

The Convolution Addressing the Conundrum of Liability and Privacy in the Age of Autonomous Vehicles

Aarushi Kapoor and Khushi Sharma

Abstract

The Automotive Industry has registered an impeccable growth rate since the adoption of autonomous vehicles by vehicle manufacturers in their high-end models. These fully autonomous vehicles are poised to replace the traditional human driver. Hence, the whole set of laws defining liability in the event of an accident involving a vehicle have to be reformed. An autonomous vehicle being sued in lieu of a human driver, would be impractical. With the accidents involving autonomous vehicles increasing, newly minted laws like that of Michigan Harbor Lacunas are forming to address the question of liability and as a consequence of which the innocent (the manufacturer in so many cases) is held absolutely liable, despite his pleading defense. Such a harsh stance is unhealthy for the development of technology. Apart from the conundrum surrounding liability there are other dimensions which are equally unaddressed when it comes to automation. These autonomous vehicles rely on data, thereby adding to the vulnerability of protection of an individual's privacy. These brimming chaos are likely to hamper the aggrandizement of technology and subsequent protection of commercial interests.

This Article is an attempt to comprehensively analyze the uncertainty surrounding the questions of liability and privacy protection for autonomous vehicles. It takes into account the technology friendly interpretation of law, which will balance the diametrically opposite variables. It draws the laws from the existing set of principles available. Further, it proposes a new framework eliminate obscurity and concludes on a positive note with recommendations which are likely to accentuate the effectiveness of the current laws and lay down a steppingstone for the future development of laws.

Key words: Autonomous Vehicles, Liability, Privacy, Manufacturer, Technology.



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The Convolution Addressing the Conundrum of Liability and Privacy in the Age of Autonomous Vehicles

Aarushi Kapoor and Khushi Sharma*

I. INTRODUCTION

This planet, we have been bestowed with, is well-accustomed to witnessing the greatest breakthroughs since the year of 1913 coining the debut of assembly line by Henry Ford. Some ideas end up offering an experience which then gets adopted by the technology giants as a viable business model to offer their customers an advanced future delivery. Innovation or simply “change” has become an inherent part of each passing day. One such innovation is that of artificial intelligence (hereinafter referred as “AI”) which assures to be both disruptive and revolutionary, in terms of human autonomy and structuring the world of tomorrow. The machines imitate human intelligence and the related traits. Be it the use of drone called Parrot AR quadcopter which recently was used to transmit a video footage over internet to spot violent behavior in crowds¹ or Sunflower Lab’s move of developing such a system of digital surveillance for homes which could monitor all the activities from measuring footsteps on the grass to the working of a coffee maker,² artificial intelligence grasps our attention everywhere.

What has withheld the grip of the world is the astonishing development of driving support and cruise control systems in the automotive industry. The balls were set rolling through a grand disclosure of automated vehicles (hereinafter referred to

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¹ James Vincent, *Drones Taught to Spot Violent Behavior in Crowds Using AI*, THE VERGE (June 6, 2018, 10:07 AM), <https://www.theverge.com/2018/6/6/17433482/ai-automated-surveillance-drones-spot-violent-behavior-crowds>.

² Nick Statt, *Sunflower Labs is Building a Drone Surveillance System for High-End Homes*, THE VERGE (Dec. 7, 2018, 9:00 AM), <https://www.theverge.com/2018/12/7/18129308/sunflower-labs-system-drone-surveillance-bee-hive-home-security-startup>.

as “AV”) at GM’s “Futurama” exhibition,³ held at the 1939 World’s Fair,⁴ followed by the “DARPA Grand Challenge” organized by The Defense Advanced Research Projects Agency, the first long distance competition for AV held in 2004. There has been no looking back since then with the number of companies developing self-driving cars reaching a gigantic thirty-nine. Tesla,⁵ Uber⁶ and other companies like Apple,⁷ Blackberry,⁸ Intel, Microsoft, Nvidia, Baidu,⁹ Honda,¹⁰ Volkswagen¹¹ have made substantial investments in pushing software innovations and developing autonomous vehicular transport system. Aiming to bring a paradigm shift driverless vehicles affect three dimensions, namely, economic, social, and environmental.

This technology is likely to go a long way in altering the revenues of insurance industry,¹² the telecommunications,¹³ the transportation industry,¹⁴ and the like. A survey by Open Roboethics Initiative, claims the generation of new kinds of jobs in insurance, automobile and technology industries will be accompanied by a massive

³ Prof. Schmidhuber’s *Highlights of Robot Car History*, IDSIA, <http://people.idsia.ch/~juergen/robotcars.html> (last visited Jan. 11, 2021).

⁴ Norman Bel Geddes, “Futurama” at the 1939 New York World’s Fair (photograph) in ARE.NA (Sept. 26, 2017, 5:00 PM), <https://www.are.na/block/957758>.

⁵ Next-Gen Audi A8 Drives Better than You, MOTORING (Oct. 22, 2014), <https://www.motoring.com.au/next-gen-audi-a8-drives-better-than-you-46963/>.

⁶ Heather Somerville, *Uber Has Removed Its Self-Driving Cars from San Francisco Roads*, TIME (Dec. 21, 2016, 9:57 AM), <https://time.com/4616266/uber-self-driving-cars-san-francisco/>.

⁷ Daisuke Wakabayashi & Douglas MacMillan, *Apple’s Latest \$1 Billion Bet Is on the Future of Cars*, WALL ST. J. (May 14, 2016, 3:40 PM), <https://www.wsj.com/articles/apples-1-billion-didi-investment-revs-up-autonomous-car-push-1463154162>.

⁸ Paul Vieira & David George-Cosh, *Blackberry Accelerates Push into Tech for Self-Driving Cars*, WALL ST. J. (Dec. 19, 2016, 12:56 PM), <http://www.wsj.com/articles/blackberry-picks-ottawa-as-hub-for-self-driving-car-tech-1482159490>.

⁹ CB Insights, *40+ Corporations Working On Autonomous Vehicles*, CB INSIGHTS (Dec. 16, 2020), <https://www.cbinsights.com/research/autonomous-driverless-vehicles-corporations-list/>.

¹⁰ Alex Davies, *Google’s Self-Driving Car Company Is Finally Here*, THE WIRED (Dec. 13, 2016, 12:30 PM), <https://www.wired.com/2016/12/google-self-driving-car-waymo>.

¹¹ Peter Campbell, *VW Enters On-Demand Ride Services with New MOIA Brand*, FIN. TIMES (Dec. 5, 2016), <https://www.ft.com/content/54d7ced2-ba7b-11e6-8b45-b8b81dd5d080>.

¹² Gary Silberg, *Self-Driving Cars: The Next Revolution*, KPMG (Nov. 28, 2012), <https://assets.kpmg/content/dam/kpmg/pdf/2015/07/self-driving-cars-talkbook.pdf>.

¹³ SOCIETY OF AUTOMOTIVE ENGINEERS, 2018 ANNUAL REPORT, <https://www.sae.org/about/annualreport/2018> (last visited Jan. 11, 2021).

¹⁴ Casey Newton, *Uber Will Eventually Replace All Its Drivers with Self-Driving Cars*, THE VERGE (May 28, 2014, 3:52 PM), <https://www.theverge.com/2014/5/28/5758734/uber-will-eventually-replace-all-its-drivers-with-self-driving-cars>.

efflux of unemployment. These AVs are likely to profoundly transform our social habits¹⁵ by revolutionizing the way to interact with the society and environment.¹⁶

II. CHALLENGES WITH INCEPTION OF AUTONOMOUS VEHICULAR TECHNOLOGY IN MAINSTREAM

The very thought of inclusion of such a technology in everyday life, may give one immense satisfaction in terms of enhanced comfort and mobility. However, it is not that easy. The following incidents create doubt in the viability of AV including that of the February of 2016, when Google's self-driving car crashed in California while changing lanes thereby putting itself in the way of an oncoming bus.¹⁷ It was followed by the first death by an AV caused by a Tesla Model S which failed to differentiate a large white truck against a bright sky in Arizona. Next was the accident of 2018, wherein Elaine Herzberg became the first pedestrian to be run over by a driverless Uber vehicle in the U.S.¹⁸

The questions took a new turn altogether when the technology employed began encroaching privacy. Such as the incidence of Coca-Cola Bottling Co., wherein a GPS device was attached to the company's vehicle, or the tale of New York Department of Labor, which installed a similar device to track employees' movement.^{19 20}

Driverless cars have the potential to revolutionize our life for the better, but the consequences of its adoption will likely put the legal and technical fraternity into the prosecution box, wherein various unanswered question will arise out of this brewing dilemma.

¹⁵ Matthew Claudel & Carlo Ratti, *Full Speed Ahead: How the Driverless Car Could Transform Cities*, MCKINSEY & CO. (Aug. 1, 2015), <https://www.mckinsey.com/business-functions/sustainability/our-insights/full-speed-ahead-how-the-driverless-car-could-transform-cities>.

¹⁶ See Brian Huerbsch & Andrew Alvarado-Sieg, *Uncertainty and Risk in the Global Automotive Industry*, THOMSON REUTERS, <https://www.thomsonreuters.com/content/dam/ewp-m/documents/thomsonreuters/en/pdf/reports/global-automotive-industry-report-thomson-reuters.pdf> (last visited Jan. 12, 2021).

¹⁷ Dave Lee, *Google Self-Driving Car Hits a Bus*, BBC NEWS, Feb. 29, 2016, <http://www.bbc.com/news/technology-35692845>.

¹⁸ Greg Bensinger & Tim Higgins, *Video Shows Moments Before Uber Robot Car Rammed into Pedestrian*, WALL ST. J. (Mar. 21, 2018, 11:10 PM), <https://www.wsj.com/articles/video-shows-final-seconds-before-fatal-uber-self-driving-car-crash-1521673182>.

¹⁹ *Elgin v. St. Louis Coca-Cola Bottling Co.*, No. 4:05CV970-DJS, 2005 WL 3050633 (E.D. Mo. Nov. 14, 2005).

