Trend of Competitive Sports Reform under the Background of Artificial Intelligence

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Abstract. Competitive athlete is a combination of artificial intelligence (AI) and technology. At least in some ways, competitive athlete symbolizes the post-AI. This perspective provides us with judging criteria and helps us identify AI improved by technology as competitive athlete. This study first summarizes the value and current status of artificial intelligence applied in sports, mass sports, sports industry and other fields: In competitive sports, artificial intelligence provides athletes with personalized quantitative analysis of sports, training guidance, and injury prevention and monitoring, provides spectators with a more comfortable and realistic viewing experience, provide referees with a scientific basis for making fairer and more efficient decisions. In terms of mass sports, artificial intelligence provides scientific health management and sports guidance for individuals, stimulating the interest and enthusiasm of the masses in participating in sports. In the sports industry, artificial intelligence enables efficient operation of sports venues and effectively improves the performance of the sports industry.

Keywords: Elite Sports, Competitive Athlete, Athletes, Dope, Artificial Intelligence

1. Introduction
Artificial intelligence is an important driving force for the new round of scientific and technological revolution and industrial transformation. Accelerating the development of artificial intelligence technology is a strategic issue that concerns whether China can seize the opportunities of the new round of scientific and technological revolution and industrial transformation. [1-2] The in-depth application of intelligence in education, medical care, sports and other fields shall be promoted, facilitating the healthy development of China's new generation of artificial intelligence. National leaders explicitly proposed "AI + sports", which means that in the context of global competition, the research and development of artificial intelligence in sports has risen to the national will, which is of strategic importance for establishing China's status as a sports powerhouse. [3-4] Therefore, how to use
artificial intelligence to provide effective support for the development of the main body of sports—competitive sports, mass sports and the development of the sports industry—is an urgent issue that every sports worker in China must consider. Based on this situation, preliminary analysis has been performed from the current application of intelligent technology in sports, development suggestions, etc., with a view to further grasp and promote the effective and reasonable application of artificial intelligence in sports for sports workers, to better respond to technical development trends for providing consultation and references.

Sports is the product of the times in the process of human socialization. In addition to its positive spirit, it also has health promotion functions, entertainment functions, and educational functions. It can meet human spiritual and cultural needs, promote national unity, and promote economic development, tourism development and benign social development. The novelty and high technology brought by artificial intelligence, while promoting social progress, give human society more autonomy and independence. The introduction of artificial intelligence technology into the sports field is an inevitable trend, which is bound to intensify, but how to introduce intelligent technology into the sports field and how to achieve the deep integration of intelligent technology and sports fields are still the main difficulties currently facing. However, with the improvement of modern technology and the progress of professional development of physical education teachers, the introduction of artificial intelligence technology into the field of physical education will surely become a future research theme and research hotspot. In this paper, focusing on the study of semi-mechanical athletes, the changes that semi-mechanical athletes can bring to the future development of elite sports are interpreted from the perspective of ethics.

2. Training of competitive talents
Introducing smart devices into sports systems and adding smart components to them can collect athletes' body composition information and sports component indicators and other data, collecting various kinds of sports information into an information resource library. Storage, analysis and sharing cannot only be used to track the athletes' trajectory, but also reflect the personality and common qualities of outstanding athletes. For example, the Sport VU system is also called the player tracking analysis system. It was originally used in the military field, and now it is gradually introduced to some professional sports events. A set of fixed cameras is used to track and collect athlete data, and then analyze and identify in time according to the data of each game, and establish different tactical models.

Table 1. Sources of competitive sports talents in colleges and universities

| Source of athletes | Number | Percentage (%) |
|--------------------|--------|----------------|
| Athletes in service of the provincial professional team | 54 | 10.8 |
| Retired athletes | 81 | 16.3 |
| Sports school athletes | 206 | 41.4 |
| Athletes in the traditional school of Physical Education | 146 | 29.3 |
| Ordinary college students | 11 | 2.2 |

Competitive sports coaches at colleges aged 36 ~ 55 account for the vast majority of the total number, which shows that colleges and universities keep a relatively stable state of the introduction of coaches and the retirement and resignation of elderly coaches, with the number of coaches aged from
36 to 46 accounting for the majority, that is, the number of young and middle-aged teachers as the core force, which shows that college coaches are full of vitality and belong to the backbone of the whole coach team. As teaching time extends, there will be great opportunities for coaches of this age to grow and develop. The statistical results are shown in Table 2 as follows.

**Table 2.** Age of college coaches

|        | Above 55 | 46-55 | 36-46 | 26-46 | Less than 26 |
|--------|----------|-------|-------|-------|--------------|
| Number | 3        | 16    | 24    | 5     | 0            |
| Percentage | 6.3  | 33.3  | 50    | 10.4  | 0            |

3. **Analysis of competitive sports reform trend**

In our traditional concept, the competitive athlete has superhuman features and abilities, combining AI nature and technical implants, and has the defining features of the popular concept of competitive athlete. These two definition elements play a key role in the academic debate on sports players.

