# AUTONOMOUS VEHICLES AND THE CRIMINAL LAW GAP: DETERMINING FAULT WHEN NO HUMAN IS DRIVING

Nisha Kumari, B.A. LL.B. (Hons.), Law College Dehradun, Uttaranchal University, Dehradun, Uttarakhand, India.

Dr. Ashok Dobhal, Assistant Professor, Law College Dehradun, Uttaranchal University, Dehradun, Uttarakhand, India.

## ABSTRACT

Self-driving vehicles disrupt the assumptions made about human drivers that are incorporated in India's transport and criminal laws. The Motor Vehicles Act of 1988 assumes that human drivers control vehicles, while the Bharatiya Nyaya Sanhita, 2023, conceptualizes the harms that occur on the road in terms of recklessness and negligence and harms caused through recklessness and endangerment by human beings. Autonomous driving disturbs that assumption as the control task would no longer be performed by a human being engaged in the physical act of driving. The greater challenge of self-driving vehicles addressed in this research paper is not the technological challenges of control, but determining whether driving conduct mediated by machines can constitute conduct constitutive of a crime. There exists no balancing framework in India separating the realms of driving conduct under the law such that criminal liability can be apportioned among the manufacturers, the driving system developers, the fleet managers, the operators, the vehicle's owners, and the maintenance and fallback drivers. This protects against the risk of under-exculpating and over-exculpating the various actors that engaged in the driving conduct. This analytical legal research proposes that interstate variability and negligence per se be brought to the forefront of criminal law, and a responsibility allocation scheme be promulgated to propose in terms of human override and maintenance of the driving system respect to divorced driving and remote system shifting.

**Keywords:** Autonomous vehicles, automated driving systems, criminal negligence, causation, and electronic evidence.

## 1.1 INTRODUCTION

The primary question is a legal one and fairly simplistic in nature, what, if anything, can be said about criminal liability in legal systems, and in this instance, in road law? In answering this question, any legal professional contemplating this would find that in road law, especially in India, the criminal liability is attributed control to the driver, the owner, the duty-holder of the accident scene, etc. This attitude, especially in road law in India, can be found in the numerous driver-regulating laws like the Motor Vehicles Act, 1988[1], especially in Sections 2B, 3, 5, 134, and 146, where the law presumes the existence of a driver, a giver of permission, a road user, a duty-holder, a responder to an accident, and an insurer. Before driverless car systems are operational in India, this law shows the legal minimum in India to be a human centric legal system in contrast to autonomous systems[2].

The human-centred part of the problem is also of a criminal nature. The Bharatiya Nyaya Sanhita, 2023[3], in Sections 106, 125, 281, and 289, talks about the punishment for death by negligence and endangering a person's life by negligent or rash driving, public road rash driving, and negligence related to a certain machine. These provisions have some elasticity but are also not written with a Collaborative Governance approach. Autonomous crashes could be due to unsafe over-the-air software updates, known or blind spot, poor sensor calibration, overreliance on remote driving, user miscommunication, driving prompts to users, or driving outside the Operational Design Domain (ODD) of the vehicle[4]. In such situation's absence of a human driver does not eliminate responsibility but does complicate the determination of the relevant defendant, actus reus, culpable mental state, and proximate cause[5].

## 1.2 AUTOMATION AND THE INDIAN SETTING

When analysing criminal law as it pertains to driving, it is essential to separate out the unique ways in which driving automation may defer from more rudimentary driving assistance

[1] The Motor Vehicles Act, 1988 (Act 59 of 1988), ss. 2B, 3, 5, 134, 146.
[2] Gabriel Hallevy, *When Robots Kill: Artificial Intelligence under Criminal Law* 75 (Northeastern University Press, Boston, 1st edn., 2013).
[3] The Bharatiya Nyaya Sanhita, 2023 (Act 45 of 2023), ss. 106, 125, 281, 289.
[4] Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles, *available at:* https://www.sae.org/standards/j3016-taxonomy-definitions-terms-related-driving-automationsystems-road-motor-vehicles (last visited on February 4, 2026).
[5] Sabine Gless, Emily Silverman, et.al., "If Robots Cause Harm, Who Is to Blame? Self-Driving Cars and Criminal Liability", 19 *New Criminal Law Review* 412 (2016).

technologies that constitute increased or more complex driving assistance as identified by the NHTSA, which include driving systems that are capable of complete autonomous operation (fully autonomous driving systems) and systems that are solely driver assistance systems that require continued human operation[6]. This distinction is particularly relevant to India, where as noted the criminal liability shifts as the control shifts. With Level 2 assistance, the driver remains, for the most part, the primary possessor of the duty of care to the road. However, as one moves into the higher Levels, the vehicle's hardware, software, remote control/adaptive driving logic, and configured systems begin to carry the dominant weighting of the decision making[7]. A legal system that does not recognize this shift is bound to inadequately consider both the acts and the liability.

Internal debates in India's policy sphere has also signaled the divide in ways NITI Aayog's National Strategy for Artificial Intelligence pointed out that while full autonomy in the Indian context was, and is, not economically feasible, there was strong enough backing for the investment in technologies for assisted and fully autonomous vehicles as a result of their potential to reduce Industrial fatalities and congestion, as well as their ability to create new economic opportunities. It illustrates an almost 'business as usual' approach. It suggests that for India, the first run-ins with the challenges of criminal law may not stem from fully driverless vehicles, but from other problematic technologies such as advanced assisted driving, automated driving of commercial fleets, driverless vehicles in controlled corridors, and mobility as a service ecosystems where the dilution of human control is substantive, but not total[8]. Hence, the gaps in criminal law will arise before levels of driving automation that eliminate the human driver[9].