²⁰ *Tubbs v. Wynne Transp. Serv., Inc.*, No. H-06-0360, 2007 WL 1189640 (S.D. Tex. Apr. 19, 2007).

One of the areas wherein the research is much needed is to decide liability for the accident caused by a driverless car in the former or issues pertaining to hacking the software as a tool for terrorists. With these questions flooding the gateways of legislatures, it is necessary to take cognizance of the current need of developing law for answering these questions.

These first of their kind incidents, with a negligible human involvement are likely to raise new questions and concerns about cyber security and liability, which as of now largely remain unaddressed.²¹ However it would be wrong to bluntly ignore the efforts of the legislatures who have tried contemplating a framework for regulating AVs, such as seven states within the United States and the United Kingdom.

But by no means can the status quo be deemed as an adequate framework for the regulation of AVs. Just because these unanswered ambiguities are lined up, does not mean that the development of technology can be brought to a halt. History has been evident to this fact, that be it general law or specific law, they both have developed either as and when the court takes cognizance of the incidents happening around or in the case of latter, with the parties specifically bringing it to the notice of the court, for the development of law. It would be wise for lawmakers to anticipate the law while this technology segment still remains in its infancy.

III. THE COMPLEXITY OF CIVIL AND CRIMINAL LIABILITY IN AV ACCIDENTS

Highly automated vehicles have the potential of initiating a metamorphosis in the man's interactions with the technological front. Amidst this chaos, the conundrum of deciding who will be ultimately bearing the brunt of liability following an AV crash remains unsettled.

In contemplating as to whom to sue in a traditional car crash, one, without a second thought, would assign the blame to the driver (operator)²² or further to the car manufacturer, depending on the type of crash. However, in cases where the car drives via software, in absentia of a driver, there needs to be a different approach for determining liability. AVs currently encompass a wide range of different driving support technologies which impact the vehicle's conduct and subsequently the involvement of human driver—in various degrees. When autonomous vehicles have

²¹ Alex Lubben, *Self-Driving Uber Killed a Pedestrian as Human Safety Driver Watched*, VICE (Mar. 19, 2018, 1:35 PM), <https://www.vice.com/en/article/kzxq3y/self-driving-uber-killed-a-pedestrian-as-human-safety-driver-watched>.

²² S.B. 47, 2019 Leg., Reg. Sess. (Ala. 2019).

a challenge with accidents, addressing liability becomes more difficult and complicated, in the want of novice methods to adjudicate as to who actually is at fault.²³

Scientific developments like that of AVs are likely to add to the list of incidents. Hence, the most prudent way to settle the quandary is to widen the breadth of jurisprudence. Every rule of law takes birth in the light of facts and circumstances surrounding a particular case. Before proceeding with the existing and expected legislative framework, there is a need to bring forth the peculiar facts of each accident involving AVs so far, which has further accentuated the complexity in adjudging the question of liability.

The facts of every accident involving autonomous vehicles that has happened so far are as follows:

(a) After having driven 130 million miles, Tesla's first known autopilot crash, causing death of Joshua Brown, was reported on May 7 in 2016. The Tesla Model S was designed in a way wherein the full attention of the driver was required to detect lane markings while parking, to adhere to traffic signals and to detect pedestrians, despite the car being automated.²⁴ On its cognizance being taken by National Highway Traffic Safety Administration (hereinafter referred to as "NHTSA"), it was revealed that both the autopilot and the driver were unable to notice the white side of the tractor against a brightly lit sky, and hence the collision.

A formal investigation by **National Transportation Safety Board** revealed an over-reliance on the representation of "Autopilot" by Brown, wherein he was to get the hold of the steering wheel, on the failure of which, a warning was to be issued to garner the driver's attention and the car would stop, and in absentia of such response to any of the alerts, a report was released in January 2017, by the concerned authority which held that Tesla was not at fault.²⁵

²³ John Villaseñor, *Products Liability and Driverless Cars: Issues and Guiding Principles for Legislation*, BROOKINGS (Apr. 24, 2014), <http://www.brookings.edu/research/papers/2014/04/products-liability-driverless-cars-villaseñor>.

²⁴ Sam Abuelsamid, *Tesla Autopilot Fatality Shows Why Lidar and V2V Will be Necessary for Autonomous Cars*, FORBES (July 1, 2016, 8:03 AM), <https://www.forbes.com/sites/samabuelsamid/2016/07/01/first-tesla-autopilot-fatality-demonstrates-why-lidar-and-v2v-probably-will-be-necessary/?sh=7836c5db2d9>.

²⁵ Andrew J. Hawkings, *Fatal Tesla Autopilot Accident Investigation Ends with No Recall Ordered*, THE VERGE (Jan. 19, 2017, 11:08 AM), <https://www.theverge.com/2017/1/19/14323990/tesla-autopilot-fatal-accident-nhtsa-investigation-ends>.

THE CONVOLUTION

(b) In July of 2015, three of **Google's** employees suffered minor injuries while their vehicle was hit by a car, because the driver failed to brake. On February 14, 2016, a Google Vehicle attempted to avoid sandbags which were blocking its path and ended by striking a truck in this maneuver.²⁶ Google however, accepted its responsibility of providing the riders with a safer driving experience.

(c) The very first death of a pedestrian named **Elaine Herzberg caused by a self-driving car by Uber**, in the United States while crossing a road, raised a new trend out of court settlements in the accidents concerning autonomous vehicles,²⁷ wherein a presumably high cost is paid to safeguard the otherwise costly blow to goodwill and reputation.²⁸ Uber, as a consequence of being debarred by the government, have withdrawn their entire fleet of self-driven vehicles.

These incidents no doubt have provided a base for the existing legislative structure in the USA, Europe, and Asia, and also raised new questions in the want of attention. However, a lot more has to be done, for the hassle free settlement of claims by answering the existing ambivalence which swings in limbo.

A. The Unsought Questions

(a) Who would be liable if Mr. Brown over-relied on the Autopilot, expecting it to come to a halt all by itself even if he does not catch hold of steering wheel despite repeated warnings? Will he be liable for having acted negligently despite knowing the car being in a beta phase, which required the attention of the driver or would the manufacturers, Tesla be liable for having misrepresented the word Autopilot, which any layman would assume to be fully automatic?

(b) Or would Tesla be liable for its inefficient sensor system which could have exercised a better control in the form of eyes engagement instead of simply relying over the verbal warnings as a means to keep the driver's attention on the wheel?

(c) Will the government in the wake of promoting technology and innovation, let go the "unquestionable failure" of any manufacturer or software developer to ensure public safety?

²⁶ Alex Davies, *Google's Self-Driving Car Caused Its First Crash*, WIRED (Feb. 29, 2016, 2:04 PM), <https://www.wired.com/2016/02/googles-self-driving-car-may-caused-first-crash/>.

²⁷ Bensinger & Higgins, *supra* note 18.

²⁸ Alex Davies, *Arizona Won't Be the Last Place to Micromanage Robocars*, WIRED (Mar. 27, 2018, 3:58 PM), [https://www.wired.com/story/uber-self-driving-crash-arizona-suspend-testing-ducey-governor/#:~:text=Today%2C%20on%20the%20orders%20of,vehicles%20on%20the%20state's%20roads.&text=\(An%20Uber%20vehicle%20operator%20was,%2Dyear%2Dold%20Elaine%20Herzberg.](https://www.wired.com/story/uber-self-driving-crash-arizona-suspend-testing-ducey-governor/#:~:text=Today%2C%20on%20the%20orders%20of,vehicles%20on%20the%20state's%20roads.&text=(An%20Uber%20vehicle%20operator%20was,%2Dyear%2Dold%20Elaine%20Herzberg.)

(d) Or will the law makers take a tough stand for the promotion of public safety, and in this process halt the development of technology by making innovators wait until a time when a proper legislative structure absolving these ambiguities is devised?

(e) Also, will the route of “Out of Court Settlement” as in the case of compoundable offences be accepted in the administration of justice, or will any accident involving self-driven cars be treated as a non-compoundable one, wherein the State itself punishes those committing a crime against society at large?

This Article attempts to put these ambiguities at rest.

Imagine yourselves riding across the countryside in your car, while catching up with your friends and family over meals and movies, with the car doing all the driving, from parking to changing lanes with minimal support of yours. Now that it is actually happening in our world, the question that strikes back and forth is how will the manufacturers like Tesla and Ford, ensure that these self-driven vehicles will never fail and even if they do, what mechanism will decide the ultimate question of liability or if no fault of either the manufacturer or the operator is found, will the car be sued?

These questions of safety and liability are indirectly thwarting the efforts of automobile giants like Volvo from bringing their vehicles to the road.

B. The Current Liability Regime and Its Application to Autonomous Vehicle Technologies

It was on September 19, 2016 that the U.S. Department of Transportation, while expressing its support for the development of driverless vehicles as a means to improve the public mobility and safety, released guidelines which could mitigate the gap between the self-driven and human-driven vehicles.²⁹ It was followed by California which became the first state to contemplate a framework regulating AVs. The guidelines meant to allocate liability among the “Highly Automated Vehicles” (hereinafter referred to as “HAV”) included the owners, operators, and manufacturers. The development of legislation covering these ambiguous and unaddressed issues is by no means sufficient to act as a stimulant in the promotion of technology and innovation.

