

Impact of Fuzzy Decision Trees on Safety Driving Systems

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ABSTRACT: *With the continuous increase in car ownership, traffic safety issues are receiving increasing attention from people. Many car manufacturers and research institutions have developed various car safety driving systems to improve driving safety. Among them, the automotive safety driving reference system based on fuzzy decision trees has been widely studied and applied as an effective technical means. This article studies the application analysis of a vehicle safety driving reference system based on fuzzy decision trees. This system utilizes a fuzzy decision tree algorithm to identify and evaluate the driving environment, providing drivers with safe driving suggestions and guidance. This article mainly introduces the system's design principle, implementation process, and experimental verification results of the system and analyzes the advantages, disadvantages, and practical application value.*

Keywords: Fuzzy Decision Tree Algorithm, Vehicle Safety Driving Assistance, Support System, Information Sensing Technology

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1. Introduction

With the rapid development of the world economy, all industries have shown vigorous development momentum. With the development strategy of economic globalization and continuous improvement of various industrial structures, great progress has been made in various fields and sectors in the world and development [1]. In the new era of development, the development of various industries in the development process for the transmission of resources for its role in the development of the industry is significant, and as an immediate manifestation of the speed of automotive technology, its industrial scale has been expanding, and for People's production and life in today's era have brought extremely important and positive impact [2]. With the increasing concern about the automobile manufacturing industry in various countries and regions worldwide, various advanced automobile manufacturing technologies have begun to emerge. They are gradually applied to the actual automobile manufacturing process [3]. The development of these relatively new technologies not only makes the car speed has been greatly improved but also provides a theoretical basis for the development of more secure automotive products [4]. Especially in the 20th century,

the emergence of computer technology, due to the technology has more complete system algorithms, and its subsidiary simulation technology in the automotive industry in the early stages of the car may be running some of the problems encountered early detection and solve them, thus reducing the occurrence of traffic accidents [5]. In this study, the author will study the vehicle safety assistant driving support system and analyze the main links in the system by using the fuzzy decision tree algorithm.

2. State of the Art

With the comprehensive development of the world economy, various industries have now achieved some progress and development. As an important pillar industry in the development of the times, the transportation industry has become an essential industrial structure in the current development of the times. Such industries include road traffic and the development of related industries such as transportation vehicles. As a fundamental means of transport for people's production and life, the car is no doubt about the practical significance of enhancing the overall economic strength of the world economy in the present era [7]. Some researchers believe that the advent of automotive technology has brought a positive impetus to the circulation efficiency of resources among various industries precisely because the gradual reduction of transportation costs and time costs also makes the development of various industries faster and the economy of access more effective [8]. With the development of various basic technologies and the increase of exchanges between different countries, the automobile manufacturing industries in various countries are also beginning to show more rapid development momentum. More innovative ideas and technologies are being applied to actual automobile production to promote the more systematic and scientific automobile products manufactured [9]. However, as a key problem in automobile manufacturing, many researchers in the field of automobile manufacturing have begun to consider the innovation of automobile manufacturing technology seriously. And make cars more secure through innovative computer technology today [10]. Virtual reality computer technology can simulate the safety support system of driving safety for automobiles, reducing the incidence of some experimental risks during the experiment [11]. The emergence of some of the more systematic algorithms also provides a systematic analysis of the inadequacies of automotive safety performance, which can provide theoretical and data support for the subsequent improvement of the entire automotive industry [12]. In many Western developed countries, it has gradually introduced a relatively complete theory of automobile safety manufacturing and obtained more improved automotive products [13].

3. Methodology

Various industries have made tremendous progress since the reform and opening up in our country. Formulating some of the more advanced economic development policies has also provided the theoretical basis for enhancing the international influence of our industry. Especially in our country's processing and manufacturing industries, as countries pay more attention to them, the economic output value of the country in this field is already among the highest in the world. As the pillar industry in the current development of various industries in our country, the transportation industry can provide more rapid operation speed for the development of other industries and improve the circulation of resources among different industries on a certain basis. The improvement of the entire industrial structure provides the basic strength. Take the automobile industry as an example, China has always been in an early importation stage. With the increase of exchanges between China and the developed countries in Western countries, our country has also started to strengthen the development of relevant technologies and theories to vigorously develop the products that belong to the country's automotive products (Figure 1). With the advent of many kinds of automobile brands and theories and technologies in our country, the automobile manufacturing technology of our country has gradually improved, and the country has also become the largest exporter of automobile manufacturing in the world. The automobile manufacturing industry has also become the pillar industry of our country. In this study, the author first read and analyzed the relevant data of China's automobile industry to determine the current development status of China's automobile industry and discussed the relevant issues facing the development of the automobile industry.

