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The Impact of Artificial Intelligence Development on the Iranian Sports Industry

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ABSTRACT

This study is aimed to The Impact of Artificial Intelligence Development on the Iranian Sports Industry. Applying qualitative, inductive research through technological determinism theory, the study employs a literature review and semi-structured interviews with 10 sport professionals. Inductive coding and line-by-line examination of interview transcripts was employed as a method of data analysis that led to the determination of AI's various effects on the sports industry. AI is leading significant innovation across the sports industry. Top innovations are enhanced performance analysis, greater fan personalization, virtual and augmented reality experiences, and innovative smart, wearable sports equipment. These innovations promise greater sport performance, greater fan experience, and greater operational efficiency across the sport industry. AI holds a lot of promise to transform the sports industry, as evident through athletic performance optimization, fan experience, and overall sector efficiency. However, a more detailed analysis of challenges and prospects for the application of AI in sports is required.

Keywords: Artificial Intelligence; Sports; Fan Experiences; Virtual Reality.

Introduction

The catch phrases of artificial intelligence, particularly generative AI (GenAI), have driven world socio-economic progress over the past couple of years. Forecasts are even sharper that by 2026 the AI market will expand by 19% each year to reach $900 billion [1]. Likewise, this very same technological trend is reshaping the multi-billion-dollar sporting world. The market for AI-driven sports technology alone will expand from $1.85 billion in 2023 to $6.59 billion in 2028 [2]. That impact goes far beyond numbers, though. AI is, quite literally, redefining the very means of sporting activity, practice, and even enjoyment. Take a football coach who can predict, through data uploaded by wearable sensors, which players are likely to get hurt and take preventive measures ahead of time. Or a team that uses historical data and opponent behavior patterns to enhance strategy and make better live decisions. These are just a few of the ways that AI is being leveraged in sport. By summing up and analyzing vast amounts of data, AI provides valuable insights for coaches, athletes, and sports business executives. They can boost athletic performance, optimize team strategy, guide game predictions, and provide fans with more engaging experiences [3]. From identifying talent and shaping the training program to marketing and management of fan relationships, AI is being integrated into each aspect of the sports ecosystem. For instance, in 2022, a Stanford University study unearthed the fact that the accuracy of predictive sports injury can be 25% more enhanced if based on machine learning algorithms [4].

NBA teams like the Golden State Warriors are using AI to enable player movement data analysis and optimizing defensive strategies [5]. Moreover, AI is being utilized to maximize fan experience in stadiums. For example, facial recognition tech can identify fans and offer customized services [6]. But with this transformation comes its challenges. Athlete data privacy, data validation, and training requirements for professionals are essential challenges to resolve [7]. It is also crucial to make sure that there are equitable accesses for all athletes and teams to these technologies. There are concerns that have been raised as well in terms of the impact of AI on equitable competition and the diminished role of human judgment in making sports decisions [8]. Due to the rapid growth of AI in sports and its far-reaching consequences, there is a need for increased research in this field. A critical examination of AI applications, opportunities, and risks can help policymakers, coaches, players, and other stakeholders make informed decisions and minimize potential adverse effects. This essay attempts to offer a contemporary and in-depth analysis of AI in sport, together with practical recommendations for its optimum application. For this purpose, it takes into account future trends and prospects. The question underpinning this study is: How might AI transform sport, and what challenges and opportunities lie ahead?

Theoretical Framework

Applications of AI in the Sports Industry and Future Outlook

A. Current Applications of AI in Sports

Artificial Intelligence has been used more and more in the sport sector. The present AI systems can gather and process gigantic volumes of information from varied sources, ranging from sensors and video cameras to world-wide-web-based sources, and build knowledge on player performance and competition planning [9]. The knowledge can range from competition technical features (i.e., speed, endurance, accuracy) to tactic and strategy issues, such as positioning and competition scenarios [10]. AI is increasingly used to create personalized training programs, detect performance weakness areas, and create focused ameliorations for weaknesses [11]. Wearable AI and associated technologies enable players, via performance and body condition monitoring, to maximize and monitor performance and gain insight into body condition. The technologies can supply game mechanics and strategic variables' analysis on a real-time basis and enable the players and the coach to make data-based decisions [12, 13]. AI is also used for athlete health and welfare surveillance, e.g., monitoring heart rate patterns and identifying anomalies [14].

