

Retraction

Retracted: Computer Aided Teaching System Based on Artificial Intelligence in Football Teaching and Training

Mobile Information Systems

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1].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.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

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] D. Li and J. Zhang, "Computer Aided Teaching System Based on Artificial Intelligence in Football Teaching and Training," *Mobile Information Systems*, vol. 2021, Article ID 9562782, 10 pages, 2021.

Research Article

Computer Aided Teaching System Based on Artificial Intelligence in Football Teaching and Training

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As the world's largest sport, football has affected a wide area and a large number of participants and had a great impact on political economy and culture, which has become the best embodiment of the social function of football. Throughout the experience of football in developed countries in the world, the stable development of youth football is the best way to improve the level of football in a country, and the Chinese Football Association has invested more energy in professional leagues and national teams. The development of youth campus football is basically in a state of no management. Therefore, people gradually realize the concept that "football should serve education." In order to solve the problem of football players' lack of exercise in multiple subjects, it is particularly important to design systems and make plans for their respective physical characteristics. After the failure of various important competitions, the Chinese national football team reflected on the specific factors of backwardness. Under today's system, no one manages the specific development of youth campus football. Especially for young people, training programs that adapt to their individual characteristics should be formulated according to their growth stage and physical characteristics. It can effectively improve the efficiency of football teaching and training (FTT) by managing football players' training information and coaches' teaching information in an intelligent and informatized way. The different sports in which athletes participate in training are identified through the motion recognition layer. The data generated during the entire exercise process, including exercise time, number of exercises, score settlement, and other data, are stored, and the data are finally uploaded to the server, to carry out scientific analysis and management and generate sports training prescriptions in line with their own characteristics. This paper proposes research methods based on the intelligent integrated system of FTT, including literature retrieval, questionnaire survey, training empirical method, comparative analysis method, interview method, and support vector machine model for action recognition, which are used in football teaching and the design experiment of the intelligent integrated system for training; the overall architecture design of the football teaching intelligent integration system and the specific design of the football teaching intelligent integration system are proposed. The experimental results of this article show that 90.70% of players like the teaching mode of intelligent FTT, and the intelligent FTT system can help improve the enthusiasm of players in training and learning.

1. Introduction

Taking the training and development of young students' "lifelong sports" as the top priority marks that school physical education in China has become the most important position to create a "lifelong sports society." However, at present, there are many problems in the "school sports project" in China. Therefore, how to develop and reform the "school sports engineering" under the concept of "lifelong sports" or how to better form students' lifelong sports

consciousness and concept through a certain sport, has become one of the important research topics today. With the continuous development and growth of football, fans have more and more expectations for watching more exciting football matches. This requires football players to continuously improve their own quality and also requires football coaches to be more scientific and systematically train players. At present, the development of football players in the world is becoming more and more comprehensive in technology. In the rapidly changing game situation on the

field, players may be required to make flexible position changes, which requires players to have good physical fitness and physical fitness. The training subjects of traditional football players are relatively single, focusing mainly on speed or strength training. Long-term continuous training in one aspect may damage the player's physical function, and the improvement of their performance may not achieve the most efficient goal. At present, computer platforms have been popularized in various universities, and most of them have established multimedia computer rooms to teach students, especially in many science and technology colleges, especially for practical operation application disciplines. The software and hardware environment is crucial to the realization of this teaching mode.

In order to rationally and scientifically evaluate the correctness of sports actions and improve the accuracy and scientificity of player training, how to improve its theoretical research and apply it to athletes' training guidance has become a frontier subject that urgently needs research and development. The establishment of an intelligent integrated system is essential for FTT. The integrated intelligent FTT system for football players established by network and other related technologies can manage the personal information of players and manage the teaching information of coaches. For players, football training can improve their skills and active mood, and for communication, it can promote better communication between coaches and athletes' families.

