Published online: 4 September 2024 DOI: 10.54254/2977-3903/11/2024101

To what extent can driverless cars be widely used in the future and reduce the accident rate?

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Abstract. The emergence of driverless cars, also known as autonomous vehicles (AVs), has generated a great deal of excitement and speculation regarding their potential to revolutionize transportation. With advanced sensors and sophisticated algorithms, driverless cars are capable of navigating roads and traffic without human intervention. There will be some help and wide use of driverless cars to reduce traffic accidents. The research will focus on the impact of driverless cars on reducing traffic accident rates in the future. After analyzing the current situation and summarizing some existing studies, the final conclusion is that driverless cars will indeed effectively reduce the traffic accident rate and it will be more widely used in the whole society in the future.

Keywords: driverless cars, accident avoiding, autonomous vehicles

1. Introduction

Autonomous vehicle is a kind of intelligent car that realizes driverless driving through a computer system. It has had a history of several decades, and in the early 21st century. On October 9, 2010[1], Google Inc. announced in its official blogged that it was developing self-driving cars, with the goal of helping prevent traffic accidents by changing the basic way cars were used, freeing people from a lot of driving time, and reducing carbon emissions. In October 2011[1], Google used the Mojave Desert in Nevada and California as a testing ground to test the car. In the same year, the Nevada legislature allowed self-driving vehicles on the road, the first such law in the United States. The law came into effect on March 1, 2012 [1]. Baidu Inc said on June 11, 2015 [1] that it plans to launch a prototype for road tests in China later in 2015 in a partnership with Germany's BMW AG to develop self-driving cars. If the plan goes well, Baidu will be well ahead of Google, which plans to officially launch its self-driving car in 2017. And now more old car companies have begun to study the field of driverless cars, such as BMW, Mercedes-Benz, Audi and so on, which shows that driverless cars are being more widely concerned, and is gradually becoming a trend in the automotive field [1].

Driverless cars already have some background for progress. Autonomous vehicles rely on artificial intelligence, visual computing, radar, monitoring devices and global positioning systems to work together to allow computers to operate motor vehicles automatically and safely without any active human input [2]. Nowadays the society has started to assume driverless cars are good for society, drivers, and practitioners and it is proposed that the accident rate of driverless cars can be reduced to almost zero, and the rapid growth of the market share of driverless cars will lead to a steady decline in the overall accident rate.

Automated cars could save the United States hundreds of billions of dollars in traffic accident costs because of the financial loss of traffic accident, traffic congestion costs and increased productivity with human labor during transportation. It could also put millions of people involved in passenger and freight transport out of work. If automated cars are reliable enough, the government may one day ban human drivers, since driver error is responsible for more than 90 percent of traffic fatalities in the United States each year [3].

The impact of driverless cars on traffic accident rates is very important. This is one of the key issues discussed in this paper, and it is also the key to whether the driverless car can be widely accepted by the public and become popular in society. From the part of the research review, it is obviously that driverless cars are significantly helpful in alleviating traffic accidents, which may help reduce about 90% of rear-end collisions and other accidents [2].

In the following parts, the existing facts and other literature will be referred to determine whether driverless cars will be widely used in the future and can reduce the traffic accident rate. These researches suggest that driverless cars have the potential to significantly reduce the number of accidents on the road. Although the studies undertaken so far are flawed, they have been able to

show the general direction. Reducing accident rates is a key and important reason for the widespread acceptance of driverless cars [4]

2. Research review

The development of driverless cars has gained significant attention from both the public and private sectors, and its potential for improving road safety and reducing traffic congestion has been widely discussed in the literature [5]. This section of the literature review provides an overview of recent research on the effectiveness of driverless cars in reducing traffic accidents and increasing their widespread adoption. There's also a large amount of researches into other aspects of driverless cars such as the law and the psychology and sociology of people. This dissertation will focus on the problems that this Research wants to solve, analyze the information obtained from it, and summarize it into this part of the Research Review. There is only a summary of the current situation, and there is no subjective content.

