RESPONSIBILITY OF ARTIFICIAL INTELLIGENCE USERS IN SPORTS EVENTS

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Abstract: *The artificial intelligence market has experienced considerable growth in recent years. Artificial intelligence refers to technology that imitates human tasks and has a form of cognitive capability, often utilizing machine learning as a method to learn from data and simulate these tasks. The expansion of technology in the field of sports is progressing rapidly and transcends boundaries. Artificial intelligence has significantly increased the number of sports enthusiasts in various domains, from ticket sales systems to player statistics, and has developed strategies for sports games, assisting in complex analyses during competitions. Advanced technology and digital services, including artificial intelligence, bring extraordinary promises and notable benefits, especially in the form of increased demand for monitoring and tracking players, data analysis, enhanced efficiency and timely accuracy, serious changes in the sports and financial industries, and judicial, disciplinary, and administrative proceedings. They have created a wide range for sports betting and predictions and increased the capacity for detecting doping. However, the emergence of these technologies has been accompanied by growing public anxiety regarding the potentially detrimental effects on individuals and the challenge of leveraging these capabilities impartially and fairly towards vulnerable groups and society as a whole. Therefore, ensuring that individuals and organizations are appropriately accountable for the adverse effects of their actions on others is essential to establish and maintain a foundation for reliable and peaceful social cooperation and coordination. This includes commitments to ensure the existence of effective and legitimate institutional mechanisms to prevent human rights violations that these technologies may cause and to promote the health and safety of the collective and social environment.*

Keywords*: Artificial Intelligence, Responsibility, Users, Data, Algorithm*

Introduction

We know that the world of sports is evolving and changing rapidly. The emergence of a technology called artificial intelligence has significantly increased the level of audience interaction and strategic games. Esports is, in fact, a result of advancements in artificial intelligence science in the world of sports. Artificial

intelligence in sports makes the world smarter for athletes, broadcasters, advertisers, and ultimately viewers who can receive real-time statistics. In addition, one of the benefits of artificial intelligence is its central role in sports prediction, which facilitates informed decision-making processes. Given the positive impact and precision that this technology brings to the field, there is no doubt that artificial intelligence solutions for sports will flourish in the future. These techniques and parameters are crucial in training for assessing athletes' performance quality and also for coaches in optimizing training sessions (Rezaei et al., 2015).

The artificial intelligence market in the sports industry has experienced noticeable growth in recent years. This growth can be attributed to advancements in artificial intelligence technologies, increased investments from sports organizations, and the growing demand for data-driven insights. For example, the global sports analytics market is expected to reach a value of $22 billion by 2030. If a player can improve their training level with basic parameters, they can certainly shine on an international level as well. The use of artificial intelligence applications will elevate the level of competitions even at the global event level. Additionally, artificial intelligence can also be utilized in developing sports tourism, where the use of digital tools will bring numerous benefits to businesses and stakeholders in the sports tourism industry (Salahi Kajooru et al., 2020). This research is aimed at developing the utilization of artificial intelligence in the sports industry.

Research Findings

Artificial intelligence analyzes data obtained regarding an individual's indicators to improve the individual and team performance of a sports team. In sports like football and basketball, the amount of running and individual mistakes in various fields can be used as parameters for evaluation and analysis. In combat sports like karate and taekwondo, the athlete's positioning on the mat, along with points lost and points received, can serve as evaluation and analysis parameters, while in stadiums, fans will be able to choose views from multiple camera angles and immerse themselves in the action (Naghibi et al., 2021).

For an athlete to succeed and become a good champion in their field, they must understand how to achieve their sports goals. For example, in football, any player who can effectively use the intensity of the kick on the ball, which depends on the distance of the ball from the goal line, becomes a skilled scorer and passer. Here, artificial intelligence acts as software that analyzes the basic parameters of each sport and provides its analytical report based on the athlete's data, bringing them closer to enhancing their level. Just as in 1997, the first victory of a computer against a world champion occurred in chess. The emergence of new technologies like artificial intelligence acts as a personal coach, playing a significant role in shaping the future of athletes (Pourbariki et al., 2021).

Impact of Artificial Intelligence on Sports Users and Requirements

The expansion of technology in the field of sports is rapidly transcending boundaries. Artificial intelligence, from player statistics systems to ticket sales, has significantly increased the interaction of sports enthusiasts and has developed strategies for sports games, assisting in conducting complex analyses after competitions and making the experience of game fans more engaging. In the following sections, we will examine the impact of artificial intelligence on various users in the sports industry.

1. Sports Data Analysis

Artificial intelligence is essentially written as software that presents its results regarding methods to achieve a goal. The use of artificial intelligence in the world of sports has made competitions more engaging for viewers and fans, and its transformations in the sports domain have gradually become evident, fundamentally changing the world of sports. The use of artificial intelligence activates and measures the determining factors affecting the force used in training. The obtained parameters can be matched with the development of intelligent methods, and practicing these techniques is crucial for optimizing the sports industry (Rezaei et al., 2015). Teams can analyze opponents' data to identify patterns and trends, allowing them to have the best lineup during games and make tactical adjustments in real-time for victory.

