

Application of AI Technology In Physical Education

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Abstract- *With the rise of a new round of scientific and technological revolution, the vigorous development of artificial intelligence technology has gradually entered human daily life. Physical education, as one of the daily teaching activities of human beings, is an indispensable part of the current teaching evaluation and students' quality assessment in colleges and universities. With the development of the times, there are many shortcomings in the traditional teaching practice, and the unique advantages of artificial intelligence technology will largely make up for the shortcomings of traditional teaching. At present, the integration of physical education and artificial intelligence technology are still in the preliminary exploration stage. With the revolution of science and technology and the rapid development of information technology, it has had a profound impact and has promoted the modernization of educational technology. Artificial intelligence is a comprehensive frontier subject under development and an important research direction in the field of computer science and technology. This paper proposes a corresponding development strategy, in order to provide theoretical support and guidance for the further development of modern science educational technology.*

Keywords- NLP, Artificial Intelligence, Big Data Analysis.

I. INTRODUCTION

The modern information revolution has promoted the transformation of the traditional teacher centered physical education model. In teaching, teachers use multimedia human-machine interaction to create a relaxed and harmonious learning environment, fully respect each student and establish a new open educational technology teaching method. "Education must be oriented towards modernization, facing the world, and facing the future". Among them, modernization means, on the one hand, serving the cause of modernization construction; on the other hand, it must include modern educational ideas and concepts. Now it has entered the stage of information technology based on computer technology and communication technology. Information technology is widely used. In recent years, it has been infiltrated and applied to all aspects of school physical education training and scientific research. This provides a new opportunity for the development of physical education. The development of modern education has put forward new requirements for physical education.

Physical education system, organizational form, teaching content, teaching means and so on are facing innovative changes. Artificial intelligence has moved from laboratory to practical application, and began to provide more and more work assistance for human beings, and even began to replace part of human work. This paper discusses the application of "artificial intelligence" in the physical education and training environment of colleges and universities, clarifies the ways to realize the application of "artificial intelligence" in the physical education and training environment of colleges and universities, and further deepens the application of artificial intelligence technology in the physical education reform of colleges and universities. The development of artificial intelligence has a history of several decades. In 1950, Alan Turing's paper "computer and intelligence" was put forward for the first time. The proposal of this pioneering idea provides a research direction for the development of artificial intelligence in the next few decades. Since then, at the Dartmouth conference in 1956, artificial intelligence was put forward for the first time, marking that human beings have entered the era of artificial intelligence. Computation, perception and cognition are generally regarded as the three elements of artificial intelligence. The corresponding computational intelligence, perceptual intelligence and cognitive intelligence also run through the whole development process of artificial intelligence technology. The development of computational intelligence began in the 1950s, mainly to solve the problem of large amounts of calculation or complex problems encountered in scientific research and engineering practice. Its essence is the algorithm that engineers endow computers by imitating the human computing process, but it cannot achieve the function of human-computer interaction. With the development of large-scale integrated circuits, computational intelligence has developed quite maturely. The development of perceptual intelligence began in the 1980s. Its characteristic is that it can collect and analyze objective information from the outside world. One of the representative technologies is intelligent recognition technology, such as Baidu's speech recognition technology, iFLYTEK's face recognition technology has developed to a relatively mature stage. At the beginning of the 21st century, the concept of cognitive intelligence has been put forward gradually. Cognitive intelligence is a further step on the basis of perceptual intelligence, which requires computers not only to distinguish the collected information, but also to judge human

emotions and intentions on the basis of comprehensive analysis. The related technologies are still in the preliminary exploration stage. Artificial intelligence has developed into sub fields such as virtual reality technology, intelligent recognition technology, big data analysis technology, machine learning and artificial neural network. Nowadays, people's life is inseparable from artificial intelligence, such as face brush payment, driverless car and intelligent voice assistant, which have entered into people's daily life. However, the application of artificial intelligence in the field of education, especially in higher education, which is the key to talent cultivation, needs more efforts. To this end, under the guidance of the idea of strengthening the country through education and science and technology, the State Council and the Ministry of education successively issued the implementation plan for accelerating the modernization of education and the action plan for the innovation of artificial intelligence in Colleges and universities, which clearly pointed out the development direction of higher education in the future. It can be predicted that in the near future, the deep integration of artificial intelligence and higher education is an inevitable trend.