The literature review is divided into two parts: the first is about reducing traffic accidents; the second is about promoting the wide application of driverless cars. This will be discussed separately below.

2.1. Reducing traffic accidents

One of the main advantages of driverless cars is the potential to reduce traffic accidents. Research has shown that human error is a major contributing factor to road accidents. This is apparently because most cars are now driven by humans, where driver error or distraction are direct reasons for crashes and the use of autonomous driving technology could significantly reduce this risk [3]. A study conducted by the National Highway Traffic Safety Administration (NHTSA) found that 94% of road accidents are caused by human error, such as distracted driving, speeding, or impaired driving and the vast majority of these accidents are the fault of the driver [6]. With the elimination of human error, autonomous vehicles have the potential to reduce the number of accidents on the road. It also makes car driving safer, and solves the problem of drivers making mistakes or some dangerous driving conditions caused by various special circumstances to a large extent [7].

Several studies have examined the impact of autonomous vehicles on road safety. For example, a study by the Rand Corporation found that widespread adoption of autonomous vehicles could prevent up to 90% of road accidents [8] even though this study is in 2019 and may produce some bias and is not authoritative, its credibility is still quite high. Another study by the Virginia Tech Transportation Institute (VTTI) found that autonomous vehicles have the potential to reduce rear- end crashes by 90%. In the experiment, the reason why the driverless car can solve the rear-end accident is roughly analyzed, because the driverless car judges the road condition by the driverless system and makes corresponding choices. This can effectively avoid driving accidents caused by driver distraction or some other reasons [9] and more details will be discussed in the following parts.

However, there are also potential challenges associated with the introduction of driverless cars on the road. For example, some studies have suggested that the transition period during which human- driven and autonomous vehicles share the road could result in increased accidents. Some explanations of this problem are given in the literature. According to the literature, the main reason for the increase in the accident rate during the transition period is that the self-driving technology used is not so advanced [10]. However, it may be wrong to deem the changes in the accident rate as solely due to driverless cars, since there are still a lot of factors that could affect it. One of the main reasons that driverless cars could increase traffic accident rates is the conflict between human control and Al control. This can be broken down into two main concerns:

1.Will it be possible for passengers to overrule the Al and interfere with its decision-making? For example, will the cars be designed similarly to aircraft autopilots, and if so the driver may instinctively interfere by, say, grabbing the steering wheel or applying breaks, which may make things worse if such inputs clash with Al's decision-making process.

2.Although other road users, such as drivers and cyclists, may be very experienced with using roads safely, human unpredictability may mean that driverless cars may have to respond quickly to unanticipated changes in the state of the road.

Here are new points that the gradual transition from manual to driverless cars may lead to an increase in accidents. Because at this particular stage, people may not fully trust the driverless model, but want to try it. Similarly, in the face of complicated situations or rain or snow, the feedback from driverless cars may not be stable. Addressing these challenges will be critical to realizing the potential safety benefits of driverless cars.[11].

Moreover, the truth is that there are still many aspects of the safety of driverless cars to be considered. In public perception, the results suggest that people tend to trust their own decisions more than they are willing to leave major decisions, even their own lives, to others. This means that people are less tolerant of self-driving car crashes than they are of accidents caused by their own mistakes [11]. Studies have shown that only 57% of people familiar with self-driving cars would be willing to ride inside them [12].

The fact that such a small percentage of individuals surveyed would be willing to ride in a driverless car suggests that there is a lack of faith in the safety of the technology. It is worth considering whether the public's perception of the safety levels of driverless cars will actually affect the safety of using driverless cars in the near future. This lack of faith is a problem for the widespread adoption of driverless cars. Therefore, manufacturers will need to aspire to very high proven safety records in order to convince drivers to abandon their old cars for the new technology, which could in turn make them safer.

For the discussion between driverless cars and traffic accidents, literature also mentions more related issues similar to the legal liability of driverless cars in traffic accidents.

As Alexander Hevelke & Julian Nida-Rümelin acknowledge [11], one way to think about it is that a person using an autonomous vehicle has no duty (and possibly no way) of interfering, but is still held (financially, not criminally) responsible for possible accidents X.