Although the automobile manufacturing industry in our country has been greatly developed, there are still some problems, such as low safety performance in the process of automobile manufacturing in our country. The annual increase in traffic accident rate has prompted many researchers in our country to realize that accident is no longer just caused by the individual subjective factors of the driver. The impact caused by automobile manufacturing itself is also greater. Some scholars think that the traditional automobile manufacturing industry pays more attention to the lower and the speed of car fuel consumption increase, and the development of these two characteristics will cause the overall quality of the car to decline, which also prompt a lot of the automobile manufacturing industry to find more lightweight car materials instead of the original more hard exterior materials, to reduce the overall ability to resist external factors automotive, and ultimately may affect the reduction of automotive safety



Figure 1. China's automobile manufacturing industry

performance. Therefore, under this trend, many scholars in our country have begun to propose that the occurrence rate of traffic accidents should be reduced based on improving automobile safety performance. Many materials used for automobile safety started to be researched, developed and used to a certain extent, and more secure car products appeared. With the advent of automotive products, the test for the safety of vehicles is also very necessary [14]. In the traditional automobile manufacturing industry, the detection of the safety performance of automobile products is often carried out by the driver driving the actual car for a crash test, which not only may cause the driver's personal safety to be threatened but also may cause a large amount of waste of the automobile raw materials, Thus limiting the sustainable development of the automotive industry. The advent of computer technology has provided technical support for the testing of automobile safety performance. This kind of technology can simulate the testing process of automobile safety performance through the simulation and make use of more systematic algorithms to obtain the data of the whole testing process information analysis and mining, based on the data obtained from the information for the automobile manufacturing process to enhance the safety performance to provide a reference. Although many industries in our country have begun to apply the simulation technology of computer technology to the actual automobile development process, the whole industrial structure still has a low development theory and technical status. Therefore, in this study, the author will outline and analyze the computer-based information security technology of vehicle-assisted driving support systems based on the previous research and provide theoretical references for the subsequent research.

The mention of related algorithms in computer technology also provides theoretical support for a clearer analysis of all the influencing factors in the automobile manufacturing process. With continuous exploration and further professional analysis, many analytical algorithm models begin to be discussed and studied. The fuzzy decision tree algorithm is a novel model algorithm that arises in the application of various evaluation algorithm models [15]. The fuzzy decision tree algorithm is a complete decision model based on the traditional decision tree algorithm (Figure 2), which will process the information of the more conventional models reasonably so that the final information separation and file Processing provide theoretical support. Because this kind of algorithm can comprehensively analyse a large amount of uncertain information, it begins to be gradually applied in various industries. Finally, it obtains more valuable decision information through the natural treatment of evaluation indexes with different confidence levels. Some scholars have begun introducing and using the fuzzy decision tree algorithm in the computer-based information security technology of driving safety support systems. By using this algorithm to make some decision-making analysis on some uncertain factors in the automobile manufacturing process, the theoretical basis for correcting some influencing factors is provided in the research and development of automobiles. Although this theoretical algorithm has already begun to be applied in many industries in our country, it also offers valuable information for developing some initiatives. However, due to the relatively small number of professionals proficient in this algorithm, the restriction limits the algorithm of further innovation. In this study, the author will analyze the fuzzy decision tree algorithm

based on previous studies and build an information sensing system based on the algorithm model of the vehicle safety support driving system to provide technical support for the follow-up study.