[6] Automated Driving Systems, *available at:* https://www.nhtsa.gov/vehicle-manufacturers/automated-drivingsystems (last visited on February 5, 2026).
[7] Nidhi Kalra, Susan M. Paddock, "Driving to Safety: How Many Miles of Driving Would It Take to Demonstrate Autonomous Vehicle Reliability?", 94 *Transportation Research Part A: Policy and Practice* 182 (2016).
[8] Dimitris Milakis, Bart van Arem, Bert van Wee, "Policy and Society Related Implications of Automated Driving: A Review of Literature and Directions for Future Research", 21 *Journal of Intelligent Transportation Systems* 324 (2017).
[9] Ugo Pagallo, *The Laws of Robots: Crimes, Contracts, and Torts* 118 (Springer, Dordrecht, 1st edn., 2013).

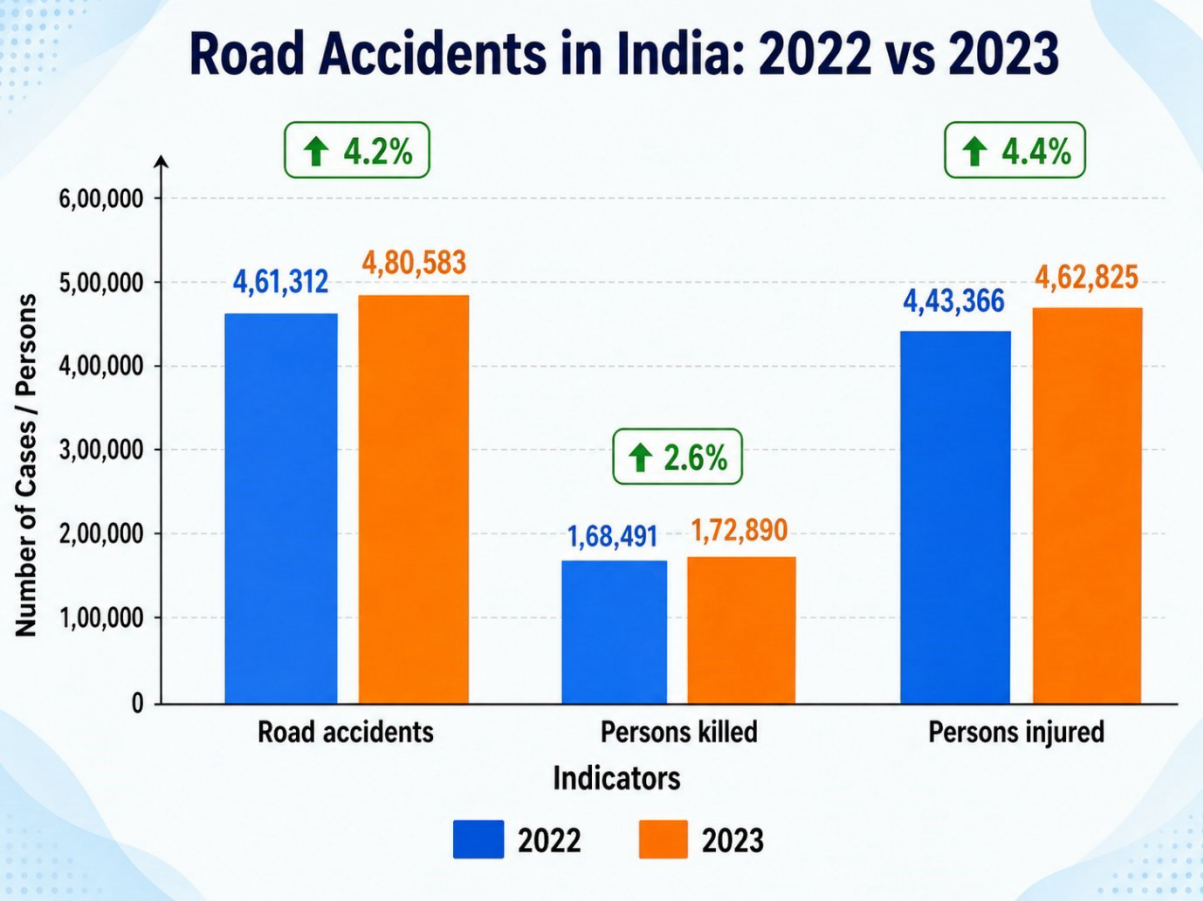


**Figure 1.** Total number of road accidents in India for 2022 and 2023.

Figure 1 illustrates why the autonomous vehicle discussion in India cannot be seen as premature. Even with road automation still far in the future, road injuries and deaths are still significant, and any future distribution of criminal responsibility needs to be done with care, as an incorrectly specified liability regime would either lead to excessive punishment of people and/or insufficiently safe closure to unsafe deployment practices[10].

### 1.3 THE EXISTING INDIAN CRIMINAL LAW FRAMEWORK

The Indian penal system has functioning elements that are still underdeveloped. Section 106 of the Bharatiya Nyaya Sanhita 2023 talks about death caused by rash or negligent act not amounting to culpable homicide[11]. Section 125 concerns rash or negligent acts which endanger life. Section 281 deals with rash driving while Section 289 deals with negligence with regard

[10] María Lubomira Kubica, "Autonomous Vehicles and Liability Law", 70 *American Journal of Comparative Law* i39 (2022).
[11] The Bharatiya Nyaya Sanhita, 2023 (Act 45 of 2023), ss. 106, 125, 281, 289.

to the use of machines. These provisions taken together show that Indian criminal law has underdeveloped interactions with dangerous technologies[12]. The challenge lies not with the absence of a legal structure, but with its presence. A self-driving stack is not just a car, or just a piece of machinery, or just a programme. It is a layered socio-technical system and the legally relevant act may have happened during the design, deployment, maintenance, supervision, over-ride etc, but not at the moment of impact[13].

