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Retraction

Retracted: Design and Analysis of Interactive Multimedia Online Physical Education Platform considering Moving Object Segmentation Algorithm

Advances in Multimedia

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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[1] Y. Hu, J. Zhou, and B. Gao, "Design and Analysis of Interactive Multimedia Online Physical Education Platform considering Moving Object Segmentation Algorithm," *Advances in Multimedia*, vol. 2021, Article ID 1220512, 7 pages, 2021.

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Research Article

Design and Analysis of Interactive Multimedia Online Physical Education Platform considering Moving Object Segmentation Algorithm

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With the development of Internet technology, Internet plus education has become a new mode of changing traditional education methods. Therefore, online physical education has attracted more and more attention. This paper introduces the sports object segmentation algorithm, designs an interactive multimedia online sports education platform by combining the research needs of sports online education platform, and analyzes online sports education from three aspects, sports teaching management, sports teaching resources, and sunshine sports activities, in order to improve the quality of sports education and improve students' learning interest. Simulation results show that the algorithm is effective and can support the analysis of interactive multimedia online physical education platform.

1. Introduction

With the continuous development of social economy, education, as a millennium plan, has attracted more and more attention. The development of information technology has spawned the development and perfection of "Internet plus" education [1–3]. As a basic course aimed at improving students' physical quality and physical fitness, physical education has not been paid much attention by schools and parents, but physical quality comes first. Therefore, physical education is gradually loved by more and more students and parents, such as swimming, table tennis, badminton, track, and field sports [4–6].

In order to better carry out the sports information construction, industry scholars have introduced various technologies to build the sports education platform, which is mainly used for sports resources, sports information, sports teaching content, and student and teacher management, and further standardize the sports teaching process [7, 8]. For example, streaming media technology is introduced to integrate long-distance sports resources and solve the transmission of large-capacity resources in colleges and universities so that students can access online resources remotely. In addition, they can repeatedly view video teaching according to the existing classic lecture videos, so as to realize necessary preview and review so that students can understand the corresponding sports knowledge in continuous learning, Especially, for interested courses or knowledge points, at the same time, this online learning method can make up for some shortcomings in the class. However, it should be noted that these remote online video courses often lack the necessary interaction between students and teachers and may not be able to answer students' doubts effectively and in time. In addition, due to the limited information displayed, teachers who need video recording can record the necessary teaching content within the specified time within the necessary time, so as to achieve better teaching effect [9–13].

In view of the above limitations and needs, this paper attempts to introduce the moving object segmentation

algorithm, sort out the needs and daily logic of physical education teaching through the particularity of physical education teaching, design and build an interactive multimedia online physical education platform, integrate online sports video and audio resources, and increase the interaction with students and teachers, which can meet the needs of students' interaction while learning, The purpose is to explore a new model of educational informatization and lay a foundation for improving the quality of physical education.

2. Moving Object Segmentation Algorithm

2.1. Motion Vector Preprocessing. For the moving object segmentation algorithm, firstly, it is necessary to preprocess the motion vector, normalize the obtained video, set the corresponding processing window, remove the video noise by using the vector filtering method, and distinguish the corresponding motion differences [14–16]. For filtering by using the corresponding processing window, the difference degree of each video sample needs to be calculated. The specific calculation formula is shown formulas follows:

$$d_i = \sum_{i=1}^{N} \left\| v_i - v_j \right\|_L, \quad i = 1, 2, \ldots, N. \tag{1}$$

The motion vector of the processing window is represented by v_i and v_j. The distance is expressed in L, and the sorted results can be calculated by

$$v_{\text{out}} = \begin{cases} v_{(N+1)/2}, & \text{cor}\left(v_{(N+1)/2}, v\right) > p, \\ v_1, & \text{others}, \end{cases} \tag{2}$$

where $\text{cor}(v_{(N+1)/2}, v) = (\|v_{(N+1)/2}, v\| / (\|v_{(N+1)/2}\| \|v\|))$, v is the average vector, and p is the preset threshold.

