps?*, Forbes (June 18, 2019), https://www.forbes.com/sites/lanceeliot/2019/06/18/florida-eases-self-driving-car-rules-are-states-and-cities-on-the-hook-for-mishaps/?sh=185b8eda26c1
[102] Ben Husch and Anne Teigen, *Regulating Autonomous Vehicles*, National Conference of State Legislatures (April 2017), https://www.ncsl.org/research/transportation/regulating-autonomous-vehicles.aspx
[103] Id.

developer and the user, which may hopefully result in more transparency regarding how artificial intelligence in cars work while not inhibiting innovation.

Overall, the idea of legal electronic personhood granted to self-driving cars has the potential of creating a liability system that would still call for accountability. In the future, legal personhood would create a bundle of legal responsibilities with specific rights and obligations. A public register of self-driving cars would help keep developers visible and accountable, hopefully resulting in higher transparency between developer and user. An insurance scheme or a damages fund would be collected from companies in order to provide redress to those harmed by autonomous vehicles where no human intervention is needed nor expected. It would be possible to hold manufacturers and developers accountable in a legal framework that considers all possibilities – whether it be a defect, human error, or an autonomous vehicle's fault when self-driving cars go wrong.

PART III

CONCLUSION

Self-driving cars should be deemed to possess legal personhood and be held accountable. Legal personhood in self-driving cars would assist in keeping manufacturer-developers liable for accidents involving self-driving cars. This framework would establish a limited liability system where manufacturer-developers are responsible for the actions of the car. As driving is taken from the hands of the driver and placed in the control of the car, those involved in self-driving car accidents require compensation for when fully autonomous vehicles cause accidents and injuries. The more autonomous that a self-driving vehicle may become within the next decade

has the ability to change existing legal frameworks regarding liability systems in the case of traffic accidents.

Until legal personhood is a possible framework, a middle ground is needed. Regulation is critically necessary at the federal and state level to address liability issues. While the product and strict liability frameworks as discussed would provide some level of redress, the question still remains as to when humans should or should not be held accountable. Adapting existing liability frameworks will address self-driving cars that include human assistance, but a new liability framework utilizing a compulsory insurance scheme, compensation fund, and registration system would address where fully autonomous vehicles are to blame. Although these legal issues have yet to be put to the test in courts, self-driving cars are the future of American roadways, and legal frameworks must adapt and accommodate.