The Barquero-Ruiz C survey found that many young players withdrew from the well-organized football team. In order to verify, Barquero-Ruiz C recruited 20 players under the age of 11 and 2 coaches from 17 clubs. It adopts a multimethod pretest and posttest design, using performance evaluation tools, entertainment, and physical activity scales, as well as players and coaches. There were two focus groups to collect data. Taking into account the reasons why some young players withdraw from the football team, from overemphasizing technical execution, low success rate of goal defense, and lack of autonomy and motivation of players, it is necessary to design an intelligent method for organized youth football teaching FTT system. This research has low reference and lacks experimental explanation [1]. The purpose of this research by Alba Práxedes Pizarro is to question the decision and execution of football and analyze the effects of the comprehensive teaching plan. Intervention procedures were applied in 21 training courses, which were based on teaching games to understand the model, and included in the modification to ask questions in the postgame environment. Alba Práxedes Pizarro conducted an experimental study over a period of 18 weeks, using 18 male football players. 1,532 movements (1120 passes and 412 dribbles) were observed. Compared with the control group, the participants in the experimental group showed better decision-making ability in passing and dribbling after applying the intervention procedure and showed better execution ability in passing. These results indicate that the transformation of an intelligent football training system must be considered to promote the improvement of football players' training and tactics. The research is not practical [2]. Wang et al. believe that existing convolutional neural network (CNN) based action recognition methods have limitations in space or

time, so they proposed a time-space convolutional neural network architecture. The lack of training samples introduces a data enhancement scheme. The process of this method is relatively complicated, which is not conducive to popularization in practice [3].

At present, in China's colleges and universities have more or less used computer means to assist teaching to improve the quality of teaching, but the current main teaching mode is still relatively single. Sampling survey result reaction, the education mode in the form of projection equipment, and slide teaching content is still the mainstream of multimedia teaching mode. This way requires funds to invest the preparation of projection equipment, which brings relatively heavy purchase costs to the school. Compared with the traditional chalk board book, it also brings difficulty for some teachers to prepare lessons, and the teaching effect in class is uneven. In addition, the teaching system using screen sharing environment is also applied in many schools, but from the survey statistics, the function is relatively single. The innovations of this paper are (1) proposing the use of support vector machine model for action recognition, which is helpful for players to train; (2) designing the overall architecture of the FTT intelligent integrated system; (3) conducting football teaching with the specific design of the intelligent integrated system for training and training; (4) designing the human-computer interaction interface and main technical architecture.

2. Research Method Based on Intelligent Integrated System of FTT

2.1. Related Research Methods

(1) Document retrieval method

Retrieve a large number of literature materials and classify, summarize, and analyze them, for the study of football intelligent teaching [4].

(2) Questionnaire survey method

According to the purpose and significance of the research, consulting the relevant literature of the intelligent integrated system for FTT, consulting relevant experts and teachers, and designing student questionnaires to understand the basic situation of students are done, so as to conduct FTT in a targeted manner [5].

Questionnaires are issued to football players or learners. The questionnaires are divided into two parts before and after the implementation of the intelligent FTT system. The preimplementation questionnaire mainly asked questions from the players' or learners' mobile terminal equipment holdings, practice habits, and online uploads and downloads; the postimplementation questionnaire was mainly from the teaching effect of the application of the intelligent football teaching system, athletes, or learning. Investigators' satisfaction with the intelligent teaching training model and other feedbacks were investigated [6, 7].

(3) Training empirical method

According to the situation of the athletes or learners, a new intelligent FTT system is adopted for FTT [8]. The teaching experiment time is from March 2020 to September 2020, training 4 times a week, and each training is 3 hours [9, 10].

(4) Comparative analysis method

Training practice research was used, and the relevant data before and after training were compared and analyzed [11].

(5) Interview method

In the form of visits, telephone calls, emails, etc., online training teachers, relevant experts, and scholars are consulted and interviewed, and some basic training methods, the selection of training indicators, and the reliability and validity test of training practices are also consulted [12, 13]. Solicit and carefully listen to their opinions and suggestions [14].

