



China's Automated Driving Mode the Imputation of the Subject

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Abstract. Autonomous driving introduces new liability challenges. This paper categorizes autonomous vehicles into assisted, highly autonomous, and fully autonomous, discussing the responsibilities of manufacturers, sellers, operators, and users. It stresses the need to allocate accident responsibility based on technology type and participant roles, ensuring user safety and technology advancement.

Keywords: automatic driving; subject of responsibility; legal regulation; automatic classification

1 Research Background

The swift progress of autonomous vehicles, like "Apollo Go" in China, raises urgent liability issues in traffic accidents^{[1],[2]}. The Wuhan incident in 2024 underscored the challenge of assigning blame in self-driving car accidents, traditionally based on the duty of care^{[1],[3],[4]}. Autonomous systems, however, lack the rights and obligations of humans, complicating legal accountability^{[1],[5],[6]}.

In the current state of weak artificial intelligence, automatic driving technology lacks the independent learning ability and planning ability of human drivers^[7]. Instead, they rely on the default application systems, these systems based on predefined procedure processing large data sets^{[5],[6]}. This raises the question of how to assign blame in the event of a self-driving car accident. The researchers propose several ways to solve this problem. One view is that the onus should fall on the car manufacturer because they cannot prove that they were not at fault at the time of the accident^{[8],[9]}. Another view is that product liability rules should apply because the driver is not actively involved in the driving behavior^{[6],[10],[11]}. A third view is an elevator accident, arguing that manufacturers should be held accountable for self-driving cars in a similar way.

Autonomous driving raises questions about criminal liability in accidents^{[8],[12]}. AI lacks rights and duties, can't breach duty of care, and can't be a "norm taker"^{[5],[13]}. Some say humans or manufacturers are responsible^{[10],[14]}, while others argue for product liability^[15]. The existing literature highlights a significant "liability gap" that

has emerged with the rise of autonomous human agents^[16]. As these systems gain greater decision-making autonomy, it becomes increasingly difficult to trace causation and assign moral and legal responsibilities^{[17],[18]}. In addition, the opacity and complexity of AI-driven software in autonomous vehicles may make it difficult for insurance companies and courts to determine the root cause of accidents^[19]. In addition, the "multi-hand problem" has emerged, with a multitude of participants, from car manufacturers and software developers to vehicle owners and pedestrians, Together they contribute to a causal chain that leads to complex outcomes^[20]. The complexity of this issue is that each participant may have contributed to the occurrence of the accident, but determining specific responsibility is very difficult. To address these challenges, this paper refers to the key factors that need to be considered in the process of liability attribution^{[8],[21]} and proposes a framework that considers the following key factors when determining liability for an autonomous vehicle accident: a) The level of autonomy and automation in the vehicle decision-making process should be the main considerations; b) Assess the ability of relevant stakeholders to foresee and prevent adverse outcomes; c) All participants comply with industry-wide safety protocols and regulations; d) accessibility of data and transparency in the decision-making process of AI systems to facilitate effective investigation and adjudication.

The framework's role is to systematically analyze responsibility for autonomous vehicle accidents, examining the level of autonomy and decision-making at the time of the incident. It helps ascertain if the cause was a system failure, procedural error, or human operation issue. It also evaluates stakeholders' abilities to predict and prevent risks through safety testing and compliance with industry standards and regulations^[15].

The proposed framework aims to systematically analyze autonomous vehicles by comprehensively considering the level of vehicle automation, stakeholders' anticipatory and preventive capabilities, compliance with industry safety protocols and regulations, as well as data accessibility and transparency of AI system decision-making processes. Liability for driving a vehicle accident. The framework emphasizes collaboration and shared responsibility when a specific failure cannot be attributed to a single party (such as a manufacturer versus a software developer). For example, if an incident is caused by a software defect and the defect involves the collaborative work of multiple development teams, responsibility is shared based on each team's contribution to the software development process and the quality standards they adhere to. In addition, the framework encourages cross-domain collaboration, such as information sharing and collaborative investigations among manufacturers, software developers, regulators and insurance companies, to more accurately determine the cause of accidents and attribution of liability. ”

2 The Subject Dilemma of Negligent Offenders Involved in Autonomous Vehicles

Traditionally, the blame for a traffic accident or dangerous driving has been placed primarily on the driver or vehicle occupant, while the motor vehicle manufacturer and the driver's support staff are rarely treated as criminal subjects unless there are serious quality issues or production defects^[6]. However, with the advent of autonomous driving technology, the responsibility landscape has changed significantly.