II. PROBLEM DEFINITION

On the one hand, in the traditional teaching arrangement of colleges and universities, due to the heavy task of other courses, the position of physical education in the whole teaching system is not high. This also leads to less time for physical education teaching. For example, many colleges and universities only offer one physical education class a week. Due to the problems of students' attendance, class attitude and teachers' teaching ability, the knowledge and skills that students can learn in physical education are very limited, resulting in the lack of theoretical knowledge of students. On the other hand, sports are an indispensable part of campus life. Students often spend a lot of time and energy on physical exercise, but if they do not carry out sports activities under the guidance of professional theory, the final exercise effect may not be satisfactory, and may even cause harm to their own body. At present, the curriculum arrangement of physical education in Colleges and universities is roughly divided into two parts, namely, the usual class and the final course assessment. However, there is a lack of effective teaching management between class and final assessment to guide students to have a clear understanding of their own learning progress, so as to better grasp the content of physical education curriculum.

III. PROPOSED METHODOLOGY

3.1 Use of color information

Use of color information can solve some sports track tracking problems. Various methods, such as polar coordinate representation, are proposed to represent the appearance model of the tracking object. Another similar method is to slice the object and take the average color in each slice. These colors are stored as skin templates for tracking objects. Figure 1 shows the appearance model of a football player.

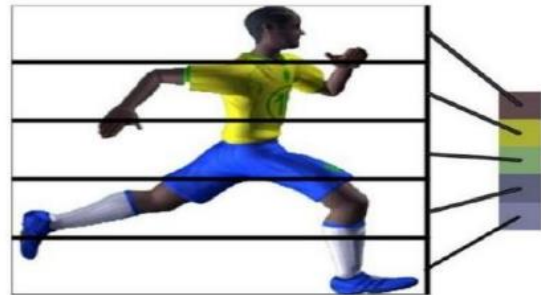


Figure 1: Color encoding of object

3.2 Multimedia color aided instruction

The multimedia computer-aided teaching program mainly includes three parts: computer hardware, system software and course software. It is a variety of teaching activities in a computer-assisted situation, through which you can change the relatively fixed time and space, and can change the relatively traditional teaching mode and teaching philosophy. In this form, the traditional combination of traditional media technology and modern media technology, the teacher plays a leading role in the classroom, through the determination of teaching design goals, the choice of teaching content media, the preparation of the teaching process. Computer aided teaching mode mainly includes six kinds, namely, dialogue and consultation, individual guidance, exercise, simulation, problem solving and games. The design of its teaching software needs to be compiled by the designer according to the computer assembly language. The traditional teaching mode of physical education is to adopt a single mode of teacher-student learning on the playground. In order to change the current situation of physical education, we must actively promote the network of physical education resources in Colleges and universities.

3.3 Large Data Analysis

The large data analysis technology based on artificial intelligence can record a single picture correctly recognized as a tracking accurate picture. The tracking accuracy of a single picture is equal to tracking the number of accurate pictures/the total number of video pictures. The tracking time of a correct single picture is the time needed to complete the recognition

of a picture and the time needed to process the picture in the program. The specific results are as follows:

