

Challenges and Response of the Driverless Vehicle to Chinese Law

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Abstract: In China, the technology of driverless vehicle has been developed rapidly, and has already had the trend of market application. Compared with traditional cars, driverless cars have significant differences. Due to the particularity of lack of direct drivers, the traditional automobile liability system and government supervision system cannot be fully applied to driverless cars. Therefore, it is necessary to perfect legislation and optimize supervision mechanism according to the characteristics and development of driverless vehicles.

1. Introduction

As a newly-developed technology, the technology of driverless cars is a revolutionary achievement in human's history of automobile technology. It not only provides convenience for human, but also brings great challenges to public life. In March 9, 2018, a woman crossing the road was knocked down by an unmanned SUV and eventually died. The driverless car was developed by Uber and this accident was considered to be the world's first standard autopilot car crash. In addition, Uber's driverless vehicles had a total of 37 crashes in the 18 months prior to the accident. It can be imagined that with the development and popularization of driverless technology, it will have a greater impact on public safety, especially challenge the principle of imputation and the supervision system constructed with the traditional human operated vehicle as the adjustment object. Therefore, it is of great practical significance to study the legal challenges and solutions of driverless vehicle technology. On the basis of discussing the development status and characteristics of driverless vehicle technology in China, this paper puts forward the challenge of its development to China's legal system from two aspects of responsibility attribution and government supervision and puts forward legislative opinions.

2. Characteristics of the Driverless Vehicle and Its Development in China

2.1 Definition and Characteristics of Driverless Vehicle

The driverless vehicle, also known as the automatic driving vehicle, is a kind of intelligent vehicle. It mainly depends on the vehicle's autopilot and relies on the computer system to realize driverless operation. In the standard case, the driverless vehicle must be able to sense the road and environment through the on-board sensor system and automatically plan the driving route to control the vehicle to reach the predetermined goal, without relying on human control and adjustment during the period. [1] Historically, driverless cars first appeared in the 1920s in the United States. Since the 1970s, driverless vehicles have made great progress in the United States, Japan, Western Europe and other developed countries. [2]

Compared with the traditional vehicle operated by human, the driverless vehicle has two main characteristics: First, it is partially or completely separated from human driving, and there is no direct driver. Second, relying on artificial intelligence to drive through technical means, it is closely related to technology and has strong technicality.

2.2 Development of the Driverless Vehicle in China

Since the 1990s, China's driverless cars have grown up from scratch and made outstanding achievements. In 1992, the National University of Defense Technology successfully developed China's first genuine driverless vehicle. In 2005, Shanghai Jiao Tong University successfully developed the first city driverless car in China. [3] In July 2011, the "Hongqi HQ3" driverless vehicle developed by the National University of Defense Technology successfully completed the 286km driverless operation test from Changsha City to Wuhan City, marking China's great development and progress in the field of driverless vehicles. In 2017, Robin Li, the CEO of Baidu, made a pilot run in a self-driving vehicle on the Fifth Ring Road of Beijing, causing widespread concern in the society. In 2019, Baidu and Hongqi of FAW jointly launched the first batch of L4 class driverless cars that can be mass produced in China - Hongqi EV.

Generally speaking, in recent years, the development speed of China's driverless vehicle technology is considerable. It has reached the international advanced level in some fields. China has listed the driverless vehicle as one of the seven major industries supported by the government, [4] and paid great attention to its development. In the foreseeable future, China's driverless vehicles have a broad prospect in the market.

3 The Challenge of Driverless Vehicle to Current Legal System

Because both the Tort Law and the traffic safety law take "human" as the object of regulation, the challenge of automatic driving technology to our existing legal system is mainly reflected in two aspects – the principle of distribution of legal liability and supervision system.

3.1 Challenge to the Principle of Distribution of Legal Liability

First, the subject of responsibility cannot be determined. Traditionally, in the Tort Law, the subject of liability is the person or organization who causes the infringement, which is essentially human. In the civil legal relationship, the main body of the civil damage compensation relationship is also "person", or a company or organization composed of people. [5] However, the core of automatic driving vehicle is to break away from human control. Therefore, when there is an accident or tort,

there is no direct infringer, so who should take responsibility at this time will become a problem. In other words, because the car is driverless, we will face the problem that there is no direct responsible person as the subject of responsibility when we pursue responsibility according to the traditional law. In traditional opinion, “Machine is innocent” is the basic principle of law, and also in line with people’s cognition and emotion. At present, in any case, it is impossible for the law to attribute the criminal responsibility to the criminal tool itself, but to the criminal himself. [6] Since the law cannot attribute the responsibility to the driverless vehicle itself, what needs to be further discussed is the responsibility of the car manufacturer, owner and user.

