Sports analytics as a subject of education

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Abstract

The article discusses the need to teach sports analytics as a subject in educational institutions for physical education and sports specialists. It provides a brief overview of the emergence of the term and concept of analytics. Additionally, a framework for the application and development of sports analytics is proposed.

Keywords: sports analytics, data processing, video analysis, tracking technologies, artificial intelligence in sports, performance prediction, tactical analysis, biometric indicators, load monitoring, Expected Goals (xG), Corsi, Fenwick, PER, Hudl, Wyscout, Opta, InStat, Catapult, Tableau, Power BI, comprehensive control, scientific and meth*odological support, sports educational programs.*

Introduction

A powerful tool that has transformed game strategies and training practices. The data obtained helps evaluate results in real-time and allows for predicting future performance based on an athlete's or team's past and current statistics. This is precisely what lends sport its spectacle and motivation.

The scope of sports analytics history is not extensive, as it has developed unevenly across different sports. For example, in football, it only emerged in the mid-20th century. In the 1950s, European clubs began systematically collecting match data, focusing on players' successful and unsuccessful technical and tactical actions, goals, assists, and shots. In the 1960s, the renowned magazine World Soccer was founded in Great Britain, which was among the first media outlets to pay attention to statistical research. However, these data were used only for general record-keeping, without deep analysis of the game.

One of the important milestones in sports analysis was the publication of the book *The Hidden Game of Football* (1988) by Bob Carroll, John Thorn, and Pete Palmer, dedicated to a method in American football. Their research opened up possibilities for applying more precise and complex analysis methods related not only to effective actions but also to athletes' physical fitness and other hidden indicators.

The 1990s marked the integration of video technology into analytics. At that time, football clubs in Europe first used video analysis, which allowed for a deeper study of game moments. Since then, it has become possible to analyze and interpret players' movements, their positioning on the field, and their interactions with teammates in detail.

Methods

In the early 2000s, football began implementing the "spider" or "spider-cam" system - a cinematographic setup that uses a gyro-stabilized camera suspended on cables, which moves above the playing field, providing unique and dynamic aerial shooting angles. This technology enables capturing clear, shake-free images and opens up new possibilities for tracking player movements and on-field events. It has provided a vast amount of data, significantly expanding the potential for analysis.

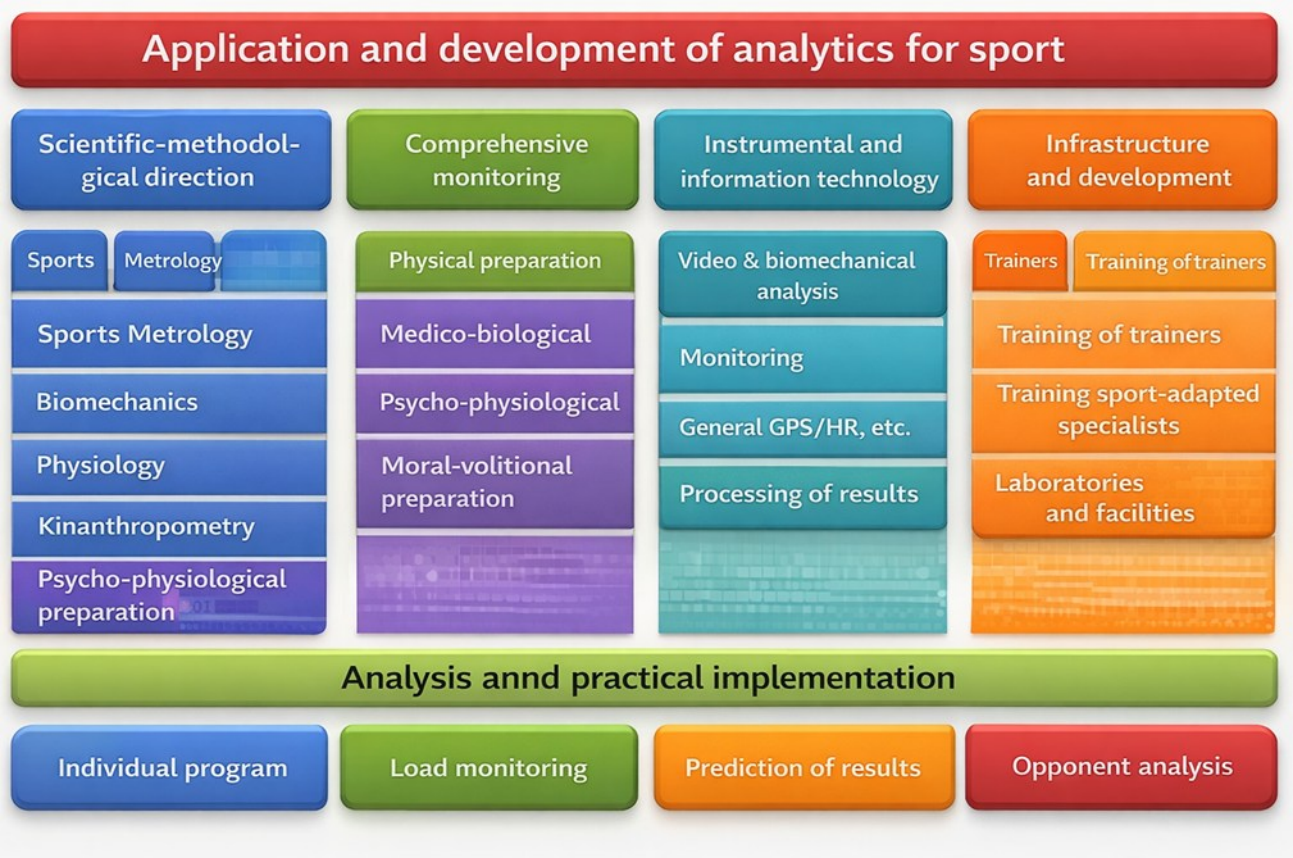
Today, it's hard to imagine a professional club in any sport without analysts on staff. Their work has made it possible to improve game tactics, anticipate opponents' actions, and conduct better player selection. Data processing systems are applied even in injury prevention: artificial intelligence predicts potential injuries using athletes' biometric indicators.

