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Original Research Article

Vehicle Routing Optimization Based on Multimedia Communication and Intelligent Transportation System

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ABSTRACT

With the maturity and popularity of network technology and multimedia technology, more and more communication tools and means have entered people's lives. The usual communication tools are often limited to the ability to transmit sound signals. This method does not well express the information between the two parties in some special occasions, such as a noisy environment, where both parties have language or hearing impairments. The multimedia communication system is a technology that combines network communication and multimedia. It utilizes the efficiency of data transmission over the network and the diversity of information in multimedia, making communication between people faster, clearer, and more intuitive. The multimedia communication system is an important part of the application to the intelligent transportation system. Intelligent transportation system is a systematic, real-time, accurate, interactive, and extensive traffic management system established by the comprehensive use of modern high and new technology in the transportation system. With these characteristics, intelligent transportation system has increasingly become an important means to solve modern traffic problems. Based on multimedia communication and intelligent transportation system, this article optimizes the vehicle path and realizes the application of intelligent transportation.

Keywords: Traffic accidents; Communication tools; Power-minimization

1. Introduction

With the rapid development of multimedia technology and communication technology, the relationship between them has become more and more close. Multimedia has gradually penetrated into schools, families, and societies, making the relationship between people beyond the limitations of time and space. Multimedia technology integrates and assembles various media modes,

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making communication and interaction between human and computer, and transforming and disseminating information. The media used include text, graphics, audio, video and animation, as well as the interactive functions provided by the program, which provides people with an omnidirectional and multisensory perception space, greatly improves the man-machine interface, and improves the application level of the computer[1]. Multimedia communication includes two aspects: different from general network, multimedia communication needs special equipment environment; compared with traditional multimedia, computer equipment used in multimedia communication is special[2, 3]. Multimedia communication is different from general multimedia in processing image, sound, and other information. Therefore, the higher image quality required by hardware equipment is determined by the number of tons per second and the size of the image. In image aspect, if the image is played at a frame rate of 30 frames per second, the human eye can see the continuous image. But in multimedia communication system, the playback effect of 30 frames per second is not ideal. We need to useDIV, JPEG, MPEG, and other coding methods to encode and decode. In terms of speech, the transmission rate of speech is relatively high, generally requiring 10 Kbps to 64 Kbps. If it is a 16 bit high-quality speech signal, it needs to reach a higher rate [3–6]. In addition, multimedia communication integrates computer, network, and multimedia functions, but the hardware devices involved in multimedia communication are various, and the types of networks transmitting multimedia information may also be different. Therefore, the compatibility of multimedia communication devices is required to ensure the synchronization and stability of multimedia voice and image in different networks. In multimedia communication, the characteristics of multimedia, such as integration, interaction, networking, and science-enabled, have made new progress[7, 8].

2. Application of Multimedia Communication System in Intelligent Transportation

Along with the rapid development of China's economy, the road traffic construction process has obviously accelerated. Despite the continuous expansion of the road area and scale of our country, the growth level of vehicles far exceeds the speed of road construction. For too many vehicles to travel, we should consider more travel safety and effectively recognize the traffic information transmitted by road traffic signs, which is the basis for ensuring safe travel. There are several problems with traffic conditions. The multimedia transportation system is shown in Figure1

(1)The growth rate of transportation demand is much higher than that of road facilities. China's dense population has led to a much lower per capita road area than the foreign average. Excessive attention to the construction of roads for expansion, lack of improvement of the road traffic sign guidance system, imperfect road traffic signs, often cause the driver to travel confused, unclear which direction should be driven, mistakenly enter the traffic flow, and other issues.

(2)Road traffic lacks overall system planning. Most of the road construction is a separate system, which lacks communication and information sharing with the construction of nearby provinces and cities. The construction of urban road traffic sign system is a systematic project that requires a complete solution. It is an important issue for whether the relationship can travel smoothly and travel safely. There is a lack of scientific and comprehensive transportation planning strategy, and the construction of road transportation facilities in various provinces is mixed.

(3)The traffic structure is unreasonable. The poor quality of public transport services has led people to find new ways to travel —self-driving. Along with the growth of China's economy, families with private cars are becoming more and more common and become the main mode of

travel for families, which also makes the road congestion more serious. The increase in the number of motor vehicles increases the burden of road traffic.

Figure 1: Voice communication flow chart.

3. Design of Multimedia Communication System in Intelligent Transportation

Audio processing module can be divided into the following two parts: audio signalsending part and receiving part. Audio signal transmission part needs to deal with the following key points: (1) the establishment of audio equipment, (2) the collection of audio data, (3) the encoding and compression of audio data, and (4) the transmission of audio data. The audio signal receiving part needs to deal with the following key points: (1) the reception of audio data, (2) the decoding of audio data, and (3) the playback of audio data.