In autonomous mode, vehicles use advanced radar and cameras to identify road conditions, monitor surroundings, and select lanes, avoiding obstacles automatically. Drivers are responsible for emergencies or special conditions and may not need to be at the wheel due to reduced physical control. This leads to changes in negligence liability, with Chinese law considering the foreseeability of outcomes and the duty to prevent harm. The new negligence theory focuses on the duty to avoid harm, complicating responsibility attribution in autonomous driving contexts^[15].

As the use of autonomous vehicles becomes more widespread, the occurrence of such accidents is expected to increase dramatically. Two pressing legal issues arise: the lack of clarity surrounding the subject of infringement liability and the distribution of liability, and the uncertainty of the quality and safety standards that underpin the identification of product liability, which may be shifted back to the "driver" based on the nature of the driver and his ability to prevent accidents. In reality, vehicle manufacturers or developers of automatic driving assistance systems must have a preliminary understanding of the risks of automatic driving, which is an inevitable derivative accompanied by innovation. The law does not prohibit any unit or individual from carrying out risk activities within the permitted scope, because such risks are conducive to the development and progress of the whole society. The realization of these risks that cannot be predicted and cannot be avoided belongs to the "permissible danger". Risk-taking behaviors, like driving, can advance society but also pose risks. Lawmakers balance these by setting legal frameworks that allow such behaviors without holding individuals accountable for inevitable accidents, ensuring broad access to technological benefits. They also require drivers to operate vehicles safely and not blame them for accidents if they follow the law. Similarly, AI product manufacturers aren't criminally liable for unintended AI actions if they meet legal and ethical standards of care^[22].

3 The Way to Solve the Negligent Offenders Involved in Autonomous Vehicle Accidents

3.1 Categories of Autonomous Driving Technology

According to the Automobile Driving Automation Classification formulated by the Ministry of Industry and Information Technology of China, automobile driving automation is divided into 6 levels, level 0-2 is driving assistance, the system assists human to perform dynamic driving tasks, and the driver is still the driver. Levels 3-5 are

automatic driving, of which level 3 is conditional automatic driving, and the system continuously performs all dynamic driving tasks under its designed operating conditions. Level 4 is highly automated driving, in which the system continuously performs all dynamic driving tasks under its designed operating conditions and automatically executes minimum risk strategies. Level 5 is fully autonomous, where the system continuously performs all dynamic driving tasks under any drivable conditions and automatically executes the minimum-risk strategy. It can be seen that self-driving cars can be roughly divided into three categories: the first category is the effect of assisted driving, that is, L0-L3, when the driver still needs to actively control the running vehicle, and the artificial intelligence system assists the driver to control the vehicle to monitor some obstacles or warn some emergencies. The second category is highly automatic driving, that is L4, at this time, the artificial intelligence system can automatically identify the road situation according to the system Settings, achieve no people in the driving position, and can also drive normally on the road, and in a specific environment, it is necessary to alert the driver to take over. The third category is full automatic driving, that is, L5. In this case, the automatic driving system can not drive according to the route set in the system, but according to the actual road traffic conditions, including control information, accident construction and other actual specific conditions, combined with big data to achieve the optimization of the route, without the intervention of the driver. For the occurrence of road traffic safety violations in intelligent connected vehicles with drivers below L3 level, the traffic management department of the public security organ will deal with the driver according to law "Shenzhen Special Economic Zone Intelligent Connected Vehicles Management Regulations", but such provisions have not been promoted nationwide, and there are no clear provisions on the main responsibilities under L4 and L5 levels. Therefore, we need to discuss the subject of possible responsibility.