Therefore, one of the areas where the research is much needed for deciding the question of liability is *Product Liability Laws*. This branch of law draws its essence from tort liability. Hence, this section explains the principles of automated motor vehicles crash and products liability law and their subsequent application to

²⁹ U.S. DEP’T OF TRANSP., THE U.S. DEPARTMENT OF TRANSPORTATION’S FEDERAL AUTOMATED VEHICLES POLICY (2016), <https://www.transportation.gov/AV/federal-automated-vehicles-policy-september-2016>.

autonomous vehicle technologies with an aim to define the undefined contours so as to incentivize the interaction of technology and automobiles, to encourage precautions against crashes, and compensating victims and promoting corrective justice.³⁰

1. Product Liability Law—The Preface

Defective products have been the root cause of thousands of injuries around the world. Product Liability laws happen to be the savior by contributing to the jurisprudence a plethora of legal rules concerning the determination of liability in the event of defective manufacture of a product. Ideally, it holds the manufacturer or the seller liable for the sin of placing a dangerous product in the hands of consumer. As of now there is a dearth of a federal piecemeal legislation on product liability law, hence making it dwell on the principles of tortious law.³¹

There has always been an impediment in the development of tortious law, which has restrained the liability of the defendant in the absence of a contractual relationship in the marketplace.³² Historically, a contractual relationship known as “privity of contract,” had to be existent between the injured consumer and the supplier for the former to recover from the latter. It was in the latter half of the nineteenth century, that this rule was done away with and the court began imposing the liability even in absence of a contract between the parties, taking into consideration the inherently dangerous nature of the products.³³ It was the historic decision in *George v. Skivington*,³⁴ that the court held the defendant liable for the breach of duty imposed by law, even if no contract or contractual intention governed the circumstance. *Donoghue v. Stevenson*,³⁵ in the year 1932, held that every manufacturer had to adhere to the general duty of care towards all consumers.

However, it is essential to recognize that this branch of law does not contemplate a strict formula for disentangling the conundrum encompassing AVs. But by the virtue of liberal interpretation of law, the definition of product and scope of product liability has been kept vast enough to include within itself all the latest

³⁰ *Rio Seco v. Alfred Meyers Trucking, Inc.*, 208 So. 2d 265, 266 (Fla. Dist. Ct. App. 1968).

³¹ CAL. VEH. CODE § 38750 (2012); National Conference of State Legislatures, *Autonomous Vehicles | Self Driving Vehicles Enacted Legislation*, NATIONAL CONFERENCE OF STATE LEGISLATURES (Feb. 18, 2020), <https://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx>.

³² *Winterbottom v. Wright*, (1848) 10 M&W 109 (Eng.).

³³ *Longmeid v. Holliday* [1851] 6 Exch 761 (Scot.).

³⁴ *George v. Skivington* [1869] 157 ER 488 (Eng.).

³⁵ *Donoghue v. Stevenson* [1932] AC 562 (HL) 564 (Eng.).

developments, both scientific and non-scientific innovations.³⁶ Hence, the AVs we have today would most likely be governed under the laws of product liability. The product liability case laws which enumerate the principles of tortious law are capacitated to saturate the gulf on the address of liability in the self-driving cars.

a. Segregation of Product Liability Law

Over the period of time, three categories of defects have emerged as a subject matter of product liability law, which are namely:

- Manufacturing Defect
- Design Defect
- Failure to Warn

Manufacturing Defect

A product is said to have a manufacturing defect, according to § 2(a) of the Restatement (Third) of Products Liability, if it “departs from its intended design even though all possible care was exercised in the preparation and marketing of the product.”³⁷ These defects can be divided into two parts. The first part being that the manufacture constructs the product using flawed raw materials³⁸ and the second being, an erroneous assemblage of the raw materials.

The decided case laws act as precedents, thereby making it a mandate for an AV manufacturer to take all reasonable care while converting the proposed blueprint of the vehicle into the vehicle itself. His failure to do so would result in his being held liable for any losses and/or injuries the victim might sustain. If the plaintiff proves the manufacturer’s departure from his self-proposed specifications, there is no defense which can save the manufacturer from the wrath of strict liability, wherein he will be held liable despite taking all the adequate care. The soundness of this provision will be analyzed in the coming section.

However, with the evolution of lean production techniques, wherein the entire manufacturing process is arranged in a systematic manner by eliminating the waste, the number of conventional manufacturing defects are on a decrease. Out of all the incidents involving Uber, Google and Tesla models, the investigative agencies did not trace the incident to manufacturing defects.³⁹

³⁶ Abuelsamid, *supra* note 24.

³⁷ RESTATEMENT (THIRD) OF TORTS PRODUCT LIABILITY § 2(a) (AM. LAW INST. 1998).

³⁸ Magnuson v. Kelsey-Hayes, 844 S.W.2d 448 (1992).

³⁹ Montez v. Ford Motor Co., 101 Cal. App. 3d 315, 320–22 (Ct. App. 1980).

This proves that the manufacturers did comply with all that was necessary in manufacturing the vehicles, keeping in mind the reasonable standard of care required to ensure the operator's safety.

What if there is a deviation in the actual vehicle manufactured from the design the manufacturer intended, leading to manufacturing defects? The intended design of the vehicle, obviously would have been the safest and the most viable design, the manufacturer chalked out and any sort of deviation from the proposed design whether attributed to negligence or inadequate infrastructure would have made the ultimate operator land into the car which carries the design, slightly or majorly unsafe for the required purpose. Or maybe the blueprint or the design of the vehicle itself was designed without keeping in mind the duty of care, therefore the design itself is in violation of the "neighbor" principle laid in *Donoghue v. Stevenson*.⁴⁰ The neighbor principle says that a person should take reasonable care to avoid acts or omissions that he or she can reasonably foresee that could injure others. The latter one of them introduces the second element of product liability, "**Design Defect**." In either of the two situations, the driver or the operator for sure, will be exposed to risk of varying quantum.

Design Defect

Design defect comprises an allegation that the design of the product is itself defective. So far, the Courts have evolved two major principles which constitute the basis of Design Defect: consumer expectation and cost-benefit.

The courts have elucidated the doctrine of reasonable consumer expectation as follows:

"A product is defective in design or formulation when it is more dangerous than an ordinary consumer would expect when used in an intended or reasonably foreseeable manner. Moreover, the question of what an ordinary consumer expects in terms of the risks posed by the product is generally one for the trier of fact."⁴¹

Each consumer while buying a product, has an expectation that the product bought will perform as safely as an ordinary consumer would expect when used in as intended or in a reasonably foreseeable manner. Any consumer would never want the inherent risk or danger to outweigh the proposed benefits which ends up causing injuries, as held in *Barker v. Lull*.⁴² This interpretation is in harmony with the conscience of the legislature as drafted in the comment of the § 402A of the

⁴⁰ [1932] UKHL 100.

⁴¹ Donegal Mutual Insurance v. White Consolidated Industries, 166 Ohio App. 3d 569 (2006).

⁴² 20 Cal. 3d 413, 426–27 & 435 (1978).

Restatement (Second) of Torts, which defines unreasonably dangerous as something which is beyond the contemplation of an ordinary consumer with an ordinary knowledge common to the community as a whole.

*Greenman v. Yuba Power Product*⁴³ further clarified that the one who sells any defective product which is unreasonably dangerous to the user or the consumer or to his property is subject to liability for physical harm thereby caused to the ultimate user or consumer or to his property.⁴⁴

However, this doctrine of consumer expectation is subject to a cautious application. The rule so stated is only applicable when the defective condition of the product makes it unreasonably dangerous for the end consumer. Many products cannot possibly be made entirely safe for all consumption, and any food or drug necessarily involves some risk of harm, if only from over-consumption. Ordinary sugar could be deadly poison to diabetics but not to others without such condition. That is not what is meant by “unreasonably dangerous” in this section.⁴⁵

Despite being an inherent part of jurisdictions, many countries have abandoned it as unworkable. This test might result in the manufactures of autonomous vehicles being burdened with an unnecessary substantial liability simply because the consumer may tend to have unrealistic expectation about the performance of these technologies.⁴⁶ These technologies which are synchronized to assist the driver, if overly relied on can make the manufacturer shoulder the burden of liability with practically no fault of his, hence acting as an impediment to technological development.

The courts tend to prefer the risk utility test to analyze the defects in design. It weighs the benefit of the product against the cost. It is inclusive of various parameters which include the usefulness and desirability of the product, the likelihood of injuries, availability of substitutes, the anticipated awareness of the dangers inherent in the product.

Some jurisdictions combine the consumer-expectation and risk-utility tests and allow a plaintiff to prove design defect by proving either theory.⁴⁷ Others have

⁴³ 59 Cal. 2d 57, 27 Cal. Rptr. 697, 377 P.2d 897 (1963), Supreme Court of California.

⁴⁴ “Framework Document on Automated/Autonomous Vehicles” (The United Nations Economic Commission for Europe (UNECE), 8th Session, Doc. No. ITS/AD-08-05 at Agenda 2,3 Def. 1, 4, Mar. 9, 2016), <http://www.unece.org/trans/themes/trans-theme-its/automated-vehicles/automated-driving.html> (accessed 15 Mar. 2020).

⁴⁵ RESTATEMENT (SECOND) OF TORTS, § 402A cmt. i.

⁴⁶ *Hisrich v. Volvo Cars of North America*, 226 F.3d 445, 2000.

⁴⁷ *Barker v. Lull Engineering Co.*, 20 Cal. 3d 413, 1978.

THE CONVOLUTION

somewhat confusingly defined consumer expectations in part by a cost-benefit analysis.⁴⁸ Consistent with § 2(b) of the Restatement (Third) of Products Liability, many courts require a plaintiff to show that an alternative design was feasible that would have prevented the harm.⁴⁹ Either way, an absolute liability gets imposed on the manufacturer.

However, it is important to take into account that whether it be risk-utility or consumer expectation, both evolve on the basis of the representation that the seller or the manufacturer makes via advertisement or marketing. This dimension gets covered by another branch of law under the **law of contracts**. The law of contracts involves warranties which are created through the process of advertisement and selling products, and hence act as assurance that the goods in consideration are of merchantable and sufficient quality. Thus, if it does not turn out to be true, and the buyer suffers loss or injury as a consequence, the seller will be liable for the breach of warranty.

Product warranties are those aspects of commercial transactions which are addressed in **Uniform Commercial Code (UCC)**.⁵⁰ It was originally published in 1952 by the National Conference of Commissioners on Uniform State Laws, now referred as Uniform Law Commission. Taking into consideration the dynamics of commercial and business environment, UCC has amended these laws many times for an enhanced jurisdiction.