2. Player Performance

Artificial intelligence significantly impacts player performance, which is the most crucial aspect of competitions and the analysis of injuries that may occur in the near future. Thanks to predictive analysis, artificial intelligence is used in sports to enhance performance and health. With the emergence of wearable technologies and sensors, athletes can prevent serious injuries. However, this is just the beginning. Artificial intelligence can assist teams in forming strategies and tactics while maximizing their strengths. For instance, sports cameras not only add visual appeal to the game and competition but are also used to assess performance levels and improve team strategies. The detailed data captured by these cameras is analyzed by artificial intelligence, allowing coaches to gain valuable insights into their teams' strengths and weaknesses as well as those of their opponents. This applies to all sports, from football to tennis, and even handball and swimming.

3. Smart Coach Assistant

Oxford University and DELOITTE foresee a bright future for robots in various professions. While it is unlikely that robots will replace coaches in the next

two decades, they may evolve into professional coaching assistants. The analytical departments of professional teams will be able to track athletes both on and off the field and create a database related to all information about players, including their current conditions, strengths and weaknesses, field dynamics, and more. Beyond that, coaches can benefit from machines that analyze competitors. The analysis of large data sets with speed and accuracy results from combining sports analytics and artificial intelligence. This was precisely what the coaches of Atletico Madrid used in the 2013-2014 season to examine the strategies of other teams in La Liga in detail. They watched all game videos, which is challenging for humans, and analyzed over three hundred thousand individual passes made by players in a single season. Atletico became the La Liga champion that season by leveraging data. With this method, even negotiations between clubs and players in sports are becoming digital. For example, the WYSCOUT platform provides all relevant information for clubs and helps renowned football clubs like Real Madrid and Juventus make better decisions in player acquisitions and other matters.

4. Talent Identification and Selection

Today, artificial intelligence can assist employers in finding and recruiting top talents by analyzing data. Coaches can record relevant information during training sessions using specific sensors and cameras, then artificial intelligence analyzes this data and suggests to managers and coaches which player to select and in what position to use them.

5. Impact on Refereeing

In an era when technology had not progressed much, making correct decisions for sports referees was challenging, and a referee's incorrect decision could change the outcome of a match. The Euro 2020 game between England and Denmark had a controversial penalty when Raheem Sterling fell near the goal. The AI referee's ruling, based on a trained model in V7, confirmed that "any contact with Sterling occurred 150 milliseconds before Denmark reached the ball." The AI referee awarded the penalty to England. Naturally, since the existence of sports, the outcome of a game has often been influenced by various margins. Line calls in tennis, handballs in football, and offensive fouls in the NBA all create conditions for altering game results. The sports industry is ready to embrace artificial intelligence, not to change the outcomes of sports events, but to improve the decision-making process. For example, VAR (Video Assistant Referee) in football, tracking systems in tennis like HAWKEYE, and Goal-line technology in football, defined by FIFA as "a technical device to determine immediately whether the entire ball has crossed the line," are technologies used for significant impact.

6. Injury Risk Identification

One of the primary applications and essential aspects of artificial intelligence in sports is the prevention of injuries through biometric monitoring of players and minimizing training risks by identifying indicators of fatigue, stress, or injury risk. By collecting and processing large amounts of data, AI systems can identify patterns that may indicate potential injury risks. For instance, AI can analyze an athlete's gait, body posture, and muscle imbalance to determine if they are at risk for injuries like stress fractures, hamstring strains, or knee problems. This information is then used to develop personalized training programs focusing on addressing these specific vulnerabilities, ultimately reducing the likelihood of injury. This is particularly valuable in sports where athletes must maintain peak physical conditions for extended periods, such as professional football or basketball.

7. Rehabilitation of Injured Athletes

Another area where artificial intelligence has a significant impact is in sports medicine and rehabilitation. Wearables and sensors equipped with AI can continuously monitor an athlete's recovery progress and provide feedback on factors such as range of motion, muscle activation, and pain levels, using this data to design personalized rehabilitation programs targeting specific areas of weakness or imbalance to ensure that athletes can return to their sport as quickly and safely as possible. Furthermore, AI can be used to predict the likelihood of re-injury after returning to sports.

Recently, a group of researchers developed an algorithm that can predict muscle injuries in players by up to 50 percent, significantly reducing recovery costs. Currently, through collaboration among several universities and sports clubs, such as the University of Pisa, CNR, the University of Milan, FC Barcelona, and the Philadelphia 76ers, an algorithm has been developed that trains AI using big data to predict injuries in professional athletes (Tayebi et al., 2022).