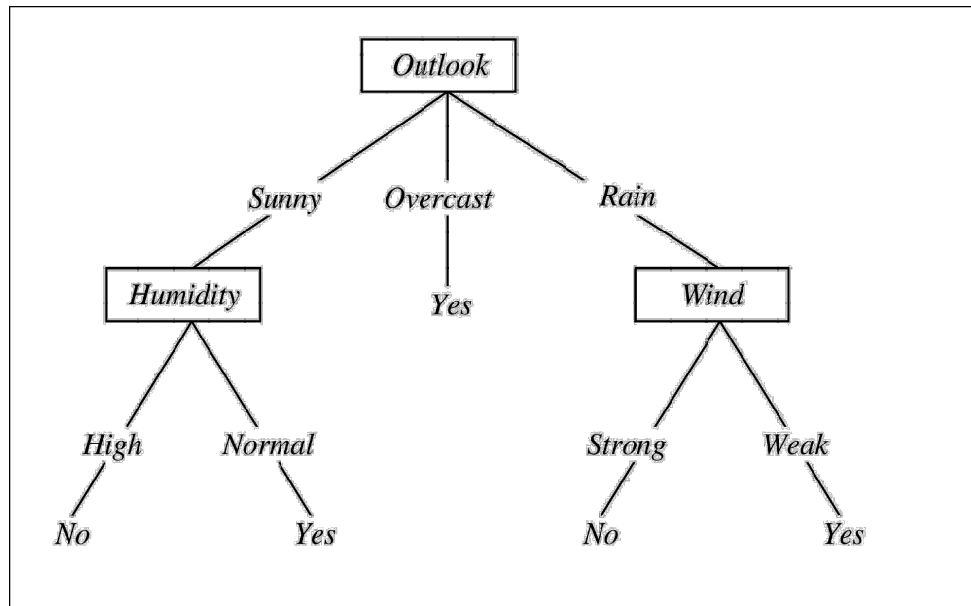


Figure 2. Fuzzy decision tree algorithm diagram

In the end, the author will analyze the actual usage efficiency of the information security system of the SAFET system based on the fuzzy decision tree algorithm from the perspective of practical application. In the research process, the author mainly applies this kind of safety assistant information perception system to the actual automobile manufacturing and development process. Based on the actual analysis of the fuzzy decision tree algorithm for the related parameters of the safety performance of the developed automobile product, for the follow-up vehicle manufacturing process improvement and optimization of some systems, provide a reference.

4. Result analysis and Discussion

4.1. China's Automobile Manufacturing Industry Development Status and the automotive Manufacturing Industry are Facing the Main Problems Survey Results

In this study, the author first investigated the current experts in the automobile manufacturing industry in our country and read through the related materials to analyze the status quo of the current automobile manufacturing industry in our country and the major problems facing the auto manufacturing industry comprehensive analysis, the analysis results shown in Figure 3. The results show that with the continuous application of many advanced technology theories in our country, the automobile manufacturing industry in our country has made significant progress. This is mainly reflected in the annual output and annual revenue of the automobile manufacturing industry in our country all show a growing trend. Especially in the 2015 survey results, China's automobile manufacturing industry has an annual gross output value of 471.351 billion Yuan, which indirectly proves that China's automobile manufacturing industry has gradually become one of the pillar industries in our country. However, despite the continuous improvement of China's automobile manufacturing industry structure and the increase of its income year by year, there are still many shortcomings in the development of China's automobile manufacturing industry, mainly reflected in the development of China's automobile manufacturing industry. There are still many theoretical deficiencies in the process. Although China has introduced relatively new technologies into the manufacturing industries in many developed countries, the incompatibility of the development of technology and theory eventually led to the development of the entire industrial structure. Unbalanced development may, in turn, affect the further enhancement of the comprehensive level of the entire industry. Through the investigation of relevant technical personnel in the automobile manufacturing industry, we find that there is still the speed of the industry in the pursuit of automobile products in the automobile manufacturing industry, while ignoring the importance and development of automobile safety may eventually result in the development of the entire industry constraints.