The existence of a “**Design Defect**,” implies holding the manufacturer liable for the breach of **implied warranty** to ensure the safety of the ultimate buyer by not certifying the goods to be of merchantable quality. The plaintiff must first produce evidence to show the defective nature of product upon its failure to perform as safely as a reasonable, ordinary consumer would expect under the circumstances surrounding the product’s failure.⁵¹ It is to be kept in mind, that the standard should be that of an ordinary consumer. Expert witness or testimony should not be used for evaluating the liability under this.⁵²

This test referred to as the consumer expectation test, is brought to use when the product’s design violates the minimum safety assumptions that are broadly based on the everyday common experience of the user in the context of the product’s

⁴⁸ Potter v. Chicago Pneumatic Tool Co., 241 Conn. 199, 1997.

⁴⁹ Restatement (Third) of Products Liability, § 2(b).

⁵⁰ Uniform Commercial Code, 2001.

⁵¹ Bresnahan v. Chrysler Corp., 38 Cal. Rptr. 2d 446, 451–52 (Cal. Ct. App. 1995).

⁵² Soule v. General Motors Corp., 882 P.2d 298, 308 (Cal. 1994).

failure.⁵³ This test was applied by the court in *Bresnahan v. Chrysler Corp.*, to a car's airbags, because any reasonable consumer would expect airbags to deploy safely in the event of a rear-end collision, despite very few consumers having experienced its deployment.⁵⁴

This has to be kept in mind that the evaluation of expectation needs to be made on an ordinary consumer expectation without laying any emphasis on what expert witnesses have to say. As it happened in *Soule v. Gen. Motors Corp.*, the consumer expectation test did not find any application, since the circumstances took expert testimonies into consideration for resolving the complex issues which required risk utility analysis, something an ordinary consumer will never be competent to ascertain under consumer expectation test.⁵⁵

The consumer's safety expectation depends on the information disseminated by the manufacturer or the seller of the product to a large extent. On a better analysis of Tesla Model S crash, one finds that the vehicle's Autopilot, operated on a beta phase, which necessitated the human engagement so as to take control of every situation going at odd. The Autopilot was no substitute to human intervention since it constantly reminded the driver to keep his/her hands on the steering wheel.

With this information brought to the notice of the consumers, as claimed by Tesla, none of them could expect the Autopilot to detect large moving objects and guarantee safety while performing an unassigned function. Autopilot's failure to differentiate the truck against a bright sky, comes somewhere under the ambit of risk utility analysis demanding expert opinion as to show why the system malfunctioned. In such a scenario, with no reported breach of reasonable safety expectations, the producer will by no means be held liable for any injury sustained by the ultimate user in this context.

The point to be noted in the Tesla accident is that Tesla did assert the circulation of the information concerning the Autopilot being operated in the beta phase which necessitated human interference. But what if things unfolded in a different way and the driver over relies on the word "Autopilot" and assumes the vehicle functions all by itself with zero driver intervention and in this expectation fails to take the appropriate steps for preventing accidents which might have been controlled had the driver acted on time.

⁵³ *Hisrich v. Volvo Cars of N. America*, 226 F.3d 445 (6th Cir. 2000).

⁵⁴ *Bresnahan*, 38 Cal. Rptr. 2d at 451–52.

⁵⁵ *Soule*, 882 P.2d at 316.

THE CONVOLUTION

If such things take place, this would not be a matter of much astonishment if the producer is held liable for misrepresentation.⁵⁶ Misrepresentation as the name suggests, involves communication of false or misleading information. If a person to whom such a piece of information has been served relies on it and consequently suffers harm, the supplier of such information will be held liable under the tort law.

There can be a situation where an AV manufacturer advertises his vehicle to require “very rare” human engagement. However, at a later point of time, the driver is asked by the vehicle to take control every three to four minutes, he or she might claim damages on account of misrepresentation.

This directly relates to the element of product liability which takes into account the liability of the manufacturer on his/her failure to provide adequate information regarding the risk involved in the use of the product, and hence if an injury follows, the manufacturer will be held liable.

Thus the vehicle manufacturers need to ensure that the required information gets conveyed to the ultimate buyer. A proper set of instructions needs to be provided and mechanisms should be devised so as to ascertain their compliance.

If a plaintiff proves that the defective design (design defect), in contrast to what was advertised (tortious misrepresentation) and what was warranted (breach of implied warranty of merchantability), it would squarely apply strict liability on the manufacturer irrespective of this default. Such a restrictive formula for the fixture of liability is detrimental for the infusion of technology into the automobile industry. Hence a harmonious construction between the development and dissemination of justice is essential.

One approach to this problem can be the integration of risk utility with consumer expectation to evolve a standard for liability. As already addressed that the intriguing question is what must constitute a reasonable level of safety from a consumer’s viewpoint, to hold the manufacturer liable under the design defect theory. Risk utility being a subjective test is unlikely to be adjudged by the objective test of the court. Hence, a standard of reasonable expectation must be devised by honoring the stakeholders belonging to both sides of the coin.

Failure to warn.

Accidents happening on account of inattentiveness of the driver, could be attributed to usage of mobile devices while driving. This is something the producers can effectively “foresee” that the human mind is not capacitated to monitor the task if it does not have any work associated with such task. Taking a ride via an AV with practically no driver engagement and just requiring to monitor the self-driven car, so

⁵⁶ Derry v. Peek [1889] 14 App. Cas. 337.

as to take control of the vehicle if and when the things go wrong, would for sure invite umpteen methods of disengagement be it movies, texting or a phone call. Since psychology cannot be changed, an effort can be made to keep the driver hooked to the automated car, with additional sensors and cameras which could sense the eye movement of the driver and warn if found off road.

Ensuring such an arrangement, would definitely enhance the degree of attentiveness of the driver in the AV and hence, this can act as a good defense in the event of any suit against the manufacturer. Therefore, products can be defective for their failure of the system to issue apt warnings. If there is a hidden danger in the product, the manufacturer has an obligation to warn of the danger. If it fails to do so, the product can be found defective as a result of its failure to warn. Section 2(c) Restatement (Third) of Products Liability defines a defect for failure to warn as follows:⁵⁷

A product is defective because of inadequate instructions or warnings when the foreseeable risks of harm posed by the product could have been reduced or avoided by the provision of reasonable instructions or warnings . . . and the omission of the instructions or warnings renders the product not reasonably safe.

The more security systems the vehicle includes the greater the cost, the ultimate brunt of which will be borne by the consumer. The plaintiff could argue for the need of security system and that it is a trivial cost to save many lives while at the same time defendant on the other hand will plead the impossibility of anticipation due to the limitation of foreseeability.

All three defects provided in product liability law hold the manufacturer strictly liable for each defect but even if a manufacturer exercises all possible care to manufacture safe products, there might be a minute chance of the product carrying an unnoticed defect. And if the same defect becomes the cause of plaintiff's injury, the manufacturer would be held strictly liable. It is intuitive, in fact, that those who are responsible for the development and the commercialization of an unsafe product must be subsequently liable for potential harms caused by its use. On the basis of this assumption, the vast majority of the literature on the topic concedes that the manufacturer is, actually, the sole reasonable figure that should be held responsible for autonomous car accidents.⁵⁸

⁵⁷ RESTATEMENT (THIRD) OF TORTS PRODUCT LIABILITY § 2(c) (AM. LAW INST. 1997).

⁵⁸ *Pathway to Driverless Cars*, UK DEPARTMENT FOR TRANSPORT (2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/581577/pathway-to-driverless-cars-consultation-response.pdf.

Supporters of technology argue that a justified reason for the exclusion of their liability is the important role they play in the industry. It could be summarized as:

First, the argument is based on the idea that the increase in the cost of litigation and compensation after the accidents in absentia of their default, would impact the overall cost structure sustained by the manufacturers, and curtail the investments made in R&D, and would impede the introduction of new technology into the market.

Second, a blind imposition of strict liability is against the principles of justice and equity, because in the development of an AV, there are numerous parties involved. The manufacturers delegate the specialization of AVs to various software experts for the better improvisation.

Hence these arguments should further be strengthened in the light of ending the deadlock amidst technology and corrective justice.

2. Law of Torts

After having discussed extensively all the situations wherein the producer can be held liable, what if a producer does everything right on his part, but it is the consumer (driver in this case) whose fault cost him injuries. As per the conventional law of torts, failure on the part of consumer to take due care and diligence, as a man of ordinary prudence would in the similar situations amounts to negligence. A vehicle is always traditionally considered to be under the control of a driver; hence he is a party who could be held immediately responsible for any accidents the car encounters. There are five levels of automation in vehicles. It begins from level 0 wherein there is no automation at all and the vehicle is manually controlled and reaches to level 5 wherein no human attention is required for driving the vehicle.⁵⁹ In regulation of vehicles ranging from level 1 to level 3, the system assigns a supervisory role to the driver, and holds him, guilty in the event of breach. For the cars with automation level 0-4, wherein the driver does have a role to play, negligence could be effectively litigated.

Tesla's Autopilot requirement of keeping hands on the steering wheel by the issuance of subsequent warnings resulted in the acquittal of Tesla from any liability by pleading negligence on the part of the driver.⁶⁰ When Oscar Wilhelm Nilsson, a

⁵⁹ Isabel Harner, 'The 5 Autonomous Driving Levels Explained', IOT FOR ALL, July 3, 2020, <https://www.iotforall.com/5-autonomous-driving-levels-explained>.