2.2. Use Support Vector Machine Model for Action Recognition. $A = \{(c_1, d_1), (c_2, d_2), \dots, (c_m, d_m)\}$, $d_i \in \{-1, 1\}$. As follows [15, 16]:

$$\begin{aligned} W^T x + b &= 0, \\ y_i [W^T x_i + b] &\geq 1, i = 1, 2, \dots, m. \end{aligned} \quad (1)$$

At this time, the optimal surface problem can be transformed into a constrained minimization $E^T \cdot E$ problem [17]. In order to solve the following problem [18, 19]:

$$L(W, b, a) = \frac{1}{2} (W^T \cdot W) - \sum_{i=1}^m a_i [y_i (W^T \cdot x_i + b) - 1], \quad (2)$$

respectively, find the first-order partial derivatives of $L(W, b, a)$ with respect to W and b , and set them equal to zero, and obtain the Lagrangian coefficient a_i and the hyperplane normal vector satisfying the conditions [20]

$$\begin{aligned} \sum_{i=1}^m a_i y_i &= 0, \quad a_i \geq 0, \quad i = 1, 2, \dots, m, \\ W &= \sum_{i=1}^m a_i y_i x_i. \end{aligned} \quad (3)$$

Through formula conversion and substitution [21], the maximum objective function value can be obtained:

$$Q(a) = \sum_{i=1}^m a_i - \frac{1}{2} \sum_{i,j=1}^m a_i a_j y_i y_j (x_i^T x_j). \quad (4)$$

After optimization:

$$a_i^* [y_i (W^T \cdot x_i + b) - 1] = 0, \quad i = 1, 2, \dots, m. \quad (5)$$

The model complexity of the support vector machine is determined by the number of support vectors, and the optimal classification function obtained after the solution is [22]

$$f^*(x) = \text{sgn} \left(\sum_{i=1}^m a_i^* y_i (x_i \cdot x) + b^* \right), \quad (6)$$

$$f^*(x) = \text{sgn} \left(\sum_{i=1}^N a_i^* y_i \cdot K(x_i, x) + b \right). \quad (7)$$

The $K(x, y)$ in formula (7) is also called, which can map samples from the linearly inseparable low-dimensional space to the high-dimensional space [23]. After determining the kernel function type [24], above kernel functions, respectively, have the following expressions:

$$\begin{aligned} K(x, y) &= x^T y + c, \\ K(x, y) &= (\alpha x^T y + c)^d, \\ K(x, y) &= \exp \left(-\frac{\|x - y\|^2}{\sigma^2} \right), \\ K(x, y) &= \tanh(\alpha x^T y + c), \end{aligned} \quad (8)$$

$$K(x, y) = 1 - 2 \times \sum_{i=1}^n \frac{(x_i - y_i)^2}{(x_i + y_i)}, \quad x, y \in \mathbb{R}^d,$$

$$K(x, y) = \sum_{i=1}^n \min(x_i, y_i), \quad x, y \in \mathbb{R}^d.$$

The particularity of school sports education is mainly reflected in the main participants who are students, not only for the physical quality of improving students, but also for the training of various skills and the selection of reserve sports talents which have also become very important points. However, school sports also have a certain degree of limitations, mainly limited content, mainly due to traditional ball project and track and field physical quality practice and the characteristics of each place being different and due to economic reasons and sports hardware faculty ability, leading to the development of school sports presenting an unbalanced state. The overall process of the intelligent integrated system is shown in Figure 1.

2.3. Computer Aided Teaching System. Therefore, from the perspective of AI, computer-assisted teaching is actually an "expert system" that is realized by the computer system assisting teachers in teaching and students in learning. Therefore, AI thought is introduced in CAI, that is, using expert system methods and tools to build intelligent CAI (i.e., ICAI). The main feature of the expert system constructed in this way is that it has the functions of diagnosis, debugging and modification, and a good man-machine interface.

Most ICAI systems generally consist of expert modules, student modules, teaching modules, interface modules, and intelligent interface modules. Since most of the current computer-assisted teaching methods are using carved CD-ROMs for online teaching, this method of teaching uses