Secondly, the traditional liability principle is not fully applicable to driverless vehicles. The imputation principles of legal liability in China include fault principle, fault presumption principle and strict liability principle. In the accident of driverless vehicle, the technical reasons will replace the fault of driver and become the main reason of the accident. From current form of driverless vehicle development, any kind of imputation principle cannot be applied to all situations, which may lead to the dilemma of imputation in reality.

3.2 Challenge to Supervision System

3.2.1 Inapplicability of Traditional Access Mode

First, the traditional access model of producers is not applicable. The access mode of traditional automobile manufacturing mainly relies on the requirement that the production of enterprises meet the national mandatory standards, industry standards and enterprise standards related to automobiles, and that enterprises conduct self-inspection and national sampling inspection before they can be listed for sale. However, now all kinds of standards and inspection standards are aimed at human operated vehicles, which are not suitable for driverless vehicles with particularity, imperfect development and higher risk coefficient. Therefore, the access standard should be improved.

Secondly, the access mode of users is not applicable. At present, China’s automobile driving access system is mainly the driver’s license system, that is, to ensure that the driver has sufficient driving knowledge and driving ability through the corresponding professional skills test, and then allows him to drive the vehicle. And different vehicle types have different requirements for the driver. This traditional access mode of driver’s license is established according to the characteristics of traditional cars. The operation of traditional cars requires the driver to fully understand driving knowledge such as traffic rules and be able to skillfully and coordinately master the skills of hand-foot coordination to operate and drive the car. [7] Therefore, as long as the driver can obtain a driving license, it is proved that he has the ability to operate and drive the car. However, the driverless vehicle does not need users to operate and drive at all, so the original assessment content also lost its significance. At the same time, the traditional automobile driving requires the driver to have certain physical conditions, such as vision requirements, hearing requirements, etc., while the driverless automobile does not need the user to meet these requirements. Thus, the assessment of the admittance of the driverless automobile should dilute the assessment of physical conditions, and develop a new assessment focus.

3.2.2 Inapplicability of Traditional Supervision System

According to the Law of The People’s Republic of China on Road Traffic Safety and other relevant laws, the main supervision methods of automobile safety in China are signal lights, police command, points deduction for violation of traffic rules, and the serious ones bear administrative and criminal

responsibilities. However, due to the particularity of driverless vehicle, the traditional supervision method is not fully applicable. For example, traditionally, China adopts the cumulative score system of drivers, and illegal driving behaviors will be recorded. If the cumulative score reaches 12 within one year, relevant education and assessment will be required, if the person wants to continue driving. This traditional scoring system is not applicable to driverless vehicles, because there is no driver, and there is no scoring for drivers as a result. In addition, when driverless cars cause casualties, it is impossible to require the car itself to bear administrative or criminal responsibility.

4. The Way to Perfect the Technical Legislation of Driverless Vehicle in China

4.1 To Adopt Different Principles of Liability Under Different Circumstances

In view of the liability principles, the basic idea should be to adhere to different principles in different situations, which are mainly divided into two situations:

In the first case, one or more of the manufacturer, the owner and the possessor shall bear the liability for fault. For example, the manufacturer intentionally or negligently makes the quality of the car fail to meet the qualification standard, which leads to accidents due to the quality problems of the car. Or for example, because of the owner or user's intention or fault, the driverless car is used wrongly and against the rules, which leads to the accident. In this case, the violators of course have to bear the responsibility. In this way, the responsibility belongs to who is very clear, less controversial.

