Research on Real-time Tracking and Analysis System for Basketball Video Tactics Formulation and Implementation

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Keywords: Basketball Video Tactics; Implementation Tracking and Analysis; System Design

Abstract: With the continuous development of China's social economy and science and technology, China's sports industry has also ushered in a vigorous development. Currently, sports videos are widely used in sports training and competitions, as are basketball competitions. As early as 2005, Guangdong Hongyuan Club began to use basketball video analysis software to analyze the basketball game. Then the CBA team also introduced basketball video analysis software in the basketball training competition. However, the current basketball video analysis software rarely involves real-time tracking and recognition of tactics. Therefore, in order to make the advantages of basketball video analysis software fully played out, it is necessary to design a system with real-time tracking and analysis functions of basketball video tactics.

1. Introduction

Today, with the rapid development of modern science and technology, more and more modern science and technology have been widely used in the field of sports, which has promoted the rapid development of sports. In today's sports events, not only in the development of sports events and sports competitions, but also in the physiological and biochemical monitoring of athletes, the selection of athletes and the technical and tactical analysis of athletes are inseparable from computer information technology. At present, the intelligent analysis in sports competition is mainly reflected in the two aspects of technical analysis and tactical analysis. The technical analysis is mainly related to individual ability, and the external influence on it is small. The tactical guidance is mainly reflected in the competition method, mainly based on the organization form of the athletes' individual skills and groups. Scientific and reasonable tactics can fully exert the individual skills and specialties of athletes, master the initiative of the game, and improve the winning rate of the game. The game can be seen, it is necessary to strengthen the research on the implementation of tracking and analysis system design for basketball video tactics.

2. Overview of Video Analysis Technology

2.1 The Concept of Video Analysis.

Video analysis technology mainly refers to the analysis of backgrounds and targets in the scene through computer image visual analysis technology, so as to analyze and track the targets appearing in the camera scene. The user can preset different alarm rules for the scenes of different cameras through the video content analysis function, so that if the target in the scene violates the behavior of the preset rules, the system will automatically issue an alarm and monitor the automatic alarm information will pop up in the workstation. The user only needs to click the automatic alarm information to reorganize the alarm scene, and then take corresponding measures to solve it [1].

2.2 Motion Video Analysis Concept.

Motion video analysis mainly refers to the analysis of global motion information and local sports information presented in the video. The technology described and used. It mainly involves image processing.

  DOI: 10.25236/eduer.18.114

3. The Principle and Characteristics of Basketball Video Tactics Real-Time Tracking and Analysis System

The main function of basketball video analysis software is to quantitatively analyze the tactical behaviors in basketball competition through modern computer information technology, and then perform excerpts and statistics on the video, and perform related statistics on the team members and opponents in the basketball competition. Analysis provides a scientific reference for coaches and sports decisions, and enhances the scientific and rationality of basketball tactics, thus effectively improving the level of sports.

The motion video analysis technology mainly improves the coaching level and the athlete's training level by analyzing and comparing the collected digital video [2]. For example, in basketball training, coaches can provide intuitive and convenient video feedback for athletes through sports video analysis software, thus providing an effective platform for technical communication and communication between coaches and athletes. After training, athletes can also use video analysis software to conduct in-depth analysis and comparison of the completion of technical actions. The current motion video analysis software mainly includes the following functions: video contrast playback, motion video panorama synthesis, video manual analysis and plotting, motion video overlay comparison, motion track display and analysis, and human motion pose parameter acquisition. The basketball video tactics real-time tracking and analysis system adds a tactical real-time analysis module based on the motion video analysis software, so as to realize real-time tracking and analysis of basketball in the process of training and competition, and improve the rationality of tactics in basketball competition.

The basketball video tactics real-time tracking and analysis system is mainly for basketball competitions. The system can identify existing tactics and also analyze new tactics. The system mainly realizes the visualization function through virtual reality technology, which is convenient for the coach to crack the opponent's tactics in the process of basketball teaching and competition. This requires the establishment of a tactical database in the design of the system, and then save the common tactics in the current basketball competition to the database, so that in the basketball competition, the system can collect the movement routes and database of the opponents in the field in real time. The tactics are analyzed to identify the most similar tactics. In addition, in the system, it is necessary to design a set of effective defensive formations to disrupt the opponent's offensive rhythm. To put it simply, when there is no matching tactical tactic in the system, that is to say, in the face of a new set of tactics, the system will use the way of the opponent's movement route in this round before the goal. Presented, the coaches can develop corresponding defensive tactics in time for the new tactics, thereby improving the winning rate of the basketball competition.