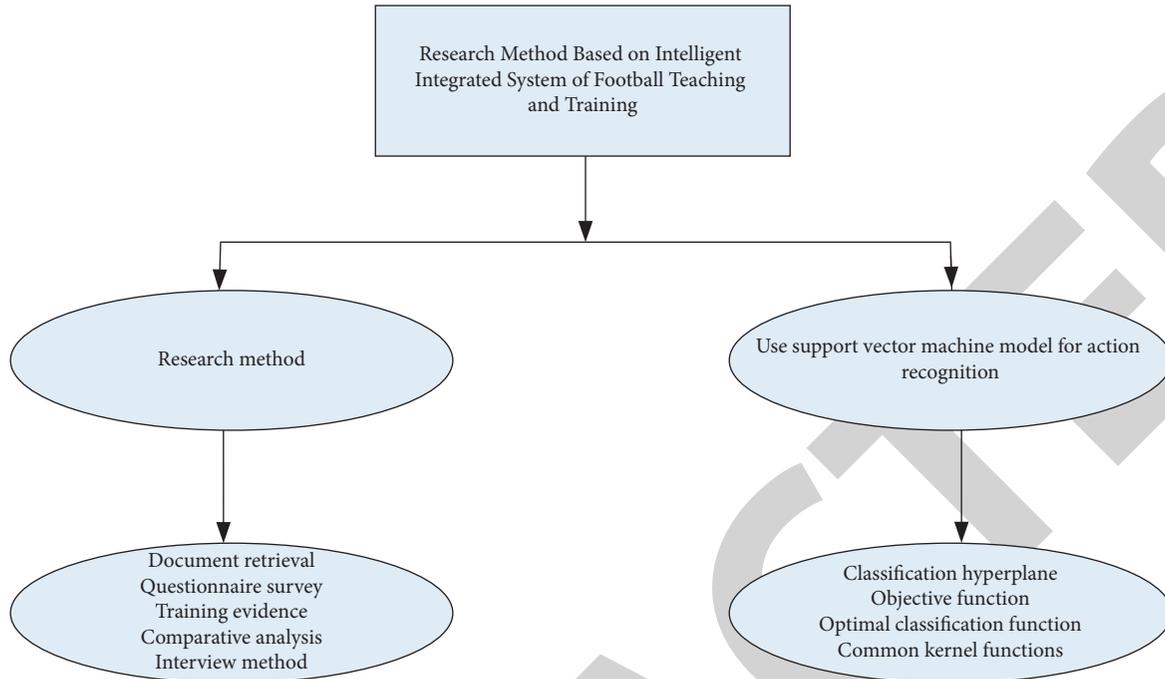


FIGURE 1: Part of the technical flowchart of this method.

teaching to a certain extent and enables learners to have relative free time for learning, but this kind of mass-produced teaching is ultimately not as humanized as teaching in accordance with their aptitude. The unified teacher conducts a unified explanation of the unified textbook. The divergence of thinking and the exchange and discussion of knowledge are gradually weakened in the invisible. The effect is far less effective than the effect of interpersonal communication in a real classroom. In this teaching process, due to poor communication, the learners seem to be more passive in their learning, and they are completely led by the courseware and rigid teaching.

3. Design Experiment

3.1. Specific Design of Intelligent Integrated System. Observing the world pattern, we can find that in advanced football countries a relevant consensus on football theory is reached; that is, if you want to improve the football level, youth football must be valued; in particular, the campus football should be paid attention to, children are the future hope, football needs to be popular among children, and through football itself being interesting, we can get more children's attention. After more people understand and participate, the accumulation and precipitation can improve the fundamental level of Chinese football.

3.1.1. System Hardware Design. The device for reading student campus card data.

The Kinect camera uses the Kinect second-generation intelligent somatosensory camera KinectV2 produced by Microsoft. Through the characteristics of KinectV2, it collects the 3D data of human bone nodes during sports

training and transmits it to the application layer for further processing.

The PC host CPU uses Intel i7 G-4600 processor, Direct X11 core display, GIGABYTE B85-HD3, 3.6GHZ main frequency equipped with 64-bit Windows 10 operating system; under the premise of meeting the normal operation of KinectV2, the cost is reduced as much as possible. KinectV2 transmits color data stream, bone data stream, and depth data stream to the algorithm processing layer for motion detection through the USB3.0 interface.

In view of the low traffic and simple business logic processing at the current stage, the cloud server uses an Alibaba Cloud server with a 2-core CPU, 4 GB memory, 64G storage capacity, and 1.5 Mbps network bandwidth.

The display is mainly used to display the user's sports training process and performance scores, as well as to achieve real-time human-computer interaction feedback results, to improve user experience and participation. Different displays need to be selected according to different application sites. For indoor environments, 15-inch touch screens are integrated in somatosensory equipment, and a 50-inch vertical touch screen is chosen for outdoor use.

