

Reduce the occurrence of "road rage" and ensure the safety of self-driving travel passengers

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Abstract. With the rapid growth of car ownership today, choosing self-driving travel has become the first choice for many people. At the same time, we should pay attention to the safety issues in the process of self-driving travel. The "road rage" emotions of self-driving drivers during the driving process pose a threat to the safety of the individual driver and the passengers in the car. Based on the traffic-oriented intelligent terminal and system platform, this article explores ways to reduce the emotion of "road rage" from the perspective of management and control. The methods discussed in this article can also help reduce environmental pollution and ensure travel safety.

1 Introduction

In recent years, urban traffic congestion has become more and more serious. The duration of the traffic peak period continues to extend. Poor road traffic conditions affect the driving mood of the driver, prone to "road rage" and "road anger" emotions, which is not conducive to safe driving of the driver. As more and more car accidents occur, emotional management has attracted much attention. It is very necessary to alleviate the problem of driver's road anger. For every driver, they are also willing to add a guarantee for their pleasant and safe travel.



Figure 1. "Road rage" and "road anger" emotions

According to research and investigations, there is currently no advanced and complete anti-road rage system or research similar to this article at home and abroad. Therefore, research the driver's anger characteristics, formulate anger management methods and strategies. It is of great significance to develop driver assistance systems to reduce driver anger and reduce road traffic accidents. Exploring a system that can

combine the driver's emotional factors to help the driver during driving is of great significance for improving the driver's acceptance rate of inducing suggestions during driving, reducing other operations during driving, and reducing traffic accidents.

2 technical background

With the development of artificial intelligence, big data, and AR technology, and the gradual in-depth application of mobile phone maps, it has become a trend for background analysis to provide users with corresponding customized services. In the context of the development of automated driving, the map industry needs to improve the technology. Provide accurate navigation for the car in real-time. The main purpose of artificial intelligence technology to empower map navigation is to improve and optimize user experience, and products that continuously meet user needs will win the artificial intelligence trend of map navigation.

As the key technology of urban traffic management, traffic guidance technology has been widely used because of its high efficiency of information transmission and obvious benefit of improving traffic flow. It has become an important part of relieving urban traffic pressure. Software technology means. The dynamic traffic guidance system induces the travel behavior of road users based on the real-time traffic status of the road. The dynamic traffic guidance system can reduce the road usage time of vehicles, improve traffic operation efficiency, rationally distribute traffic flow, and alleviate traffic congestion without expanding roads and increasing traffic infrastructure. [1] As one of the first intelligent transportation demonstration cities in China, after years of research, the transportation information application platform and logistics data platform have completed the preliminary framework, which can realize

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data collection, classification, effective storage, and query. The application situation is shown in Figure 2 [2] The Guangzhou City Traffic Guidance System has been constructed in phases since 2009. So far, 6 phases have been constructed, and a total of 107 traffic information boards have been built. Its real-time, continuous and systematic traffic information release on the road is becoming more and more popular. Many people accept and pay attention[3].