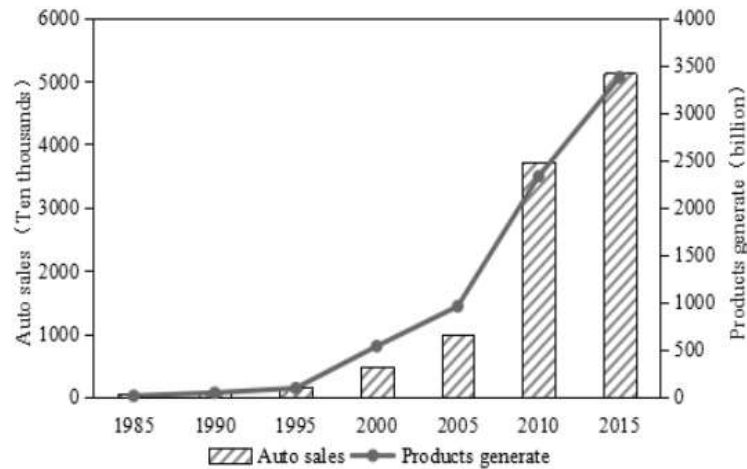


Figure 3. China's automobile manufacturing industry development status quo

4.2. Computer-based automotive Safety aid Driving Support System Information-sensing technology analysis of the advantages of Factors

Based on previous studies, the author has understood the current information technology of vehicle safety assistant driving support systems for computer technology. The advantages of this technology are summarized, and the results are shown in Figure 4. The results showed that the computer-based technology of information security of driving safety support systems was mainly based on the simulation technology of computer technology. Compared with the traditional vehicle safety-assisted driving support system, it enhances the sensitivity of the target when it appears and in the actual operation process. As this technique can be used to systematically analyze the sensing data information using the relevant computer technology algorithms, it may ultimately provide a positive impetus for obtaining more valuable information. Based on the computer technology, the information security technology of the assistant driving support system for vehicle safety in the actual car application process due to the lack of subjective factors caused by the interference, which may make the entire car reduce the operation of the instruction error rate, and thus make the car running The process is more secure. In addition, computer-based car safety AIDS information-aware technology can reduce the number of tests in automotive safety performance testing to enhance resource efficiency and tester safety.

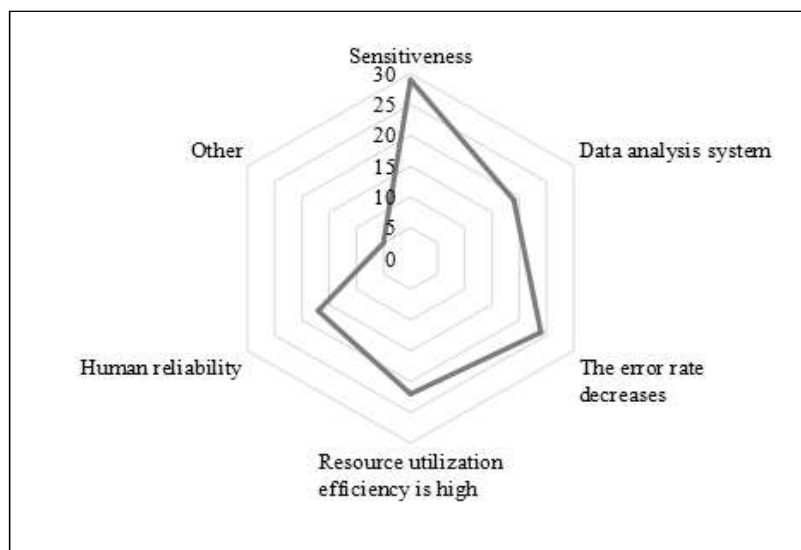


Figure 4. Advantages of computer-aware vehicle safety aid-driven support system information-sensing technology

4.3. Based on Fuzzy Decision tree algorithm for Vehicle Safety aided Driving Support System Information Sensing technology System to Build the Results

Based on the understanding and summarization of the fuzzy decision tree algorithm and the theory of information-sensing technology for vehicle-assisted driving support systems, the author constructs an information-aware operating system based on the fuzzy decision tree algorithm, the kind of system running process shown in Figure 5. The results showed that this kind of system mainly makes a fuzzy decision tree analysis of the distance and speed between two vehicles under the driving condition of the vehicle and finally sets the decision value suitable for the travelling speed and the safety distance of the car, according to their experience, eventually providing a reference theory for the safe driving of automobiles.