B. Emerging Trends and Future Potential Opportunities of AI in Sports

AI is already fast-tracking the sport industry. With the ever-changing nature of tech and its growing usage, fresh trends are being defined that can positively impact the performance of athletes, operations, and consumer and athlete experiences. They are being investigated and introduced across all phases of the industry, and the key to a most interesting and innovative future lies here [12]. The most significant are as follows:

1. **Predictive Analytics** – The use of predictive analytics supported by AI is involved in collecting and integrating different forms of data (e.g., player performance data, weather, past play behavior) to make predictions for game outcomes, performance patterns, and future risks more accurate. The models guide the trainer on customizing training schedules, strategy formulation, and risk management. For example, forecasting the likelihood of a player getting injured from performance patterns could prevent injuries and enhance game planning [10].

2. **Immersive Technologies / Extended Reality (XR): Virtual Reality and Augmented Reality** – Virtual reality and augmented reality offer enormous potential for the growth of training, learning, and sports watching experiences. AR and VR can be utilized by athletes in practice with specific skills. AR has the capability of overlaying real-time information—performance rating, teammates' location, and opponents' strategy—on the athlete's visual field during training or competition. The technologies enhance the viewing experience of the spectating public by incorporating interactive and visual components to real-time events, thus making sport more informative and entertaining [15].
3. **Automated Talent Scouting and Discovering** – The use of AI can enable automated sifting through player performance and game video to identify patterns suggesting raw, yet undiscovered talent. Such platforms enable sports organisations to identify up-and-coming players and hidden talent domestically and internationally [14].
4. **AI-Based Diagnosis and Treatment** – AI application is beneficial to provide early diagnosis for injuries, medical image analysis, and customized planning for treatment. The efficacy and speed of treatment for injured players are enhanced [16].
5. **AI-Driven Sports News** – The sport journalists may be aided by AI during data compilation and analysis, summarizing, and even automated post-match news story generation. Such features can make sports news coverage faster and better [17].
6. **Customization through Machine Learning** – Machine learning can be utilized to tailor training schedules, nutrition regimens, and rest patterns based on each athlete's needs. Customized actions like these can enhance one's performance as a performer while reducing the danger associated with becoming injured [18].

Sport is already undergoing a revolution driven by artificial intelligence, and this is already bringing unprecedented opportunities to enhance sport performance, administration procedures, and fan support. As the future years continue to advance AI, applications for AI will keep expanding, and further growth and development prospects across sport will be achieved.

Methods and Materials

Technological determinism as a theoretical perspective is used here to explain the impact of artificial intelligence (AI) on the Iranian sport system and industry. Technology, while holding this theoretical perspective, drives the social and cultural norms in motion rather than getting conditioned by them [19, 20]. The work also borrows from the idea of “enchanted determinism” proposed by [21], where a kind of a “superhuman” precision and vantage point on a problem is brought about by AI and, on the other hand, hides the step-by-step process on how its decision is made.

Compilation of data necessitated seeking out a widely ranging group of global experts on sport and emerging technologies. The inclusion criterion required participants to have a minimum of five years’ extensive sport industry work experience on a full-time basis, along with ongoing career paths having closest proximity to human resource, innovation, and/or technological changes in the sport industry. In a bid to uphold ethical standards, all interview participants were anonymized. The interview participant selection criterion was designed to be aligned with the study objectives and theoretical underpinnings.

A purposeful sampling strategy was used to select participants most likely to provide informed and relevant information on the sports industry and AI influence. Special care was taken in selecting practitioners who operate where human resource,

AI, and sport business intersect, i.e., those working under volatile and evolving industry forces from a multidisciplinary approach. The final outcome was the acquisition of rich and heterogeneous information on the sports industry and its interaction with AI.

Between January and February 2025, more than 100 interviews were conducted with global experts in sport and technology industries, of which 10 written interviews were successfully completed. Although the sample was extensive, the methodology strictly adhered to an inductive qualitative study founded on technological determinism. The participants were intentionally chosen because they work with ever-evolving industry dynamics and can provide an integrated view of the sector. Each interview was conducted in writing, supported with follow-up questions for amplification and clarification.

Member checking was implemented during data collection to ensure interpretive fidelity, allowing participants' voices to be recognized and accurately represented. Quoting and summarizing were employed extensively to maintain fidelity and clarity in presenting participant insights. On average, it took interviewees 30 minutes to respond to the pivotal question: *"What are the future trends and future development opportunities for artificial intelligence in sport?"* The interviewees agreed to be quoted and were provided with a written advance view of the authors' abstract so they could approve it before finalization.