⁶⁰ Rachel Abrams & Annalyn Kurtz, *Joshua Brown, Who Died in Self-Driving Accident, Tested Limits of His Tesla*, N.Y. TIMES (July 1, 2016), <https://www.nytimes.com/2016/07/02/business/joshua-brown-technology-enthusiast-tested-the-limits-of-his-tesla.html>.

motorcyclist asserted that he was involved in a collision with a self-driving 2016 Chevrolet Bolt (which was in self-driving mode) due to the vehicle switching lanes on the driver's command, it led to the evolution of the first-known suit involving a self-driven vehicle on the ground of negligence on the part of the automated vehicle.⁶¹

However, the United States District Court (Northern District of California), did not admit any liability against the defendants since negligence was not proven. What came to the brim was the negligence was on the part of motorcyclist instead who abruptly appeared before the vehicle.⁶²

However, this definition of negligence cannot be applied per se when we talk of automated AVs at level 5. This is because of the reason that the very essence of negligence involves “**reasonable care**” analysis. Self-driving cars, just like other machines lack human capacity to reasonably analyze the amount of exercisable care. In absentia of the essence of negligence, i.e. capacity to take reasonable care, the AV by no means can be held negligent, and it would be fruitless to argue negligence on the part of the driver in a fully automatic car, for he plays no active role in the control of vehicle, except for a minor hypothesis like negligence in downloading mandatory updates for vehicles' software (for which Section 4 of The Automatic and Electric Vehicles Act, 2018, just limits or excludes the liability of the insurer or the driver of automated vehicle, if the damage suffered by injured party arises from an accident arising as a direct result of: (a) software alterations made by the insured person, or with the insured person's knowledge, that are prohibited under the policy, or (b) a failure to install safety-critical software updates that the insured person knows, or ought reasonably to know, are safety-critical.⁶³

Thus, prima facie it would be impossible for a human conduct to cause an accident. Being addressed as “**Twice Impotent**” before the automated vehicle, the driver neither can modify the conduct of the vehicle nor possess the specific competencies to operate the software. Just like the driver is absolved from all the liabilities concerning automated vehicles since he too will be unable to predict the behavior of the car.

Also, there has been an increase in car-sharing, accruing benefits such as reduction in traffic and pollution to the society. This ends up impacting the proprietary assets of the vehicles, as in whosoever undertakes this, will be disincentivized for bearing the costs of something he had never had control over.

⁶¹ *Id.*

⁶² Nilsson v. Gen. Motors LLC, 3:18-cv-00471 (N.D. Cal. June 26, 2018).

⁶³ Automated and Electric Vehicles Act 2018, 1, § 4 (U.K.).

In any incident involving automated vehicle, either the manufacturer is liable under the strict liability rule or it is the driver being held responsible for negligence. Both ways have limitations attributed to them. Holding the manufacturer strictly liable despite taking all reasonable possible care or arguing negligence on the part of the driver, who could do nothing, if the car he was riding in was fully automatic, are not feasible. It was the 2018 legislation of UK, Automatic and Electric Vehicle Act, which took into consideration the two extremities and at the same time drew a midway to decide the question of liability.

The act specifically held the driver of the automated vehicle liable for any accidents of an uninsured individual it causes while plying on the roads of Great Britain and on a similar note, the insurer was made liable to compensate any damages, the insured vehicle sustained in the event of collision with an AV.⁶⁴ The act also talks about the possibility whereby the injured party is in any way the cause of the accident along with the AV's driver, the amount of the liability is subject to whatever reduction under the **Law Reform (Contributory Negligence) Act 1945** would apply to a claim. This is in respect of the accident brought by the injured party against a person other than the insurer or vehicle owner.⁶⁵ This is nothing but a principle of contributory negligence.

C. Imposition of Liability among Stakeholders

In the light of the various conditions and circumstances where we studied the extent of the liability being shared by the three players namely the owner, the driver or the operator and the manufacturer (in some instances), it is the third player upon which the imposition of liability is controversial and debatable.

These proposed arguments call for a complete doing away with the principle of strict liability in its imposition on the manufacturers. Diametrically opposite to this, lies the current stance of law, which does not mind holding the manufacturers liable for even the unforeseeable accidents. Hence avoiding the extremities, it is nonetheless opportune to observe both of them, and frame a rationale which could justify the interests both of the lawmakers and manufacturers.

D. The Furtherance of Criminal Intent in Autonomous Accidents

After extensively discussing about the scenario which prevails in the event of a accident by autonomous vehicle, the question which intrigues the law framers back and forth is whether, killing of a person in an accident by AV is likely to be termed as homicide. Generally speaking, killing a person is a crime and one is guilty "if he

⁶⁴ *Id.* § 5.

⁶⁵ Law Reform (Contributory Negligence) Act 1945, 8 & 9 Geo. 6 c. 28, § 3(1)(b) (U.K.).

purposely, knowingly, recklessly or negligently causes the death of another human being.”⁶⁶ But when the perpetrator does not maintain intent, the killing could be either manslaughter or negligent homicide.

There might be a possibility that the manufacturer or the software developer in furtherance of a criminal intent commanded the automated vehicle to run over the mob or crowd. No law could at that time save the culprit from the imposition of liability.

The most important elements of a criminal act are **actus reus** and **mens rea**. To be guilty of a standard crime, the perpetrator must commit a voluntary act that causes harm.⁶⁷ The first element is called actus reus which is where the suspect personally or proximately causes a harm via his own voluntary act. However, evaluating actus reus in the context of AVs, makes us re-affirm the statement that the passengers relinquish control to a human driver, and hence not guilty of any harm the vehicle causes. Similarly, the human driver too relinquishes the control to the automated driving system after inputting the destination.⁶⁸ The human operator by no means satisfies the element of actus reus, because he is not acting. It is the automated vehicle which controls everything. Hence it is evident that AV’s output is the result of the programmed input given by the manufacturer or the software developer.

Instead, the law should hold the AV and its manufacturer criminally culpable through the products culpability cause of action. The harm still occurs, and the criminal law must deter and punish harmful, illegal behavior.⁶⁹

When it comes to the second element of the criminal liability, i.e. **mens rea**, proving criminal liability becomes difficult to prove. Suppose the automated vehicle broke one of the traffic rules and ignored the presence of police. In such an instance it would be of no use to hold the driver liable, since he did not give any command to the vehicle except for inputting his destination. Hence the very element of intent remains missing on the part of the human operator.

⁶⁶ *Pathway to Driverless Cars: Consultation with the proposals to support advanced driving assistance systems and automated vehicle*, THE UK DEPARTMENT FOR TRANSPORT (2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/581577/pathway-to-driverless-cars-consultation-response.pdf.

⁶⁷ MODEL PENAL CODE § 2.01 (AM. L. INST. 1985).

⁶⁸ Ryan C.C. Chin, *Driverless Cars—The Future of Transport in Cities?*, THE GUARDIAN (Feb. 24, 2014, 7:41 PM), <https://www.theguardian.com/sustainable-business/driverless-vehicles-future-car-sharing>.

⁶⁹ SAMIR CHOPRA & LAURENCE F. WHITE, *A LEGAL THEORY FOR AUTONOMOUS ARTIFICIAL AGENTS* (Univ. of Mich. Press 2011).

THE CONVOLUTION

Similarly, the Automated Vehicle's software did not willfully disobey the officer, because it simply responds to the commands the programmer had issued.⁷⁰ As always, the manufacturer could be held liable for programming the intentional breaking of a traffic law, but that kind of technological crime should be treated similarly to any other technology-based crime.⁷¹

IV. PROPOSED FRAMEWORK

An attempt is made to propose the formation of a model which seeks to effectively chalk out the way of golden mean to this prevailing conundrum of undecided liability amongst the actors involved in an AV accident.

The model advances the establishment of a capped fund, which will be regulated by the central government of any country. This will be followed by the institution of a new body bestowed with quasi-judicial powers, playing an influential role in adjudicating the matters concerning AV accidents and providing the final verdict, deciding the question of liability and consequent compensation.

The inception of a new body solely for this very specific purpose, is based on the belief of not "IF" but "When". The authors believe that the path towards autonomous vehicles might be more or less far away, but that mankind is capacitated to reach a degree of technology capable of substituting the driver with technology *in toto*. Also, the separation of the adjudicating functions of the existing courts, involving this question of interpretation of law in the matter of deciding liability in AV accidents, will provide an expediency to dispose of such case, in comparatively less time.

At the same time, it will ensure a broader scrutiny of the bench involving not only the judges and legal scholars, but also the experts in the field of algorithms, technology and software programming, in contrast to the existing structures of law, wherein the available judges, might not be in a position to judge the intertwined matter of technology and law.

The mechanism would work as follows:

(a) In the event of any incident involving AVs being reported, the quasi-judicial body will be taking the cognizance of the situation. A preliminary investigation would be ordered wherein a sort of screening would be initiated. The report followed by an investigation will clear the cloud to an extent by ascertaining if the driver or

⁷⁰ European Parliament resolution of 16 February 2017, with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), 2018 O.J. (C 252/239).

⁷¹ RESTATEMENT (THIRD) TORTS § 17(a).

the operator was himself responsible for the incident or not. Was any negligence reported on the part of the driver himself, the approximate cause of the accident?

(a)(i) If the answer is in positive, i.e. the driver/passenger himself is at fault, an attempt would be made further to quantify this negligence and ascertain if it was solely the operator's negligence or a contributory negligence.

(a)(ii) If the answer is in negative i.e. absolving the driver with a clean chit, the further course of action will be based over the ascertainment that whether the vehicle was insured or not.

If the Automated Vehicle is not insured

If the vehicle is not under an insurance cover, the instituted body will order a release of compensation from the capped fund for the injured party in the first place. The injured party would be compensated from the provision of capped fund, against all the injuries and damages of person and property.

Once the claim of the injured party has been settled, the body will further investigate into the root causes of the accidents, wherein all the experts in the field of law and technology will be playing the ultimate role to decide the party who is to ultimately bear the brunt of liability. After a proper investigation, whosoever found the tortfeasor will be notified by the body to compensate the capped fund for the settlement it made to the injured party on its (culprit's) behalf.

If the Automated Vehicle is under Insurance Cover

However, if the vehicle does come under the insurance coverage, the entire process would be the same except involving the inclusion of insurer. In the event of an accident, once the body has issued the preliminary investigation report absolving the driver of any fault, the insurer will compensate the injured for all the damages and losses, he/she had suffered in person or property, as a result of the accident.

When examining Section 4 of **Automated and Electric Vehicle Bill, 2018**, this model incorporates the provision wherein the insurer, after having paid to the injured party, could recover the same from the third party, if its act was proximate enough to cause loss. This means that the third party is liable to the insurer, just like the insurer was liable to the injured.⁷²

Therefore, taking this provision into account, once the insurer has paid the injured, the body will carry on its investigation to ascertain the true culprit, be it manufacturer or software developer, and having found the same, will direct him to compensate the insurer of what he paid to the injured.

