Application of Video Recognition Technology in Sports Stunt Teaching

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Abstract. In recent years, with the rapid development of sports in our country, the national importance of sports is also increasing. In order to further improve the level of physical education in our country, we began to pay attention to the teaching of physical stunt. Sports stunt is difficult and dangerous. These characteristics determine that sports stunt teaching should improve teaching efficiency as much as possible. Therefore, the decomposition and identification of sports stunt is particularly important. The traditional sports stunt teaching can not identify the movements accurately, which brings some difficulties to the sports stunt teaching. Video recognition technology provides a new means for the teaching of physical stunt and greatly improves the teaching effect. This paper first gives an overview of video recognition and sports stunt, analyzes the advantages of video recognition technology in sports stunt teaching, and analyzes its feasibility based on data feature screening algorithm. It not only promotes the further integration of video recognition technology and teaching, but also deepens the research on this aspect.

Keywords: Video Recognition, Sports Stunt, Teaching Application, Data Feature Screening

1. Introduction
Since the founding of the People's Republic of China, due to the low attention paid to physical education in China, the application of science and technology in physical education is far lower than other disciplines [1]. The judgment of teachers or coaches on the actual sports skills of students and athletes is mainly based on the subjective judgment of personal experience, so there is often a large error in judgment, which makes the effect of physical education teaching not reach the ideal effect [2-3]. With the development of national sports in recent years, in order to pursue a higher level of physical education, the training and teaching of sports stunts have been increased, which makes physical education teaching more difficult [4]. The traditional artificial technical judgment is unable to adapt to the difficult sports stunt teaching, and the teaching effect is greatly reduced, so the reform of physical education is imperative [5]. The development of information technology provides a good support for the reform of physical education. In recent years, with the continuous development of information technology, video recognition technology began to appear, and as the technology
continues to mature and gradually applied to various fields, the application of video recognition technology is also gradually extended to the teaching of sports stunt [6-7]. Video recognition technology can accurately identify and judge through advanced image data extraction and comparison technology, which is exactly in line with the difficulties in sports stunt teaching, so it is gradually popularized in sports stunt teaching [8-9].

At present, scholars at home and abroad have conducted relevant researches on video recognition technology and sports stunt teaching, but these researches are all independent researches on the two. Research on the application of video recognition technology mainly focuses on various monitoring fields and related intelligent management fields [10-11]. However, there are very few related applied researches involved in physical education, which do not combine video recognition research with sports stunt teaching, but are isolated from the connection between the two. Therefore, from this perspective, there is still a large room for improvement in this research [12-13].

In order to make the related research deeper, this paper links the video recognition technology with the sports stunt teaching and carries out the related research. This article first on video recognition associated with sports stunts, analyzes the video recognition technology in the teaching of sports stunts application, advantages and application status and the data feature selection algorithm on the basis of the feasibility has carried on the detailed analysis, validate the video identification technology application in the sports teaching stunts make has higher feasibility [14-15]. On the one hand, it is beneficial to promote the deep integration of video recognition and sports stunt teaching; On the other hand, it also provides a certain theoretical basis for future research.

2. Method

2.1 Video Recognition and Sports Stunt

Video recognition technology is using in the video frame by frame of the image recognition, the image of each frame image feature extraction and analysis, and then put the data stored in the server compared with the data of image features extraction, by comparing the characteristics of the data and uniqueness, so as to achieve accurate identification and assessment of the effect of video. Sports stunts mainly refer to the difficult and dangerous sports movements in various sports events. The whole system of video recognition works around the video recognition server. The video recognition technology system is mainly composed of hardware and software, including intelligent video recognition server, front-end data collector, terminal display and centralized display platform. The hardware core of the video recognition technology system is the intelligent video recognition server, which is mainly used to receive the collected data, obtain the analysis results by means of data comparison, and present the results. The front-end data collector mainly consists of two parts: face acquisition and action acquisition. The main function is to collect the characteristic data of face and sports skill movements, so as to realize accurate judgment of the characteristic data. The terminal display and centralized display platform are responsible for the display of judgment results. When the identified sports stunts do not match the stored data of the server, they can be found in time and send relevant signals. The software of the intelligent video recognition technology system mainly includes the following parts: center recognition, data collection and screen display. The main function of the software is to conduct data matching, transmission and storage of sports special actions, and real-time monitoring of relevant pictures.

2.2 Data Feature Filtering Algorithm

In the process of identifying sports stunts, a large amount of feature data will be generated, but not all feature data have value, and complex information will be generated in the feature data, which will interfere with the effective feature data and affect the result of video recognition. At the same time, if the feature data is too much, it will cause server processing difficulties, thus affecting the real-time recognition of sports stunt, so it is necessary to screen the collected data features. N sports stunt video data features are collected and processed to form the data feature vector. The vector expression is as
follows:

\[ X = [x_1, x_2, ..., x_m]^T \quad \text{and} \quad Y = [y_1, y_2, ..., y_n]^T \]  \hspace{1cm} (1)

Where X represents the feature vector of sports stunt data; Y represents the category of sports stunt video corresponding to the feature vector. The two together constitute the learning samples of sports stunt video, which is an important tool for teaching. Then, the video recognition results are analyzed and counted, and the impact degree of the feature data is calculated. The specific calculation results are as follows:

\[ MIV_i = \frac{1}{m} \sum_{j=1}^{m} IV(f), i = 1, 2, 3...n \]  \hspace{1cm} (2)

Where I represents the ith data feature vector, which represents the contribution rate of each data feature to sports stunt video recognition. The final MIV results are sorted from large to small. The smaller the MIV value is, the smaller the contribution rate of the characteristic data is, and the more complex information in the characteristic data can be screened out.

