Intelligent sports teaching platform based on AI background

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Abstract: In order to further promote the digital and intelligent teaching of school physical education, improve teachers' work efficiency and teaching quality, this paper, through the method of induction and analysis, combs the current situation of intelligent physical education and physical education, combined with the actual needs of physical education, builds a new intelligent physical education teaching platform model.

**Key words:** intelligent sports; Physical education teaching; Teaching platform

I. Introduction

Since the 18th National Congress of the CPC, China has attached great importance to the development and application of artificial intelligence in the field of education. In October 2021, the General Administration of Sport issued the "14th Five-Year Plan for Sports Development", which "supports the innovative application of new technologies such as big data, blockchain, Internet of Things, cloud computing and artificial intelligence in the sports field, creates a smart fitness scene and speeds up the development of related products". In order to explore the realizable path of smart sports, this paper tries to build an intelligent and systematic sports teaching platform to promote the further development of sports teaching.

II. The main problems existing in the existing sports teaching activities

According to the investigation and research, the current intelligent physical education in schools is still in the exploration stage from the traditional mode to the digital transformation and intelligent upgrading. In the actual physical education teaching work in most schools, there are still many problems: first, the physical education teaching mode is too old, which is mainly manifested in the large class physical education teaching mode, a single assessment method, old textbooks and fixed teaching methods. The second is the lack of combination of theory and practice, mainly manifested as teachers' oral teaching at the theoretical level, lack of enough professional theoretical explanation, practical training and students' extracurricular exercise arrangements, such as students' daily physical exercise and physical education seriously out of line, teachers can not really grasp and understand the students' physical exercise situation, can not fully mobilize students' enthusiasm for exercise. The third is that the teaching content is not rich enough, which is mainly manifested in the basic physical activities and sports skills, and the technical tactics, psychology, spirit and quality of sports items are less. Fourth, the goal of physical education is vague, which is mainly manifested in that the teaching pays too much attention to the needs of students' physical development and ignores the needs of social development for talents. The fifth is the backward updating of teaching concepts, which is mainly manifested as teachers being too conservative to new developments, low informatization of teaching means, and insufficient in-depth reform of physical education. To sum up, the existence of these problems has further promoted the application and development of artificial intelligence in campus physical education.

III. The construction of intelligent physical education teaching platform
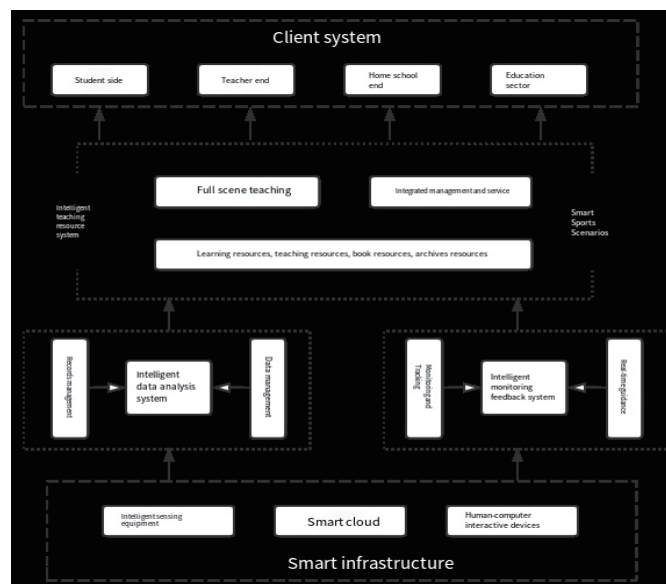
(FIG. 1) Model of intelligent physical education teaching platform

According to the literature investigation and research analysis, in order to promote the development of intelligent physical education in schools, combined with the actual needs of physical education, a structured description method is adopted to build an intelligent physical education teaching platform (hereinafter referred to as "platform") model, as shown in the following (Figure 1). The platform is mainly composed of intelligent infrastructure module, data analysis system, teaching resource system, client system, monitoring feedback system, sports scene and so on.

1. Intelligent infrastructure module

Intelligent infrastructure aims to support the establishment of an efficient and reliable platform through the introduction of advanced hardware, software and science and technology, and the continuous research and development and iteration of these technologies will be greatly influenced by the field of artificial intelligence. The first is the intelligent perception of critical devices. These are all kinds of intelligent perception devices that are connected to realize the needs of intelligent sports teaching, such as computer vision devices, Internet of things sensors, 3D holographic imaging, wearable devices, etc., which make the teaching environment shift from the physical and information environment to the connected environment of situational awareness, biometric perception and social characteristics perception. The second is the intelligent cloud based on big data analysis and super computing power, which can provide support services for large-scale application of intelligent teaching in order to realize the infrastructure of intelligent data collection, analysis, transmission, feedback and storage. Finally, human-computer interaction equipment, in order to achieve personalized and intelligent learning of all kinds of interactive facilities, it can provide and display all kinds of sports related teaching resources, such as text, images, audio, video, animation and other forms of action content.

2. Intelligent data analysis system

The construction of the system relies on AI artificial intelligence, big data, computer vision equipment and intelligent wearable devices to achieve the collection, transmission, processing, analysis and storage of relevant data for teachers' physical education classroom teaching and students' sports and training. At the same time, through the establishment and integration of teachers and students related to physical education resources, physical fitness test, physical health and other aspects of the intelligent database, and the establishment of teachers' teaching records and students' physical health growth files (the files should be established from the primary school stage). The summary and statistical data of the system can be visually displayed to the client (students, teachers, parents, schools) through the intelligent physical education platform to present the data of students' physical exercise and sports performance, teachers' physical education management and evaluation and other aspects. The data collection can be automated and intelligent, which greatly reduces the work burden of teachers. Improve the teaching quality and work efficiency of teachers.