3.2 Specific Subject of Responsibility

The purpose of developing self-driving cars is to improve the safety and convenience of travel, not only to ensure driving safety but also to avoid major impact on the current road traffic order. If the traditional principle of liability for traffic accidents is still applied, punishing drivers will not only violate the original intention of technological innovation of automatic driving, but also put forward higher duty of care requirements for drivers. It will also ignore the safety guarantee responsibility of developers, sellers and other entities in autonomous vehicles, which is obviously not in line with the future development trend of autonomous driving technology and is too harsh for drivers^[22]. Therefore, at different levels of autonomous driving technology, the results of legal infringement caused by autonomous driving should be distributed among driving participants such as developers, sellers, users and operators.

3.2.1. Producer Responsibility.

Scholars argue that producers of AI should bear strict liability regardless of fault, due to high profits, supposedly correcting fairness and minimizing innovation barri-

ers^[23]. However, linking punishment solely to corporate gains, without considering the severity of legal rights infringement, could lead to disproportionate penalties and a chilling effect on innovation, potentially conflicting with the principles of criminal law.

For vehicles that have entered the application stage, manufacturers have limited control over them. They cannot force drivers to be vigilant or control the vehicle. They can only maintain system safety, especially algorithm safety, and prevent serious dangers in the operation of autonomous vehicles through real-time monitoring, closed management and timely maintenance, especially when the vehicle personnel activate the emergency help button. Remote monitoring or intervention of autonomous vehicles should be initiated through the cloud background (Liu, 2024). While manufacturers aren't criminally liable for self-driving car accidents, they're still responsible for product quality. Autonomous vehicles require seamless hardware-software integration for safe operation. Manufacturers must ensure compatibility and establish safeguards against system failures and cyber threats. They should also provide clear warnings to drivers, like visual and auditory cues, to prevent accidents, maintaining vigilance even as automation increases.

If the manufacturer's problems lead to traffic accidents in autonomous vehicles, such as rainy weather, the recognition of automatic driving is limited, and the driver is not reminded to pay attention to the surrounding environment to take over the right to drive the car, according to the Product Quality Law, the manufacturer must be responsible for the safety of the products it produces, and bear the corresponding legal responsibility when the product is defective. Further, if technical defects cannot be found in the production stage due to the limitation of scientific and technological level and cognitive ability, in the event that technical defects that may cause casualties are found in the operation stage of automatic driving vehicles that meet technical standards, the manufacturer shall promptly notify all users to stop using the product and recall and improve the defective product. If the technical defect causing a motor vehicle accident cannot be found at the circulation stage, then the manufacturer does not have a breach of duty of care^[22].

3.2.2. Liability of the Seller.

After the motor vehicle is put on the market and entered into circulation, the seller shall fulfill the reasonable duty of warning and product improvement. When consumers purchase a motor vehicle with automatic driving function, the seller shall provide clear instructions and warnings to consumers to ensure that consumers understand the functional limitations and conditions of use of the automatic driving system, and clearly inform the level of automatic driving function and the precautions after activation, so as to ensure that the users of the automatic driving vehicle master and standardize the use of automatic driving function. For example, vehicles below L3 should not leave the driving position when opening the automatic driving mode, and should maintain appropriate vigilance. When the system prompts to take over, the driving right of the car should be mastered at the first time; Although vehicles above L3 generally do not need to manage the operation of the motor vehicle, they should also tell the user that they should upgrade the vehicle software according to relevant national

regulations and standards, do not use the autonomous driving function independently in case of complex situations, and do not falsely advertise the functions of the autonomous driving car sold in the sales process, nor exaggerate the functions of the autonomous driving. Nor shall the management obligation of legal interest risk be transferred to the car user through extremely complex and obscure product instructions, and the seller shall ensure that the instructions for the use of autonomous vehicles can be accurately understood by reasonable and sound ordinary people, and shall carry out special training for consumers when necessary. If the seller fails to provide adequate information, resulting in an accident during the use of consumers, the seller may need to bear certain responsibilities.

3.2.3. Liability of the Operator.

When the autonomous vehicle is a vehicle engaged in transport business, according to the "Autonomous Vehicle Transport Safety Service Guide (Trial)" issued by the Ministry of Communications of China, it can be seen that the autonomous vehicle engaged in urban public tram passenger transport and road passenger transport operations should be equipped with a driver or operation safety guarantee personnel. Taxi autonomous vehicles must have a safety officer, while fully autonomous vehicles can use remote personnel in designated areas. The duty is to monitor the vehicle and environment, taking control when needed. If technology fails, passengers aren't responsible as they lack driving obligations. Operators must follow regulations; otherwise, they risk legal consequences for negligence. If remote officers or safety personnel fail in their duties, they're accountable for accidents due to system failures or temporary controls.