3.1.2. System Software Design. The data interaction of this system is transmitted through the USB 3.0 interface, and the color data stream, depth data stream, and bone data stream of the movement process are collected through KinectV2 for real-time interaction with KinectV2, and the application program receives real-time data for processing. The system uses Visual Studio 2019.

Design ideas are drawn. For motion recognition, client display design, and cloud server design, a C/S framework is proposed to realize the requirements of multiple clients

connecting to the server at the same time. In the realization of football sports related actions and other aspects of statistical scoring, users can query sports results in real time.

3.2. Human-Computer Interaction Interface Design. The functional requirements and nonfunctional requirements of the intelligent auxiliary teaching system first summarize the functional requirements that include system login, user information management, information data collection, resource management, and system management, and then the performance indicators, operability characteristics, and security requirements of the auxiliary teaching system are analyzed.

The user roles of the system are divided into five categories, namely, players, coaches, physical trainers, team managers, and backend administrators. After entering their main system interface, each user will get a different user interface according to the different functions provided by the system. Each system main function interface has a different operation interface; the specific design is as follows.

3.3. Main Technical Architecture

- (1) Data collection layer: Obtain the athlete data stream through the Microsoft KinectV2 smart camera, and use the collected bone data stream for bone movement recognition.
- (2) Skeleton algorithm processing layer.
- (3) Motion recognition layer: Collect a large amount of predefined motion data after processing in the skeletal algorithm processing layer, and then calculate the HMM initial parameters, train the motion model, and obtain the output probabilities of many hidden Markov models, and compare and select the largest output probability as a result of motion recognition.
- (4) Application layer: The different sports in which athletes participate in training are identified through the motion recognition layer. The data generated during the entire exercise process, including exercise time, number of exercises, score settlement, and other data, are stored, and the data are finally uploaded to the server, to carry out scientific analysis and management and generate sports training prescriptions in line with their own characteristics.

This experiment part is based on the intelligent integrated system of FTT. The specific process is shown in Table 1.

4. Experimental Analysis Based on the Intelligent Integrated System of FTT

4.1. Questionnaire Reliability Analysis

4.1.1. Questionnaire Validity Test. The specific situation of the statistical questionnaire validity is drawn into a chart, as shown in Table 2 and Figure 2.

4.1.2. Questionnaire Reliability Test. This article mainly applies the test-retest reliability analysis method in the questionnaire reliability testing process. The SPSS22.0 software was used to further analyze and sort out the results of the questionnaire survey and finally calculated $r=0.831$, $p<0.01$, reflecting the good reliability of this group of questionnaires.

4.2. Survey Results. For teaching of sports training professional football general courses, the author designed a series of related questions to conduct a questionnaire survey on the students. The subjects of this survey selected 46 players from two football teams. 46 questionnaires were distributed and 43 valid questionnaires were returned, with a questionnaire effective rate of 93.48%. The questionnaire is divided into two parts before and after the implementation of the intelligent FTT system. The preimplementation questionnaire mainly asked questions from the players' or learners' mobile terminal equipment holdings, usage habits, and understanding; the postimplementation questionnaires were mainly from the teaching effect, athletes, or learners using the intelligent football teaching system to investigate the degree of satisfaction of the smart teaching training model and other feedbacks.

4.2.1. Before Implementation

- (1) Usage of players' mobile smart terminals

Calculate the survey results of the usage of players' mobile smart terminals in the questionnaire and draw them into graphs, as shown in Table 3 and Figure 3.

Interest is the power source of students learning and is the best teacher; the student is the main body of campus football activities, which can let more students participate in football; campus football is crucial to the development; it is of great significance for training qualified football reserve talent, from the perspective of the rise of football playing an important role.

From the chart, we can see that the players who spend half an hour or less using mobile smart terminals every day account for approximately 16.28%, while those who spend half an hour to one hour account for 20.93%, and 25.58% of players spend one to two hours a day, 32.56% of players spend two to three hours a day, and players who spend three to four hours using mobile smart terminals account for about 2.33%, which is the same as those who spend more than four hours.

- (2) Players' understanding of the intelligent FTT system

The survey results of the players' understanding of the intelligent FTT system in the questionnaire were counted and graphed, as shown in Table 4 and Figure 4.