⁷² Derry v. Peek, (1889) 14 App. Cas. 337 (U.K.).

This model even takes the possibility that the cause of the accident cannot be attributed to the fault of any of the parties we have studied so far. The accident could be due to some unforeseeable and unpredictable factors, which in the light of present circumstances could not be made out. Hence in such a situation, this model will deviate from the principle of strict liability, and opt to not hold the manufacturer liable. This will let him escape the liability of the wrong he never committed, thereby never letting his spirit of innovation die. The injured would be accordingly compensated directly out of the capped fund. This provision will act as a great incentive for the manufacturer to innovate while being assured that he will not be prosecuted unnecessarily.

What needs to be taken into account is that there cannot be a strict compliance with the principle of no fault liability as long as the subject matter of concern is AVs. The strict liability principle can go well for ascertaining the liability in a traditional car crash. However, when it comes to AVs, the incorporation of this principle will be detrimental to the innovative capacity and spirit of the manufacturer. Therefore, the importance ultimately lies in conducting detailed investigations for the purpose of deciding the question of liability so that no interest of any kind or of any quantum is hampered.

The question that now arises is the source via which the fund will always be sufficient to meet the compensation and settlement demands of the injured and affected. The basic source will be none other than taxation. A further question will be raised as to decide the type of tax to be imposed for the replenishment of the fund.

Income tax would not be a good question to exercise since, it would distribute the burden over both the users and non-users of the automated vehicles. **Sales tax** might slow down the collection and there is a good possibility that the amount may not be available at the time when it is required.

An option worthy of further investigation is the introduction of a **mileage-tax**, through which each user will be charged an individual-specific amount on the basis of her effective use of the car; HAVs will be, as a matter of fact, able to monitor the specific route of each driver, and calculate the amount of miles she travels. The adoption of this tax will reach three positive goals at once:

- a) each driver will pay a specific amount related to how much he drives;
- b) the fee will not be tied to the ownership of the vehicles (and, subsequently, will not be subject to possible issues related to the development of car-sharing activities);

c) the contribution to each driver to the fund will be proportional to the activity risk she entails for the circulation.⁷³

V. SECURING PRIVACY AND CYBER SECURITY INFRINGEMENTS

Since this modern digital age is witnessing an increase in our reliance on technology with every passing day, in a parallel stead, so do the threats which compliment with an equivalent pace. Internet of Things (IoT) has become an integral part of socializing. This phenomenon has made fundamentals like privacy vulnerable to an outside intrusion.

Having said that, data security and privacy, in the light of increasing digitalization cannot be compromised with, hence the development of law is being sought to address such issues. The Universal Declaration of Human Rights⁷⁴ recognizes right to privacy as a human right. In furtherance of the same, European Union enacted General Data Protection Regulations,⁷⁵ while Germany gave to its country Federal Data Protection Act.⁷⁶ The USA too has brought forth stringent laws for data protection and privacy regulations. Vowing to always rub its shoulders with the world at large, India too, recognized Right to Privacy as a fundamental right under Right to life given under Article 21 of the Indian Constitution.⁷⁷

AVs have replaced the human operator with an artificially programmed software. Obviously, the software will not be capable to interpret where the driver wishes to go without instructions. Clearly, some inputs and instructions such as destination and time, need to be fed to the vehicle. This data is vulnerable to hacking by third parties, making us face unpredictable and ineradicable repercussions.

Hence the safety and security of data fed in an AV becomes an issue of prime importance. If there are no stringent laws addressing this, the world out there might be exposed to cyber security threats of hacking.

This data if, accessed by a third party, could be tampered with and subsequently used for illegal activities such as instigating terrorism, propagation of manipulated

⁷³ See Clint W. Westbrook, *The Google Made Me Do It: The Complexity of Criminal Liability in Autonomous Vehicles*, 2017 MICH. ST. L. REV. 97 (2017).

⁷⁴ Universal Declaration of Human Rights, (adopted Dec. 10, 1948) G.A. res. 217A (III), U.N. Doc A/810 at 71(UDHR) art. 12.

⁷⁵ Regulation (EU) 2016/679 of the European Parliament and of the Council, 2016 O.J. (L 119).

⁷⁶ Datenschutz-Anpassungs-und-Umsetzungsgesetz EU [Federal Data Protection Act], June 30, 2017, BGBl I at 2097 (Ger.).

⁷⁷ K.S. Puttuswamy v. Union of India [2017] 10 SCC 1 (India).

THE CONVOLUTION

advertisements to divert a mindset and the like. FBI's Directorate of Intelligence,⁷⁸ issued a report wherein it was observed that driverless cars might be used as "lethal weapons" by terrorists through programming them to be a self-driving bomb.

Just like internet, which connects millions of computers, these AVs too form a network, interconnected and interdependent. This no doubt assists in traffic management and enhanced coordination but ends up putting the data at stake. U.S. National Road Safety Council and NHTSA (National Highway Traffic Safety Administration) have encouraged use of connected vehicle technology and crash avoidance systems to enhance intersection safety.⁷⁹ The Road Safety Council which is a not-for-profit organization believes that vehicles should be integrated in such a way, that warning could effectively be transmitted.⁸⁰ Cooperative Intelligent Transport Systems Platform in Europe also supports exchange of useful data among all the components of road traffic system.⁸¹

The questions take a new turn when such interlinked technology ends encroaching upon privacy. There can be certain laws, with special mention to that of California, which requires the technology manufacturers to disclose the collected information during a vehicle's use like that of GPS Coordinates, times, and ultimate destinations. This of course can be useful for the investigators to trace the criminals, but the other side of the coin is not that fascinating, especially when it comes to meddling with one's privacy.

A. Incidents Seizing the Minds of Law-Makers

The renowned Coca-Cola Bottling Co.⁸² attached a GPS device to a company-owned vehicle used by the employee to service the vending machines. The appeal by the employee was dismissed by the court on the ground that the only information potentially revealed by the alleged "intrusion" was the whereabouts of the company

⁷⁸ Mark Harris, *FBI Warns Driverless Cars Could Be Used as Lethal Weapons*, THE GUARDIAN (July 16, 2014), <https://www.theguardian.com/technology/2014/jul/16/google-fbi-driverless-cars-lethal-weapons-autonomous>.

⁷⁹ *Collision Between a Car Operating with Automated Vehicle Control Systems and a Tractor-Semitrailer Truck Near Williston* (2016). Highway Accident Road. Washington, D.C: N.T.S.B., May 7, 2016.

⁸⁰ International Transport Forum (ITF), *Roads with Automated Vehicles*, OCED/ITF 2018 (May 23, 2018), <https://www.itf-oecd.org/sites/default/files/docs/safer-roads-automated-vehicles.pdf>.

⁸¹ FINAL REPORT ON COOPERATIVE, CONNECTED AND AUTOMATED MOBILITY, COOPERATIVE INTELLIGENT TRANSPORT SYSTEMS PLATFORM (C-ITS), EUROPEAN COMMISSION 16 (2017), <https://ec.europa.eu/transport/sites/transport/files/2017-09-c-its-platform-final-report.pdf>.

⁸² *Elgin v. St. Louis Coca-Cola Bottling Co.*, 2005 WL 3050633 (E.D. Mo. Nov. 14, 2005).

vehicle, being that a part of employment, no such infringement of privacy was proved.

However, incidents did not unfold this way when the New York Department of Labor, installed a similar kind of device on the personal vehicle of an employee, to gather information about his movements. The New York Court of Appeals specifically held that even if the installation was being used for reasonable search of employee's misconduct, the search was unreasonable in its scope, since it was designed to trace the employee's personal vehicle twenty-four seven.⁸³

In the light of all these incidents, one can understand the gravity of this issue.

There have been instances where experiments have been conducted to ascertain the security promised by such devices. Security flaws have been found by gaining control on the vehicle.⁸⁴ Tesla Model S has taken control of⁸⁵ and Nissan cars were hacked at different occasions of experimentation. A device which was being used to steal cars has been discovered.⁸⁶ Researchers found that apps were vulnerable to data leak.⁸⁷ Companies like Tesla, GM etc. have established "Big Bounty" programs to reward individuals who identify and solve issues related to security.

B. Expanding the Scope of Interpretation of Laws by Re-Defining the Defined

Basically, there are two major security threats:

1. Risk of third-parties taking control of the vehicle.
2. Risk of theft of personal information.

The repeated reference to the terms of data protection, cyber security, data privacy and personal information makes it essential to re-define them, so as to ascertain their boundaries and ambit. Data protection—means a natural person's right to respect for his or her private and family life, home and communications with

⁸³ Cunningham v. New York Department of Labor, 997 N.E.2d 468 (N.Y. 2013).

⁸⁴ Sophie Curtis, *Hacker Remotely Crashes Jeep from 10 Miles Away*, THE TELEGRAPH (July 21, 2015, 5:16 PM), <https://www.telegraph.co.uk/news/worldnews/northamerica/usa/11754089/Hacker-remotely-crashes-Jeep-from-10-miles-away.html>.

⁸⁵ Mark Ward, *Warning after Security Experts Hack Tesla Car*, BBC NEWS (Aug. 6, 2015), <https://www.bbc.com/news/technology-33802344>.

⁸⁶ Nathan Bomey, *This Device May Allow a Thief to Steal Your Car*, USA TODAY (Dec. 7, 2016, 11:16 AM), <https://www.usatoday.com/story/money/cars/2016/12/07/car-theft-remote-entry-national-insurance-crime-bureau/95085746/>.

⁸⁷ Lucian Armasu, *Hyundai 'Blue Link' Vulnerability Allows Thieves to Start Cars Remotely*, TOM'S HARDWARE (Apr. 27, 2017, 8:10 AM), <https://www.tomshardware.com/news/hyundai-blue-link-vulnerability-thieves,34248.html>.