Result and discussion

During the match, analysts adjust the game in real time. Through the programs, they identify the vulnerabilities of both their team and the opposing team, offer tactical solutions, and make predictions.

Analysts' work after the match is based on meticulous data collection and the compilation of specialized metric reports. In football, for example, the Expected Goals (xG) metric is

Table 1. Sports analytics



used, which assesses the quality of goal-scoring opportunities, taking into account the distance to the goal, the angle of the shot, and the pressure from the defense. In hockey, Corsi and Fenwick indicators are used to assess puck possession, while in basketball, a Player Efficiency Rating (PER) is used, which shows the contribution of each team member.

Video analysis allows for frame-by-frame breakdown of matches, marking key moments - shots, interceptions, or passes. Players can examine their mistakes in detail and evaluate opportunities for improvement. For example, a hockey player learns how to better position themselves during power plays, while a football player learns which of their actions lead to defensive failures.

Modern sports analysts use a wide range of advanced tools and programs. Here are some of them.

Hudl and Wyscout. These are used for analyzing game footage, providing detailed breakdowns of match progress and player performance.

Opta and InStat are statistics aggregators for football, basketball, and hockey. These platforms track thousands of events in each match.

Catapult is a leading brand of tracking devices for measuring athletes' physical activity on the field.

Tableau and Power BI are visualization tools that transform complex data into intuitive dashboards for coaches and management.

Sports analytics as a subject in educational institutions:

Each year, the role of analytics in sports continues to grow, bringing new approaches and innovations in making complex and important decisions. Examples of successful data application are increasing, confirming the importance of science in achieving sports excellence. In this regard, there is an urgent need to train specialists in the field of physical culture and sports who can analyze, make suggestions for adjusting the training process, and predict the best results and periods for reaching peak physical fitness. For this purpose, we can propose the following four main blocks of directions, which we have conditionally divided (see diagram-1):

- Scientific and methodological direction;
- Comprehensive control;
- Instrumental and information technology;

- Infrastructure and education.

It is also important to consider the relationship with disciplines and the stages of mastering skills and abilities to apply specific types of data. Only a competent and comprehensive approach can forecast the best recommendations for making important and complex decisions.

Conclusion

It is also important to consider the relationship with disciplines and the stages of mastering skills and abilities to apply specific types of data. Only a competent and comprehensive approach can forecast the best recommendations for making important and complex decisions.

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