2.2. Global Motion Compensation. On the basis of motion vector processing, global motion compensation is carried out, that is, residual motion compensation is carried out for the accumulated motion field, and the global motion compensation model is constructed by using the corresponding motion model [17–20]. This paper attempts to use the affine model, that is, not only to optimize the spatial distribution of video images but also to optimize the distribution of time axis of image frames in long-time series. For the actual moving object, it is difficult to capture it directly. It is necessary to set a certain threshold and set the affine parameter M. The specific calculation is shown formulas follows:

$$m = [m_1, m_2, m_3, m_4, m_5, m_6]. \tag{3}$$

If there are t time frames in the time series, a corresponding one-to-one affine correspondence can be established for the specific coordinates to be converted into affine coordinates, which can be calculated and expressed by

$$\begin{aligned} x' &= m_1 + m_2 x + m_3 x, \\ y' &= m_4 + m_5 y + m_6 y. \end{aligned} \tag{4}$$

Therefore, the motion vector $v(x, y)$ is obtained:

$$v(x, y) = (x' - x, y' - y). \tag{5}$$

Explicit definition of weighting function $w(n)$ can be expressed by

$$w(n) = \begin{cases} 1 - \dfrac{\varphi(n)^2}{\left(\mu_\varphi + 2\sigma_\varphi\right)^2}, & \varphi(n) < \mu_\varphi + 2\sigma_\varphi, \\ 0, & \varphi(n) \geq \mu_\varphi + 2\sigma_\varphi, \end{cases}$$

$$\text{cor}\left(v_{(N+1)/2}, v\right) = \frac{\left\|v_{(N+1)/2}, v\right\|}{\left\|v_{(N+1)/2}\right\| \|v\|}. \tag{6}$$

For the multimedia video, the modeling operation can be carried out first. After the motion vector preprocessing, the global motion compensation is carried out to reduce the impact of noise, and the motion vector block is obtained. Finally, the specific segmentation of the moving object is carried out by using the corresponding function. The segmentation process is shown in Figure 1.

3. Overall Design of College Physical Education Information Teaching Platform

3.1. Platform Technology Architecture. In the current platform construction, the more common modes are mainly divided into two types. One is the B/S mode running on the network end, which needs the support of the network (including the corresponding software and hardware equipment environment), and the other is the C/S mode running on the single machine end, which does not need the network and is directly deployed. Compared with the C/S mode, the B/S mode is easy to deploy and remote maintenance. It has better advantages for secondary development, expansion compatibility, and data update. Therefore, the B/S mode is more common. In addition, the B/S mode can be used directly without installing relevant plug-ins.

By comprehensively comparing the requirements of B/s and C/S modes and interactive multimedia online physical education platform, this paper adopts the B/S mode to construct the platform, mainly including application layer, data layer, and logic layer, as shown in Figure 2.

3.2. Overall Structure of the Platform. Based on the technical architecture of the platform, relevant subplatforms are designed according to the needs of the interactive multimedia online physical education platform, which are mainly divided into three subplatforms: teaching management, teaching resources, and sports activity management, as shown in Figure 3.

3.2.1. Introduction to the Structure and Function of College Physical Education Teaching Management Subplatform System. For the teaching management subplatform, it

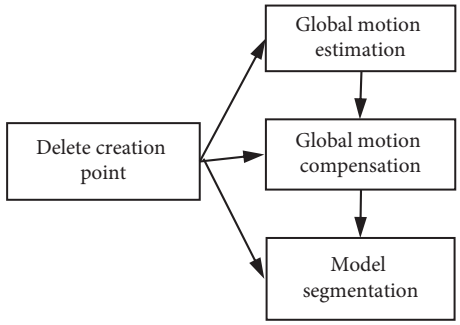

Figure 1: Method flowchart.

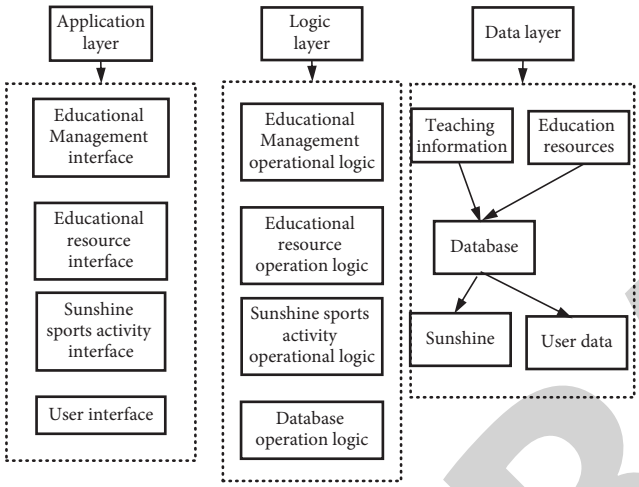

Figure 2: Overall structure diagram of college sports information teaching platform.