Research has shown that safety autonomous systems for driverless cars are the key to reducing accident rates and there are already ways to improve the capabilities of safety autonomous systems with the efforts of people around the world, thanks to the birth of new technologies such like some in the self-driving system. Moreover, specific HIV technologies could benefit from an agile iterative approach to validate conditional security [13].

2.2. Increasing widespread adoption

In addition to improving road safety, the widespread adoption of driverless cars could have significant economic and social benefits. For example, autonomous vehicles could reduce the cost of transportation [14]. However, the adoption of autonomous vehicles will depend on a range of factors, including public acceptance, government regulations, and technological advancements [14].

Several studies have examined public attitudes toward autonomous vehicles. A survey conducted by the American Automobile Association (AAA) found that 63% of U.S. drivers are afraid to ride in a fully autonomous vehicle [15]. Similarly, a survey conducted by the Pew Research Center found that 59% of Americans are not interested in riding in a driverless car. At the same time, they expressed their distrust of driverless car technology and expectations for the development of driverless cars in the future [16].

Currently, there is a lack of uniform regulation, for autonomous vehicles across different states and countries, which could hinder their development and deployment. It limits the trade of vehicles between countries and makes people harder drive-in different countries [17].

However, several countries, including the United States, China, and the United Kingdom, have developed regulations to support the development of autonomous vehicles. These include preferential policies for the purchase and sale of autonomous vehicles, and subsidies to encourage the purchase of autonomous vehicles. For example, in 2021, the U.S. state of Nevada allocated $1.3 billion to subsidize the purchase of driverless cars.[16].

A comprehensive review of the literature makes it clear that technology is at the heart of driverless cars. Issues related to various advanced technologies and the unfamiliarity of artificial intelligence and network to develop cities are also discussed in the literature.

Advancements in sensor technology, artificial intelligence, and machine learning will improve the safety and reliability of autonomous vehicles [15]. Additionally, advancements in infrastructure, such as the deployment of 5G networks and the development of smart cities, will support the development and deployment of autonomous vehicles [18]. Continued investment in research and development will be critical to the successful adoption of autonomous vehicles which determines the future prospects of driverless vehicles and the speed and depth of development [19].

In addition, regarding the wide adoption of driverless cars, there are certain perceptions about the fuel efficiency and sustainability of autonomous vehicles [20]. The results show that AV following algorithms designed without considering efficiency can degrade fuel economy by up to 3%, while efficiency-focused control strategies may equal or slightly exceed the existing EPA fuel economy test results, by up to 10%. [21] The algorithms which allow autonomous vehicles to realise gains in full efficiency of up to 10% would enable driverless cars to travel a larger distance without refueling.

The research part has shown that the algorithm design of different driverless cars can greatly improve the driving experience and safety. This is the same conclusion from the literature mentioned above, technology is the core of the driverless car and therefore determines the driving experience and safety of the driverless car.[22]

When more literature mentions the wide application of driverless cars, it also relates to the help of driverless cars for special groups of people. The most typical example is that the emergence of driverless cars can lead disabled people to wherever they want to go, instead of only being pushed slowly in a wheelchair. The studies mentioned have shown that most disabled people express happiness and expectation after learning of the rapid development of self-driving cars, and are willing to actively support the development of self-driving car technology because driverless cars give disabled individuals independence and reduces their dependence on others.

In order to benefit the people, governments and countries also begin to use their own power to provide an impetus for the development of driverless car technology which means driverless cars may have a bright future [15]. As one of the key and significant projects in the future, driverless cars may be vigorously developed by all countries in the world [23].

