Application of Computer Virtual Technology in Basketball Training

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Abstract. With the rapid development of information technology, various industries are facing great opportunities and challenges for upgrading, as is the sports industry. Combining the Internet of things, big data, artificial intelligence, VR/AR, 3D printing with sports products, stadiums and sports services will bring new changes to the sports fitness industry. Computer virtual technology is a new technology produced under the background of the all-round development of science and technology. This technology is mainly composed of sensing technology, computer technology, simulation technology and so on, so as to better simulate the real world. By simulating real vision and various actions, we can deepen the user's understanding of something, feel all kinds of phenomena constructed by the virtual world, strengthen the communication between the user and the virtual environment, and feel more the connotation of the real world[1]. Athletes can interact with their own limbs and environment through computer virtual technology, which is the application of virtual method in real sports training, so that athletes can better exercise their sports skills and improve their sports ability.

Keywords: Virtual Technology, Basketball Training

1. Current problems in basketball training

At present, the field of basketball is mainly based on traditional training methods. In the stage of establishing theoretical cognition, it mainly depends on coach assistance, coach guidance, video animation and PPT, CBT media [1]. Most of these training tools are mainly one-way input, which can not simulate the real training environment and lack of interaction. The learning process mainly depends on students' understanding and memory. Later training tools gradually introduced some interactive functions, but limited by the development of tools and terminal platform function constraints can not generate effective brain feedback and muscle memory, low skill mobility, relatively backward means[2].

2. Computer virtual technology in blue ball training

2.1. Smart basketball

A near field communication (NFC) chip is embedded in the basketball. With the help of this
technology, the ball track and the player's throwing skills can be obtained simply and effectively, so that the player's skills can be fully analyzed. After understanding the player's skills, through the video referee assistant, for the referee to prepare a strong "electronic eye" ability \[3\]. The video playback of the video assistant referee involves four situations: goal, penalty, red card and referee's mistake. The video assistant referee system consists of 33 broadcast cameras scattered at all angles and two special offside cameras. Eight super slow motion cameras and four extremely slow motion cameras are the most scientific and technological parts of the video assistant referee\[4\].

2.2. Digital presentation and tracking system (EPTS)
Since 2015, when the game allows players to use and wear wearable devices on the field, the wearable device, optical tracking technology, GPS equal digital performance and tracking system should record the player's position on the field, track of movement, passing, pressing, speed, personal status and other data by camera, smart device and GPS positioning technology. Transfer to the console and the tablet computer of coach and medical team within 30 seconds at the latest can help coach, medical team and so on to monitor the player's status in real time.

![Figure 1. Principle of virtual technology.](image)

2.3. Athletes' action analysis
In the past training athletes need to master the main points of action often through experienced coaches, while infrared motion capture technology for the traditional experience training provides a strong data support, making the training process more efficient. By capturing and analyzing the action data of the world's top athletes, the trainers can compare and judge the training action gap more accurately, and guide them to correct and optimize it\[5\]. In addition, the coach can compare the difference of the trainees' movements before and after, and select the optimal motion trajectory scheme.

The training time of players and coaches on the field is strictly stipulated in basketball. In the past, players often went back to study with hundreds of pages of tactical map solutions after training. The emergence of VR training system makes players need not read long and boring tactical manuals, can use VR monitors to simulate scene training anytime and anywhere, players and coaches can communicate at any time during training, dissatisfied with a certain part can be studied repeatedly, which greatly improves the efficiency of training. A foreign company named STRIVR has introduced a variety of VR simulation training equipment and content, which can be used for basketball, ice hockey and other sports training. For example, the company has built a basketball simulator that allows fans to experience live basketball games after wearing headgear. At present, three teams have used this technique in training. Attention should be paid to the evaluation of the effect of training in
simulation training, in addition to the use of VR headband for visual simulation, but also in combination with some peripherals, such as the ball frame of basketball, to evaluate the effect of training. In order to adjust the training method in time.

2.4. Application of new technologies

Virtual Point OptiTack techniques play a great role in athletes’ training. In the past, the movement essentials needed by athletes are often obtained by experienced coaches. The Virtual Point movement provides strong data support for traditional empirical training and makes the training process more efficient. By capturing and analyzing the movement data of top athletes, trainers can accurately compare and judge the differences in training movements, correct and optimize them, and reduce bone damage. What is worth mentioning is, with OptiTrack product as the core basketball sports solution Gears Golf, the idold basketball enthusiast likes. a sports capture suit consists of a top, trousers, and a special cap, Marker is sequentially attached to the key bone position point of the dynamic capture suit. OptiTrack the motion capture system combined with the force measuring platform, with the help of motion data calculation and big data analysis system, athletes can also compare the impact on the knee when their heels or toes suddenly change direction to prevent unnecessary bone damage.

![Figure 2. Application of virtual technology in basketball.](image)

2.5. Intelligent stadiums and gymnasiums become the basic supporting equipment of the industry

Sports venues are an important part of the sports industry. The traditional old stadiums generally have the problems of low utilization rate, poor network facilities and single profit model. At present, intelligent stadiums and gymnasiums have become the development direction of the industry. The new stadiums and gymnasiums have embraced information, intelligence and data. In the future, intelligent stadiums and gymnasiums will become the basic matching of the industry[^6].

3. Advantages of virtual technology

The cost of developing a high-level VR training software is not low. Low cost refers to its marginal cost attribute, which is common to any IT product, that is, the first product is expensive, but once a large-scale replication application is carried out, the marginal cost is close to zero. Similar cases include CPU chips, operating systems, software, etc. Even if the system maintenance and service costs are included VR once the system is popularized on a large scale, the cost will be diluted very low. Sports big data auxiliary decision-making will become the focus of future development. At present, it is not difficult to collect the data of sports big data such as exercise length, speed, distance, acceleration, blood pressure, heart rate, brain wave and so on. Various sports App and smart wearable devices provide many data sources[^7]. In the future, sports big data will still play an important role in the sports industry, but the focus will turn to data mining, screening, analysis, integration and deep
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4. Conclusion
The necessity of the application of computer virtual technology in sports training summarizes that some sports have strong physical antagonism, such as taekwondo, boxing and so on. Virtual technology can improve sports skills, correct the non-standard movements in training, and improve the training effect. Computer virtual technology can virtualize sports movements, deal with difficult sports movements flexibly, avoid serious damage to athletes' bodies caused by complex movements, and enable athletes to try all kinds of new movements boldly. The progress of science and technology is deeply transforming our life. The application of frontier science and technology in sports industry will be the trend of the times[9]. In the future, the integration of technology development level and sports application scene will reshape the Internet sports industry.

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