THE CONVOLUTION

regard to the processing of personal data.⁸⁸ Informational privacy (or data privacy) is defined as “the protection of a person and his/her behavior” such that the individual is “able to control the risks for his or her rights to privacy, freedom, or equality caused by the processing of data related to him or her.”⁸⁹

Cyber security aimed at preservation of confidentiality, integrity and availability of information in the Cyberspace, i.e. the complex environment resulting from the interaction of people, software and services on the Internet by means of technology devices and networks connected to it, which does not exist in any physical form. Data protection now even includes the responsibility of the organization to protect the vulnerable user data. Data Privacy⁹⁰ includes the reasonable right of an individual to mark his sphere wherein the State cannot intrude. The Ontario Court of Appeals in the case of *Citi Cards Canada Inc v. Pleasance*⁹¹ interpreted that the “personal information” has an elastic definition with reference to data involved in communication with other vehicles. With the inter-connectedness of the vehicles, there are chances of data being tampered with. Data protection laws therefore constitute an important need of law.

In the light of liberal interpretation, various countries by the means of legislation have tried to protect the privacy of the individual from infringement in every form. The **UK Department of Transport** along with the **Centre for the Protection of National Infrastructure** has issued eight principal guidelines to be followed for ensuring security of AVs.

First, it ensures that security issues should be addressed at the board level itself i.e., during the development of products and services. Personal accountability of the organization must be throughout.

Second, the assessment and management of security risks must be done by the organizations along with third parties. They should identify, categorize, and treat such risks. Risks associated with supply chains, sub-contractors etc. must be dealt with the help of design, specification, and procurement policies.

Third, the organizations must plan to provide for after sales protection and an incident response mechanism,

⁸⁸ U.N. Economic Commission for Europe (UNECE), 8th Sess., *Framework Document on Automated/Autonomous Vehicles*, U.N. Doc. ITS/AD-08-05 at Agenda 2, 3 Def. 1, 4 (Mar. 9, 2016).

⁸⁹ Patrick Pye, Gerardo Daalderop, Eva Schulz-Kamm, Eckhard Walters & Maximilian von Grafenstein, *Privacy and Security in Autonomous Vehicles*, in *AUTOMATED DRIVING: SAFER AND MORE EFFICIENT FUTURE DRIVING* 17–27 (Daniel Watzenig & Martin Horn eds., 2017).

⁹⁰ *Id.*

⁹¹ *Citi Cards Can. Inc v. Pleasance* (2011), 103 O.R. 3d 241 (Can. Ont. C.A.).

which will be able to identify vulnerabilities and mitigate them.

Fourth, all the stakeholders must work in coordination to enhance system security according to standards and manage external dependencies.

Fifth, an in-depth approach must be followed while designing the product with the help of risk reducing techniques like monitoring one-way communication.

Sixth, the security of the software must be managed throughout its lifetime by updating and renewing it.

Seventh, while transmission, only intended persons should be able to access the data and the users must be able to delete the sensitive data stored.

Eighth, the system's primary work should be unhindered even if it is attacked by malicious or corrupt data.⁹²

The **NHTSA** issued non-binding guidelines to follow cyber security standards as laid down by international standards like NIST, SAE and Auto-ISAC.⁹³ Other recommendations include risk identification, rapid detection, creating awareness and mutual sharing of information. However, the legislation to address these recommendations is the **SPY Car Act (Security and Privacy in Your Car Act of 2015)**.⁹⁴ According to this act, all motor vehicles manufactured in the U.S. two years after the enactment of this act must adopt reasonable cyber security measures against hacking. These measures must involve best security practices like data protection and securing the data collected by an electronic device on-board, off board, or during transit.

The vehicle must have the capacity to detect, report, and stop attempts to control the vehicle and/or the data. It also prescribes a compulsory cyber dashboard informing the consumers the standard up to which a system can protect their privacy. It requires a plain and clear notice to the user of the vehicle for collection, transmission, use and retention of driving data. The consumer must have an option

⁹² GOV. OF UK, DEP'T OF TRANSP., THE KEY PRINCIPLES OF VEHICLE CYBER SECURITY FOR CONNECTED AND AUTOMATED VEHICLES, 2017, <https://www.gov.uk/government/publications/principles-of-cyber-security-for-connected-and-automated-vehicles/the-key-principles-of-vehicle-cyber-security-for-connected-and-automated-vehicles> (last visited Jan. 11, 2021).

⁹³ U.S. DEP'T OF TRANSP., NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION ON AUTOMATED DRIVING SYSTEMS 2.0 A VISION FOR SAFETY (2017).

⁹⁴ Security and Privacy in Your Car Act, 114th Cong. § 3 (as reported by S. Com. on Commerce, Science, and Transportation, July 21, 2015).

THE CONVOLUTION

to have the collected data destroyed except for any needed for post investigation purposes. The act prescribes a penalty of not more than \$5,000 in such cases.

Analyzing the provisions of “**Safely Ensuring Lives Future Deployment and Research in Vehicle Evolution Act**” (SELF DRIVE Act) 2017⁹⁵ and “**American Vision for Safer Transportation through Advancement of Revolutionary Technologies Act**” (AV START Act) 2017⁹⁶ together, it can be observed that both mandates a provision of compulsory cyber security plan with the manufacturer. This plan must be able to identify and diminish cyber security threats by corrective action plans like efficient detection and incident response mechanism.

This plan should be publicly disclosed by the manufacturer. Employees should be trained timely, headed by an officer. The U.S. government gives inspection powers to the Secretary of Transportation in security violation cases. The Secretary has to create an educational document and make it available on NHTSA’s website to create awareness amongst consumers regarding the above provisions. The SELF DRIVE Act requires a privacy plan by manufacturers informing about the practices of collection, storage, and use of information and the choices offered for its collection. Manufacturers must have a method providing notice to the owners about the privacy policy. Violation of the above provisions would be considered an unfair trade practice under **§ 45(a)(1) of Federal Trade Commission Act**⁹⁷ and the punishment would be decided accordingly.

The European Union General Data Protection Law (EU GDPR) is a regulation in **EU law** for data privacy and protection. Though not specifically enacted for AV, the inherent principles govern them in various aspects. Any data collected by an AV may be deemed personal data if it can be traced back to the owner, driver, passenger, or any other person and is not mere technical data pertaining to the vehicle. Under Article 5, the AVs must not collect data more than what is necessary and the same is also protected by the principle of purpose limitation protecting its arbitrary re-use.⁹⁸ The data subjects must be given complete information about the collection and processing of their personal data.

⁹⁵ SELF DRIVE Act, S. 5, H.R. 3388, 115th Cong. (as reported by S. Com. on Commerce, Science, and Transportation, Sept. 7, 2017).

⁹⁶ AV START Act, S. 14(b), S.1885, 115th Cong. (as reported by S. Com. on Commerce, Science, and Transportation, Nov. 28, 2017).

⁹⁷ Federal Trade Commission Act, 15 U.S.C. § 45-45(a)(1) (2006) (incorporating U.S. SAFE WEB ACT AMENDMENTS OF 2006).

⁹⁸ Regulation (EU) 2016/679 of May 4, 2016, art. 33, General Data Protection Regulation, O.J. L 119.

The principle of data minimization provides for the use of minimum amount of data by controllers and processors to finish their task. Looking at the amount of data that is collected and used, the application of data minimization principle must be ensured by anonymization and pseudonymization of data.

Under this law, a company is required to pay a huge fine if it violates the core principle of privacy by design. If a data breach, resulting in risks to the individual rights, takes place, it is compulsory for all the members to notify it within 72 hours of appraisal.⁹⁹ It also facilitates the preparation of a “code of conduct” to provide authoritative guidance for its key requirements. The same may be prepared for AVs by the concerned supervisory authority.

GDPR provides the **Right to Access and Right to be Forgotten**¹⁰⁰ under Article 17 and 19 which enables the data subjects in their access to use of the data and its subsequent destruction when no longer needed. It also provides with appointment of an expert in the field of privacy laws and practices as the “Data Protection Officer” for entities regularly involved in large scale data monitoring.

Canada’s Personal Information Protection and Electronic Documents Act (PIPEDA)¹⁰¹ governs data protection of all commercial activities in all jurisdictions, lacking a specific legislation for AVs. It is less flexible than the GDPR when it comes to consent. The manufacturers needs to protect the data is also recognized. **South Korea** has amended its Motor Vehicles Management Act to require the approval of Minister of Land and Transport and Maritime Affairs before using any data processed by electronic data processing systems.¹⁰² This will ensure that the data collected by AVs is used after permission is granted by the competent administrative authorities. California also has draft regulations which mandate that the operator be informed about the collected information and obtain the operator’s consent before collecting any additional information.

As of now, it is only the U.S. which has enacted legislations specifically concerning AVs. The UK other countries are also moving in this direction. This Article so far has studied the various existing laws related to cyber security and data protection of vehicles. The importance of a lack of legal clarify surrounding AVs is worth taking notice of, so are the threats, which may be addressed by stringent yet innovation friendly laws.

⁹⁹ *Id.* at art. 17, art. 19.

¹⁰⁰ *Id.*

¹⁰¹ See Federal Trade Commission’s Act, *supra* note 97.

¹⁰² Motor Vehicle Management Act, Act No. 13486, Aug. 11, 2015, art. 69, Korean Legislation Research Institute Online Database, https://elaw.klri.re.kr/eng_service/lawView.do?hseq=35841&lang=ENG.

THE CONVOLUTION

Analyzing the laws, we conclude that consent of the data subject is given paramount importance. The user must have a right to know the way in which his/her data is being used and must have a right to delete it. If this industry is to prosper, all the leaders of the industry should come together to create a platform where threats can be identified and resolved. The governments, while making laws, must leave an incentive for companies to innovate in this field and be strict with consumer privacy at the same time. However, prevention of overregulation must be taken care of as it can suppress the spirit of innovation amongst manufacturers. Hence, a systematic, cooperative, and positively competitive balanced approach with involvement of all the stakeholders is essential for the furtherance of this objective which will ensure its safe and widespread adoption.

VI. ENCOURAGING LEGISLATIONS OF COUNTRIES FOR ADOPTION OF AUTONOMOUS VEHICLES

Nations which possess industries at the cutting edge of such technological developments and innovations, are aiming to make a smart move by taking a first mover's advantage in order to capitalize on such an unaddressed and disruptive technological trend which has the potential of reshaping the human society in the 21st century.