Based on the chart, it can be seen that 31.27% of players understand the intelligent FTT system

TABLE 1: The experimental procedure of this article.

Design experiment based on intelligent integrated system of FTT	3.1	The overall framework design of FTT intelligent integrated system	1	Player subsystem
			2	Coaching subsystem
			3	Physical training subsystem
			4	Backstage management subsystem
	3.2	Specific design of intelligent integrated system for FTT	1	System hardware design
			2	System software design
			1	Player subsystem interface
	3.3	Human-computer interaction interface design	2	Coaching subsystem interface
			3	Physical training subsystem interface
			4	Backend administrator subsystem interface
			1	Data collection layer
	3.4	Main technical architecture	2	Skeleton algorithm processing layer
			3	Motion recognition
			4	Application layer

TABLE 2: Questionnaire validity test.

Evaluation standard	Very reasonable	Reasonable	Basically reasonable	Not reasonable	Not reasonable at all
Survey design	2	4	3	1	0
Questionnaire structure	3	3	2	2	1
Questionnaire content	5	4	1	0	0
Questionnaire logic	4	2	3	1	0

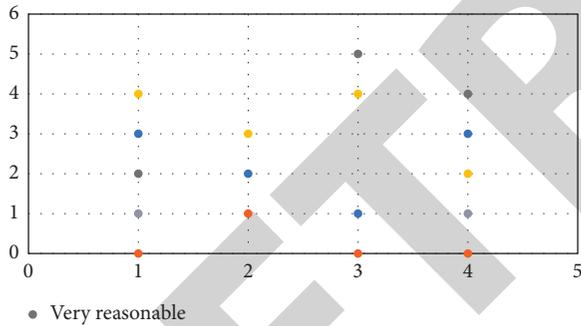


FIGURE 2: Questionnaire validity test.

TABLE 3: Usage of players' mobile smart terminals.

Time slot	Number of people	Percentage (%)
Half an hour or less	7	16.28
Half an hour to one hour	9	20.93
One to two hours	11	25.58
Two to three hours	14	32.56
Three to four hours	1	2.33
More than four hours	1	2.33

through a special APP, 29.48% of players understand the intelligent FTT system through the web, and the percentage of players who understand the intelligent FTT system through other people's introductions is 18.65%; 16.51% did not understand the intelligent FTT system, and the remaining 4.09% had other conditions. On the whole, players have a positive attitude towards the intelligent FTT system.

Most of them believe that this method can further consolidate theoretical knowledge and help themselves improve their technical level. They can use the daily fragmented time to continuously improve themselves and at the same time provide more options.

4.2.2. *Player Feedback after Implementation.* Questions about the players' feedback after using the intelligent FTT system were set up in the questionnaire, and the results were statistically sorted and graphed, as shown in Table 5 and Figure 5.

It can be clearly seen from the chart that the vast majority of players like the intelligent FTT system, accounting for 90.70%; most players believe that the application of this innovative intelligent system can greatly promote football skills learning, which is easier to understand and grasp the key points and difficulties in the process of knowledge learning; moreover, it can maximize the player's initiative to learn the basics of football, thereby enhancing the players' confidence in learning football skills.

4.3. *Action Recognition Accuracy Analysis.* Perform recognition experiments on the player's foot movements, and input the feature vector into the SVM for classification. 46 samples are taken for training in each stage, 23 samples are tested, and the relevant results are counted and graphed, as shown in Table 6 and Figure 6.

It can be seen from the chart that the support vector machine has a good performance in football action

