

Research on the Application of Image Processing Technology on Intelligent Transportation

Zijian Wang

Information Engineering University, Zhengzhou, Henan, 450000, China

Keywords: Application study, Image processing, Intelligent transportation

Abstract: Image processing technology plays an important role in the development of intelligent transportation and directly affects the quality of intelligent transportation development. Based on this, this article will analyze and study the application of image processing technology in intelligent transportation, hoping to improve the level of image processing technology in intelligent transportation, and promote the faster and better development of intelligent transportation in my country.

1. Introduction

my country's economy is currently in the process of rapid development, and the transportation industry and its motorization level have also been rapidly developed. However, in this context, there are many problems in my country's transportation development. The traffic flow in many cities is increasing day by day, traffic jams, and accidents. And so often happens. In order to solve the current difficult situation in the development of transportation, some cities in my country have begun to establish and apply intelligent transportation systems to realize the smooth operation of urban transportation. In the application of intelligent transportation systems, image processing technology is widely used, which has important practical significance and broad development prospects. Intelligent transportation systems are currently widely used in many countries around the world, and they are the focus of attention in the development of transportation and transportation in many countries. my country's current economic development is fast, and related science and technology are also in the process of deepening development. Under this background, intelligent transportation systems are also in a trend of rapid development in my country, and they have been well applied in many cities. It has a very strong application prospect. The intelligent transportation system is developed on the basis of perfect road design and construction. The system mainly applies various advanced technologies such as information technology, intelligent technology, electronic technology, geographic technology, image processing technology, sensor technology and so on. Among them, image processing technology is the most widely used and most important value in intelligent transportation systems. The application of these advanced technologies makes the intelligent transportation system an advanced, accurate, and real-time transportation system, which can drive the development of transportation and transportation to the direction of intelligence. The development and application of intelligent transportation systems can not only improve the efficiency of ground transportation, but also enable the most extensive and efficient application of existing transportation infrastructure and ensure traffic safety. After the application of the intelligent transportation system, the input of manpower, material resources, and financial resources will be significantly reduced. Compared with the traditional mode of transportation system, it has better social value and economic significance. In addition, the application of the intelligent transportation system can also realize the behavior analysis of the vehicle in the state of motion, ensure the accuracy of the analysis work, and also have a positive role in promoting the work of the transportation department.

2. The Main Types of Image Processing Technology

If people simply collect part of the information in the image, it will be difficult to play the true

value and role of the image for all kinds of work. Therefore, it is necessary to apply image enhancement technology scientifically and efficiently. Based on the application of this image processing technology, the staff can effectively extract the key information existing in the image in a short time and weaken the data information without any value. The most significant advantage of image enhancement technology is that it can comprehensively improve the image contrast, thus fully guaranteeing the high definition of the original drawing paper of the image. In addition, the application of image enhancement technology can also optimize the color of the image without modifying any image information, but by highlighting the key data information in the image to emphasize to people.

In the current image processing field, image denoising technology is a widely used technology, which is a basic and key link in image processing technology. In the process of collecting image information in daily work and life, people will be affected by various external physical factors, causing noise in the image collection process. The forms of noise mainly include optical quantum noise and firmware noise. The occurrence of noise problems will cause the image processing to be interrupted, which reduces the quality and efficiency of image processing to a certain extent. In view of this, the staff must give full play to the role of image denoising technology, effectively reduce various noises in the image processing process, and prevent the work from being affected by noise.

People can help themselves to effectively extract the collected key image data information by rationally using image compression technology. Under normal circumstances, TV images tend to produce larger image data rates. In order to reduce the actual image data rate of TV images, staff need to use image compression technology to effectively reduce the redundant information in the image data, so as to achieve more scientific and efficient Store and transmit data in a new format, and maintain good contrast and clarity of the image. Image compression technology is mainly divided into lossy data compression and lossless data compression.

3. Application of Image Processing Technology in Intelligent Transportation

In the intelligent transportation system, the application of image processing technology is first reflected in the license plate recognition. License plate recognition is the main component of the intelligent transportation system, which can help the vehicle management department to manage the vehicles reasonably and efficiently, and improve the specific efficiency of the staff. At present, license plate recognition is mainly used in parking lot management, community management, highway system and other major aspects. License plate recognition is mainly to monitor and photograph the vehicles running on the road, and extract the main information of the license plate, such as Chinese characters, English characters, colors, numbers, etc. In the process of processing this information, the image needs to be collected, preprocessed, and finally recognized. The application of license plate recognition requires the relevant departments to install digital equipment, camera systems, computer systems, etc., on this basis, the vehicle image information is collected, and then the collected information is preprocessed to find out the license plate in the image. For the specific location, extract all the information, analyze all the elements in the information, and finally identify the real information and real number of the license plate. In the specific application process of license plate recognition, the quality of images and photos will be affected by many external factors, such as sunshine factors, rainfall, and vehicle operating speed. Under the influence of these different external factors, the license plate information collected by the license plate recognition system often has problems such as blur, unclearness, and overlap, which has a serious negative impact on the subsequent recognition work. Therefore, before the formal license plate recognition work, the staff should focus on preprocessing the license plate image, such as ashing, binarizing, and correcting the image to ensure the accuracy of the license plate recognition. Although my country currently uses image processing technology for license plate recognition, my country's license plate formats are relatively diverse, the background is also relatively complex, and lacks good uniformity, so there are problems such as unclear recognition, and relevant departments need to make further reasonable improvements.