Two leading negligence cases set out two ideas important for liability surrounding autonomous vehicles. In *Kurban Hussein Mohammedali Rangawalla v. State of Maharashtra*[14], the Supreme Court said negligent acts must be the proximate cause and the efficient cause of death. In *Syad Akbar v. State of Karnataka*[15], the Court attempted to differentiate between criminal negligence and civil negligence. In *Jacob Mathew v. State of Punjab*[16], he reaffirmed criminal negligence to be an offence of much greater blameworthiness than mere negligence. These cases are important because hindsight will be overused because autonomous vehicle accidents will be commonplace[17]. After a death, everything that occurred beforehand will seem negligent. The Court's doctrine pushes against that and seeks the proof of a culpable, proximate and sufficiently serious failure.

Car cases further refine the analysis. In *State of Karnataka v. Satish*[18], the Court noted that speed alone is not proof of rashness. In *Mohammed Aynuddin alias Miyam v. State of Andhra Pradesh*[19], it was noted that rashness and negligence depend on the particular driving and the environment. In *State through P.S. Lodhi Colony*, *New Delhi v. Sanjeev Nanda*[20], and *Alister Anthony Pareira v. State of Maharashtra*[21], the court showed that road fatalities could go beyond simple negligence where the knowledge of the likely fatal consequences of the act was present. This is very important for autonomous mobility. A single sensor malfunction is not

[12] Andrew Ashworth, Jeremy Horder, *Principles of Criminal Law* 177 (Oxford University Press, Oxford, 7th edn., 2013).
[13] Philip Koopman, Michael Wagner, "Autonomous Vehicle Safety: An Interdisciplinary Challenge", 9 *IEEE Intelligent Transportation Systems Magazine* 90 (2017).
[14] AIR 1965 SC 1616.
[15] (1980) 1 SCC 30.
[16] (2005) 6 SCC 1.
[17] Michael S. Moore, *Causation and Responsibility: An Essay in Law, Morals, and Metaphysics* 91 (Oxford University Press, Oxford, 1st edn., 2009).
[18] (1998) 8 SCC 493.
[19] (2000) 7 SCC 72.
[20] (2012) 8 SCC 450.
[21] (2012) 2 SCC 648.

the same as a reckless act of knowingly using a defective system after multiple warnings, safety complaints, or internal tests that fail to meet the safety requirements[22].

Thus, the Attribution of criminal liability to companies is unavoidable. The Supreme Court of India in *Standard Chartered Bank v. Directorate of Enforcement*[23] affirmed the prosecution of companies. Regarding the case of *Iridium India Telecom Ltd. v. Motorola Inc.*[24], the Supreme Court acknowledged the attribution of corporate criminal liability through the directing mind and case. However, in *Sunil Bharti Mittal v. CBI*[25] and *Shiv Kumar Jatia v. State (NCT of Delhi)*[26], it was held that the directorial position of a person does not render them liable criminally, by virtue of their position. These are specific to autonomous technologies[27]. If a manufacturer or a fleet operator is liable for a death caused by the automation of a vehicle, the law has to bring a distinction between the institutional blame and the personal culpability. Also, it would have to confess that, for the purpose of the Consumer Protection Act, 2019[28], and within the ambit of Sections 82 to 87 (on product liability), the law of culpable omissions and services would help the law to classify the defective design, failure to warn, and service deficiency, without, for a change, treating each product malfunction as criminal.

[22] Andrea Bertolini, "Robots as Products: The Case for a Realistic Analysis of Robotic Applications and Liability Rules", 5 *Law, Innovation and Technology* 214 (2013).
[23] (2005) 4 SCC 530.
[24] (2011) 1 SCC 74.
[25] (2015) 4 SCC 609.
[26] (2019) 17 SCC 193.
[27] Andrea Bertolini, "Robots as Products: The Case for a Realistic Analysis of Robotic Applications and Liability Rules", 5 *Law, Innovation and Technology* 214 (2013).
[28] The Consumer Protection Act, 2019 (Act 35 of 2019), ss. 82 to 87.