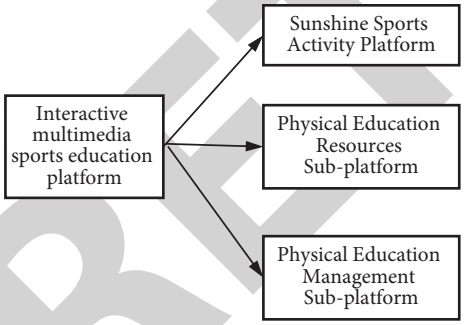

Figure 3: Overall architecture diagram of college sports information teaching platform.

mainly covers the corresponding physical education teaching management, including performance management, health test, course selection, teacher evaluation, examination, competition, and other contents, as shown in Figure 4.

On the one hand, the teaching management subplatform can analyze, count, and mine the students' physical examination results and analyze the corresponding weak links, such as the 1000 m long-distance running test. Students can carry out targeted training and improvement according to their own weaknesses; especially, according to the moving object segmentation algorithm, they can extract the

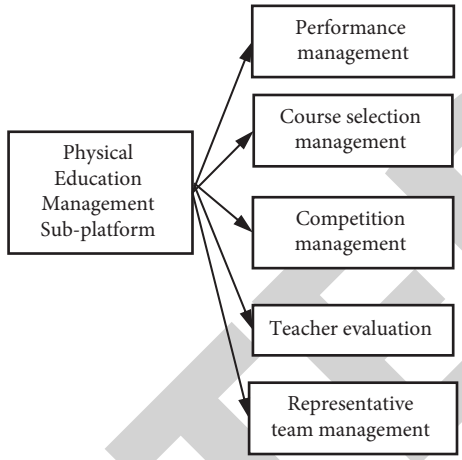

Figure 4: Framework of physical education teaching management subplatform (some modules).

deficiencies or inadequate training in the process of sports, and students can correct the deviation automatically by themselves.

Course selection allows students to understand the specific content of the course, the teacher, and the intensity of the course according to their corresponding interests.

Teacher evaluation allows students to participate in the specific evaluation of teachers, that is, an objective evaluation of the shortcomings and specialties of teachers.

The test allows students to conduct corresponding theoretical tests, such as judging whether they meet relevant specifications and whether the actions are in place according to the corresponding results obtained by the moving object segmentation algorithm.

The competition allows students to register online, such as marathon, and query their scores.

3.2.2. Introduction to the Structure and Function of College Physical Education Teaching Resources Subplatform System. For the teaching resource subplatform, it mainly manages the online teaching resources of physical education, including high-quality courses, video resources, courseware resources, network resources, and interactive sections, as shown in Figure 5.

Physical education teaching resources are constantly enriched and updated. There are not only teaching videos of teachers but also excellent course resources shared on the online Internet. Students can not only access the platform to obtain the resources of teachers but also ask other network resources remotely. On this basis, teachers can try to establish communication with students according to their needs, so as to realize the exchange of learning among students, teachers, and teachers and students, the answers to difficulties and key points, the sharing of experience, etc.

3.2.3. Introduction to the System Structure and Function of Sunshine Sports Subplatform in Colleges and Universities. For the sports activity subplatform, it mainly manages daily sports activities, mainly including physical fitness test, sports

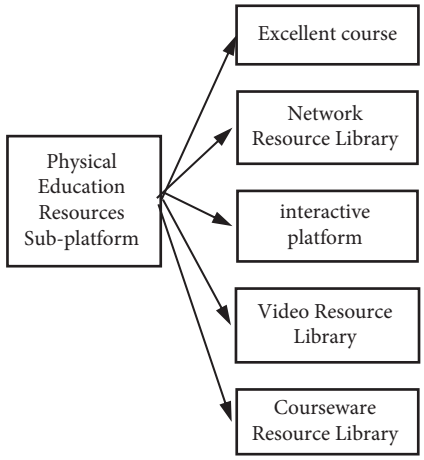

Figure 5: Framework of college physical education teaching resource subplatform.

activities, league activities, and sports competitions, as shown in Figure 6.

According to the corresponding sports activity platform, students can check their weaknesses according to the daily physical fitness test, consult relevant teachers for correction, perfect sports methods, and precautions for exercise, etc.