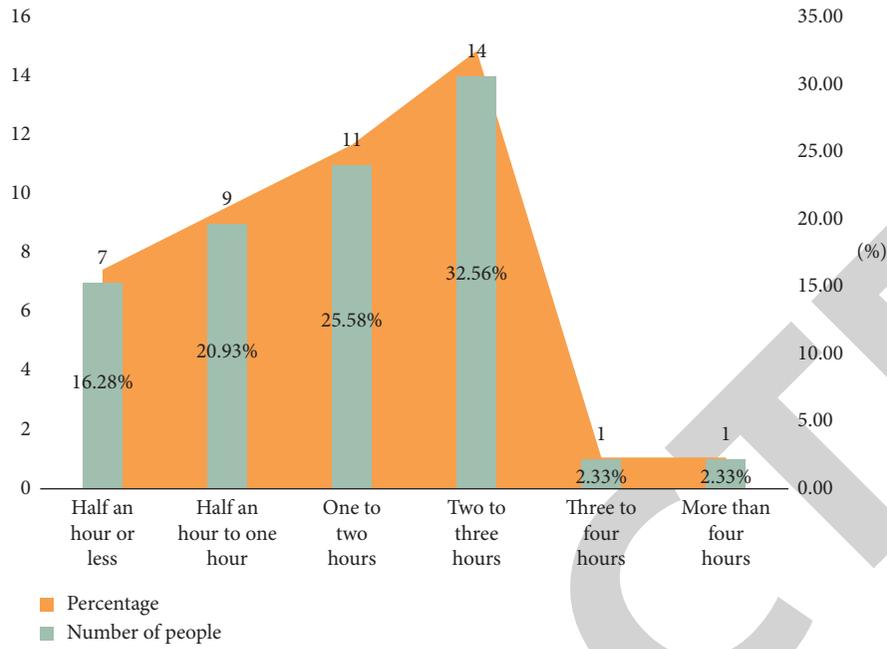


FIGURE 3: Usage of players' mobile smart terminals.

TABLE 4: Players' understanding of the intelligent FTT system.

Understand situation	Percentage (%)
Do not understand	16.51
Learn from the web	29.48
Learn from the APP	31.27
Introduced by others	18.65
Other cases	4.09

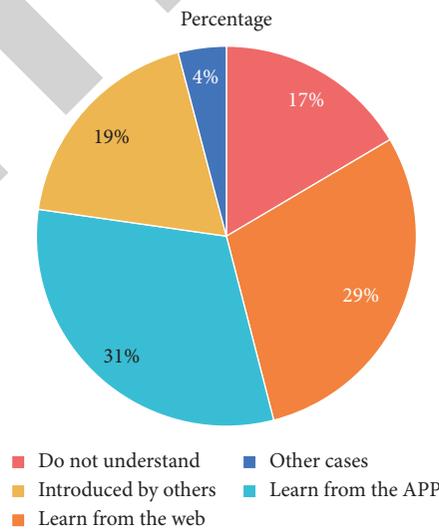


FIGURE 4: Players' understanding of the intelligent FTT system.

TABLE 5: Player feedback.

Serial number	Survey content	Yes	Yes-percentage (%)	No	No-percentage (%)
1	Do you like smart FTT system?	39	90.70	4	9.30
2	Does the intelligent FTT system help you learn football skills?	34	79.07	9	20.93
3	Whether the intelligent teaching training system can stimulate your interest in training?	36	83.72	7	16.28
4	Does the intelligent FTT system enhance your enthusiasm?	31	72.09	12	27.91
5	Is the intelligent FTT system conducive to understanding and grasping the important and difficult points in football technology?	29	67.44	14	32.56
6	Does the intelligent FTT system make FTT more convenient?	40	93.02	3	6.98
7	Does the intelligent FTT system enhance your confidence in learning football?	23	53.49	20	46.51