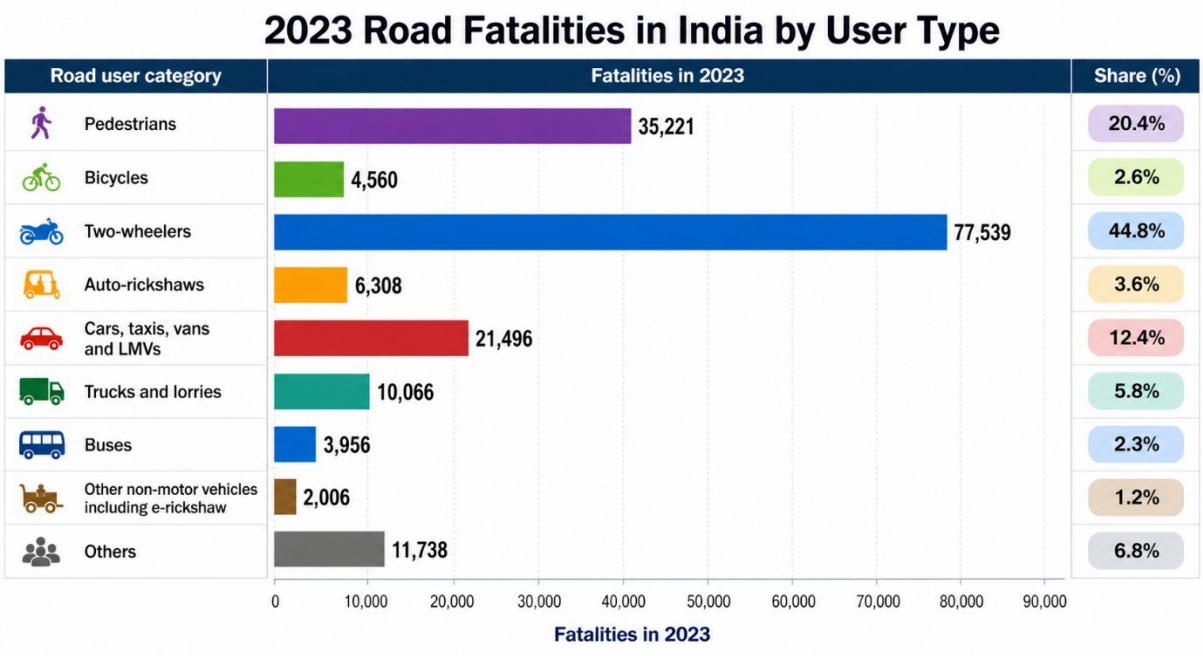


**Figure 2.** 2023 Road Fatalities in India by User Type.

Figure 2 assists us doctrinally by showing us whom we would most likely have to issue claims against in any forthcoming automated traffic ecosystem. A fault model that would exclude pedestrians, cyclists, and two-wheeler users would not just be incomplete; it would be fundamentally erroneous in the context of Indian roads that autonomous systems would actually be operating in[29].

## 1.4 FAULT ATTRIBUTION WHEN NO HUMAN IS DRIVING

When thinking about autonomous criminal liability, rather than asking who "drove" in the traditional sense, the focus can shift to who exercised control over the relevant risks[30]. Control can manifest in numerous ways across the chain: authorising the system to be used on a public road, switching it on, active non-response to a takeover request, active non-response to maintenance, active non-response to updating safety information, or non-adherence to operating the system in/out of the active deployed conditions[31]. Moving the focus from

[29] Sven Nyholm, Jilles Smids, "The Ethics of Accident-Algorithms for Self-Driving Cars: An Applied Trolley Problem?", 19 *Ethical Theory and Moral Practice* 1275 (2016).
[30] Joel Feinberg, *Harm to Others: The Moral Limits of the Criminal Law* 187 (Oxford University Press, New York, 1st edn., 1984).
[31] Sabine Gless, Emily Silverman, et.al., "If Robots Cause Harm, Who Is to Blame? Self-Driving Cars and Criminal Liability", 19 *New Criminal Law Review* 412 (2016).

physical steering to control over relevant risks fits more comfortably with Indian criminal law than the more simplified human/robot dichotomy. It also enables the courts to retain more traditional criminal law elements while shifting the lens through which those elements are considered.

The legal shift can be addressed through comparative legislation. The UK Automated Vehicles Act 2024 and its explanatory notes differentiate "user-in-charge" and "no-user-in-charge" features, acknowledge that a vehicle can only drive autonomously under certain conditions, and assign continuous legal responsibility to an entity that drives without a user[32]. This structure matters not because India should adopt it in a copy-paste manner, but because it makes explicit what Indian legislation is currently silent about: the legal responsibility shifts when the system is enabled to self-act, and the inquiry is not about metaphysical agency of the system but about legally structured human responsibility, vis-à-vis the system[33].

The UK model describes how residual human presence does not settle a fault. A user-in-charge could possibly be given immunity for acts of driving while a self-driving feature is being used, but that immunity is reversed when a proper transition demand is issued and the response time is over[34]. This is valuable for analysis in India. It calls for criminal fault to follow control transfer, not occupancy of the cabin[35]. This exemplifies the 2023 Maricopa County resolution in the Rafaela Vasquez prosecution concerning the 2018 Uber crash and demonstrates how early autonomous systems had a fallback human and how prosecutors were institutionally wedded to a liability anchor in that fallback, rather than the systemic wider structure[36].

Causation becomes more difficult to establish when there are mixed responsibilities. Design defects, incomplete mapping, unclear lane markings, poor perception of weather, safety features that are turned off, late braking, inadequate driver oversight, no human intervention, etc. can all cause a crash[37]. The Indian courts' tendency to try to put all of that into a single

[32] The Automated Vehicles Act 2024 (2024 c. 10) (UK), ss. 1, 2, 7.
[33] Automated Vehicles Act 2024 Explanatory Notes, *available at:* https://www.legislation.gov.uk/ukpga/2024/10/notes/division/6/index.htm (last visited on February 12, 2026).
[34] The Automated Vehicles Act 2024 (2024 c. 10) (UK), ss. 1, 2, 7.
[35] Tina Sever, Giuseppe Contissa, "Automated Driving Regulations: Where Are We Now?", 24 *Transportation Research Interdisciplinary Perspectives* 101033 (2024).
[36] Driver of Uber Vehicle Involved in Death of Woman in Tempe Pleads Guilty, *available at:* https://maricopacountyattorney.org/CivicAlerts.aspx?AID=1012 (last visited on February 13, 2026).
[37] Marcel Aguirre Mehlhorn, Andreas Richter, Yuri Shardt, "Ruling the Operational Boundaries of Highly Automated Vehicles", 56 *IFAC-PapersOnLine* 2202 (2023).

coarse criticism is unacceptable. In *Jacob Mathew v. State of Punjab*[38], and more recently, *Kurban Hussein Mohammedali Rangawalla v. State of Maharashtra*[39], the South Asian courts have had to isolate the proximal and culpable cause, to the exclusion of an arbitrary historical cause, and those cases have utility. In that regard, the 2025 Florida ruling in *Tesla*, *Inc. v. Banner*[40] is also useful, where the court explicitly distinguished Level 2 driver assistance from real driving autonomy, and also separately analysed warnings, design, and user agency as distinct problems[41].