4. Basketball Video Tactics Real-Time Tracking and Analysis System Design Analysis

The basketball video tactical real-time tracking and analysis system needs to have functions such as data acquisition, tactical recognition, video editing, post-production, and interaction. Therefore, the system not only needs to meet the collation and output of the current game data, but also needs to record, produce and save the game, and also needs to be able to interact with the terminal [3]. When designing the system, it can be divided into four main modules: acquisition and transmission module; acceptance and processing module; tactical identification module; and interaction module.

The module mainly uses digital high-definition industrial-grade webcam and wireless router as the live real-time video capture device, and then uses the bandwidth and notebook computing functions to achieve multi-channel simultaneous acquisition and recording. This requires the notebook to have hardware compression and decompression capabilities, so that all captured video can be processed quickly.

The collection and transmission equipment must be installed on the course. Usually, the cameras are installed on one side of the course and the two bottom lines, and then the three cameras are connected to a higher performance computer. In the middle of the camera must use a high-definition camera (the angle of the lens can not be less than 60 °), and then connected to the computer through

the network cable. Only the standard-definition camera is needed on the bottom line, and then the wireless router is used to receive and transmit information. In this way, a local area network can be formed. The coach only needs to use a terminal such as a computer or a mobile phone to get what he wants to see at any time.

This module is a module in the basketball video tactics real-time tracking and analysis system. The main function of this module is to accept and monitor the multiple video signals in real time, and to effectively solve the problem. After the acquisition and transmission module transmits a plurality of video signals to the receiving module, the module needs to receive and process all the video signals, and the processing module removes the target identification and interference factors in the video, thereby effectively Solve the problem of overlapping multiple targets. Simultaneous shooting of targets from multiple video angles with multiple cameras enables real-time tracking of targets.

As the main way of offline processing of this system, this module must provide import functions of various hardware devices and video files in various formats. This ensures that after the video file is imported, the system can freely control the playback, pause, image capture, fast forward, fast rewind, and video cascade playback of the video file.

The main function of this module is to edit and process the video of the previous basketball competition, which can help the coaches and players better understand the opponent. Therefore, the module also needs to have video file time capture, screenshots, language narration, circle mark, text description editing, editing file analysis and storage, multi-time axis editing and so on. In addition, the system should also be compatible with a variety of common editing file formats, such as: MP4/AVI/RMVB/VOB/FLV/WMV.

This module is the highlight of the basketball video tactics real-time tracking and analysis system, and current motion video analysis software rarely involves real-time tactical analysis. The module is mainly to identify existing tactics and record and match new tactics. After the receiving and processing module identifies and tracks the target, the module needs to extract and depict the moving route of a certain stage of all the targets, which can be reduced to individual sports routes, collective sports pants, and offensive player routes. And let go of the player route. The module mainly matches these routes with the routes in the database, identifies existing tactics, records new tactics, and facilitates coaches to analyze new tactics when the game is over.

The module belongs to a separate system, also known as basketball teaching and training communication system. The main function of this module is to count the data of the game, and it can also be used for basketball teaching and training. The module can record sensitive information and events in the basketball game, such as tactical applications, pitching points and technical applications [4]. The statistician can quickly calculate, analyze and process the data on the court through the control of the computer keyboard + wireless remote control, thus providing a scientific basis for the coach's strategic adjustment.

The interactive content of the module mainly includes the following points: (1) the team's score statistics, shots, field goal percentage, free throws and free throw percentage, turnovers, assists, blocks, steals, fouls, etc.; (2) each The scores of the players, the number of shots, the field goal percentage, the number of free throws and free throw percentage, turnovers, assists, blocks, steals, fouls, etc.; (3) record each player's position and time to obtain more data; (4) Record the time period in which each tactic occurs; (5) the position of our player when the other party obtains the data; (6) the specific operation of the video through the display, the size of the screen can be adjusted according to the actual situation, the user can Operate any position and any time on the court through the mouse and keyboard, and the results of the operation can be directly reflected on the sand table in the background, and the data is stored in the database; (7) the results need to be clearly displayed, The data can be fully displayed in the system.

5. Conclusion

In summary, the current basketball video analysis software has been widely used in basketball training and competition, and various functions are constantly improving and maturing, but the

functions of real design basketball tactics recognition are very few. This paper mainly realizes the tactical image, intuitive and dynamic description through the interactive basketball tactics demonstration system involved in basketball training and teaching. At the same time, it cooperates with the tactical recognition and interaction technology of basketball video tactics real-time tracking and analysis system. The design of basketball video and video tactics real-time tracking and analysis system, applied to the basketball competition, can ensure the rationality and scientificity of basketball tactics, improve the winning rate of basketball competition, and promote the healthy development of sports.

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