3. Discussion and development

3.1. Algorithm advantage

The main reason why driverless cars increase the traffic accident rate in the early stage could be the conflict between human control and driverless driving. Many traffic accidents of driverless cars come from the fact that the command system of the driverless car will make corresponding decisions when facing traffic accidents, and the driver will also make his own countermeasures according to the situation at that time. When the driverless mode is changed to manual driving, various conditions often occur, like the nervous drivers suddenly take over the steering wheel when facing danger, which could be a key problem that greatly increases the incidence of traffic accidents. For example, when the car is driving on the road in driverless mode, the vehicle in front of it suddenly brakes, at this time is likely to occur a rear-end accident. The driverless system detects the braking of the vehicle in front and decides to apply emergency braking to prevent a rear-end collision. However, when the driver is facing such an emergency situation, he or she may choose to switch the driving mode to manual mode at this crucial moment due to nervousness or distrust of the driving system. This may result in missing the best braking time and leading to rear-end accidents. Therefore, it could be argued that the cooperation with autopilot system is the key to preventing accidents, which not only requires a lot of time of improvement and practices but also requires people's continuous active attempts.

However, it is found in the research review that the driving system of the current driverless car is very advanced and intelligent. The driving system is the core and framework of the whole driverless car. The sensor will give the road conditions and surrounding information to the system center, and the system will process the road conditions and make appropriate choices. They are responsive to avoid collisions than vehicles or pedestrians in time to avoid, and in rain and snow and other complex weather automatically control the speed of the car [24]. As a key part of the driverless car system, the algorithm is undoubtedly very important in aspects like reducing accident rate.

As the key to saving fuel and electricity in driverless cars, Algorithm design is a very important part of driverless cars. The appearance of AI is a great leap forward. When more advanced technology can be used in driverless cars, road conditions like a sudden cut in line will be handled better by the self-driving system. This means it can optimize routes more reasonably, allowing each trip to arrive at the destination faster, and it can reasonably calculate that it will take less time to arrive at the destination while using less fuel. More importantly, it could directly affect the accident rate of driverless cars as well as the power and fuel savings. This is certainly a major benefit of driverless cars, and could be the key to greater acceptance. Thanks to that people driving cars cannot accurately control fuel consumption and time, they must rely on external tools to achieve part of the purpose such as mobile navigation.

Therefore, we can deduce that the algorithm design can not only bring good improvement in all aspects of the driverless car but also better reduce the accident rate and help the drivers to solve the emergency situation more quickly. Therefore, the accident rate of driverless cars will undoubtedly decrease in the future, and will gradually decrease over time.

3.2. Attribution of legal responsibility

When an accident happens, which party should bear the responsibility is also a big problem. According to the existing laws and regulations [25], there is often a division of responsibility, but when the driverless car is responsible, who should bear the responsibility? Because the owner is not driving the vehicle, an AI algorithm system cannot be convicted. And this is a very interesting point. But if it is clear who is legally responsible for a driverless car involved in an accident, then that people may be afraid that they will be held responsible for the actions of the AI due to this lack of certainty. Therefore, it is particularly important to speed up the improvement of laws, which can promote the popularization of driverless cars.

Although most people believe that artificial intelligence is not human, so it cannot be convicted by law, with the development of technology, artificial intelligence will certainly appear more frequently in life in the future, and participate in the decision of many events. So, laws are bound to change or add new regulations as AI becomes more widespread. The current initial assumption is that the manufacturer or AI designer should be held liable for legal accidents caused by AI. But there must be a whole team behind an artificial intelligence technology, including dozens or even hundreds of people, and who should bear the responsibility? In addition, the same artificial intelligence technology may have several traffic accidents with driverless cars in the process of popularization, which will also cause the design team to bear a lot of unbearable legal liabilities.

In a sense, this may be an inhumane behavior.

And it's debatable whether the car owner should be held responsible because the car owner chooses to drive and the car owner drives on the road. After the purchase of a vehicle, the ownership of the vehicle belongs to the owner, so when the vehicle causes some accidents, should the owner be held responsible? It is a comprehensive problem involving many aspects and fields, which may have a bearing on the future development of mankind.

This legal issue also needs to be discussed, and people need to discuss the results, and formulate laws and regulations to make people satisfied. The advent of autonomous vehicles on our roads presents an unprecedented legal conundrum.