3. Feasibility Experiment of the Application of Video Recognition in Sports Stunt Teaching

In order to verify the feasibility of the application of video recognition technology in sports stunt teaching, it is necessary to judge by its specific application effect. Therefore, this paper conducts an experiment on the feasibility of the application of video recognition in sports stunt teaching. In this paper, the Matlab 2012 toolbox is used for simulation experiments. Basketball, football, table tennis, badminton and volleyball are taken as the main objects of experiments. There are 10 training sets for sports stunt video recognition and 10 verification sets.

The first is the screening of data features. By referring to relevant materials and combining the main characteristics of sports special effects, the first eight data features are decided to be retained with the help of the above data feature screening algorithm after comprehensive consideration. Secondly, in order to increase the persuasiveness of the video recognition results under the data feature screening algorithm, the recognition accuracy of the training set and the verification set was verified by referring to the sports stunt video recognition results in relevant literature. Finally, the training time and the verification of recognition time, which is an important indicator to measure the video recognition effect. In sports stunt teaching, it is necessary to give timely feedback on students’ learning effect. If the recognition time is not timely and fast enough, the feedback effect will be affected.

4. Discuss

4.1 Advantages of Video Recognition in Sports Stunt Teaching

Sports stunts video identification process is relatively comprehensive, covering video image data acquisition, data feature extraction and feature classification and recognition and other various aspects, these processes have important influence on sports teaching stunts, largely highlights the video identify in the athletic stunts teaching application advantages, its advantage mainly displays in the following aspects: first, the video recognition technology in the athletic stunts teaching application, able to quickly solve the stunts and break through the sports teaching and training key points and difficulties existing in the technology. Teachers can accurately and timely grasp the shortcomings of students in stunt learning, and on the basis of the server database for scientific and accurate guidance of existing problems, so that students can quickly grasp the key points of action, improve the effect of physical education; Second, the application of video recognition technology in the teaching of sports special movements has realized the integration of sports and information technology, which is not only conducive to the reform of sports teaching methods, but also can effectively explore a variety of teaching resources, so that students can acquire more comprehensive sports knowledge. At the same time, with the help of the data storage function in video recognition technology, the classroom
capacity and information degree can be improved, reducing the difficulty of sports stunt teaching. Thirdly, with the advanced technology of video recognition, teachers can present some combination of sports techniques and technical movements with high difficulty coefficient in front of students, so that students can analyze and compare, propose and solve problems, which can greatly improve students' ability of technical movements.

4.2 Feasibility Analysis of the Application of Video Recognition in Sports Stunt Teaching

Through the above experiments, we can draw a conclusion: the application of video recognition in sports stunt teaching is completely feasible, and the above data feature screening algorithm greatly reduces the time of video recognition, which verifies the reliability of the algorithm in this paper. The specific experimental data are shown in table 1, figure 1 and figure 2. The data in the chart is the result of the author's experimental arrangement.

### Table 1. MIV data results

| Serial Number | Characteristic                      | MIV       |
|---------------|------------------------------------|-----------|
| 1             | The G component of Ei              | 0.026 7   |
| 2             | Sigma I of the G component         | 0.014 5   |
| 3             | R component sigma I                | 0.007 6   |
| 4             | B component sigma I                | 0.006 9   |
| 5             | The R component of Ei              | 0.006 8   |
| 6             | The value of the ENT               | 0.005 4   |
| 7             | B component of Ei                  | 0.004 3   |
| 8             | CON's average                      | 0.003 4   |
| 9             | ASM standard deviation             | 0.003 2   |
| 10            | Standard deviation of COR          | 0.002 4   |
| 11            | Standard deviation of ENT          | 0.001 5   |
| 12            | ASM average                        | 0.000 4   |

*Data came from the in-depth analysis of financial data in the experiment*

![Figure 1. Comparison of recognition accuracy of sports stunt video](image-url)
From figure 1 can see, in this paper, under the algorithm of sports stunts video identification accuracy than other resources for sports stunts video recognition accuracy is higher, the precision reached 98.27%, suggesting that video identification can carry on the correct judgment to the athletic stunts and classified, the ultimate effect of video identification is more ideal. As can be seen from figure 2, the video recognition time under the data-feature-based filtering algorithm is shortened and the result recognition speed is faster, which also verifies the superiority of the data filtering algorithm. To sum up, it is completely feasible to apply video recognition to sports stunt teaching.

5. Conclusion
Sports stunt teaching is difficult, especially in the stunt decomposition is more difficult to grasp. Video recognition technology can realize the recognition and decomposition of sports stunts, analyze and compare the results of stunts learning and server data, and get more accurate recognition results. According to the shortcomings of the recognition results, teaching guidance can improve the teaching and learning effect. Therefore, video recognition has a very broad application prospect in sports stunt teaching.

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