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ANALYSIS OF THE USE OF AI IN THE TRAINING AND COMPETITIVE PROCESS OF ATHLETES: ACHIEVEMENTS AND PROSPECTS

Over the past decade, AI has played a significant role in many areas of life, including sports [4].

The application of AI in sports typically begins with the analysis of various data. Machine learning technologies and data analysis enable coaches and specialists to conduct a deep analysis of statistical calculations, assist in identifying the strengths and weaknesses of athletes or teams, develop game strategies or competitions, and make decisions during these events [4, 7].

AI in sports is primarily used for the analysis of video information regarding various parameters of athletes' movements. Computer vision systems allow for the analysis of training and competition videos, determining athletes' movements, and evaluating their technique, and efficiency of their actions. This helps coaches identify mistakes, develop individual training programs, and improve athletes' performance. This also helps create a more objective system of judging in sports with subjective perception and evaluation of athletes' actions [1, 2].

Gymnastics has recently been significantly influenced by data analysis technologies, allowing coaches and athletes to obtain valuable information to improve training processes and enhance performance in competitions. One of the primary methods of data processing considered here is the use of video analysis. It enables one to identify errors and inaccuracies, develop individual training programs, and improve the technical and choreographic preparation of gymnasts. In addition to video analysis, inertial motion sensors, light sensors, and other data collection technologies are used. These devices measure various parameters of

complex coordination movements, evaluate physical fitness, and movement mechanics, and improvement of athletes' technical skills [2, 3, 4, 9].

Overall, data analysis through AI is becoming an increasingly important tool for coaches and athletes in achieving the highest results. Among the most significant expectations, one can name the possibility of improving athletes' technical skills, which will contribute to reaching new heights in their careers and the progress of the sport [4, 5, 6].

Finally, AI plays an important role in the practice of modern gymnastics training. It serves as a tool for talent selection and development, provides new opportunities for identifying and developing future champions, and contributes to the objectification of judging at world-class competitions. One of the key aspects of using AI is the analysis of biomechanical data. With the help of modern motion sensors and other technologies, experts obtain detailed information about the technique of performing movements, distribution of forces, and load on the athlete's body. This allows coaches and athletes to understand weaknesses and risks, develop individual training programs, improve athletes' technical skills, provide immediate feedback, and the ability to adjust technique. Computer vision systems can automatically detect errors and inaccuracies in movement execution, providing judges with the opportunity for objective, instantaneous, and error-free evaluation of the difficulty of gymnasts' competitive programs [2, 4, 8, 9].

Moreover, AI is used for predicting training and performance results. Through the analysis of various factors such as athletes' physical condition, training volume, weather conditions, and others, machine learning algorithms can predict potential outcomes and assist in determining optimal strategies to achieve set goals [3, 5, 6].

Thus, AI quickly becomes an essential tool in the world of sports, opening up new opportunities for improving all processes and outlining new trends in its application, including:

1. Processing large volumes of data. Modern sports generate enormous amounts of data on training, performances, and physical indicators, and AI helps analyze these data quickly and efficiently.
2. Personalization of training programs. AI allows for the development of individual training programs for each athlete, taking into account their needs, strengths, and weaknesses.
3. Analysis of technical elements. With the help of computer vision systems and machine learning algorithms, it is possible to analyze the technique of performing various elements and identify errors, which helps improve gymnasts' technical skills.

4. Prediction of results. AI can predict potential outcomes of training and performances, helping coaches and athletes develop optimal strategies to achieve their goals.

5. Application in rehabilitation and injury prevention. AI is used to analyze injury risks and develop personalized rehabilitation programs, helping to accelerate the recovery process.

In summary, AI plays an extremely important role in artistic gymnastics. Its use opens up new opportunities, helping coaches and athletes, judges, and analysts make more informed and effective decisions to improve results and reach new heights in the world of objectifying competition judging. The application of AI in artistic gymnastics has significant potential for further development. However, for now, we can observe that it cannot completely replace the human factor.

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