Development and Application of Sports Video Analysis Platform in Sports Training

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Abstract. The promotion of the concept of "healthy China" has set off a nationwide fitness boom, and sports training have been widely valued. As a coach, it is necessary to explain the action essentials to the athletes through the intuitive and vivid sports video. However, there are many problems in many sports analysis platforms, which need to be optimized. This paper focuses on the development and application of sports video analysis platform in sports training.

Keywords: Sports Training, Sports Video, Analysis Platform, Development and Application, Research

With the rapid development of network information technology, sports training are developing in the direction of intelligence and digitization. Using video analysis software to collect athletes' movement information, correct and improve training actions of athletes, so as to continuously improve the efficiency and level of sports training, therefore the sports video analysis platform in sports training is very important. Next, the development and application of sports video analysis platform in sports training will be discussed.

1. Development Purpose of Sports Video Analysis Platform

With the traditional sports training mode, the sports video analysis platform aims to observe and analyze with naked eyes to meet the purpose of sports training analysis, but this method has great limitations [1]. Under the new situation, an effective sports video analysis platform can comprehensively analyze the athletes' competition or training video, highlight the details, and establish the spatial-temporal correlation of video images, so as to obtain the effective parameters of human kinematics, the required information needed by coaches and trainers for targeted guidance and training in the follow-up [2].

2. Design of Sports Video Analysis Platform in Sports Training

2.1 Platform Function Design

This paper aims to analyze human motion through monocular video, the functional framework of the platform is as follows:
The system developed in this paper is a sports video based on DirectShow technology. It mainly uses the image phase technology with mosaic technology, which successfully extracts much information in the video and segment the video image in time domain [3]. The purpose of this system is to extract the moving objects in the video and finally synthesize the effective panoramic image for reference [4]. In this system, the static background is filtered out by using the frame difference method, which can successfully suppress the background, and effectively combine the color block matching and Kalman filtering, so as to automatically track the key parts. Based on this, accurate and efficient human motion parameters can be obtained for the success construction of video analysis network platform of sports training [5-6].

2.2 System Hardware Facilities Configuration

After building the sports video analysis platform for sports training, we should pay attention to the optimization of its hardware facilities. Among them, the digital processor TMS236351, as the core part, adopts the internal and external storage structure, and the internal fast buffer storage area is the dual machine buffer structure, while the storage space and digital signal processing range mainly involve the first level buffer structure. Therefore, the processor can also be called dynamic random access memory, which can successfully save sports training video in case of sudden power failure, and ensure that the video data information will not be lost due to objective factors.

Specifically, the hardware structure of sports training video analysis platform should cover synchronous control chip, multimedia structure and external memory, power module, video collection and processing module and other equipment. After collecting sports training video, the platform allocates storage address through the storage bus, and effectively stores by using processor and nearby components, so that the storage bus can transmit the video to the collection module in the process of video analysis. The core function of network control chip is to effectively adjust the network bandwidth to ensure the normal operation. Secondly, the power module of sports training sports video analysis platform aims to ensure sufficient power supply for video collection and processing module, and provide effective power supply for processor and storage bus, so as to ensure that the platform can run smoothly and stably for a long time. It is worth mentioning that in order to ensure that many modules and constructions in the platform can be safe and efficient in operation, the power switch of the storage bus should be turned off first, followed by the power supply of the processor, the video collection and processing module for the final. In addition, the multimedia interface is the core output of the platform. Therefore, before comprehensive analysis of video, the connection relationship
between multimedia and processor should be accurately defined, so as to ensure the integrity and scientific effectiveness of the video to a large extent.

2.3 Design of Target Tracking Model
In the new situation, the key link of sports training video analysis system is the target tracking model. To some extent, the data in the target tracking model is also the core data in the process of video analysis in sports training video. In the process of formal operation, the main working goal and purpose of sports training video is to continuously shoot sports change process based on the existing shooting conditions, which will make the visual angle constantly change, and the target analysis data of different visual angles are also very different, so as to obtain the different analysis results. However, these different analysis results are scientific, objective and effective for sports and competition, which can fully show the different attitudes of athletes in the process of sports. In the process of target tracking, we should actively use multi tracker to collect comprehensive data information. The structure of the target tracking model of the sports training video analysis system designed in this platform is as follows:

![Target tracking model structure of sports training video analysis system](image)

Figure 2. Target tracking model structure of sports training video analysis system