In the process of the development and application of intelligent transportation, the staff can also use image processing technology to collect information to ensure the efficient and stable operation of the intelligent transportation system. After developing an intelligent transportation system, the transportation department of a city uses image processing technology to collect traffic information reasonably. Through the specific operation of the technology, the staff obtains all aspects of the operation information of the road traffic operation process, such as the specific traffic volume, vehicle operating speed, vehicle type, road traffic density, etc. After the image processing technology collects the relevant information, it immediately transmits the image back to the computer of the staff and the analyst. The analyst can obtain the exact information and actual conditions of the traffic operation based on this, so as to ensure that the traffic management department understands the truth about the traffic. Carry out reasonable and efficient management, and issue early warning information and guidance information in time, adjust and divert the traffic flow in road traffic operation, avoid serious traffic congestion, and realize the smooth operation of reasonable traffic. The city's transportation department found that after applying image processing technology for information collection and analysis, the work efficiency of the road traffic management department has been significantly improved, and the city's traffic congestion problem has been reasonably solved.

The application of image processing technology in intelligent transportation, in addition to license plate recognition, can also be used for vehicle detection. At present, the main methods of vehicle detection include background difference detection method, edge detection method, frame difference method, model method and so on. These four detection methods can be used for vehicle detection and have good detection results. At present, in the application and development of intelligent transportation, one of the main application directions of image processing technology is to be used for vehicle detection. Intelligent transportation uses image processing technology for vehicle detection, to a certain extent, it is based on the work of license plate recognition. After the intelligent transportation system collects the vehicle information, the image processing technology can realize the real-time detection of the vehicle by reasonably and efficiently identifying the main information of the vehicle such as the license plate.

The application of image processing technology in intelligent transportation can also be embodied in the application of electronic police. Electronic police is an important part of the intelligent transportation system, which can replace the police to some extent. It can not only ensure the efficiency of the work, but also improve the rationality of the work. The application of image processing technology in electronic police can be divided into the following aspects: image filtering technology, image coding, image recognition, image encryption, etc. Image filtering technology mainly refers to that image processing technology can reasonably remove serious interference sources such as noise in the captured video images, and on this basis, the effective information in the video images can be extracted by colleges and universities. Video coding mainly uses the corresponding coding technology to perform secondary coding on the video images captured by the intelligent transportation system to ensure that the images can meet specific communication requirements. Image encryption is mainly used to encrypt video images, and other security measures can also be added to ensure the security of video images. After developing and using the intelligent transportation system, the transportation department of a city combined the electronic police with the intelligent transportation system. The city's electronic police, due to the application of more advanced and key image processing technology, can not only perform video shooting of vehicles and pedestrians, but also analyze, encrypt, and encode the captured video. The managers of the city's transportation department found that the work efficiency of the electronic police has been significantly improved after the application of image processing technology, which has played a positive role in promoting the development of the city's transportation industry and also promoted the city's intelligent transportation system in the future. Deepen development.

In addition to the above-mentioned application directions, the application of image processing technology in intelligent transportation also includes the main content of obstacle detection. In the traffic system, obstacles mainly include pedestrians, bicycles, electric vehicles, other motor

vehicles, and traffic signs on the road ahead while the vehicle is running. The application of image processing technology in obstacle detection mainly uses the main methods such as stereo vision detection, background motion detection analysis, optical flow detection and so on. In the process of detection, the image processing technology is mainly based on detailed analysis of the video images taken by the camera, to see where there are obstacles in front of the road, and prompt the driver and others about the obstacle in time. At present, these several main obstacle detection methods have been relatively well applied in intelligent transportation systems, and the effects are relatively ideal. They can play a powerful role in the deepening of image processing technology and the further development of intelligent transportation systems. Promoting role.

4. Conclusion

The research and application of image processing technology has created many practical values for the development of human society, greatly changing and facilitating people's production and lifestyle. It is widely used in various industries in human society, such as transportation and agriculture. , Military and medical fields. Therefore, in order to ensure that the value of image processing technology can be maximized, and to improve the quality and efficiency of workers in all walks of life, it is necessary to in-depth and innovative research on image processing technology to promote the sustainable development of image processing technology.

References

- [1] Cui Liyan. Research on the Application of Image Processing Technology in Intelligent Transportation. Communication World, 2014, 2(004): 21-22.
- [2] Xie Haibin. Research on the Application of Image Processing Technology in Intelligent Transportation. Electronic Technology and Software Engineering, 2015, 11(019):129-129.
- [3] Wei Xin, Zuo Yuling. Application of Digital Image Processing in Intelligent Transportation. Science and Technology Outlook, 2015(2).
- [4] Zou Zicong, Pi Yang. Discussion on the Application of Image Processing Technology in Intelligent Transportation. China High-Tech Enterprise, 2017, 8(003): 41-42.
- [5] Tu Junshu, Zhang Jianwen. Overview of the application of image processing technology in intelligent transportation. Science and Technology Wind, 2017, 3(011): 87-87.
- [6] Zhao Jien, Long Fei, Dai Bao. Application of Digital Image Processing Technology in Intelligent Transportation. Information and Communication, 2017, 6(008): 82-84.