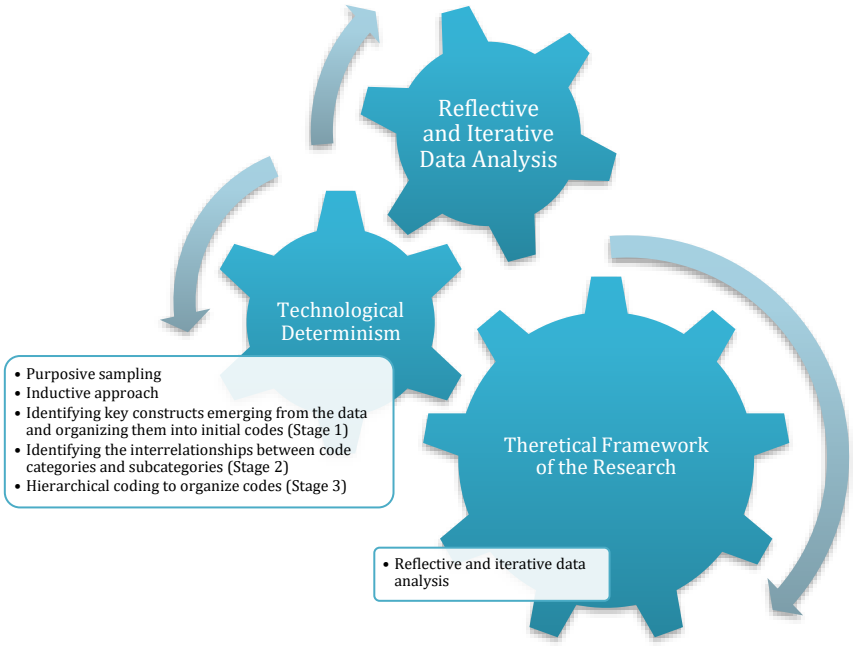
The qualitative research method utilized throughout enabled in-depth data collection and the creation of novel conceptual knowledge from the analysis and synthesis of information. Given the changing and transformative nature of the research question, expert involvement served as a fulcrum for sense-making regarding the dynamic alterations in the world of sport. Moreover, the qualitative approach was particularly valuable as it is not constrained by the drawbacks of quantitative methods. Focused on addressing the essential "why" and "how" questions concerning the diffusion and use of AI technologies, and the multifaceted impacts within the sports ecosystem, the method centered on capturing rich, detailed data and iterative learning.

Data analysis followed a robust, iterative, and reflexive process aimed at extracting a comprehensive understanding of the formative impact of AI on the sport industry. As outlined through a broad literature review, analysis proceeded in several stages, each involving deeper comprehension and higher-level abstraction. In the first phase, inductive classification identified and labeled important patterns from participants' perspectives. In the second phase, close readings of interview data were conducted to achieve a comprehensive understanding. Major concepts were identified, and novel themes emerged through line-by-line reading.

Findings were organized hierarchically according to their interdependencies, providing a rational basis for integrating empirical insights with theoretical foundations. This facilitated a systemic, iterative, and reflective multi-step analytical process from which rich findings about the impact of AI on the sport industry were developed (see Figure 1).

Figure 1.

Diagram summarizing the research process.



Findings and Results

The respondents of the research identified the following major emerging trends in artificial intelligence in the sports industry:

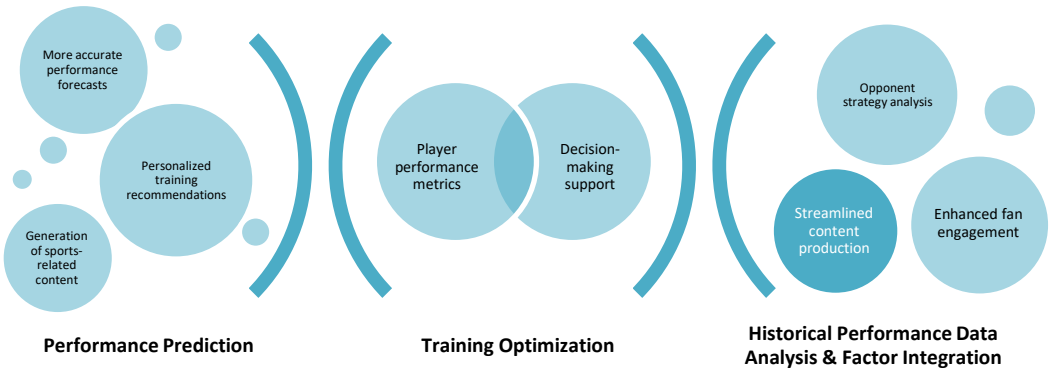
1. **Enhanced Performance Analytics** – AI-powered performance analysis is leaving its impact on the entire sports industry. Machine learning algorithms process large volumes of data (e.g., biometric data, movement patterns, game data, and training and recovery session data) to gain deep insights into athletic performance, injury prevention, and strategic decision-making. These insights can range from injury risk prediction, optimization of training programs, identification of individual strengths and weaknesses, to forecasting competition performance. For instance, a player's movement pattern can be analyzed to identify links to specific injury risks so that preventive measures can be implemented in advance [4].
2. **Improved Fan Experience** – Artificial intelligence is increasingly used to enhance the fan experience through personalized engagement. AI algorithms monitor fan preferences, behaviors, and social media activity to provide tailored content suggestions, targeted marketing campaigns, and interactive chatbot services. This includes sending promotional materials based on individual interests, recommending matches aligned with personal preferences, and addressing fan inquiries and complaints via chatbots [15].
3. **Use of Extended Reality (XR) Technology** – XR technologies, including VR and AR, are gaining traction across the sports world. They enable interactive and immersive experiences, such as viewing games from new perspectives, engaging in virtual practice sessions, or participating in life-like game simulations. For example, players can refine specific skills using VR, while spectators can enhance live viewing with AR overlays that provide interactive, real-time information [22].

