Value and Development Ideas of the Application of Artificial Intelligence in Sports Training

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Abstract. In this paper, the value and development dilemma of artificial intelligence (AI) technology in the process of building a sports power are analyzed by literature and other research methods. Combined with the current situation and characteristics of the sports development in China, the following suggestions are proposed for the application of AI in sports: clarify the responsibilities of the state, governments and sports departments at all levels, and provide funds and policy support for the application of AI in sports, develop norms and standards for the application of intelligent products in sports, maintain fairness, justice and social ethics in sports, enhance the training of sports AI talents, facilitate the organic combination of production, learning, and research, strengthen the training of sports practitioners in AI, cultivate their awareness of AI application and information literacy, accelerate the development of data norms and information standards, to provide data guarantee for the integration of AI and sports.

Keywords: Sports Management, Sports Power, Internet+, AI.

1. Introduction

In March 2018, Premier Li Keqiang pointed out in his government work report: “we should strengthen the research and application of the new generation of artificial intelligence (AI) [1-2], promote the Internet+" in the fields of education, culture, and sports, develop intelligent industries and expand intelligent life [3-4]. State leaders put forward “Internet+ sports”, which means that the research and application of AI in sports has risen to the national will and has a very important strategic significance for the establishment of the status of China's sports power. Therefore, how to flexibly apply AI technology to support the development of sports in China is a pressing problem for every sports worker to consider [5-6]. This paper analyzes the value, difficulties, and Countermeasures of sports application of AI, to provide a reference for sports workers to further promote the effective application
of AI in sports and better meet the needs of sports power construction.

2. Value of the application of AI in sports training under the background of sports power

In the report of the 19th National Congress of the Communist Party of China, general secretary Xi Jinping said: “We must accelerate the construction of a sports power.” In the process of establishing China’s position as a sports power, AI, as the most cutting-edge innovation technology in the Internet era, has become an essential force to drive the development of various sports undertakings in China. The core value of sports training applied in AI lies in taking AI as technical support, actively connecting with the development needs of competitive sports, mass fitness, sports industry, and other fields, building a people-centered intelligent sports service system, and providing strong support for the realization of the strategy of “sports power”.

Teenagers are the future of China’s sports and the backbone of accelerating the construction of a sports power. School physical education is an integral part of physical education, and also an important practice base for the implementation of major strategies of AI in China. Relying on the new generation of information technology, such as big data and AI, a new type of sports education ecosystem is built. Its core feature is to help students with personalized sports learning and training, help teachers with scientific guidance for technical tactics and special quality of various sports, assist managers with efficient and orderly school governance, and realize the intelligent coordination of school, family and society Communicate. Moreover, the main teaching objects of school physical education are primary and secondary school students, who are the future force of the development of AI in China. Through the teaching of intelligent knowledge and the use of intelligent products in daily physical education, the information literacy of primary and secondary school students is improved imperceptibly, so as to improve the popular science education system of AI and provide talent reserve for the development of AI in China.

3. Dilemma of AI application in physical training

In the state of physical training, at this time \( T(s,a,s') \), that is, the state transition function is unknown training item \( \theta^{s,a,s} \). The sports training method that relies on AI data is defined as follows: partly observable sports training, using \( <S_P, A_P, Z_P, T_P, O_P, R_P> \) this six-tuple way to describe. \( S_P \) is the cross product between discrete states \( S \) and \( \theta^{s,a,s} \); MDPs has the same set of sports training items \( A \) and \( A_P \). \( Z_P = S \). The state transition function \( T_P(s,\theta,a,s',\theta') = P(s',\theta'|s,\theta,a) \) can be decomposed into the product of two conditional distributions:

\[
T_P(s,\theta,a,s',\theta') = P(s',\theta'|s,\theta,a)
= P(s'|s,\theta,a,\theta)P(\theta'|\theta,a)
= \theta^{s'} \delta^{\theta'}
\] (1)

The following is met:

\[
\delta^{\theta} = \begin{cases} 
1, & \theta = \hat{\theta} \\
0, & \text{otherwise}
\end{cases}
\] (2)
According to the basic definition of AI data, it can realize the effective transformation of sports training problems, which can be transformed into sports training problems. In this problem, because the state is unknown, the probability distribution of the state is regarded as belief. By introducing this concept, we can achieve the training of sports through belief monitoring. Based on the Internet+ update rule, we can get the update of the letter as follows:

\[
b^{t+1}(\theta) = \eta b(\theta) P(s|\theta, s, a) = \eta b(\theta) b^{t+1}
\]

(3)

Where it represents the normalization factor.

In terms of talent reserve, China is still in the initial stage in the cultivation of sports AI talents, and there is a big gap in the “sports + AI” composite talents. The key is to compete for talents in AI. As the talent output base, colleges and universities and scientific research institutes have some problems such as the lack of setting up of sports AI related majors and the lack of mature talent training system. Taking Beijing Sport University as an example, to fully respond to and serve the national strategy of “sports power”, Beijing Sport University formally established the school of Sports Engineering in June 2018 and successfully established new majors such as intelligent sports engineering and biomedical engineering. As a new Department, the perfect training mechanism of sports AI talents is still in development and construction.