It is not immediately clear which party should bear responsibility for the harm caused during an accident. The literature review did not yield much legal perspective on this issue, but it is a problem that cannot be avoided. There are arguments for the

manufacturer to be held responsible, and these arguments are more likely to be persuasive because the manufacturers are who made the cars.

As Alexander Hevelke & Julian Nida-Rümelin acknowledge [25], one way to think about it is that a person using an autonomous vehicle has no duty (and possibly no way) of interfering, but is still held (financially, not criminally) responsible for possible accidents. Imagine a situation where an individual, let's call them Alex, is using their autonomous vehicle for their daily commute. While the vehicle is in self-driving mode, it encounters an unexpected scenario: a pedestrian suddenly runs out onto the road without warning, directly in front of the vehicle. The vehicle's sensors and algorithms work to assess the situation in a split second, but it becomes clear that there is no way to avoid colliding with the pedestrian, given the suddenness of the pedestrian's appearance. In this case:

No Duty to Interfere: Alex, as a passenger in the autonomous vehicle, has no means to physically interfere with the vehicle's operation. The technology is designed to operate independently, relying on sensors and algorithms to make real-time decisions. Alex is essentially a passive passenger at this moment, without the capability to take control of the vehicle or make decisions in this high- stress situation.

Financial Responsibility: The autonomous vehicle collides with the pedestrian, resulting in injuries to the pedestrian and damage to the vehicle. While it is clear that the situation was unexpected and beyond Alex's control, they are still held financially responsible for the consequences. The autonomous vehicle's insurance policy may cover some of the costs, but there may still be a financial burden on Alex, such as increased insurance premiums, deductibles, or other out-of-pocket expenses.

This case underscores the ethical and legal complexity of autonomous driving. Users like Alex, who are essentially passengers in self-driving vehicles, cannot be expected to intervene in unexpected situations like the one described. However, the responsibility for financial outcomes falls on them, even though they have no control over the vehicle's actions in such situations.

It raises important questions about how the legal and insurance frameworks should evolve to ensure that individuals using autonomous vehicles are not unfairly burdened with financial responsibility in cases where they have no means to prevent accidents due to the limitations of the technology. This scenario highlights the need for a more nuanced approach to defining financial liability and insurance coverage in the era of autonomous driving.

Now many people believe that the driverless car belongs to the legal object, namely "thing", and does not have individual rights.

The good news is that Shenzhen, China, has already issued regulations on the division of responsibility for driverless car accidents in advance. As the issue of the first regulation, or very reference. It gave the provisions:

1: When there is a driver, traffic violation or responsible accident, the responsibility and compensation by the driver.

2. In case of a traffic violation or liability accident in the absence of a fully autonomous vehicle, the owner of the vehicle shall bear the responsibility and compensation in principle.

3. If the traffic accident is caused by the defect of the intelligent connected vehicle, the driver or the vehicle owner and manager can ask the producer and seller for compensation after paying compensation.

It could be a great beginning.

In other words, when an accident is caused by a violation of traffic regulations by a driver or an autonomous vehicle, the driver is always the first person to be held responsible. Perhaps there is still a lot of room for improvement in this regulation, and a more comprehensive and well- recognized law will be introduced in the future. For example, the manufacturer is responsible for the traffic accident of the driverless car, and the person in the car is regarded as the victim. They have a duty of care towards users of their product. As a society, it will therefore be important to hold manufacturers to account for any accidents that driverless cars cause.

The core of a driverless car is to remove the driver, so there will also be less responsibility on the driver. Only by identifying this point can we better promote the development of driverless cars in society and the efforts of manufacturers.

3.3. Safety standard

Moreover, there have to establish some common standards to measure how safe driverless cars are. This safety system ISO already exists and can already address the expected functions of safety required in driving.

These standards are key to autopilot systems. They are also the standard by which autonomous programs in driverless cars are judged. In different countries and regions, there are different safety standards. At present, there are several major international safety standards, which are developed by different countries and international organizations to ensure the safety and performance of driverless vehicles. Here are some relevant standards and guidelines:

ISO 26262 (International Standard): ISO 26262 is an international standard specifically designed to assess the functional safety of automotive electronic systems, including driverless vehicles. It provides a set of specifications for managing and reducing the risks associated with failure of electronic systems. ISO is an international organization that has developed several standards, including ISO 26262, for assessing the functional safety of automotive electronic systems. ISO standards usually have global acceptance.