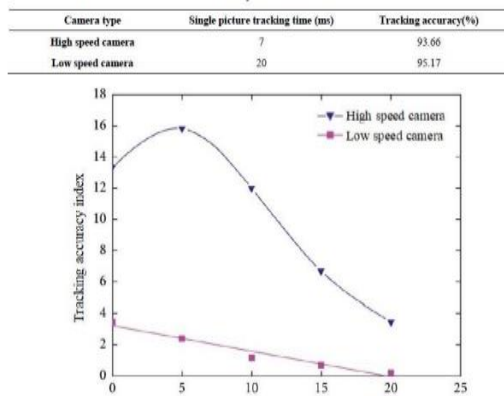


Figure 2: Single picture time tracking index

3.4 Natural language processing

Globally, the current school system is a product of the industrialization era and is designed to provide the right of education for all citizens. Before the school system was introduced, education was something that only privileged classes could enjoy. The school system contributed greatly to the realization of democracy in that it gave all citizens the benefit of an education. However, in the process of creating an education system for all citizens, a valuable form of education was relinquished: customized education. In designing the mass education, we call school, the standardized school structure, wherein one teacher is responsible for educating several students, was established. This structure places curriculum and evaluation in the hands of the provider rather than the learner. For learning to be effective, the characteristics of each learner's interests and aptitudes, as well as their academic history, level, and learning speed, must be diagnosed accordingly. However, in school, classes are conducted according to a pre-established curriculum, and evaluation is conducted only on results. This has been a structural and systemic problem since the school system was introduced. To compensate, efforts have been made to change classroom structures in various ways, but alienation of students in the class environment remains an unresolved issue. Customizing PE classes means providing teaching support to give students the most suitable PE learning experience, considering individual learners' physical condition, physical activity achievement level, psychological characteristics, and home environment. Therefore, it can be assumed that all students can achieve their goals through customized PE classes. The issue of mass education is important to overcome in future.

3.5 Personalized PE using AI

Adaptive learning and customized education, which take both learners and learning types into account, have emerged as major interests in applying AI research in educational contexts, suggesting that the use of AI in education aims to meet learners' requirements and provide them with their preferred learning opportunities. Customized PE, which considers learners' various physical, mental, and social characteristics, can be divided into differentiated, individualized, and personalized PE types. Differentiated PE involves classes made up of small groups, wherein learners' learning speed and degree of prior learning are considered when selecting teaching methods, although the educational content and learners' goals are the same. Individualized classes involve learners being taught individualized lessons, wherein learning is tailored to their level and needs. Personalized lessons have different educational goals, content, and teaching methods depending on the individual learner. For customized PE classes that incorporate and implement AI, improvements and developments should be made not only in the school system but also in environmental aspects of school, such as sports equipment and gymnasiums. Such changes should focus on the "teaching-learning process." A shift to a flexible school system is needed, meaning that a flexible teaching system should be in place that adapts to set physical activities for learners that suit their level of achievement and speed of learning, considering differences between learners' cognitive and physical growth levels. This would enable various learning methods that reflect individual learners' needs and learning outcomes. However, grade level must be maintained in group ball games or project learning, which require cooperation with other students. For learner-centered customized PE classes, individual learners' physical condition, level of physical activity achievement, and psychological characteristics should be objectively measured through an empirical evaluation. Sensory AI can be used to objectively measure physical activity achievement level according to an individual's physical condition, enabling them to be identified based on facial recognition and voice analysis, alongside analysis of physical activity image and video. Such measured data can then be analyzed on machine learning and deep learning platforms using cognitive AI to provide learners scientific evaluation and feedback. This method can also interact with learners using the natural language of executive AI, allowing learners to diagnose and develop their performance levels and improvements.

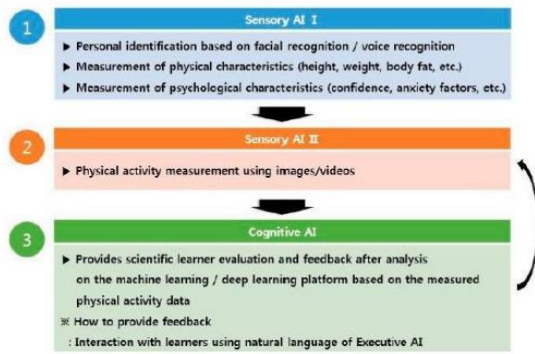


Figure 3: Learner centered customized PE

3.6 Intelligent recognition technology

Intelligent recognition technology (IRT) is a kind of technical means that collects information through identification equipment, processes information by computer, and finally automatically identifies relevant information and makes feedback. The problem of unilateral teaching in traditional physical education can be improved by intelligent recognition technology. First of all, students come to class is the premise of interactive teaching. Therefore, the intelligent recognition technology can be applied in class attendance. Compared with the traditional check-in methods such as question answering and code scanning, face recognition technology can not only fundamentally eliminate the possibility of signing in on behalf of others, but also ensure that the check-in can be completed in a very short time, thus considering the discipline and efficiency of class. Secondly, intelligent recognition technology can also be applied in the specific process of physical education teaching. For example, when students encounter difficulties in the learning process, they often have puzzled expressions and mumble or repeatedly make irregular sports actions.