4. Application of AI in sports training

In this experiment, a specific vocational technology is chosen as the practice object, and they can be divided into experimental class and reference class. In teaching practice, adjust teaching content, teaching process, pay attention to teaching details according to various evaluation indexes of evaluation system, guide students to carry out three-dimensional and comprehensive evaluation from different points and different aspects, in which teachers' relevant comments and parents' participation are interspersed to make thorough evaluation, and finally realize the school physical education teaching quality evaluation system through continuous adjustment To improve the quality of physical education teaching.

After one academic year of teaching practice, from the 2015-2016 academic year of teaching evaluation survey results of students' teaching evaluation, it can be found that the satisfaction of experimental class students to teachers is slightly higher than that of reference class, and the majority of teachers and students have given a higher evaluation and affirmation to the teaching reform.
Figure 1. Comparison chart of the results of the students' teaching evaluation survey in 2015-2016 academic year.

In each teaching stage, such as goal, method and evaluation are adjusted. Different from before, students have a happy and relaxed learning atmosphere, which greatly enhances their “can do” learning confidence and makes them more interested in learning. When the human brain is excited by good stimulation, the desire for knowledge and unknown is the strongest, and the ability to learn is also relatively strong. Through professional sports skills teaching, students will also consciously form the consciousness of physical exercise in the subconscious. By studying

Table 1. List of evaluation and ranking of physical education teaching in municipal colleges and Universities

| Unit name                        | Self-assessment by teachers | Assessment by students | Assessmen by experts | Parent assessment of teaching | Peer review |
|----------------------------------|----------------------------|------------------------|----------------------|-----------------------------|-------------|
| University of science and technology | 0.9678                     | 0.3133                 | 0.3575              | 0.9581                      | 0.2197      |
| University of Finance and Economics | 0.5859                     | 0.6339                 | 0.3744              | 0.8549                      | 0.2299      |
| Commercial University            | 0.4489                     | 0.4959                 | 0.3944              | 0.6908                      | 0.3864      |
| Polytechnic University           | 0.4603                     | 0.1640                 | 0.1862              | 0.7503                      | 0.1518      |
| Agricultural College             | 0.4444                     | 0.3671                 | 0.2888              | 0.3873                      | 0.4821      |
| School of urban construction     | 0.5807                     | 0.1818                 | 0.2662              | 0.4304                      | 0.1234      |
| University of foreign languages  | 0.4298                     | 0.2978                 | 0.1388              | 0.6666                      | 0.2929      |
| Medical University               | 0.8781                     | 0.3653                 | 0.1442              | 0.3665                      | 0.4746      |
| Academy of Fine Arts             | 0.4272                     | 0.2908                 | 0.1399              | 0.4046                      | 0.4143      |
| Academy of music                 | 0.4511                     | 0.1914                 | 0.1678              | 0.2156                      | 0.1443      |

Note: The data in the table have been normalized.

In the final analysis, the development of AI application in sports depends on professional talents, so it is indispensable to cultivate “sports + AI” composite talents, and the government, universities, and enterprises play an essential role in the process of talent cultivation. The government should provide a guarantee from two aspects of policy guidance and financial support, such as providing special fund guarantee for colleges, vocational colleges and relevant organizations that carry out sports AI
education. As a talent training base, colleges and universities are an important source of AI technology innovation and application practice, and the cultivation of sports AI talents is no exception. Physical education is a subject with distinct educational characteristics. In the process of training sports AI talents, colleges and universities should first tap their own sports advantages, combine the advantages of sports with AI in combination with social needs, and set up corresponding sports engineering majors. In terms of professional curriculum, students should not only have sports human science, sports training, etc. Sports professional knowledge, but also to learn higher mathematics, machine learning, image recognition and other AI professional courses, at the same time, social ethics, privacy protection and other humanities education into the required courses of AI, to help students establish ethics and codes of conduct; schools should also actively encourage students to participate in such as the National College robot competition, innovation and Entrepreneurship of College Students Projects and other intelligent competitions and scientific research projects to improve students' problem-solving ability and innovation ability.

5. Conclusions
In the future, sports will enter the era of synergy between people and AI. The application of AI in sports is one of the core contents of future sports development in China. The integration of AI technology into sports will produce dramatic chemical reactions. Based on more precise automatic detection and intelligent data analysis, the limited training time of athletes will be more valuable to further support their success in competitions and better guarantee public health. Facing the new opportunities offered by the development of AI, every sports professional should keep a learning attitude and an open mind, being a practitioner and leader of AI application in sports, actively exploring the implementation path of AI application in sports, providing scientific guidance for the promotion of public scientific fitness, the development of sports industry, the improvement of coach training skills and athlete competitiveness, implementing the deep integration of sports with AI, to serve for the national strategy of “Sports power”.

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