Proof often outweighs theory in determining outcomes. Crash tech generates software logs, e.g., event data recorders, sensors, videos, update logs, remote commands, and diagnostics[42]. While these are valuable to the crash forensic process, their value legally and for preservation relies on certain, well-known, Indian legal rules. For instance, *Anvar P.V. v. P.K. Basheer*[43], *Arjun Panditrao Khotkar v. Kailash Kushanrao Gorantyal*[44], are the most cited works concerning electronic evidence, while *Tomaso Bruno v. State of Uttar Pradesh*[45], is the most cited concerning the value of electronic evidence in relation to proof. The Bharatiya Sakshya Adhiniyam, 2023[46], with Sections 61 to 63 and accompanying presumptions, further develops its relation to the above. This makes autonomous crash forensics more about rigorous digital evidence and not the latest tech.

[38] (2005) 6 SCC 1.
[39] AIR 1965 SC 1616.
[40] Tesla, Inc. v. Banner, No. 4D2023-3034 (Fla. Dist. Ct. App., February 26, 2025).
[41] Margarita Martínez-Díaz, Francesc Soriguera, "Autonomous Vehicles: Theoretical and Practical Challenges", 33 *Transportation Research Procedia* 275 (2018).
[42] AVSC Releases 2nd Best Practice, *available at:* https://avsc.sae-itc.com/news/avsc-releases-2nd-bestpractice (last visited on February 15, 2026).
[43] (2014) 10 SCC 473.
[44] (2020) 7 SCC 1.
[45] (2015) 7 SCC 178.
[46] The Bharatiya Sakshya Adhiniyam, 2023 (Act 47 of 2023), ss. 61, 62, 63.

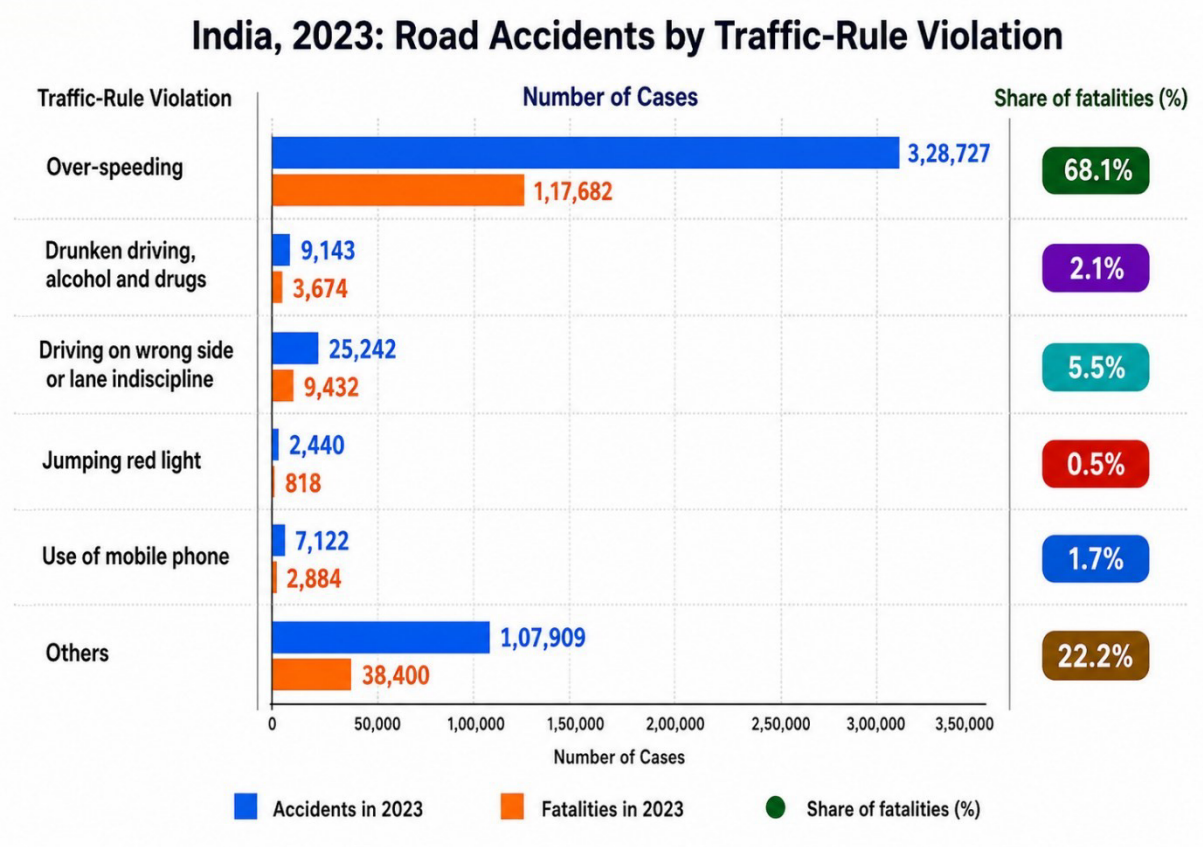


**Figure 3.** India, 2023. Road accidents as per traffic-rule violation.

The most useful aspect of Figure 3 for the future is the overwhelmingly current criminal attribution that still focuses on human actions. While automation may not eliminate those categories, it will add a layer where the design of the road, failure of monitoring, or in the deployment of road safety technologies, are themselves legally destructive road threats[47].