3. Intelligent teaching resource system

The system applies AI deep learning algorithm, big data, combined with natural language understanding, knowledge graph and intelligent recommendation engine to effectively support knowledge learning and skill training, so as to build rich physical education courses and perfect physical education teaching resource system, so as to promote the optimization and upgrading of teaching resources. The system can achieve the following functions: first, it can provide all kinds of sports teaching resources required by students' learning and teachers' teaching as well as related management and sharing services; Second, it can provide the whole process of physical education classroom, online and offline integration of the whole scene teaching application; Third, it can provide comprehensive management and intelligent services of teaching resources including human, material and financial resources, such as learning, teaching, teaching research, equipment management, assessment and evaluation. Of course, if these functions can be realized, it is necessary to sort out and integrate all kinds of knowledge and skills required by students in different stages of sports or exercise on the basis of the existing physical education teaching resource system, and classify them according to different technical levels or movement difficulties, so that students can choose the appropriate content for learning according to their own sports level.

4. Intelligent user terminal system

The construction of the system is mainly based on the platform, and students, teachers, schools, parents existing mobile phones, computers, tablets and other mobile application devices for seamless docking, to achieve user information data transmission, processing, display, management and query. On the student side, the platform presents students' daily physical education class attendance, sports performance, exercise records, comprehensive ranking, physical fitness test appointment and inquiry and other information, and establishes physical health growth files. On the teacher side, the platform connects with the school educational administration system, authorizes teachers to manage students' basic information, physical education curriculum construction, curriculum arrangement, teaching plan, teaching resources, sports scenes, record physical education courseware, student attendance, physical education assessment results and evaluation, and view students' course selection, student list, teaching quality evaluation, etc. At home, schools and parents can inquire about students' physical health, sports performance and exercise records, teachers' teaching work management and evaluation.

5 Intelligent monitoring feedback system

Use computer vision devices, Internet of Things sensors and smart wearable devices and other technologies to track and capture students' movements, body posture, movement trajectory, rotation Angle and other motion data in real time, collect and analyze these data through sensors, and transmit them to the platform data analysis system, and then feed back to students through the display terminal, voice prompt or vibration, etc. To help students find their own movement technology problems in time, provide real-time guidance, weakness analysis, progress tracking and other intelligent teaching counseling to help them correct movements and improve training effects. Real-time guidance for volleyball, badminton, table tennis and other sports hit track, speed, Angle, rotation and student body posture. To provide

students with specific training methods or exercises to strengthen the instability of a certain skill. The system can not only realize the real-time capture of students' movement, movement trajectory, collection and analysis of heart rate, energy consumption and other sports data, but also monitor violations, injury risks and generate visual data reports to provide personalized assessment, guidance and suggestions for students.

6. Intelligent sports scenes

(1) Smart Fixed venue (outdoor)

AI vision algorithm, Internet of Things and other technologies will be used to intelligently transform and upgrade the existing sports classrooms, all kinds of courts, playgrounds, swimming pools, rock fields and other fixed sports places, while adding intelligent "helpers" such as AI teaching assistants to achieve scientific sports exercise and scale testing, and provide students with more accurate, personalized and standardized sports scenes. The intelligent transformation can usually deploy the Internet of Things camera on the edge or corner of the fixed site, connect the platform systems using 5G communication network, and access application terminals and interactive devices in the appropriate areas, such as AI teaching assistants, intelligent wearable devices, intelligent display screens, teaching tablets and so on. In addition, the platform's access to the display terminal can realize real-time teaching interaction, video playback, auxiliary judgment of the same field confrontation, event broadcast, highlight replay, etc., so that students can more intuitively understand their own sports performance, skills and rules of various sports, and improve students' learning effect. Usually, this kind of intelligent field after transformation and upgrading can not only meet the actual needs such as football, rugby, ultimate Frisbee, but also meet the sports needs such as running, swimming, rock climbing and so on. In addition, it can also be used as a special platform for students to provide exercise, training, competition, testing, assessment and other sports environment.

(2) Smart Sports venues (indoor)

Use AI, VR/AR, computer vision, face recognition, human-computer interaction, big data and other technologies to build a safe, reliable and intelligent sports venue to provide students with immersive and personalized sports training scenes. In this environment, students can adjust their learning status and progress according to their own situation, and can clearly observe the details of the movement while fully recognizing the theoretical knowledge, and integrate the action, and can also be applied in the simulated scene to expand the breadth and depth of sports. In this way, it can not only promote students' enthusiasm in daily sports and participation in classroom activities, but also improve students' sports knowledge and skills, as well as enhance students' physical fitness. Then, this intelligent venue is usually suitable for skill-based performance of beauty, performance accuracy, mesh antagonism, combat antagonism sports, indoor physical testing projects and other projects with the help of simulation props. For example, in the martial arts class, students watch the knowledge explanation and action demonstration through intelligent wearable devices, learn and master various basic technologies such as technique, footwork, leg method, jumping, etc., in the virtual scene, carry out action imitation and actual combat experience, and use intelligent monitoring system to follow up the dynamic learning process of students in real time to ensure students' safe practice and exercise. At the same time, strengthen the learned knowledge and skills.

IV. Conclusion

With the progress of science and technology, smart sports has become an indispensable part of today's society, but the current intelligent technology is not mature enough, in order to achieve the comprehensive popularization and promotion of smart sports teaching, still need to rely on the Ministry of Education and the State General Administration of Sport policy, funding and other aspects of strong support, in order to accelerate and promote the development and upgrading of key technologies of the platform. So as to truly realize the intelligent sports teaching.

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