3.2.4. User's Responsibility.

When an autonomous vehicle belongs to a non-operational vehicle, it is divided into standard divisions according to the level of the autonomous driving system for the vehicle driving operation, peripheral monitoring, and taking over the driving behavior. It has the function of directly replacing the driver's "cognition", "judgment" and "execution" of part or all of the vehicle control. The degree of duty of care is also reduced^[24]. Since the purpose of automatic driving is to reduce the burden of tedious driving, it requires the driver to pay attention to the automatic driving system and driving conditions all the time, which in essence only replaces another complex task with a sick obligation. Automatic driving also falls into a logical contradiction^[25].

Drivers retain duty of care even as autonomous vehicles reduce it. Despite reduced control, they must respond to emergencies and system alerts. Beijing's draft highlights this, stating drivers must monitor autonomous vehicles, taking control when needed or prompted. Neglecting this duty, such as by being distracted, can lead to accountability for any resulting accidents.

For example, if the driver knows that the driving system is not sensitive to the sensitivity of static objects, but still focuses on playing with his mobile phone on a busy road, resulting in the car hitting a static object or a stopped vehicle, the driver should be held responsible for his negligence. Of course, regardless of whether the vehicle is

an operating vehicle, if the driver relies too much on artificial intelligence technology in the car with only auxiliary driving function (L0-L3 level), violates the obligations of road condition information and driving environment that should be paid attention to, causes accidents or drunk driving and other occasions, it can be directly inferred that the driver's behavior has exceeded the normal driving behavior. The driver's fault liability can be investigated in comparison with the non-automated driving behavior. In practice, this view is indeed affirmed, "Sun opened the vehicle's auxiliary driving system after drinking, set the speed and lane, and drove by the auxiliary driving system." Before long, the Sun began to be confused, out of trust in the auxiliary driving system, he simply fell asleep. After driving for about 10 minutes, Sun's car rear-ended the car in the same lane, and the violent impact made Sun's car fly off the road, the front of the car almost all smashed, and the dozing Sun fell into a coma before he had time to react. The court held that the vehicle had adaptive cruise control and lane-keeping assistance under the operating conditions specified by the system. But this is partially autonomous driving, where the basic operation is done by the vehicle, and the driver still has control of the vehicle, is responsible for peripheral monitoring, and remains focused and ready to take over the vehicle. Therefore, even if the automatic driving function is turned on after drinking alcohol, it should still be considered that the driver is in control of the vehicle while drinking, which is a drunk driving, and its behavior still constitutes the crime of dangerous driving^[26].

At L3 level autonomous driving, the vehicle can continuously perform all dynamic driving tasks under designed operating conditions, but a driver is required to take over under certain circumstances. In the event of an accident, the allocation of liability needs to consider whether the system is in normal operation and whether the driver took over control of the vehicle promptly and reasonably. For example, if the system fails to work properly due to abnormal weather or road conditions, and The driver has been reminded to take over in time, but the driver fails to respond. On the contrary, if the system fails for no reason and fails to remind the driver, the manufacturer will be held responsible if an incident involving L3 occurs. In the event of an accident involving a self-driving car, the distribution of responsibility between the system and the driver becomes a key issue. The distribution of responsibility must consider whether the system is operating within normal parameters and whether the driver takes over vehicle control in a timely and reasonable manner if the system is abnormal. If weather or road conditions prevent normal operation and the driver is alerted to takeover but fails to respond, the driver is primarily responsible for the accident.