SAE J3016 (American standard): The Society of Automotive Engineers (SAE) has published SAE J3016, which defines different levels of automated driving systems, from automated assistance to fully autonomous driving. This helps consumers and manufacturers better understand the capabilities of driverless cars. SAE has published the SAE J3016 standard, which defines

different levels of automated driving systems and provides a common classification and understanding framework for autonomous driving technologies.

The National Highway Traffic Safety Administration (NHTSA) has published a series of guidelines on automated driving, including Driverless Cars 2.0: A Policy and Technology Vision. These guidelines are intended to provide manufacturers, governments and other stakeholders with direction on the safety of driverless vehicles. NHTSA is the traffic safety regulator in the United States and has issued automated driving guidelines, which are authoritative in the United States.

European Autonomous Vehicle Project (EUCAR): The European Autonomous Vehicle Project (EUCAR) has published technical reports and guidance on the safety of autonomous vehicles to support the development and testing of autonomous vehicles in Europe. EUCAR publishes technical reports and guidelines on the safety of autonomous vehicles, which are of importance for the European market [26].

Unfortunately, such standards do not provide comprehensive coverage to ensure the safe operation of autonomous vehicles.

But at the same time, these fields are not fully applicable to civilian use. Designers are also grappling with the unique problem of building secure autonomous systems. But now there are still some technical bottlenecks in autonomous driving technology, and various sensors have their own limitations, in extreme weather conditions, to achieve safe and reliable autonomous driving, there is still a long way to go.

3.4. The importance of technology

Autonomous driving technology requires massive data support, and algorithm models receive training through input data to achieve algorithm iteration. According to statistics, L5-level self- driving cars require 1-20 terabytes of data per hour . Through this kind of special and proffesional way, the diverse data accumulated from real road testing at the city level will also be necessary for high-level autonomous driving applications. Only in this way can the accident rate of driverless cars be effectively reduced.

In addition, large-scale data collection, including personal information, technical information, environmental information, road mapping and other sensitive information, ensuring the security and compliance of data use will also be key. The world is actively promoting the development of vehicle-road cooperation-related industries, and the city-level smart transportation plan of "bicycle intelligent + network enabling" [26] has become an important strategic direction. The planning of driverless cars is also included in these plans, which can help driverless cars integrate into society faster and be put into use.

3.5. Help people to solve problems better

A further point about the widespread use of driverless cars is that they will greatly help troubled humans. This is great news for disabled people, as they can ask the car to take them to a certain place by themselves with the command or the press of a few buttons. This will also be key to the widespread acceptance of driverless cars, as society becomes more aware of and proactive in helping people with disabilities. If driverless cars dramatically improve the lives of people with disabilities, they are likely to be widely accepted at a faster pace. At the same time, however, relying on driverless cars may also bring some disadvantages, such as taxi industries that require human drivers may lack employees because people are used to autonomous driving. But these relative drawbacks should not affect the overall development of driverless cars.

3.6. The future of the driverless car

Overall, the application of driverless cars is very bright. Driverless cars are bound to become increasingly important in the future. Looking ahead to the future of driverless cars, we can see a number of predictions. December 31, 2013 IHS Global Insight (hereinafter referred to as IHS) predicted that the world will have nearly 200 million autonomous vehicles by 2035, and the introduction of fully automated vehicles will be relatively slow [27]. At the same time, there will be more companies developing and selling driverless cars, and there will be a variety of driverless cars appearing in society.

Total global sales of driverless cars are expected to rise from 230,000 in 2025 to 11.8 million in 2035, while fully automated cars without a driver will be available around 2030. The study also predicts that after 2050, almost all cars will either be driverless or driverless business vehicles [27].