In the state of school competitive sports training, then \( T(s,a,s') \), i.e., the state transition function is an unknown training item \( \theta^{a,s} \). This paper defines the training methods of school competitive sports relying on AI as follows, that is, some of them can observe the training of school competitive sports and make use of it \( <S_p,A_p,Z_p,T_p,O_p,R_p> \). The six tuple approach is described. \( S_p \) represents a discrete state \( S \) and \( \theta^{a,s} \) A set of sports training events with consistent \( A \) and \( A_p \). \( Z_p = S \). 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:

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

Where \( \delta^{a\theta} \) represents a Kronecker function, satisfying:

\[
\delta^{a\theta} = \begin{cases} 
1, & \theta = \theta' \\
0, & \text{otherwise}
\end{cases}
\]

Based on the basic definition of AI, it can realize the effective transformation of school competitive sports training, and then it can be transformed into school competitive sports training. In this problem, since the state at this time is unknown, so \( b(s) \), i.e. introduction status \( s \) By introducing this concept, \( \theta \) by introducing this concept, \( b(\theta) \) Updated as follows:

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

Where \( \eta \) is the normalization factor.

The introduction of computer technology has had a significant impact on the development of sports events, especially in sports applications. While satisfying the audience to appreciate sports events, it
can also objectively and fairly evaluate sports events and reduce referee disputes on the playing field. For example, the current Hawkeye system uses high-speed cameras at different angles to capture the flight trajectory of tennis or volleyball in high-speed movements in high-speed movements, determine its precise landing point, and assist in the decision of the event. The electronic real-time judgment system in football can accurately determine the offside or suspected goal situation generator during the game.

The government obtains strategic determination through strategic research and top-level design, and provides support and guidance for the application of artificial intelligence in sports from aspects such as organizational management, financial support, and security regulation. It actively mobilizes and guides colleges and universities of sports, sports event associations, high-tech companies, etc., to participate in the research and development through various policy measures, implement major projects in artificial intelligence in sports applications, transform and apply the scientific and technological achievements, and strengthen the collaboration and deep integration of multi-innovation subjects; (2) increase the number of sports artificial intelligence talents Cultivate strength. Colleges and universities are important bases for talent training. In the process of cultivating sports artificial intelligence talents, in addition to combining their own sports advantages and social needs, they should actively apply for sports engineering majors. They should also cooperate with well-known universities, research institutes, and artificial intelligence companies at home and abroad. To form a cross-disciplinary and cross-regional research community, establish a cooperative relationship for personnel training, and realize the learning needs of different learners through joint training or mutual recognition of credits; around the core areas of artificial intelligence frontier dynamics and sports practice, in intelligent sports equipment, sports biomedicine collaborative research is carried out in engineering, big data precision training, etc., to strengthen students' scientific research and practical ability in the form of topic research; to comprehensively strengthen the innovation incubation and practical application of sports science and technology. By regularly conducting international conferences on the theme of “Artificial Intelligence + Sports” and forming international academic teams, it organizes and analyzes the latest developments in the world's science and technology, and concentrates multiple forces to build science and technology incubation projects on the basis of complementary resources and talents; (4) Accelerate the development of sports artificial intelligence data specifications and evaluation standards. The government should cooperate with sports research institutes, related sports enterprises and other innovative entities, and on the premise of focusing on the long-term development of China's sports, formulate a unified smart sports data standard, and conduct data from data collection, transmission, analysis, and application. specification. According to the application of smart technologies such as smart stadiums and smart sports equipment in sports, establish smart sports evaluation standards, regulate the use rights and effects of artificial intelligence technology in sports or games, and promote the healthy development of smart sports.

4. Conclusions
The application of artificial intelligence in sports is in the deepening research stage in China, and it is the core competitiveness of promoting sports development. If China's sports development does not fall into a passive situation in the world, it must be supported by emerging technologies. Facing the new opportunities for the development of artificial intelligence, every sports worker should soberly
recognize the advantages and disadvantages of artificial intelligence technology in sports applications. Focusing on the core areas and development pain points in the process of sports development, gather the strength of multi-innovation players such as sports artificial intelligence companies, sports research institutions at home and abroad, and actively explore corresponding solutions and implementation paths with an open, cooperative, and inclusive attitude, comprehensively promote the deep integration of sports and artificial intelligence, and serve artificial intelligence for the national strategy of a "sports power" It is an already semi-mechanized existence, and athletes are the standard paradigm for sports people. As a symbol for the post-AI presence, competitive athletes are rather an insubstantial existence than a real entity.

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