In semi-autonomous mode (L3-L4), although the vehicle has certain autonomous driving capabilities, the driver still needs to keep monitoring the vehicle and take over control when necessary. If an accident occurs due to user negligence, the user needs to bear the corresponding responsibility. For example, at the L3 level, if the driver fails to respond in time when the vehicle prompts to take over, resulting in the vehicle failing to avoid obstacles and causing an accident, the driver needs to bear primary responsibility. Similarly, at the L4 level, although the vehicle can drive autonomously in most situations, it still requires the intervention of the driver or safety officer when encountering complex or unknown road conditions. If the driver or safety officer fails to take over control in time due to negligence, causing an accident, he will also be

held responsible. Therefore, while users enjoy the convenience brought by autonomous driving, they should also remain vigilant at all times to avoid accidents caused by negligence. "

At the L5 level, the vehicle can continuously perform all dynamic driving tasks in any drivable condition without driver intervention. At this time, if an accident occurs, the manufacturer is usually required to bear strict liability, unless it can be proven that the accident was caused by force majeure or intentional damage by a third party. For example, if an L5 self-driving car suddenly loses control and causes an accident while driving, the manufacturer will be required to bear full responsibility if the investigation finds that it was caused by a faulty vehicle sensor.

The question worth thinking about is, when the car is driving normally in the highly automatic driving mode (L4 and L5), whether the safety officer or the driver is the driver of the motor vehicle after drinking to meet the drunk driving standard and thus constitute the crime of dangerous driving? FuYuMing professor "by highly automated driving car, driver's position as a taxi passengers, can be trusted completely automatic driving system, the" driver "drunken ride from people driving position, enable automatic driving mode, does not conform to the stipulations of the" criminal law "the components of the crime of dangerous driving behavior, not by dangerous driving sin^[27]". The author views safety officers as crucial for operating vehicles, especially during autonomous alerts or unsuitable conditions, ensuring safe operation regardless of automation level. For non-operational vehicles, drivers rely on the system's development and design, suggesting a trust-based reduction in their duty of care.

4 Conclusion

The advancement of autonomous driving in China, as globally, challenges the traditional assignment of legal liability in traffic incidents. This paper discusses the need for a legal approach that reflects the different automation levels and stakeholder roles. It advocates for a tiered liability model, where responsibility varies with the degree of vehicle autonomy. To stresses that with increasing autonomy, the liability shifts towards the manufacturer in case of technical defaults, while users still bear the responsibility to supervise and respond to system alerts, particularly in semi-autonomous vehicles. It also highlights the necessity for future-oriented legal guidelines that can evolve with technology. Ultimately, creating a legal framework that encourages innovation while safeguarding public safety is essential. This involves a balanced distribution of responsibilities to facilitate the secure integration of autonomous vehicles into our daily lives.

To ensure that autonomous vehicle liability laws keep pace with technological advancements, it is crucial to first formulate and improve relevant laws and regulations. As autonomous driving technology continues to develop, existing laws and regulations may no longer be able to fully adapt to new liability allocation needs. Therefore, relevant laws and regulations need to be updated and improved in a timely manner based on the actual development level of autonomous driving technology, and the responsible entities and liability principles under different automation levels need to

be clarified to provide legal protection for the safe operation of autonomous vehicles.

Secondly, it is also essential to establish a cross-field cooperation mechanism. Self-driving cars involve many sectors, including manufacturers, software developers, regulators and insurance companies. In order to more effectively deal with the responsibility distribution challenges brought about by autonomous vehicles, these fields should strengthen cooperation and jointly develop safety standards and responsibility sharing mechanisms. Through cross-disciplinary cooperation, the interests of all parties can be more comprehensively considered, the efficiency of accident investigation and handling can be improved, and the safe operation of autonomous vehicles can be better ensured.

In addition, strengthening data sharing and transparency is equally important. The operation of self-driving cars relies on a large amount of data support, including vehicle status, driving environment, user behavior, etc. In order to more accurately determine liability for accidents, regulators, manufacturers and insurance companies need to ensure that this data can be obtained and analyzed in a timely manner. Therefore, the sharing and transparency of data related to self-driving cars should be promoted, and unified data standards and access mechanisms should be established to provide strong support for liability determination.

Finally, enhanced user education and training cannot be ignored. Although self-driving cars can reduce the burden on the driver, they still require the driver to maintain a certain degree of vigilance and emergency response capabilities. In order to ensure that users can use autonomous vehicles safely, education and training for users should be strengthened to improve their safety awareness and emergency response capabilities. This will not only reduce accidents caused by user negligence, but also increase users' trust and acceptance of autonomous vehicles.

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