## 1.5 COMPARATIVE MODELS AND REFORM FOR INDIA

India needs to admit to doctrinal incompleteness and not doctrinal panic when it comes to reforms. What the country needs is not a comprehensive and novel criminal philosophy for autonomous mobility, but better statutory language[48]. While NITI Aayog's AI strategy has surfaced the possibility of innovation and testing for the behaviour of assistive and autonomous technologies, Section 2B of the Motor Vehicles Act, 1988[49] also creates some space for this. However, neither of these documents provide anything to a prosecutor, investigator, or a judge

[47] Nidhi Kalra, Susan M. Paddock, "Driving to Safety: How Many Miles of Driving Would It Take to Demonstrate Autonomous Vehicle Reliability?", 94 *Transportation Research Part A: Policy and Practice* 182 (2016).
[48] Andrew Ashworth, Lucia Zedner, *Preventive Justice* 62 (Oxford University Press, Oxford, 1st edn., 2014).
[49] The Motor Vehicles Act, 1988 (Act 59 of 1988), ss. 2B, 3, 5, 134, 146.

in relation to the classification of fault when a system, and not a direct human operator, is behaving in a way that is critical and potentially dangerous. The gap is therefore more normative and institutional than merely technological[50].

What the UK shows us that will be of most value in the other countries is not the exact results of their liability regime, but the value of role definition in advance[51]. The Automated Vehicles Act 2024 specifies that operational legislation will be linked to the driving test, operational domain user, user out classification, safety principles, and self-driving person entities responsible for ongoing compliance[52]. Criminal law will always be able to be more effective in the absence of more specific regulations. In India, the prosecutors are going to be put in the position of having to reconstruct the contractual and software manual debris relating to who was responsible for update monitoring, log preservation, route authorisation, sensor calibration, or decisions about whether the system was capable of safe operation in a particular environmental domain after an crash[53].

An effective Indian model would identify five specific categories. First is human override fault, wherein a user, safety operator, or remote supervisor acts recklessly after control was/is lawfully or literally available. Second is deployment despite known defect, wherein a manufacturer, integrator, or fleet entity deliberately operates a system that is unsafe[54]. Third is maintenance or calibration fault, which involves negligence of the system that creates an ordinary technical risk. Fourth is corporate concealment of safety risk, which is the suppression of warnings, incidents, or design flaws. Fifth is non-culpable system failure within approved operating conditions, where the situation may warrant civil compensation and the adjustment of regulations, but may not justify criminal liability[55]. The strength of this model is that it bridges mens rea and negligence to control different nodes rather than assuming that each

[50] María Lubomira Kubica, "Autonomous Vehicles and Liability Law", 70 *American Journal of Comparative Law* i39 (2022).
[51] Automated Vehicles: Statement of Safety Principles, *available at:* https://www.gov.uk/government/publications/automated-vehicles-statement-of-safety-principles/automatedvehicles-statement-of-safety-principles (last visited on February 18, 2026).
[52] Automated Vehicles Act 2024 Explanatory Notes, *available at:* https://www.legislation.gov.uk/ukpga/2024/10/notes/division/6/index.htm (last visited on February 19, 2026).
[53] Tina Sever, Giuseppe Contissa, "Automated Driving Regulations: Where Are We Now?", 24 *Transportation Research Interdisciplinary Perspectives* 101033 (2024).
[54] Ugo Pagallo, *The Laws of Robots: Crimes, Contracts, and Torts* 118 (Springer, Dordrecht, 1st edn., 2013).
[55] Sven Nyholm, Jilles Smids, "The Ethics of Accident-Algorithms for Self-Driving Cars: An Applied Trolley Problem?", 19 *Ethical Theory and Moral Practice* 1275 (2016).

autonomous crash has a single driver-like author[56].

In order for procedure to reflect the evolving nature of the substance, India must act on the immediate post-accident collection of event data, sensor logs, software updates, remote commands, audit logs, etc. with a requirement to the automated driving systems/collision avoidance systems[57]. India must act on requiring a collection of data pertaining to the vehicle's operational design domain, the fallback and/or M S P (minimum safer position) conditions, and the vehicle's operational domain, etc. The ability for investigators to determine system failure/exceeding/non-compliance with the system's operational design domain documentation is imperative[58]. The Bharatiya Sakshya Adhiniyam, 2023[59] provides the required legal underpinning for electronic proof, and the Bharatiya Nagarik Suraksha Sanhita, 2023[60] provides the overarching legal proof for collection of evidence and the investigations. The missing element is the specialty forensic automation driving evidence.

Simultaneously, there should be further restrictions on the criminal law restraints. In *Sunil Bharti Mittal v. CBI*[61], and *Shiv Kumar Jatia v. State (NCT of Delhi)*[62], they do not get involved in the ominous allegations of vicarious liability, while in *Standard Chartered Bank v. Directorate of Enforcement*[63], and *Iridium India Telecom Ltd. v. Motorola Inc.*[64], litigation, there can be liability for genuine corporate misconduct. Under the Consumer Protection Act 2019[65], there is an alternative product liability approach for defects presenting an unsafe performance that is also less likely to attract criminal liability. Therefore, the aim should be calibrated accountability: criminal prosecution for the conscious creation of risk, gross negligence, or deception suppression, and civil or regulatory action for failures that are serious