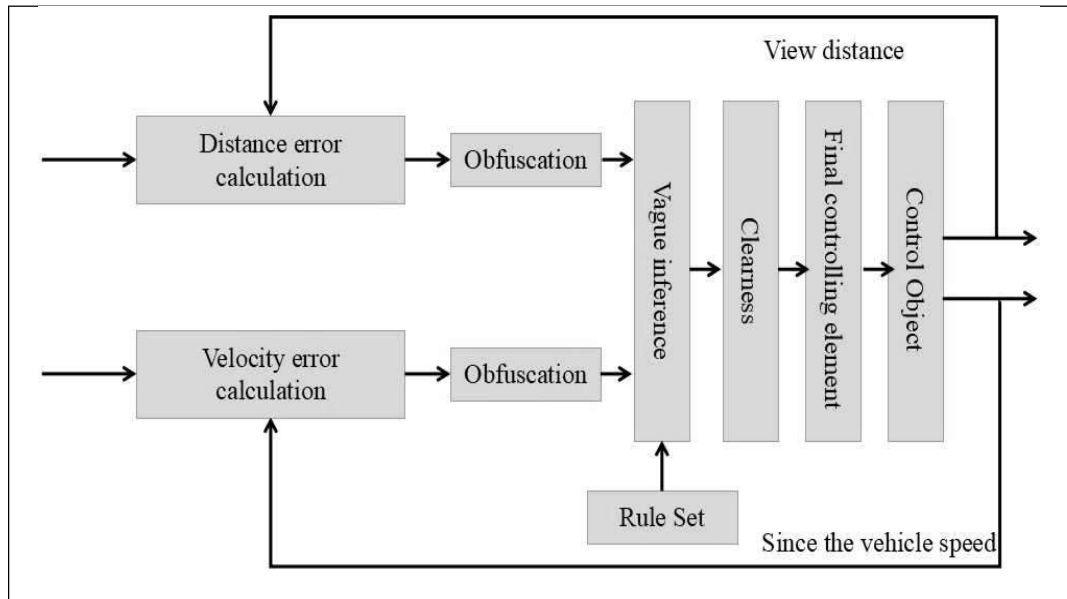


Figure 5. System construction results of information awareness technology for automotive safety aided driving support system based on fuzzy decision tree algorithm

4.4. Based on Fuzzy Decision tree algorithm for Vehicle Safety aided Driving Support System Information-aware technology System for a Brand Car Speed and Distance Prediction Results of the analysis

The author applied a fuzzy decision tree algorithm to the information security system of the driving safety support system to the forecasting process of car speed and distance. The results are shown in Table 1. The results showed that the system can be more accurate on the car’s speed, spacing, and relationship analysis density.

speed of a motor vehicle ≥	120 km/h	100 km/h	80 km/h	60 km/h
gape ≥	200 m	150 m	100 m	70 m
densitye ≥	5 vehicles /km	7 vehicles /km	10 vehicles /km	14 vehicles /km

Table 1. Vehicle Safety Based on Fuzzy Decision Tree Algorithm Driver Assistance System for Driving Information System for the Perception of a Brand of Car Speed and its Pitch Prediction Results

5. Conclusion

As an important industrial technology in the development of the present era, this kind of industry makes people more convenient for production and living and promotes the circulation of certain resources and information among different industries. Therefore, our country began to strengthen the research on the automobile manufacturing industry. Many advanced theories

and technologies began to be combined with the traditional automobile manufacturing industry. Our country has also started to produce new automobile products with more rapidity. Therefore, to a certain extent, it provides technical support for developing and progressing other industries in our country. However, there are still some shortages in the related technologies of automobile manufacturing in our country, which leads to a decrease in the safety performance of the products. The advent of computer technology has provided technical support for the research and development of safety assistant driving systems in the automobile manufacturing industry in our country. Because this kind of technology can perceive dangerous problems that may appear more sensitively, and through the operation of a more systematic algorithm model, it avoids some of the security issues. In this study, the author studied the system of information-sensing technology of a vehicle-assisted driving safety support system based on a fuzzy decision tree algorithm. Because the author only analyzed the relationship between speed, distance and density, the research is insufficient but still has reference value.

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