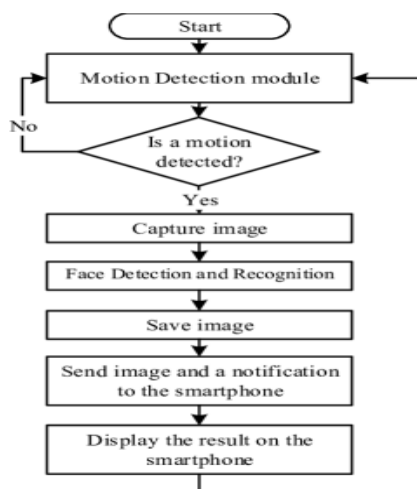


Figure 4: IRT flowchart

3.7 Big data analysis technology

Big data analysis technology mainly includes data visualization, data mining and prediction analysis. Among them, data visualization technology, as a basic requirement of data analysis tools, can show data intuitively to users. On the basis of visual analysis results, the future trend of things can be judged by prediction analysis. The implementation steps of data visualization analysis technology are shown in Figure 5, including data acquisition, data access, data processing, statistical analysis and correlation analysis. In college physical education, the introduction of big data analysis technology will make the course teaching and management more scientific, standardized and efficient. For example, teachers can post homework on the learning platform and ask students to submit them in the form of photos or videos. In the learning platform terminal, VR, machine vision and other technologies can be used to extract and process the information provided by students. Then through the data visualization technology, the students' learning results are fed back to the teachers in the form of data. Therefore, teachers can adjust the teaching direction and progress in time through the data information obtained. At the same time, big data analysis technology can also help students learn more actively. Through the analysis of students' activity track, attendance and homework Submission on the learning platform, we can understand their preferences and learning habits, so as to portray a specific image of learners. Through further prediction and analysis, it provides learners with more suitable learning content and learning methods, so as to achieve the goal of personalized autonomous learning.

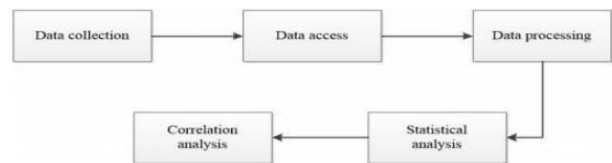


Figure 5: Implementation steps of data visualization

IV. RESULTS AND ANALYSIS

PE classes using AI technology are expected to help not only PE teachers but also learners. Mechanical iterative learning, formalized discussions, and stereotyped evaluations could be conducted by AI on behalf of PE teachers. From the point of view of precision education, AI will enable customized and individualized learning so that all learners can achieve their learning goals. Guilherme believes the relationship between teachers and students will become increasingly important as education becomes more technologically advanced. AI will enable the fair treatment of students, increase enjoyment among students, and reduce labor