[56] Andrew Ashworth, Jeremy Horder, *Principles of Criminal Law* 177 (Oxford University Press, Oxford, 7th edn., 2013).
[57] Automated Vehicle Safety, *available at:* https://www.nhtsa.gov/vehicle-safety/automated-vehicles-safety (last visited on February 21, 2026).
[58] Marcel Aguirre Mehlhorn, Andreas Richter, Yuri Shardt, "Ruling the Operational Boundaries of Highly Automated Vehicles", 56 *IFAC-PapersOnLine* 2202 (2023).
[59] The Bharatiya Sakshya Adhiniyam, 2023 (Act 47 of 2023), ss. 61, 62, 63.
[60] The Bharatiya Nagarik Suraksha Sanhita, 2023 (Act 46 of 2023), ss. 173, 176.
[61] (2015) 4 SCC 609.
[62] (2019) 17 SCC 193.
[63] (2005) 4 SCC 530.
[64] (2011) 1 SCC 74.
[65] The Consumer Protection Act, 2019 (Act 35 of 2019), ss. 82 to 87.

but are not significantly criminal[66].

## 1.6 CONCLUSION

The issue of autonomous vehicles and their implications for criminal law is an immediate concern in doctrinal terms, not a problem for the future[67]. While road deaths remain a persistent problem in India, the existing legal frameworks governing the harm caused by vehicles are dependent on an articulated model of visible, immediate human control, which quickly becomes less stable when driving decisions are made by code, sensors, maps, software updates, human fallback decisions, and organisational decision-making[68]. It is reasonable to argue that Indian criminal law does have the regulatory frameworks, in terms of proximate cause, graded fault, knowledge, negligence, and proof beyond reasonable doubt, to deal with the questions raised, but there is a lack of the regulatory and doctrinal frameworks to deal with impertinent issues with respect to vehicle automation[69].

Less extreme responses from India are required than making criminal all autonomous failures or saying that no driver presents an accountability black hole. Responsibility ought to shift to whoever ran the relevant risk at the relevant moment (fallback user, remote manager, maintenance lessor, fleet manager, manufacturer who blindfolded fitted an unsafe feature)[70]. Courts ought to be presented with good hard evidence, not evidence of appreciation for the tech; Parliament and the regulatory frameworks ought to establish operating parameters, data retention obligations, the relevant duty to mitigate transitions, and role-specific obligations; and prosecutors ought to reserve the criminal charge for cases that are truly deserving of blame and not just for failure to operate as prescribed[71]. Control, knowledge and proof will be the starting point; not steering wheel formalism, and other laws will cross the gap left by criminal law.

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[66] Michael S. Moore, *Causation and Responsibility: An Essay in Law, Morals, and Metaphysics* 91 (Oxford University Press, Oxford, 1st edn., 2009).
[67] Margarita Martínez-Díaz, Francesc Soriguera, "Autonomous Vehicles: Theoretical and Practical Challenges", 33 *Transportation Research Procedia* 275 (2018).
[68] New Car and Light Truck Sales by Levels of Driving Automation, *available at:* https://www.bts.gov/content/new-car-and-light-truck-sales-levels-driving-automation (last visited on February 23, 2026).
[69] Joel Feinberg, *Harm to Others: The Moral Limits of the Criminal Law* 187 (Oxford University Press, New York, 1st edn., 1984).
[70] Andrew Ashworth, Lucia Zedner, *Preventive Justice* 62 (Oxford University Press, Oxford, 1st edn., 2014).
[71] Automated Driving Systems, *available at:* https://www.nhtsa.gov/vehicle-manufacturers/automated-drivingsystems (last visited on February 24, 2026).

## 1.7 SUGGESTIONS

The reforms must clarify and potentially break up the responsibility for software-led driving by reorganising the liability for who controlled the legally relevant risk posed at the various stages of the deployment and the operation of the software[72].

1. Integrate the statutory definitions of 'automated driving system', 'operating design domain' and 'fallback user' into the Motor Vehicles Act and merge user definitions for criminal law alignment as 'user-in-charge' and 'no-user-in-charge'[73]. Develop quadrant duty statements that include for each status the duties of monitoring, response to takeover requests, and duties following a crash. For each approved instance of no-userin-charge driving, designate one 'authorised self-driving entity' who is legally liable for system driving-related compliance breaches. Use the innovation mechanism of the Act to provide sub-delegated legislation and pilot projects for the unqualified regulation of these roles.

2. In the context of Indian traffic systems, make autonomous operation unlawful until a regulator-approved 'safety case' demonstrating the system's operational design domain, known limitations, and performance claims pertaining to safety and operational metrics is provided[74]. Establish a public database of approved system variants to enhance investigatory efficacy concerning approvals as of the date of a collision, including the software version and mapping data. Consider substantial remote updates as 'safetyrelated changes' requiring a new authorisation, rather than routine regulatory maintenance. Connect new authorisation to the revised post-market obligations, thereby making legality reliant on continued compliance as opposed to a singular historical evaluation.

3. Develop prosecutorial and law enforcement instructions specifically assigning autonomous vehicles to real-world behaviours associated with recklessness,

[72] Philip Koopman, Michael Wagner, "Autonomous Vehicle Safety: An Interdisciplinary Challenge", 9 *IEEE Intelligent Transportation Systems Magazine* 90 (2017).
[73] Levels of Automation, *available at:* https://www.kba.de/EN/Themen_en/Typgenehmigung_en/Autonomes_automatisiertes_Fahren_en/Stufen_Automatisierung_en/stufen_automatisierung_node_en.html (last visited on February 25, 2026).
[74] Automated Vehicles: Statement of Safety Principles, *available at:* https://www.gov.uk/government/publications/automated-vehicles-statement-of-safety-principles/automatedvehicles-statement-of-safety-principles (last visited on February 26, 2026).

negligence, endangerment, and negligence relating to machinery without resorting to a "driver" fiction[75]. Incorporate an internal charging test comprising: human override

fault, deployment with knowledge of defect, negligent maintenance and/or calibration, corporate concealment, and non-culpable system failure within an approved operational domain. Justified documentation of the selection of an accused node in the chain (user, remote supervisor, fleet operator, manufacturer, contractor) is required to avoid the tendency to blame the closest human. Add an internal step for reviewing fatal cases, so prosecutions can only proceed where the proximate cause is evident and where the culpable state of mind reaches the criminal negligence threshold.