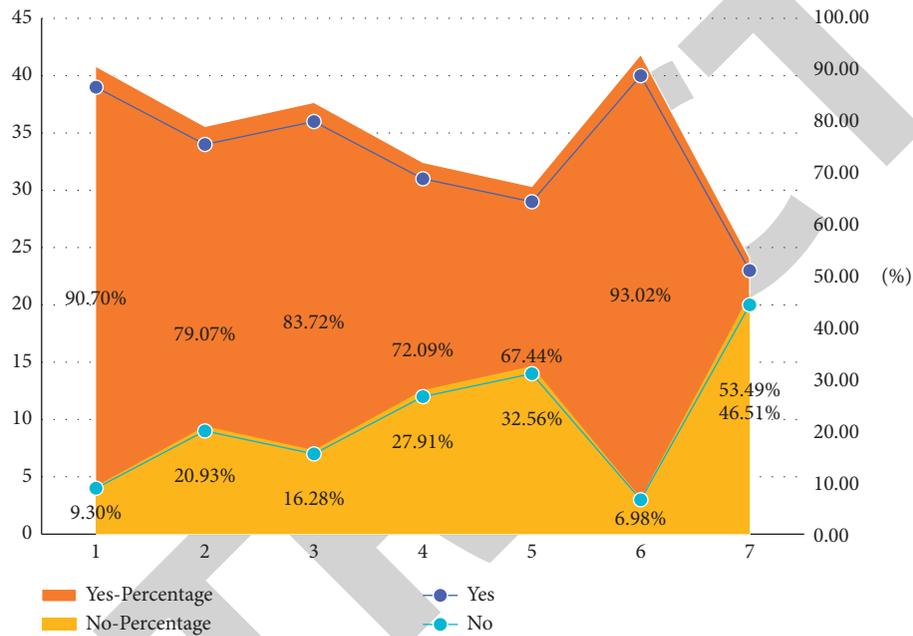


FIGURE 5: Player feedback.

TABLE 6: SVM-based player foot movement recognition.

	Number of training samples	Sample recognition rate (%)	Average recognition accuracy (%)	Number of test samples	Test recognition rate (%)	Average recognition accuracy (%)
Preparatory stage	46	92.36	89.71	23	86.71	85.02
Swing stage	46	90.31		23	83.42	
Sliding stage	46	88.07		23	87.13	
Transitional phase	46	86.79		23	83.29	
The final power stage	46	91.03		23	84.56	

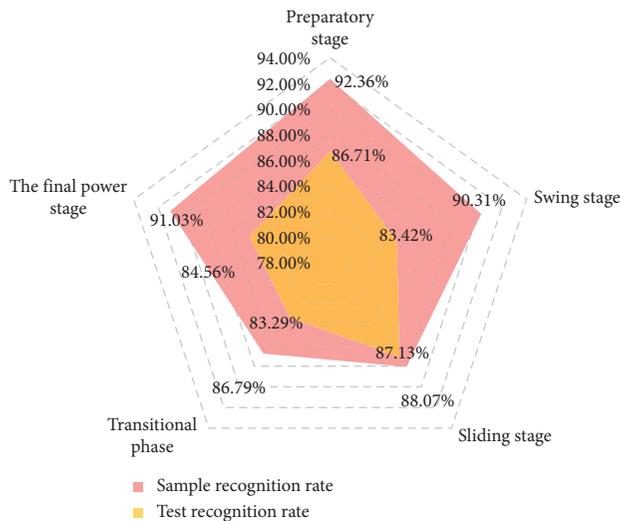


FIGURE 6: SVM-based player foot motion recognition.

recognition. The average sample recognition accuracy rate reaches 89.71%, and the test recognition accuracy rate reaches 85.02%, which is suitable for the requirement of fewer samples and fast speed for football analysis.

5. Conclusions

Artificial intelligence has achieved rapid development and progress in recent years and has become a hot advanced technology in various industries in our country. For the development and reform of computer-assisted teaching, the integration and application of artificial intelligence have important value and significance. Education and teaching methods in the twenty-first century will be the embodiment of new technologies developed in multiple disciplines and directions.

People's increasing physical fitness needs have promoted the reform of the sports industry, and the latest science and technology have entered the sports industry, continuously impacting traditional sports equipment. However, the current technical solutions for traditional sports equipment in colleges or teams are unreasonable, and the sports training management model is outdated. It is impossible to provide scientific guidance to players' sports, and the overall sports effect is not good.

This article designs and implements the FTT management system and first understands the research background and significance of the subject. Then it learns the technology needed to develop the system and then analyzes the functional and nonfunctional requirements. Although the intelligent-based teaching system developed in this paper has achieved some research results, the system development time and many functions of the system need to be further improved and improved. In the subsequent research work, we need to improve and update the systems in the following aspects: further optimizing the code of the system and strengthening the compatibility of the online teaching auxiliary system and the client browser; in-depth understanding of the user's operation habits, so as to conduct

humanized design and try to avoid the inconvenience caused by the user because of the long operation interval and the error prompt being not friendly enough; further adjusting the management rights of the system, because the system is easy to be stolen if the program process is too large.

Data Availability

No data were used to support this study.

Conflicts of Interest

The author declares that there are no conflicts of interest regarding the publication of this article.

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