4. **Personalization of Fan Experience** – AI technologies can learn fan behaviors and interests to deliver highly customized experiences, including tailored content suggestions, match recommendations, and targeted advertising. This is achieved by mining social media data, purchase history, and user ratings to maximize fan engagement [6].
5. **Game and Resource Scheduling** – AI can assist with game scheduling, time management, and allocation of resources such as equipment, venues, and personnel. It also supports weather forecasting, traffic coordination, and logistical collaboration between teams and event organizers [1].
6. **Developing Sportsperson Skills** – AI-enabled tools offer personalized training programs and educational games for athletes. These include targeted drills, instant feedback, and analyses of strengths and weaknesses. For instance, a video-based training platform can help basketball players improve shot accuracy by analyzing their form and suggesting corrections [18].
7. **Match Outcome and Event Prediction** – AI systems are employed to predict match outcomes and events based on a wide range of data inputs, including historical team performance, real-time match conditions, and player fitness levels [13].
8. **Analysis and Criticism in Real Time** – AI software analyzes game footage and delivers real-time feedback to players and coaches, highlighting mistakes, identifying strong and weak points, and recommending improvement strategies [17].
9. **Enhanced Safety for Athletes** – AI-driven monitoring of biometric data enhances athlete safety by enabling early injury detection and supporting efficient recovery strategies. For example, physiological data analysis can track physical stress levels to reduce injury risks [14].

These findings provide only a glimpse into the extensive and growing applications of AI in the sports industry, with further innovative uses expected as the technology continues to evolve (see Figure 2).

Figure 2.

Thematic framework of the findings



Discussion and Conclusion

Artificial intelligence usage in the sports industry is increasing robustly, fueled by several significant trends and potential future innovations that are shaping its trajectory. Among them are top upcoming trends like advanced performance analysis, personalized fan experience, virtual and augmented reality immersion, and AI-enabled sports equipment and wearables. These technologies carry great potential to improve the performance of sportspeople, fan engagement, and operational efficiency for everyone in the business, with a very good chance of remapping the entire sports landscape. These developments are already influencing the world of labor and will likely exert an even greater impact in the years to come. An obvious case in point is the development of big data analysis, fueled by tracking systems and sensor-enabled wearables. The data enables more precise pattern recognition of athlete performance, facilitates finding strength and weakness, and allows training regimes to be personalized, resulting in better performance and reduced sports injuries. AI is also vital in fan engagement. Machine learning programs are employed to develop highly customized fan experiences, including making users access content, information, and interaction that is customized to their tastes. The customization increases fan interaction and loyalty. Virtual and augmented reality experiences are also being enhanced by AI. Virtual and augmented reality experiences can be utilized to aid in the training of athletes through the offering of virtual practice environments and interactive experiences for fans. The introduction of AI-powered smart sports wearables and equipment will revolutionize the sports scene. These technologies can offer real-time performance feedback, help prevent injury, and enable constant athlete development. In the future, with AI technology, we can expect even more precise and effective applications in performance prediction, decision-making processes, and personalized training systems. These advancements will help players, coaches, and teams make more intelligent and tactical decisions and improve their performance. Ultimately, AI will greatly transform the sports ecosystem, enhancing its attractiveness as well as overall efficiency.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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