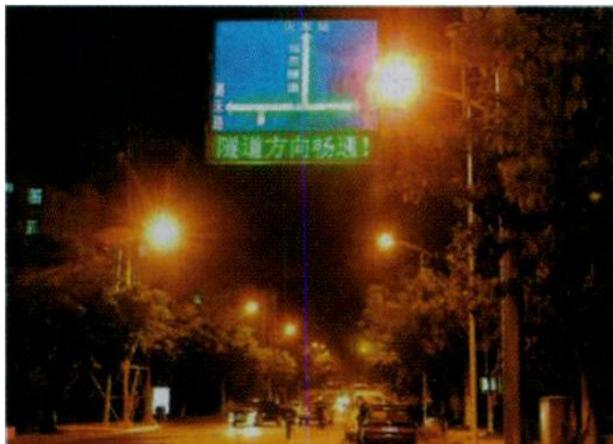


Figure 2. Guangzhou traffic guidance screen

However, in terms of improving traffic problems in traditional traffic guidance methods, the information display content and the location of the guidance screen are relatively fixed, and cannot be adjusted in real-time according to the time-varying and unstable characteristics of traffic flow conditions, nor can it be combined with individual drivers. Real-time feedback based on the mood factors of the city and its large number of layouts are expensive and affect the appearance of the city. When the site selection is optimized, it cannot take into account all aspects of traffic guidance needs. These all restrict the effect of urban traffic guidance control to a certain extent and affect the entire city The transportation function of the road network.

Looking at the industry development status of China's traffic guidance system and guidance terminal, combined with the fit situation, improvements are needed in the following aspects:

- Explore real-time traffic information, establish effective travel time prediction models, and integrate drivers The weight of mood factors in the driving process can efficiently deal with the

problem of traffic travel and road condition prediction so that the information provided to users has real-time and reliable.

- Research and support APP mobile phone terminal, computer terminal, data broadcasting, and other ways of guidance information The release method improves the intelligence and informatization of the induced information release terminal, so that users can obtain real-time, comprehensive, and convenient information on demand.

3 System solutions

Based on the traffic guidance technology, the system terminal can collect the driver's driving data through the equipment, influence the driving process mood factors, collect the personalized data and send it to the processing terminal. The processing terminal analyzes the data, combines the existing traffic flow database, the personality setting database, and the traffic control system to generate the guiding data. And then send the analyzed data to multiple terminals (the receiving terminal shown in the figure is a mobile phone APP). After the driver receives the analyzed data, the driver changes his driving behavior and relieves the traffic flow pressure. The changed traffic flow data is fed back to the information collection process through the detector and manual data correction. Figure 3 shows the flow structure of the traffic guidance system.

The service feature of this system is that the user's mood weight is added to enable users to travel happily. For example, when the local space guidance function of this product is invested in a university, it will investigate in advance the degree of students' preference for the school's cafeteria, and increase the preference weight during intelligent optimization calculations to carry out a path planning for mood, So that students can eat more appetizing dishes as soon as possible after class. The personalization of the road traffic guidance system is reflected in the decision-making in the face of congested intersections. In addition to collecting the proportion of vehicles around the intersection that they chose to avoid during the period time, we will also collect past drivers who chose to avoid the congested intersection in the past. The historical data of driving or continuing to wait is used as a measure of the influence of congestion at the intersection on the mood of the driver, and then planning an efficient and more comfortable driving path.

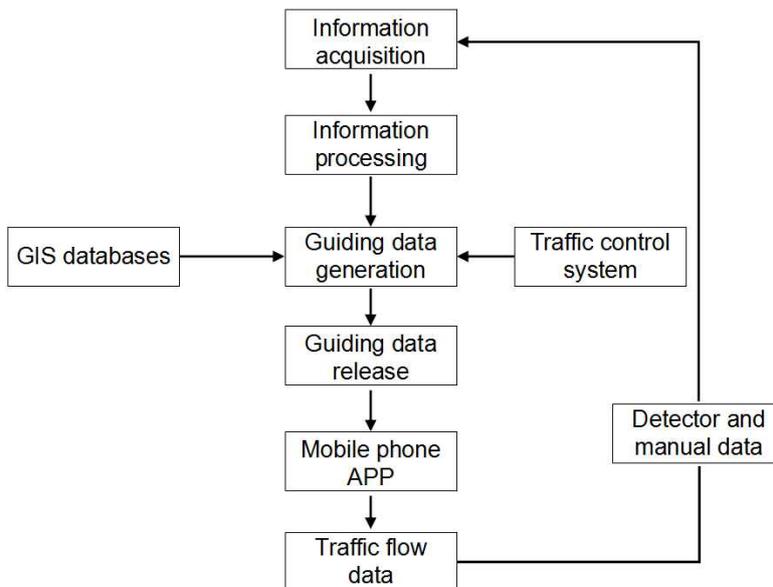


Figure 3. Process structure of traffic guidance system

Because most of the development technology of road traffic guidance includes the development technology of local space guidance, the following analysis will take road traffic guidance as an example.