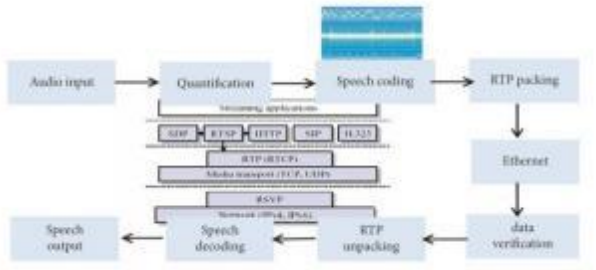

Figure 2: Multimedia transportation system.

4. Conclusions

In recent years, with the increasing popularity of vehicles, road traffic pressures have become increasingly apparent, seriously affecting people's travel safety and travel efficiency. In the field of intelligent transportation systems, China has made some efforts and attempts in highway construction, such as card charging, remote video surveillance, and real-time electronic display, but there are still imbalances in the development of traffic in various provinces and highway traffic in various provinces. A series of problems such as the inconsistency of the logo and the overall backward development of intelligent transportation have seriously restricted the development of China's intelligent transportation system. It is precisely because of this series of problems caused by the increase in traffic pressure that vehicle travel path optimization is very important for the general public, emergency rescue personnel, or logistics distribution industry. In view of the backward development of highway construction in the field of intelligent transportation, this article studies the application of multimedia communication system in intelligent transportation and hopes to provide useful help for highway construction development. The main conclusions drawn areas follows:

(1) In the future road of urban traffic development, multimedia communication is applied to intelligent transportation, and information is networked to transmit traffic information in various ways, so that traffic participants are familiar with road conditions and drive vehicles more safely. It will become an important development direction of urban traffic in the future. It will form a traffic information development model for people, cars, and roads and provide a certain reference value for the future development of intelligent transportation.

(2) The multimedia communication system cannot only realize voice communication but also can transmit and display text and graphic information handwritten on the touch screen in real time. This feature allows the communicating parties to more intuitively understand what the other party wants to express. The graphic communication function has greatly improved the

communication effect of the traditional telephone and is more applicable in traffic use.

(3) Based on the demand analysis of the intelligent transportation service system, combined with the actual road conditions, the functional modules, such as road condition inquiry, driving route planning, public exchange inquiry, pedestrian navigation, and data management, were designed; the database was designed and completed the storage of traffic information, real-time traffic conditions, and data required for dynamic path finding.

Conflict of interest

The authors declare no conflict of interest.

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References

1. L. F. Huang, J. F. Lin, Z. C. Huang, Q. Y. Chen, and H. Z. Lin, "Design of mobile terminal multimedia communication system in intelligent community based on SIP," Applied Mechanics and Materials, vol. 556-562, pp. 4929–4932, 2014.
2. K. Araki, M. Kobayashi, H. Nakashima, and K. Kawazoe, "ATM cell/IP packet transmission characteristics evaluation in multimedia interactive satellite communication system," Electronics and Communications in Japan, vol. 84, no. 5, pp. 76–85, 2015.
3. K. Srirangan, L. Akawi, and X. Liu, "Method and apparatus for transmitting multimedia broadcast data in wireless communication system," Biotechnology for Biofuels, vol. 6, no. 1, pp. 1–14, 2016.
4. N. Zorba and C. Verikoukis, "Energy optimization for bidirectional multimedia communication in unsynchronized TDD systems," IEEE Systems Journal, vol. 10, no. 2, pp. 797–804, 2016.
5. T. Ikeda, S. Sampei, and N. Morinaga, "Adaptive modulation with dynamic channel assignment multimedia communication systems," Electronics and Communications in Japan, vol. 84, no. 6, pp. 49–58, 2015.
6. X. Ge, H. Wang, R. Zi, Q. Li, and Q. Ni, "5G multimedia massive MIMO communications systems," Wireless Communications and Mobile Computing, vol. 16, no. 11, pp. 1377–1388, 2016.
7. O. I. Khalaf, G. M. Abdulsahib, H. D. Kasmaei, and K. A. Ogudo, "A new algorithm on application of blockchain technology in live stream video transmissions and telecommunications," International Journal of E-Collaboration, vol. 16, no. 1, pp. 16–32, 2020.
8. X. Tang, Z. Wang, X. Li, Z. Han, Z. He, and Y. Fu, "Performance analysis for multimedia communication systems with a multilayer queuing network model," China Communications, vol. 15, no. 8, pp. 67–76, 2018.