The countries which are signatories to **1938 Vienna Convention on Road Traffic**, are working to revise the present framework which mandates the presence of a driver who should be fully in control and responsible for the behavior of the vehicle,¹⁰³ to something which complements the development of technology by doing away with the requirement of a driver, as debated by EU countries. France, in pursuance of their "**New Industrial France**" plan, and along with other countries such as Italy and Germany have proposed and supported the amendment to the Vienna Convention on Road Traffic.¹⁰⁴

There is a possibility that the U.S. might gain advantage over their EU counterparts, since the U.S. is not a party to the convention and does not come under the scope of its obligations.¹⁰⁵

¹⁰³ Convention on Road Traffic, Nov. 8, 1968, 1042 U.N.T.S. 17.

¹⁰⁴ *France Greenlights Driverless Car Trials on Public Roads*, RT (Aug. 5, 2016, 1:47), <https://www.rt.com/news/354683-france-driverless-car-trials/>.

¹⁰⁵ *EU Countries Want Legal Change for Driverless Cars*, EURACTIV (Sept. 27, 2016), <https://www.euractiv.com/section/transport/news/eu-countries-want-legal-change-for-driverless-cars-but-theyll-have-to-wait/>.

Taking a lead in shaping a conducive environment for the promotion of automated vehicles, the United Kingdom is on the way to remove the requirement of a driver, with the Department of Transportation issuing the guidelines for the same.¹⁰⁶¹⁰⁷ Similarly it was in 2016, that seven states in the U.S. enacted laws governing autonomous vehicles, with **Nevada** becoming the first jurisdiction in the world to have issued safety and performance standards.¹⁰⁸ Following Nevada were **Florida**,¹⁰⁹ **California**¹¹⁰ and **Michigan**,¹¹¹ which allowed the testing of driverless cars on public roads.

However, these acts remain silent with respect to deciding the question of liability and majority of it deals with the procedural aspect of law which is to be complied with respect to the introduction of self-driving vehicles. The beauty of these laws is that they primarily focus over the question of safety of the passenger even if it takes to resort to level 2 or level 3 of automation instead of operating at level 4, if they are not very sure.

Similar to the U.S., a section of **A9 Autobahn** in **Bavaria** has been designated for automated vehicle testing.¹¹² With each Federal state issuing exemptions from the German road traffic licensing regulations; allowing their testing, only if there is driver inside to take control in adversities.¹¹³

Be it the announcement of **Land Transport Authority** in **Singapore** to set up **Singapore Autonomous Vehicle Initiative** to enhance the deployment of automated

¹⁰⁶ Nick Chrissos, *Driving UK Innovation with Autonomous Vehicles*, BUSINESS CHIEF (Jan. 25, 2019), <https://www.businesschief.eu/technology/driving-uk-innovation-autonomous-vehicles>.

¹⁰⁷ Graeme Paton, *Driverless Cars on UK Roads This Year After Rules Relaxed*, THE TIMES (Mar. 17, 2018, 12:01 AM), <https://www.thetimes.co.uk/article/driverless-cars-on-uk-roads-this-year-after-rules-relaxed-zdjwd0b60>.

¹⁰⁸ Alex Knapp, *Nevada Passes Law Authorizing Driverless Cars*, FORBES (June 22, 2011, 5:29 PM), <https://www.forbes.com/sites/alexknapp/2011/06/22/nevada-passes-law-authorizing-driverless-cars/#5c738e361332>.

¹⁰⁹ *Florida Law Opens Doors to Self-Driving Cars*, AL JAZEERA (June 13, 2019), <https://www.aljazeera.com/economy/2019/6/13/florida-law-opens-door-to-self-driving-cars>.

¹¹⁰ John Oram, *Governor Brown Signs California Driverless Car Law at Google HQ*, BSN (Sept. 27, 2012), <https://brightsideofnews.com/governor-brown-signs-california-driverless-car-law-at-google-hq/>.

¹¹¹ *New Law Allows Driverless Cars on Michigan Roads*, CBS DETROIT (Dec. 23, 2013, 9:01 AM), <https://detroit.cbslocal.com/2013/12/28/new-law-allows-driverless-cars-on-michigan-roads/>.

¹¹² Jon Martindale, *Germany Creates its Driverless Car Legislation*, TELEMATICS (Feb. 6, 2015), <https://www.telematics.com/germany-creates-its-driverless-car-legislation/>.

¹¹³ *The Pathway to Driverless Cars: Summary Report and Action Plan*, UK DEPT. FOR TRANSP. (Feb. 2015), https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/401562/pathway-driverless-cars-summary.pdf.

THE CONVOLUTION

vehicles on road,¹¹⁴ or the issuance of the first license for automated driving to Nissan, thereby enabling Japan to emerge as a leader in autonomous vehicular technology¹¹⁵ or initiatives of Indian Universities like IIT Kharagpur to launch start-ups like AURO to introduce driverless cars or a recent proposal for an amendment to Motor Vehicles Amendment Bill, to include within its ambit provisions of innovation in Automated Vehicular technologies, all show the willingness of the countries to provide the technology makers with a decided portion of law in respect to the question of liability.

VII. RECOMMENDATIONS AND CONCLUSION

(a) Early determination of threats and a platform to identify them: There should be a mechanism to collaborate and research to determine possible threats and their outcomes. The research and development must be in consonance with the laws of Intellectual Property. Safety and security of trade secrets should be of utmost priority during research. A common platform should be developed where all interested experts can participate in deliberations and discussions to make the use of autonomous vehicles better and safer.

(b) Role of Government: Governments must acknowledge the multitude of benefits offered by autonomous vehicles. They must welcome the idea of innovation and allow testing of such vehicles. Laws should be framed in such a way that a balance is maintained between consumer benefit and profit of companies involved in such business. The government is required to maintain utmost level of transparency when dealing with AI.

(c) Separate Department: Innovation and technology involved in autonomous vehicles are going to change the complete outlook and ways driving laws are governed. The concept of liability is going to change with time as it is continuously evolving. There will be more cybersecurity threats pertaining to vehicles. Therefore, a special office should be dedicated to the governance of autonomous vehicles.

(d) Role of judiciary: With the increasing use of autonomous vehicles, there will be an increase in litigation. Since judges, lawyers, and the legal field are well versed in the law, but lack technical expertise required to adjudicate these matters, we need to have well-qualified technical experts assist our judges and law makers to frame and interpret laws in consonance with latest technology.

¹¹⁴ Leslie Hook, *How Driverless Cars Are Set to Reinvent and Humanise our Streets*, FINANCIAL TIMES (Dec. 7, 2016), <https://www.ft.com/content/19cd31da-b71d-11e6-ba85-95d1533d9a62>.

¹¹⁵ Stanley White & Sam Holmes, *Japan Looks to Launch Driverless Car System in Tokyo by 2020*, REUTERS (June 4, 2018, 4:22 AM), <https://www.reuters.com/article/us-japan-economy-strategy/japan-looks-to-launch-driverless-car-system-in-tokyo-by-2020-idUSKCN1J00VN>.

(e) Right to be forgotten: This right is mentioned in the EU's GDPR. Every law made with regard to data privacy and cybersecurity must have certain provisions which ensures that illegally obtained data or data obtained without consent must be deleted as soon as it comes to the knowledge of the authorities in consultation with the concerned party whose data was stolen.

(f) Right to know: Every consumer must know the way in which his/her data is being used. The information that is being provided to the autonomous vehicle is sensitive and confidential information. It includes the location data, age, sex, and the mental and physical health of a person. In such a situation, it might be used to send personalized advertisements and in worst case, a large-scale hacking can be done. A data provider must know where his information is being stored and in which way it is being used.

(g) Regular Consultation with Experts: A proper consultation must be made with Departments of Traffic Control, research centers dealing with transportation studies, or any other institution having expertise in automotive technology, automotive safety, and design system, in regard to framing of requirements for testing, equipment, and performance standards of vehicles.

(h) Additional safety requirements: The department as it may deem fit, may impose additional requirements required for safe performance of the vehicles, even if it demands the presence of a driver inside, because it is the presence of the passenger or the driver inside the automated vehicle which is of utmost importance.

(i) Role of other institutions: A proper consultation must be made with Departments of Traffic Control, Research Centers dealing with transportation studies, or any other institution having expertise in automotive technology, automotive safety and design system, in regard to framing of requisites for testing, equipment and performance standards of vehicles.

(j) Consumer Education: The operator of the vehicle must be aware of all the systems and functions of the vehicle. He must know how to deal with emergency situations. It is the duty of the service provider to inform the consumer about all necessary information.

(k) After sales services: The seller of AVs must provide after sales services and regular updates in the software installed in the vehicles. It must provide with scanning and servicing of the vehicle.

(l) Additional requirements: The department as it may deem fit, may impose additional requirements for safe performance of the vehicles, even if it demands the presence of a driver inside, because it is the presence of the passenger or the driver inside the automated vehicle which is of utmost importance.

THE CONVOLUTION

Autonomous vehicles have already come along a long way. Nations are more than eager to assimilate this technology. For getting this purpose accomplished, they are on their toes to develop such pieces of legislations which address the ambiguities related to liability and privacy. Many of the judiciaries have expanded the scope of tortious and contractual law to include into their ambit such questions, to do away with the need of enacting separating legislations. However, adoption of something renewed in mundane mainstream is never so easy. Various social, legal, economic, ethical questions are raised, and the answers lie in limbo.

This Article discussed the conflict of interests the law framers could face while dealing with the human welfare, human protection, and technical up gradation. The attributes of human safety and welfare should be blended with the promotion of innovation and technology, in such a way that one does not become the next best alternative of the other.

When it comes to the choice of law, which are enacted to indemnify the victim, the one maximizing protection to the same, has to be opted out. Every law, be it related to deciding liability or ensuring the fundamentals of privacy, must always prioritize consumer protection and welfare. At no cost should development be forgone. For their peaceful amalgamation, the recommendations mentioned above will play a great role in ensuring that the best interests of mankind are met.