It is predicted that by 2025, global sales of driverless cars will account for 0.2% of total car sales. By 2035, as driverless cars become a reality, that figure will rise to 9.2 percent. In a report, the company predicted that self-driving car electronics would raise prices of driverless cars by $7,000 to $10,000 by 2025, falling to $5,000 by 2030 and $3,000 by 2035 [27]. To a certain extent, the price reduction of driverless cars indicates that driverless cars will gain a higher degree of popularity in the future.

In addition to the price of the forecast, driverless cars in other areas also have quite good prospects for development.

Traffic Improvement and safety: One of the most significant potential benefits of driverless cars is improved traffic efficiency and increased road safety. Autonomous driving systems are able to reduce traffic accidents, comply with traffic rules, reduce traffic jams, and more effectively manage the flow of vehicles on the road. This is expected to reduce traffic congestion, improve commuting efficiency and reduce traffic accident rates.

Wider mobility: Driverless cars are expected to improve mobility, especially for those who are physically or age unable to drive a conventional car. The elderly, the physically disabled, and those unfamiliar with driving can more easily access independent transportation.

Urban planning and land use Change: Driverless vehicles could lead to significant changes in urban planning and land use. As autonomous vehicles can be shared, parked and dispatched more efficiently, it is likely to reduce the need for parking within cities, freeing up more space for greenery, public facilities and residential use.

New business opportunities: The development of driverless vehicles will bring new business opportunities. This includes autonomous taxi services, freight automation, driverless freight and related technology and infrastructure developments.

Environmental and energy efficiency: Autonomous vehicles can reduce tailpipe emissions through more efficient driving patterns, better traffic flow management, and optimized fuel efficiency. In addition, electric autonomous vehicles are also expected to reduce reliance on conventional fuel, thereby helping to reduce greenhouse gas emissions.

Regulatory and safety challenges: While promising, driverless cars face regulatory, privacy, security and ethical challenges. Governments and regulators need to develop appropriate regulations to ensure the safety and compliance of these vehicles while protecting consumer privacy [27].

The data forecast the commercial availability of driverless cars, global sales, and price fluctuations. It is a good indication of the great possibility of the widespread application of driverless cars in the future.

4. Conclusion

For all its original goals, the study was relatively successful. The initial research direction is to explore whether driverless cars can be widely used and reduce the incidence of traffic accidents in the future. After consulting various materials, we have reached a lot of relevant conclusions. Already, some trends can be seen, with the emergence of driverless cars. There are already some evidences that driverless cars have a wide range of applications in the future, and could reduce traffic accidents to some extent and improve people's lives.

After a lot of literature reading and analysis, it can be found that there are several key points about the widespread use of driverless cars.

On the whole, it is mainly divided into two aspects: reducing the car accident rate and improving the public acceptance, but in fact, to some extent, the two are partly for the same purpose, and it can even be said that reducing the accident rate is to improve the public acceptance and further make the driverless car more widely used.

Reassessing the problem of reducing the accident rate will find that the safety level and the algorithm design of the autonomous vehicle system are very important. Safety levels can often more clearly delineate the safety level of driverless cars, so that people pay more attention to safety issues. Algorithmic design, as mentioned before, is the heart of the driverless car and really determines everything the driverless car does. Driverless cars have the most potential for future development, because the progress of science and technology is the fastest, we may be able to predict that in the near future, after the breakthrough of algorithm design, driverless cars will be comprehensively improved.

Among other factors that affect public acceptance is the law, which determines the adjudication and attribution of legal liability in the event of a car accident. If the legal responsibility is not clear, it will seriously affect the promotion of driverless cars. It can be seen from the Research Review that currently there are not many laws elaborating laws on driverless cars, but this may be one of the fastest parts to be solved in the future, if lawmakers prioritize new laws around driverless cars. which is very helpful for the widespread use of driverless cars.

In conclusion, it suggests that driverless cars have the potential to significantly reduce the number of accidents on the road, improve mobility for vehicles and people's quality of life and help special groups in society. And there is still a certain potential to be developed in various fields related to society. It is clear that the future of the automobile is driverless.

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