Based on this, in the process of operation with actual situation, we should refine the target tracking model into two parts: behavior observation and basic motion. Among them, the goal of behavior observation model is to refine the goal of basic sports model according to the actual needs; the working goal of basic sports model is to summarize the rules of sports objectives according to the basic sports situation of athletes. In the use of this platform, it is bound to involve sports training and sports video playback, and the playback mentioned here should involve two plug-ins, namely, playback detection and playback thread creation. In the specific operation process, if the sports training video cannot be played normally, the callback function should be used to pause the playback content, and play again. If the video can be played normally, the playback thread can be actively created according to the actual situation during the playback, so as to promote the realization of video target consistency and unity. Multi dynamic target synchronous tracking aims to extract many targets at the same time, in order to increase the accuracy and effectiveness of behavior analysis and target tracking. From a large number of operation practice, when the target in the sports training video has been determined, the part will work on its own. In the process of operation, it can intercept multi-target images as punctuation points, to track the target points comprehensively, and finally save and output them in the form of log, which lays a solid foundation and good premise for providing more perfect and effective video analysis.

2.4 Video Motion Behavior Identification
In the process of sports training, sports video recognition cannot identify the irregular movement. Based on this, we should make effective comparison between the actual movement and standard movement of athletes, so as to successfully identify the sports behavior of athletes. It is worth mentioning that the process of recognition is to use the separated basic action video sequence and the
motion model for learning. The input motion video separation sequence is used to detect, so that the conditional random field model parameters can be obtained, and the parameter values are compared for effective attribution.

In the process of the performance test of analysis platform for sports training, the aim is to collect the sports video information of the athletes successfully through the embedded device, and carry out scientific and effective monitoring. The system interface can effectively set the sports training video parameters, and use the visible mode for human-computer interaction.

3. The Application Prospect of Video Analysis Platform of Sports Continuation in Sports Training

From the current point of view, most of the sports training in China, especially in colleges and universities, is still based on the observation results, through oral expression to correct students' wrong sports behavior, but in this mode, it is difficult for students to form a clear image concept for their own operation, and can not accurately and scientifically change their wrong sports behavior. Those disadvantages are not conducive to the great progress and development of sports in China. In sports training or physical education, most professional technical actions are completed in a certain moment, and many details cannot be observed and judged by naked eyes. Under the new situation, in the process of sports training or teaching, we should actively adopt sports video analysis technology and platform to guide students understand and master the essence of a certain technical action through slow motion. And take this as the reference to have an intuitive and visual cognition of their own actions, in order to find their own shortcomings with rapid adjustments, constantly optimization and improvement of their own movements, so as to ensure that the movements are qualified, effective and competitive, and finally improve the quality and level of training sports. As a coach, by sports training video, it can effectively improve the quality and level of analysis, effectively enhance the competitive ability and level of athletes, and obtain excellent results in sports and competitions. In the long run, it is conducive to promote the development of competitive sports in China towards digital, scientific and intelligent direction. To some extent, the training process of coaches for athletes and PE teachers for students is essentially a process of discovering, analyzing and solving problems. The application of sports video analysis platform is conducive to providing a bridge for coaches and athletes to communicate with each other, and can also build a perfect competition platform for Chinese and foreign coaches. In the process of sports training and competition, the use of video for comparative analysis is conducive to help athletes understand and master the movement essentials and coach's technical requirements for the action in the shortest time, so as to be able to carry out targeted training and constantly improve their sports quality and level. Moreover, by sharing and watching the top athletes' sports video materials, it is conducive to in-depth learning and understanding the gap between them. While understanding and learning the world's most advanced sports technology, athletes can also find gaps, analyze their own problems, and make targeted corrections and improvements to continuously improve the efficiency and level of sports. In addition, scientific comparative analysis of daily training and formal competition sports movements, to a large extent, can cultivate students' good practical combat ability, team cooperation ability, especially to find the lack of movement caused by psychological factors, endurance factors and other problems, so as to guide students to improve their sport skills and constantly adjust themselves to improve their psychological level. It enables them with best sports state, psychological state in the formal competition, to devote to the sports training and competition for achievement of good results and comprehensive development.

4. Conclusion

In summary, in recent years, people pay more and more attention to sports training and sports competition. However, in order to continuously improve the quality and level of sports training, coaches should correctly recognize the importance of sports video analysis platform, and give full play to the role of the platform in the actual sports training process, so that athletes can find gaps and their own deficiencies, grasp the technical essentials, so as to continuously improve the quality and level of
sports training. Based on this, we should pay attention to build a perfect sports training video analysis platform, improve the platform function design, and configure perfect software and hardware equipment, for doing a good job in target tracking model design, and doing a good job in video sports behavior identification, effectively ensure the quality and level of sports video analysis platform.

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