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Introduction to Intelligent Traffic Monitoring System Based on Computer Vision

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Abstract

With the continuous development of the economy, people's living standards have been increasing and their ability to purchase has been significantly enhanced. Therefore, more and more people use cars as a means of travel. However, the transportation and road resources are limited. Therefore, This will inevitably lead to traffic jams and other related problems. Then, it brings out the main content of this article, namely the research brief introduction of intelligent traffic monitoring system based on computer vision. In this article, first introduce the computer vision, the intelligent traffic system, the intelligent traffic monitoring system under the computer vision, then introduce the knowledge related to the intelligent traffic monitoring system, and then, It also analyzes the significance of the system and the existing difficulties. Finally, it summarizes the full text.

Keywords

Computer vision, Intelligent transportation system, Open CV, Comparison of traffic flow parameters.

1. Understanding the Intelligent Traffic Monitoring System under Computer Vision

1.1. Computer Vision

Computer vision refers to the use of high-definition cameras, or other electronic image recording devices, instead of the human eye to identify, track, measure and transmit the acquired visual information to the computer, using computer graphics and image technology to further obtain visual information. Processing, Computer observation techniques for three-dimensional representation of real situations[1].

1.2. Intelligent Transportation System

Intelligent transportation system refers to a traffic management system that uses various computerized intelligent technologies to manage modern transportation and provide services to participants in transportation[2].

Along with the improvement of the gross national product and people's living standards, vehicles and roads are also developing rapidly. Intelligent transportation systems have gradually received great attention at home and abroad[3]. In recent years, with the universal establishment of road monitoring system, video surveillance has been or will be realized at key road intersections and road sections[4].

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1.3. Intelligent Traffic Monitoring System under Computer Vision

From the previous analysis of the meaning of computer vision and intelligent traffic monitoring system, we can see that the intelligent traffic monitoring system under computer vision refers to the use of modern computer vision information collection and processing technology, real-time monitoring, collection, processing of urban traffic information, And through the intelligent traffic system to achieve real-time monitoring and command of urban traffic conditions, to achieve real-time monitoring of urban traffic congestion, illegal parking and traffic accidents, and to direct the traffic to avoid various traffic accidents intelligent traffic monitoring system[5].

2. Knowledge Related to Intelligent Traffic Monitoring Systems

2.1. Intelligent Traffic Management System(ITS)

The intelligent traffic management system refers to the intelligent handling of traffic management [6]. It uses advanced science and technology, sensor technology, and Internet technology to construct a series of intelligent and Humanized traffic management systems to achieve constant, efficient and accurate traffic command, management of vehicles, and handling traffic accidents. Maintain normal traffic. With the acceleration of the urbanization construction, the contradiction of urban traffic appears to be particularly prominent, and the solution to the urban traffic problem has become an urgent matter. The intelligent traffic management system realizes flexible traffic management and solves traffic conflicts by introducing computer artificial intelligence [7]. Therefore, the research on intelligent traffic monitoring system has become very valuable and far-reaching, and it is undoubtedly a great joy to solve the traffic problems in Chinese cities.

2.2. Open CV Technology

Open CV translation is the meaning of the open source computer vision library, which is an important part of the intelligent traffic monitoring system [8]. Open CV technology is mainly composed of C functions and C++ classes. It is an independent system that can record and store video or images, and integrates image processing and computer visualization. Open CV technology can be used to image processing. Help the computer to visualize and set up recognition programs to help the intelligent traffic monitoring system better capture images and videos [9]. And in terms of the current development situation, Open CV technology has become relatively mature, both commercial and non-commercial uses have been free, and the use is very extensive [10].

2.3. Comparison of Common Traffic Flow Parameters

Traffic flow, in short, refers to the amount of traffic passing through a certain point, section, or lane of a certain road during a certain period of time. Traffic flow is an important parameter for judging traffic congestion, and it can also be used as an important reference for solving traffic problems [11]. With the development of science and technology, there are more and more ways and types of monitoring traffic flow. We can use ultrasonic detection, infrared detection, circular buried coil detection, and computer vision detection. But because of the blocking of human body, building, vegetation, and vehicle, it has a great influence on ultrasonic detection. This leads to the lack of accuracy of ultrasonic detection traffic flow, and ultrasonic detection itself also has the defect of limited detectable distance. Infrared detection is easily disturbed by noise. Infrared detection next to noisy roads will be very inaccurate. In addition, infrared light will also be affected by the heating body, so it will be greatly affected by pedestrians and vehicles. Although the detection ability of circular buried coil is strong and the accuracy of the detection traffic flow is high, the installation of circular buried coil for detection needs to destroy the road, which will cause certain obstacles to pedestrians and vehicles and is less feasible. However, with the Advancement of science and technology, the level of computer

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technology has also begun to make rapid progress. People love this method of visual detection and use it on a high frequency. Its advantages are convenience to use, high accuracy of detection results, less interference, and the ability to provide pictures and video data, making computer vision detection more and more reused in daily traffic detection [12].

The characteristics of computer visual detection compared to other detection methods are as follows:

(1) Clear traffic images can be viewed in a computerized video library and high-quality vehicle information can be extracted.

(2) The large geographic coverage that can be detected has resulted in a certain reduction in the use of surveillance cameras on traffic routes, reduced use of funds and savings.

(3) The installation and removal of video sensors for computer visual detection are easy and have little impact on roads and peripheral facilities and are not destructive.

(4) Computer visual detection can quickly return video images, which is more efficient and convenient than previous detection methods.

3. Study the Significance and Existing Difficulties of Intelligent Traffic Monitoring System

3.1. Research on the Value of Intelligent Traffic Monitoring System

China has not always attached great importance to the intelligent transportation system, and the research depth and breadth are insufficient, the research progress is lagging behind, and there is very little literature and data related to it. This has caused little achievements in this field. It is very unfavorable to promote the sustainable development of China's transportation. Now we have a detailed study of the key parts of the intelligent traffic monitoring system, hoping to bring some help to the relevant units and individuals who are interested in the intelligent traffic monitoring system. It is also hoped that the academic community can pay attention to the related knowledge of intelligent traffic monitoring system, deepen the research degree of intelligent traffic monitoring system, and bring new vitality to the development of China's modern transportation industry.

3.2. Study the Existing Difficulties of Intelligent Traffic Monitoring System

The research on intelligent trading monitoring system can find that there are many problems that need to be improved. First, China's research in this area is limited, and the accuracy and accuracy of computer vision system calculations are not yet very high. And the performance of the intelligent traffic monitoring system needs to be improved. Second, for the detection of mobile background, the current calculation method in China is still very complex and huge, and it also needs to build a complex modeling to solve the problem. Third, the implementation of the intelligent traffic monitoring system is not very smooth. There are many reasons to hinder the establishment of a unified and complete national intelligent transportation system.

4. Summary

At present, the traffic problem has become a prominent contradiction that affects economic development and social progress. Therefore, we must face this problem squarely. Then, the use of intelligent traffic monitoring system to solve traffic problems will be the first choice. After understanding the above relevant knowledge, we can understand that the intelligent traffic monitoring system based on computer vision is very suitable and very meaningful to deal with this problem. It is believed that with the continuous efforts of researchers over time, The system will be more perfect and better able to deal with many problems that arise in road traffic.

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