When there is a definite guilt party, the principle of fault liability should be considered in legislation, that is, only the liability of the wrongdoer should be investigated. The reasons are as follows: First, when there is a clear guilt party, according to the principle of fairness, we should only pursue the responsibility of the party in the spirit of seeking truth from facts. Second, if there is a clear guilt party, we can achieve the relief for the victims by pursuing the responsibility of the party, and achieve the legislative purpose of maintaining the balance of interests of both sides and stabilizing the social order. At this time, to pursue the liability of the non-wrongdoer is no longer necessary. [8]

In the second case, the occurrence of the accident is a fortuitous event, which is difficult to predict and very accidental. So the manufacturer, the owner and the possessor are not at fault. [9] Due to the particularity of driverless vehicle, we can foresee that such accidents are not rare. For example, there are occasional system failures that cause the car to lose control and eventually lead to traffic accidents.

When there is no fault party, the principle of strict liability should be considered in legislation, that is, the responsibility of the manufacturer, the owner and the possessor should be investigated according to certain standards, regardless of whether the party is at fault or not. But at the same time, we should pay attention to two points in legislation: First, in this case, we should give priority to civil liability and try to avoid criminal liability. Second, we should flexibly control the distribution of specific liability according to the accident situation. For example, when the car has been separated from the owner's possession for a long time and there is a new possessor, we should reduce or exempt the original owner's liability. When the occurrence of accidents is hardly relevant to the performance of the vehicle itself, the responsibility of the manufacturer shall be reduced or exempted. The reasons are as follows: First, when there is no clear guilt party, in order to coordinate the interest of both parties and ensure the appropriate compensation for the victims, the principle of strict liability should be applied to achieve a balanced interest of both parties, so as to reach the legislative purpose. Second, when the party is not at fault, pursuing criminal responsibility may violate the principle of suiting punishment for crime and the principle of justice. Civil liability should be pursued instead, to balance the interests of both parties. Third, we should adhere to the principle of seeking truth from facts, not

being rigid nor neglecting the interests of the parties to maintain the interests of the victims and move from one extreme to another.

4.2 Innovate Current Regulatory System

First of all, we should strengthen quality supervision at all levels. Due to the particularity of driverless vehicle, quality supervision is of decisive significance to reduce the accident probability. In terms of legislation, we should strengthen the quality supervision of driverless vehicles from three dimensions: The first is the dimension of manufacturer access. We should strictly regulate the access of producers, and take various considerations for producers, including technical capacity, accident rate, reputation, etc. With regard to the evaluation criteria for these aspects, China's legislation can refer to the relevant regulations of western countries, such as the Federal Automated Vehicle Policy issued by the U.S. National Highway Traffic Safety Administration in September 2016, [12] which has made certain norms for the network and system safety of the driverless vehicles. The second is the vehicle periodically checks dimensions. For the vehicles that have been put into use, we should carry out regular quality inspection, the frequency and intensity of which should be far higher than that of the traditional vehicles. We should make requirements for the owners from the legislative level, and investigate the administrative responsibility for the owners of the vehicles that are not tested on time. The third is the dimension of driving license. Presently, driverless vehicles are still in the experimental stage. Any enterprise or individual who puts driverless vehicles on the road shall obtain the approval of the government and carry out all-round investigation.

Secondly, we should innovate the driving license examination system. Although there are no direct drivers for driverless vehicles, and the requirements for users' physical conditions and skills are low, this does not mean that the user access assessment of driverless vehicles can be cancelled. The driving license examination of driverless vehicle is different from that of traditional vehicle. In the driving license examination system for driverless vehicle, the content should focus on two aspects: The first is the user's understanding and application of the knowledge of driverless vehicle, that is, whether the user can correctly master the method of using driverless vehicle, so as to avoid the error as much as possible. The second is to focus on the user's understanding of the potential risks of driverless vehicles and the study of relevant laws, especially the application of the principle of strict liability in legislation, so as to ensure that the user can clearly understand the responsibility of using driverless vehicles and improve their legal identity. [13] This is ignored in the traditional automobile driving license test.

Finally, innovate the cumulative scoring system and incorporate it into the credit record. Although the existing cumulative scoring system for drivers in China cannot be directly applied to driverless vehicles, its form is still meaningful for them. For driverless vehicles, the cumulative scoring system can be applied in two forms: The first is the scoring of the vehicles themselves. Compared with the traditional scoring method for drivers, each time a driverless car breaks down or has an accident, it should be scored according to the regulations considering the specific circumstances. When the score reaches the limit prescribed by the law, it can be judged that the car has greater problem in its quality, and the probability of the accident is large. Thus, the car should be ordered to recall. Second is to cumulate credit score for users. Whenever the user has operational mistakes or errors (intentional or negligent), the score shall be scored according to the specific circumstances. When the score reaches the limit prescribed by the law, it can be judged that there are great problems in the user's ability and way of use, and the probability of accidents is large, so it is necessary to retrain and assess the user. For some malicious behavior out of intentional or serious negligence, it should be recorded in the user's credit record. By promoting the innovation of these two forms of cumulative scoring system

in traffic legislation, we can most accurately determine the accident probability of driverless vehicles, and then deal with it to reduce the accident probability.