costs, while the teachers' role of disseminating knowledge will be reduced. At the same time, PE teachers will be able to focus on communication and facilitate self-directed growth among students. Koedinger et al. believe that it should be based on the curriculum at a time when teachers enter what they need to learn in a learning system based on AI. It suggests that a collaborative relationship of mechanization is needed; the teacher should not have direct control of everything. In other words, for AI teachers, mechanical iterative learning, personalized learning, formalized discussion, diversification of learning, and formalized evaluation can be performed, whose data is relatively easy to algorithmize and accumulate. By providing a complete form of personalized education and a number of different forms of learning situations that cannot be realized perfectly in the current PE environment, AI can build a learning environment where learners would be more interested and participate more actively. Furthermore, by dealing with formalized work. Thus, human teachers will have to demonstrate their competence in terms of emotional interaction with learners, value judgments about educational activities, design and operation of learning performed by AI, and relationship-based consultation. Furthermore, human and AI teachers will have to be in constant interaction. A single PE class has disparate members with different cognitive, physical, and affective abilities. In such an environment, PE teachers should be able to identify students' individual differences and present them with appropriate goals. According to Bandura's theory of self-efficacy, achievement experiences create strong individual beliefs, while failure experiences result in weakening self-efficacy. Presenting achievable goals to learners so that they can attain an achievement experience is an important aspect to consider in planning for PE classes. However, there are many limitations to ensuring learners' achievement of successful experiences by accurately identifying individual differences and providing appropriate levels of achievement and goals for all individual learners in PE classes. PE classes using AI can overcome these difficulties through "difficulty control." Considering the various characteristics and individual differences of learners participating in a class, AI's "difficulty control" function serves to provide achievable goals and task levels according to the learner's level. Currently, some students enjoy PE classes and participate actively, while others avoid or passively participate in the classes for different reasons. It has been pointed out that the problem is that students do not judge their physical ability and level of activity by themselves, but through the perspective and language of teachers and other students participating in the class. PE classes using AI will allow learners to have diverse and tailored experiences. Through the provision of diverse sensory information, learners can have direct experiences, and by receiving objective information and feedback from AI,

learners can objectively assess their physical abilities. Furthermore, learners can actively carry out physical activities to improve their physical abilities, rather than being self-aware among other students.

V. CONCLUSIONS

PE is an important part of comprehensive human development. Technology use in modern PE can theoretically enrich educational content, promote perception of PE and changes in traditional educational models, and have practical effects, restructuring PE and promoting continuous development. Along with the nature of the education model, visualization, and repetition, PE will have a brighter future due to AI application in sports. To gain an accurate understanding of AI, it is first necessary to consider the opportunities and challenges technology brings to PE and scientific and technological innovation's dynamic role. AI can not only be a just product of modern PE innovation but must also be a complex of human comprehensive ability and imagination. Treated as such, AI promotes human creative thinking and ability and reflects its value more prominently. The application of these technologies will doubtlessly impact modern PE engineering development. There are three main reasons AI is needed for PE. First, PE no longer just happens on the playground. As technologies such as AR, VR, and the Internet of Things have developed, previous restrictions on PE have been removed. Students can now take the PE classes they want without restrictions. Second, individualized learning and customized education can be realized to improve students' learning performance. AI very effectively identifies each student's athletic ability, compiling data and giving feedback in real time to produce optimal results. Third, AI provides various learning tools to induce students' interest and maintain their motivation to learn. It is, thus, necessary to develop and spread AI services such that both learners and professors are satisfied with the resulting learning performance improvements. To sum up, as a new thing, artificial intelligence technology will be a great challenge to the traditional physical education teaching. It will make teachers face a new working environment, and the teaching mode also needs to keep pace with the times. This requires teachers to learn constantly to improve their core competitiveness. But it's also a good opportunity. On the one hand, it can provide more high-quality learning resources for students, help students find their own interests, so as to enhance students' participation in physical education teaching, and achieve the teaching objectives of "healthy sports" and "Happy Sports". AI-based PE is summarized in terms of learner, educator, and educational work. AI helps learners collect data, analyze the basics, and visualize, enabling them to spend more time on high-level physical activities and practical and virtual

experiences and in interactions between educators and learners. AI supports educators' decision-making by reporting real-time class status to educators and presenting various alternatives to learners' problems. It also effectively assists educators in evaluation and learning management. Finally, AI helps teachers by efficiently assisting in and reducing the time spent on administrative work, helping them invest more time in improving teaching and learning quality. Information service education permits PE teachers to extensively select physical educational technology based on multimedia and network communication and create optimized PE by actively developing and applying information resources. Within the information technology environment, PE teachers need not only modern technology but also new concepts and theories to reexamine their teaching methods across all aspects.

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