

The Application of AI Technology in Self-Driving Cars

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Abstract. With the rapid development and widespread application of autonomous driving technology and artificial intelligence technology, more and more people are participating in the discussion and learning of these emerging technologies. However, some individuals are concerned about the actual impact of these technologies on their own and pedestrian safety. This article aims to help eliminate public concerns and encourage them to form independent opinions by clarifying the basic principles of these technologies and the problems they can solve. The research content mainly focuses on the in-depth analysis of the principles and applications of artificial intelligence technology in autonomous vehicles, focusing on the public's concerns about the safety of this technology. This analysis will be based on the principles and definitions of the relevant technologies to provide a theoretical basis for understanding the potential impact of these technologies.

Keywords: Self-driving cars; application; artificial intelligence.

1. Introduction

The development of driverless cars dates back to the early 20th century, when researchers began to consider using radio technology to control cars remotely. Since then, researchers have devoted a lot of effort to exploring this emerging field. In 1925, a company in America called Houdina Radio Control devised a driverless car called AmericanWonder which was exhibited in New York. Some experiments about self-driving cars were being conducted after 1939. The first self-sufficient and truly automatic car appeared in 1980 [1]. In July 2013, Vislab demonstrated BRAiVE, a vehicle that moved autonomously on a mixed traffic route open to public traffic. Although many attempts have been made about making self-driving cars, the status quo of this technology still can't make this new technology be available in a very large scale for the reason that there are still some challenges people need to overcome such as difficulties in detecting the surrounding environment and making decisions for self-driving cars [2,3].

The increasing popularity of artificial intelligence technology may provide new ideas for solving these challenges. Artificial intelligence can be regarded as a simulation of human intelligence, and its application makes self-driving cars more adaptable in a variety of complex situations. As the distance between this new technology and real-world applications gradually shortens, it becomes increasingly important to explore the application of artificial intelligence in self-driving cars. The relevant discussion can cover many aspects, including the basic principles of artificial intelligence technology, how to effectively combine artificial intelligence with self-driving cars, and the public's concerns about safety issues. In-depth research on these issues will help the public make more rational judgments based on facts when facing the development of self-driving car technology.

To systematically explore the above issues, this paper will be divided into three main parts. The first part will define artificial intelligence technology and its basic principles in self-driving cars, so as to clarify the connotation and operation mechanism of each before exploring the relationship between different concepts. The second part will analyze the safety considerations of humans when traveling in self-driving cars combined with artificial intelligence technology, because safety is usually the most concerned factor in the promotion of new technologies. The third part will explore the potential benefits of artificial intelligence in the application of self-driving cars to evaluate whether the development of this technology is worth continuing.

2. The definition of AI

AI, which is the abbreviation of artificial intelligence that can tackle with some problems that require human intelligence by using a number of principles that exist in computer science. With the help of artificial intelligence, various tasks can be accomplished such as language learning, pattern recognizing, decision making which are the tasks that may play very important roles in realizing self-driving. Artificial intelligence, which mainly aims to mimic humans' intelligence can be basically classified into two types according to the extent the AI system can exhibit its intelligence, weak AI and strong AI [4,5]. Weak AI, which can also be called as narrow AI, it functions just like its name, it is design to accomplish some specific tasks. Based on this characteristic, this type of AI system is usually applied in some specific fields like self-driving technology. The other type of artificial intelligence is strong AI which can also be called as general AI. This type of AI system shows the function to comprehend, learn and apply knowledge in a similar level of humans' intelligence. And this is still a kind of theoretical form of artificial intelligence.

3. The definition of self-driving technology

Self-driving cars, which can also be called as driverless cars. It differs from many of the cars we use today by requiring no human's input, it can completely travel from the starting location to the destination by itself in the whole process which means that to realize this technology, we need to get these driverless cars ready for all of the tasks and the circumstances it may meet during the trip [6,7]. These self-driving cars can also be classified based on the extent it exhibits the characteristic of being driverless. The autonomy system means that the vehicle rather than human beings are going to navigate and coping with all kinds of circumstances by itself. In contrast, the automation system means the vehicles may control some of the basic aspects of the travelling like the speed control but let human beings to determine some important decisions in some special cases.

4. The effect of AI technology in solving the safety issues.

In modern society, with new technologies advanced one after another, the safety issues are what the public often focuses on, especially when the technology may affect people's safety a lot. Then, the self driving technology would be a good example. Many people concern with what safety issues can self driving technology help the drivers to solve and whether self driving technology will bring us to some dangerous situation or not from time to time. Therefore, the discussion of the the effect of self driving technology has on reducing travelling accidents seems to be really important. For this reason, the thesis mainly analyzed the chart that is connected with car accidents. From the chart, it's easy for people to evaluate the effectiveness of AI technology on helping people avoid some problems. To be specific, this thesis is going to study how likely it is for AI technology to avoid those problems and whether the technology can ensure the safety of other people. Then, by analyzing different reasons for the car accidents, we may Fig. out whether AI technology and self driving technology can help us solve some safety issues by examine whether these technologies can keep drivers away from these circumstances that may lead to car accidents.