4.3 Focus on the Refinement of Legislation and Closely Integrate with the Development of Science and Technology

The legislation in the field of driverless vehicles should be based on the principle of refinement, paying attention to the role of supplementary provisions and legal interpretation to make the provisions of the law more detailed, clear and specific. It should try to avoid abstract and general provisions. At the same time, we should pay attention to the close combination with the technology development level of driverless vehicles. [10] According to the development of driverless vehicles, we should establish corresponding technical standards, and timely legalize the relevant standards. For driverless vehicles, it is necessary to combine the law with specific vehicle technology.

For example, China can use the classification standard of the U.S. Transportation Security Administration for reference to divide the automatic driving technology into five levels. [11] To some extent, L4 and L5 in the standard can be considered as driverless vehicles in real sense. L1, L2 and L3 still belong to semi-automatic driving vehicles controlled by human beings. If there is an automatic driving technology grading standard, there should be a corresponding safety grading standard. For semi-automatic driving vehicles, the traditional content can be more preserved in legislation, and the principle of fault liability is more inclined. For the driverless vehicle that may appear in the future, the legislation needs to be regulated separately according to the specific circumstances of new technology, and more inclined to strict liability principle.

5. Conclusion

With the rapid development of driverless vehicles, driverless vehicles will become more and more popular in China, and make more contributions to social development. At the same time, it will also bring more challenges to current legal system. The problem of responsibility attribution and government supervision analyzed in this paper will become one of the most important challenges. At present, the legislation in the field of driverless vehicles is still lagging behind. People in the legal field should strengthen the relevant research and discussion and promote the continuous progress of the legal theory in the field of driverless vehicles. The government should promulgate laws and regulations on driverless vehicles as soon as possible and strengthen the legislative preparation for the development of driverless vehicles, thus promote the prosperity and development of this emerging industry.

References

- [1] Liu Zuofeng, Zhang Jinyou. *The Current Situation and Tendency of Driverless Cars*. Hebei Agricultural Machinery. 20(1)
- [2] Li Qian. *Development of Driverless Vehicles in China and Abroad*. Elecfans. <http://m.elecfans.com/article/714019.html>
- [3] Wang Junming. *Criminal Law Application for Automatic Driving Vehicle*. Jilin University Journal Social Sciences Edition. 19(4)
- [4] Li Lei. *On the Establishment of Autonomous Vehicles Regulatory System in China*. Journal of Beijing Institute of Technology (Social Sciences Edition). 18(02)
- [5] Xu Hua. *On the Traffic Legislation and Current Traffic Regulation*. Jiangnan Forum. 17(08)
- [6] Bai Langtao. *Guide to the Criminal Law*. NPC Publishing, 2019
- [7] Chen Xiaolin. *Challenges and Responses of the Driverless Vehicle to Existing Law*. Theory Journal. 16(1)
- [8] Zhang Mingkai. *Criminal Law*. Law Press, 2016

- [9] *Specific provisions of voluntary, negligent, and accidental events mentioned in the Criminal Law of the People's Republic of China and General Rules of the Civil Law of the People's Republic of China*
- [10] Wang Ying. *How Is the Law Possible? – An Inspection of Admissible Risks in Autonomous Driving from a Legislative Perspective*. *Law and Social Development*. 19(06)
- [11] Fang Yueping, Wang Quansheng. *The Legislative Improvement of Traffic Accident Crime in the Era of Unmanned Driving*. *Qilu Journal*. 18(06)
- [12] Wang Xinyu, Zhang Changqing. *Research on the Conflicting Laws of Driverless Vehicles*. *Science and Technology Review*. 17(19)
- [13] Yang Jie, Zhang Ling. *Barriers and Thoughts of the Legislation of Driverless Vehicles*. *E-Governance*. 18(08)