4. Part of responsibilities related to these automated functions is that you shall preserve crash data on serious events. Preservation of crash data involves event data recorders, snapshot data from prompts, logs of perception, logs of the driver monitoring states, revision logs, and described remote command logs. Tamper evidence must be demonstrated, and the time, data, and event storage must be maintained for a minimum time period. Deletion and selective disclosure are criminal and sanctions will be imposed after notification of harm. Increase these obligations on the Owner, Fleet Entity, and the Manufacturer to eliminate the risk of contractual blame-shifting. Preservation order templates for the police to serve in the field and on backend service providers must be created.

5. Create consistency in the handling of electronic evidence for self-driving vehicle collisions by providing evidence of self-driving vehicle collisions admission-consistent checklists and certificate templates[76]. Methods that will create auditable documentation of logging that will be court-accessible will be mandated for forensic labs to extract, hash, and log documents. Investigating officers should be instructed to obtain telematics/middleware telemetry (which are usually stored in the vehicle) from service providers early in the investigation. These elements should all be included in a single protocol to ensure that procedural shortcomings do not jeopardize evidence.

[75] Gabriel Hallevy, *When Robots Kill: Artificial Intelligence under Criminal Law* 75 (Northeastern University Press, Boston, 1st edn., 2013).
[76] The Bharatiya Nagarik Suraksha Sanhita, 2023 (Act 46 of 2023), ss. 173, 176.

6. Create a specialised multidisciplinary crash investigation unit for autonomous driving incidents that functions outside of regular traffic law enforcement[77]. Grant them instant access to the operational protocols to secure vehicle hardware, cloud logs, and external sources (maps, data connectivity, roadside infrastructure streaming data). Standard operating procedures to secure external sources. Mandate them to provide anonymized cause summaries to promote pattern investigatory practice and lessen accusations of hindsight criticism. Ensure the unit's findings are provided to both prosecutors and regulators, preserving the distinction between safety learning and criminal charging determinations.

7. Establish compulsory post-market surveillance obligations for manufacturers and fleet operators, including the reporting of safety-critical disengagements, near miss clusters, and repeated perception failures[78]. Mandate clear recall or safety update pathways, and provide risk assessments if safety updates are deferred or implemented in stages. Create an offence for intentional omission or alteration of safety information concerning regulatory or investigative submissions, focused on the corporate fault instead of management/director fault. Safeguard internal whistleblowers and mandate the independent auditing of safety management systems to reveal "known defect" situations more quickly.

8. Document duties concerning maintenance and calibration for sensors, cleaning, alignment, tires, brakes compatibility, and diagnostic health assessments related to the use of automated functionalities[79]. Incorporate proprietary service networks and regular assessments of digital service logs for commercial vehicles that are auditable in court. Connect maintenance-related enforcement to insurance and permit requirements, resulting in compliance-related safety incentives prior to the application of criminal law. Continue the compliance approach for the mandatory safety systems

[77] Dimitris Milakis, Bart van Arem, Bert van Wee, "Policy and Society Related Implications of Automated Driving: A Review of Literature and Directions for Future Research", 21 *Journal of Intelligent Transportation Systems* 324 (2017).
[78] UN Regulations on Cybersecurity and Software Updates to Pave Way for Mass Roll Out of Connected Vehicles, *available at:* https://unece.org/sustainable-development/press/un-regulations-cybersecurity-andsoftware-updates-pave-way-mass-roll (last visited on February 28, 2026).
[79] Araz Taeihagh, Hazel Si Min Lim, "Governing Autonomous Vehicles: Emerging Responses for Safety, Liability, Privacy, Cybersecurity, and Industry Risks", 39 *Transport Reviews* 103 (2019).

being introduced for heavy vehicles in India, and for automated systems, extending the same to safety technologies.

9. Establish criminal law relating to control transfer and remote monitoring as law based cores and not operational peripheries. Standardise minimums on requests for takeovers, timeframes on escalations, and effectiveness on driver supervision for any system that requires people to be involved[80]. From remote supervision, implement licensing and regulation for fatigue, logging, and in competency, as their absence, delay, or misuse, can be proximate causes of injury. Define precisely when the law will consider control to be available, so that the courts can determine whether a person had the opportunity to act and a real ability to do so to avert the consequences.

10. Make vulnerable road users safety a mandatory performance pillar in authorisation, testing and enforcement of India's exposure profile[81]. Scenario-based validation for pedestrians, cyclists and two-wheelers, including night, occlusion, informal crossing and mixed-traffic ambiguity, should be mandatory. Until a system shows reliable detection and conservative behaviour in those scenarios, limit operating domains via geofencing, speed capping and corridor rules. Enable community reporting and hotspot mapping so regulators can responsively manage domain permissions where repeated near misses pose systemic risk.

[80] Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles, *available at:* https://www.sae.org/standards/j3016-taxonomy-definitions-terms-related-driving-automationsystems-road-motor-vehicles (last visited on March 1, 2026).
[81] Automated Vehicle Safety, *available at:* https://www.nhtsa.gov/vehicle-safety/automated-vehicles-safety (last visited on February 11, 2026).