In addition to the large subplatform, there are other daily management modules including

(1) User Management Module. The so-called user management module is the management for teachers, students, and managers. It is used to realize the identity authentication of the platform. The administrator is the operator of the platform, mainly to ensure the daily permission of the platform, set permissions, resource construction, etc. Teachers carry out interactive multimedia resource construction and students' performance and daily management according to their needs. Students share the resources of the platform and participate in the sharing of the platform.

(2) Teaching Resource Management Module. The teaching resource management module is SOA oriented. The administrator manages the online physical education resources (modify or delete, etc.) through network transmission.

(3) Design of Teaching Video Information Display Module. For the teaching video information display module, it provides teaching video for ordinary students, and students can read the corresponding resources through the platform.

(4) Interactive Multimedia Teaching Resource Synchronization Module. For the interactive multimedia teaching resource synchronization module, it is to broadcast the physical education resources and teaching process synchronously in combination with the teaching video information so that students can learn synchronously in combination with relevant teaching resources while watching the teaching video information, as shown in Figure 7.

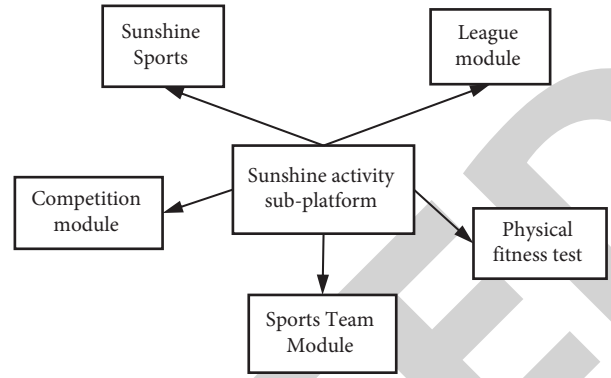

Figure 6: Framework of sunshine sports subplatform.

4. Platform Implementation and Analysis

4.1. Server Settings. Basic settings of the streaming media server: first, the helix server administrator (usually on the desktop) enters the management page.

On the basis of setting the number of client connections, the corresponding mount point is also set.

4.2. Application End Design. The application end is the end that users face directly. The interface design is very important. A good interface can make users feel happy and learn better. The teaching video information and multimedia teaching resource information are displayed in the form of embedded playback. The page embedded real player is used to play the streaming media information. The code is as follows:

```
<object classid = clsid:CFCDAA03- 8BE4- 11cf- B84B-
0020AFBBCCFA height = 60 id = video1 style = LEFT:
0px; TOP:0px width = 209>
<param name = _ExtentX value = 5530>
<param name = _ExtentY value = 1588>
<param name = AUTOSTART value = 1>
<param name = SHUFFLE value = 0>
<param name = PREFETCH value = 0>
<param name = NOLABELS value = 0>
<param name = SRC value = RM.RAM.RA Wait for the
absolute address of the music file>
<param name = CONTROLS value = StatusBar,
ControlPanel>
<param name = CONSOLE value = RAPLAYER>
<param name = LOOP value = 0>
<param name = NUMLOOP value = 0>
<param name = CENTER value = 0>
<param name = MAINTAINASPECT value = 0>
<param name = BACKGROUNDCOLOR
value = #000000>
</object>
```

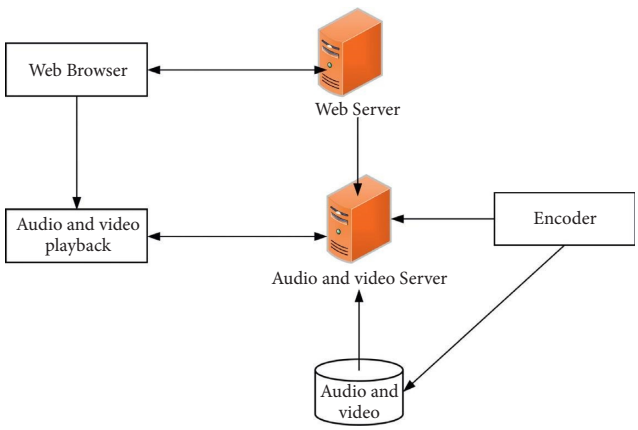

Figure 7: Platform logic.

4.3. Synchronous Design of Multimedia Teaching Resources. The synchronous play of multimedia teaching resources and teaching video information is mainly realized by SMIL language programming.