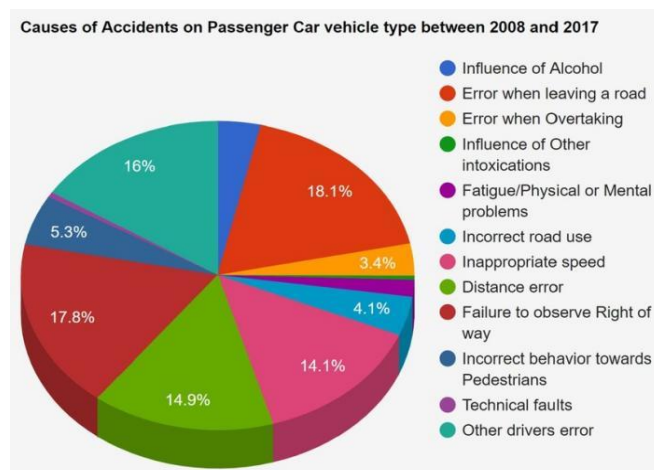


Fig. 1 Causes of Accidents on Passenger Car vehicle type between 2008 and 2017 [8]

As shown in Fig. 1 consists of different reasons for the car accidents, there are some main reasons for the happening of car crash. However, many of these leading reasons can be avoided by applying AI technology and self driving technology.

The possibility that drivers are not in the right situation to drive the car which may lead to car crash might be avoided, since when drivers are not able to drive, self driving cars with AI technology can help them driving the cars and making decisions on the road. So that the driver who is influenced by alcohol or fatigue will not need to drive by themselves, and the car accident possibility may decrease.

Some drivers who met car accident because of their technical problems can also be avoided, the self driving technology may help drivers drive the cars in the proper ways that may avoid some technical problems such as distance error.

While many circumstances that may result in car accidents may be avoided with the help of AI technology and self driving technology, there are still some problems that AI can not wonderfully tackle with, for instance, the AI technology may do some behavior improperly to pedestrians which may lead to some other problems.

5. AI's challenges in driving applications

This paper mainly focused on explaining what are AI technology and self driving technology and whether these technology can help people decrease the possibility to get into some dangerous situation. Self driving technology, which is likely to appear with some kinds of vehicles in the future, may be concern with some safety issues. Though the self driving technology is potentially revolutionary in the system of vehicles in the future, the wide application of the self driving technology is still being argued for some safety issues that people concern. The pubic is still not really believing whether that kind of driving car can ensure the safety of pedestrians,

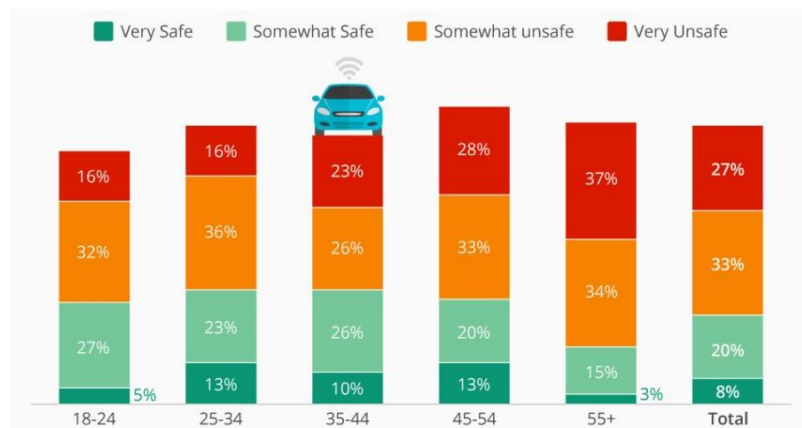


Fig. 2 The challenge of autonomous driving [8]

As shown in Fig. 2 , it shows the percentage of adults who don't really believe the technology. The result shows that most of the U.S. adults think the self driving cars are somewhat unsafe or very unsafe. However, the high possibility of the car accidents happening in recent years may mean that people may need to somehow make the driving cars a safer way of travelling. Then I think combining the self driving technology and AI technology with the cars may be a way to make travelling safer. The reason why I do the research of the definition of these technologies and search for people's concerns is to help people know something about self driving cars which is really likely to be realized in the future and let more people learn the importance of the development of self driving cars [9,10].

6. Conclusion

The thesis finally accomplished finding the definition of AI technology and self driving technology while also evaluated the effectiveness on coping with some safety issues of these technology. In the thesis, the definition section helps the reader learn more about how these technologies work and some principles of these technologies. Then, based on what readers learn in the definition section, the analysis part presents some viewpoints on the safety issues on self driving cars with some evidences that are mainly about the principles mentioned in the definition section. The section which discusses the challenges AI technology meet in the application of driving cars describes the situation of these new technologies, AI technology and self driving technology, in today's society, the section also presents the perspective of the public on the safety issues of these technologies and it may let readers think about their own opinions according to the things they learn in the thesis. In today's world, which needs a new way of travelling to ensure the safety of drivers and pedestrians, may need to let more people know the new technologies and develop these new technologies together to make our world better.

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