- The use of floating vehicles to collect traffic data has outstanding features that are superior to traditional fixed detection methods, such as wide coverage (all levels of roads), low investment, diverse and accurate collected data, and become a very necessary supplement to traditional detection methods. Since the floating car system is mostly a built-in combination with taxis, bus dispatch systems, vehicle navigation systems, etc., it can save a lot of equipment investment and achieve a multiplier effect. It is very suitable for the characteristics of my country's limited investment in infrastructure construction and complex traffic flow conditions. It is an important technical means for my country's traffic information collection system to achieve leapfrog development.
- Based on retaining the advantages of the domestic commonly used ground sensing coil acquisition equipment, this system combines with the now gradually emerging GPS-based floating car data acquisition technology and proposes an algorithm for fusing the data acquired by the two acquisition equipment. The fusion algorithm improves the accuracy of traffic flow information data collection, and on this basis, uses the corrected road network weights for effective traffic flow path guidance.

The data collection part of the system can help traffic violation and environmental monitoring, improve the efficiency of traffic operation and traffic safety, and assist government departments in urban traffic planning; the induction part of the system can greatly alleviate traffic congestion and balance the traffic volume on each road. Improve the efficiency of the road network. For

ordinary individual users, by collecting the user's GPS information, the user can provide the best choice and route, save the user's travel time, provide the user's vehicle with the best driving route, and provide real-time navigation during the navigation process. Avoid congestion points, accident points, control points, construction points, inspection points, and flooding points, shorten the driving time or distance of vehicles and enable users to travel more efficiently.

4. advantage comparison

Compared with the existing system, set a starting point and destination. Without resetting the conditions, the existing navigation map plans multiple routes at the beginning, but after selecting one of them, the road conditions change in real-time, And will not automatically change the established route to avoid congestion. Drivers are required to choose other routes to avoid congestion according to the real-time road condition monitoring function of the map, which increases the complexity of driver operations and is not conducive to ensuring driving safety. In contrast, this system can optimize driving routes in real-time and intelligently induce drivers to avoid congestion.

In the later optimization, the system will focus on the user's personalized experience. The system can perform psychological and behavioral analysis according to the user's historical usage, generate and store the personalized probability of the user choosing to avoid or wait in the face of congestion, customize a personalized path to meet the user's personality, and reduce the phenomenon of "road rage" If you provide accurate guidance information, you can avoid these wrong path choices and produce greater benefits. If you can provide real-time dynamic traffic information, the benefits will be more significant. And multi-terminals, as intermediate carriers of the Internet of Vehicles, have stronger

interaction and wide acceptance, and can better connect with the Internet.

5.conclusion

Traffic guidance technology is a technology to manage modern traffic more effectively and optimize traffic flow. It integrates a variety of high-tech, such as geographic information systems, positioning technology, navigation technology, modern wireless communication technology. It is used to guide traffic participants and make traffic more convenient.

In summary, the technical support of this system has become mature, but the field involved in this system started late in my country. The traffic guidance intelligent terminal and system platform start from the perspective of the system, from the perspective of management and control, with information collection, processing, analysis, release, and interaction as the mainline, and Internet technology.

Functions, on the one hand, focus on the extensive application and service of traffic information, on the other hand, focus on improving the operating efficiency of existing transportation facilities, with high flexibility, obvious effects in improving city appearance, easy cost control, good focus, and wide real-time performance. Therefore, it can make up for the shortcomings of the traditional guidance method to a certain extent, effectively improve the driver's driving mood, reduce the wrong operations of driving, ensure the safety of travel, reduce the traffic congestion and improve the efficiency of traffic operation.

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