The synchronous multimedia courseware made with SMIL language is played with RealPlayer. The code implementation is as follows:

```
<? xml: namespace ns = "rn" prefix = "rn"?>
<smil>
<head>
<meta name = "title" content = "computer network"/>
<layout>
<root-layout height = "407" width = "626"/>
<region id = "bgimage" left = "0" top = "0" height = "407" width = "626" z-index = "0"/>
<region id = "video" left = "15" top = "4" height = "170" width = "195" z-index = "1"/>
<region id = "bar" left = "14" top = "218" height = "170" width = "186" z-index = "1"/>
<region id = "chapter" left = "237" top = "15" height = "20" width = "360" z-index = "1"/>
<region id = "content" left = "237" top = "75" height = "280" width = "354" z-index = "1"/>
<region id = "time" left = "410" top = "372" height = "12" width = "185" z-index = "1"/>
</layout>
</head>
<body>
<par>
<video src = "video/video1.rm" region = "video" repeat = "2" fill = "freeze"/>
<audio src = "video/audio1.rm" region = "video" fill = "freeze"/>
<text id = "content-id" src = "content/content1.rt" region = "content" fill = "freeze"/>
<text id = "chapter-id" src = "chapter/chapter1.rt" region = "chapter" fill = "freeze"/>
<text id = "bar-id" src = "bar/bar1.rt" region = "bar" fill = "freeze"/>
<text id = "time-id" src = "time/time1.rt" region = "time" fill = "freeze"/>
<img src = "images/bg.rp" region = "bgimage" fill = "freeze"/>
<anchor href = "command: play()" coords = "44, 174, 60, 190"/>
<anchor href = "command: pause()" coords = "98, 174, 114, 190"/>
<anchor href = "command: stop()" coords = "71, 174, 87, 190"/>
<anchor href = "chapter0.smi" coords = "124, 174, 140, 190"/>
<anchor href = "chapter2.smi" coords = "151, 174, 167, 190"/>
</img>
</par>
</body>
</smil>
```

As shown in Figure 8, from the segmentation effect, the moving object segmentation algorithm can effectively remove noise and achieve better segmentation.

5. Key Technology

5.1. Automatic Question Answering Technology. The so-called automatic answer technology or method is to timely and effectively answer the questions raised by each student and give the corresponding results.

The question bank in the server is used to cooperate with teachers to realize automatic answer. The specific method is that when a question occurs, the server finds the standard answer from the answer database and transmits it to the teacher machine and the student machine, respectively. If the teacher feels that the answer is inappropriate, he can send the correct answer to the student machine or store it in the question bank. With the expansion of the question bank, the server can automatically answer more questions, which is not only more beneficial to students but also further reduces the burden on teachers.

5.2. Concurrent Processing Technology. In the real-time duplex interaction between teachers and students, electronic whiteboard is one of the important media for teachers and students to communicate with each other. In the case of one to many between teachers and students, if we want to realize the collaborative work of shared electronic whiteboard, there will be concurrency, and conflict is inevitable. In class discussion, it often happens that two people ask questions at the same time, which is an example of concurrency. Concurrent processing is mainly to reduce the operation conflict under the condition of multiple requests.

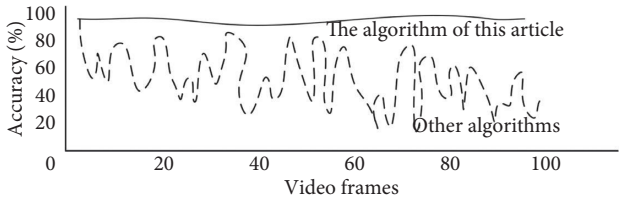

Figure 8: Simulation results of platform segmentation.

6. Conclusions

With the continuous development and improvement of multimedia technology, the introduction of interactive multimedia technology into online physical education has become a new mode of Internet plus physical education. This study introduces the sports object segmentation algorithm, designs and constructs an interactive multimedia online physical education platform by combining the needs and related logic of online physical education, manages the online physical education platform from three aspects of teaching management, resource management and sports activities, realizes the sharing of online physical education resources, tries to explore the informatization of physical education, and promotes the continuous development of the teaching quality of physical education. Simulation results show that the moving object segmentation algorithm is effective and can better support the design and analysis of interactive multimedia online physical education platform.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

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