8. Fan Interaction

AI-based analytics revolutionize fan engagement. By understanding fans' preferences and habits, content, advertisements, and interactions can be tailored accordingly. This strategy encourages and enhances fan engagement and loyalty. AI provides a better experience for viewers through creative camera angles and immersive realities. Virtual reality and gamified features create an engaging and dynamic experience for fans seeking a deeper level of interaction, serving the sports industry.

9. Betting and Predictions in Competitions

In the large betting industry, bettors have long sought to process vast amounts of data to predict the outcomes of future competitions. However, due to human limitations, even with most betting platforms and data-driven algorithms, precise analysis within a short time has not been possible, and predictions were merely based on assumptions and guesses. However, in this area, AI has emerged as a savior, able to process data 125,000 times faster than the human brain, meaning it requires only a few seconds to process very large data volumes, which is a blessing for the betting industry. While AI in sports does not guarantee accurate results, it improves human predictions.

10. Statistical Specialist

Artificial intelligence can analyze player performance in combination with sensory systems, providing real-time reports on match statistics, including scores, speed, distance traveled, power, possession percentage, and more, depending on the type of sport. Notable technologies include HAWK-EYE and systems for requesting video checks (DATAFLOQ.COM).

11. Design and Production of Sports Apparel

AI algorithms can analyze data related to customer preferences, body measurements, and cutting and sewing to create personalized designs that meet customers' needs, preferences, and priorities, resulting in cost savings for manufacturers and reducing prices for customers. For example, specialized smart clothing for mountaineering has been developed that features heating elements that adjust based on the climber's body temperature. Another example is a smart ski suit that adjusts the athlete's body temperature and alerts them of nearby skiers to prevent accidents. Sweat-proof clothing and scented socks are other examples of smart apparel (Mirjalili et al., 2011). Clothing with sensors comes in two types: those that analyze sweat levels and those that monitor the pressure and movement of the garment on the body (Coyle et al., 2009). Recently, European Union scientists have succeeded in inventing and designing clothing equipped with small sensors that help users avoid overstretching their muscles during activities and adjust their movements as needed (Mirjalili et al., 2011). Progress in clothing technology will continue until a stable intelligent level is achieved.

12. Personal Programs and Diet Plans

One of the most important applications of AI in sports is the provision of personalized diet plans and rapid fitness and weight loss programs. The use of diet applications to customize various meal plans for different players based on personal fitness needs available in the market is just the beginning. A popular

example is the development of fitness programs for women, which have significantly improved for athletes over the years.

13. Ticketing for Sports Events

In this process, spectators reserve their tickets, and AI recognizes them by scanning their faces to enter the stadium. The use of this technology prevents crowd congestion at entrances and facilitates the entry of spectators into the stadium. Those who remember the Champions League final between Real Madrid and Liverpool know that fans and spectators wandered for hours trying to obtain tickets. Managing this massive crowd was challenging, and there were not enough ticket sales portals or staff on the ground to guide spectators. Even in 2021, famous sports teams faced delays in entry. Southampton FC had to refund ticket costs to its fans because thousands were still unable to enter the stadium after the game had started. Now, artificial intelligence has stepped in to address the issues faced by fans at sporting events.

14. The AI Journalist That Never Sleeps

According to Oxford University's research on job automation, the likelihood of robots replacing journalists in the next two decades is only 8%. However, this situation could change at any moment. In 2015, the American software company AUTOMATED INSIGHTS entered the tech world with its new solution, WORDSMITH. This AI system processes large amounts of data, performs quantitative analysis, and uses writing rules such as style and grammar to create news stories. Major clients of this company include the ASSOCIATED PRESS and YAHOO, which effectively implement this solution for quickly writing summaries of sports events without human intervention (DATAFLOQ.COM).

Artificial Intelligence and Responsibility

The sports institution is considered a necessity of human life and a social phenomenon. The various aspects of health, recreational, economic, cultural, and even political factors involved in sports are indisputable and, on the other hand, the increasing investment opportunities in this sector compel policymakers to be more concerned about ensuring the safety of sports community participants and advancing the sciences and technologies affecting it (Yousefi Sadeghloo, Rajabi, 2021). Artificial intelligence has automated many tasks in various fields, including the sports industry, and the determination of responsibility for errors made by this system is debatable. Understanding the relational aspect of responsibility enables AI specialists and operators to know what they are doing and encourages them to communicate with stakeholders and provide reasons and explanations for their actions. They also need to be more aware

of unintended consequences and the ethical significance of their activities. To explore the issue of assigning responsibility to AI, we first look at the conditions Aristotle mentions; 1) the condition of control and 2) the condition of knowledge. The problem with Aristotle's theory is that it views technology merely as a tool and believes that only humans can have moral responsibility. Moreover, Aristotle focuses solely on the moral agent and does not study the relational aspect of responsibility and the audience of moral action. This means that one can freely and willingly create an effect with their action and have sufficient control over that action. Technology, because it influences human action, is neither responsible nor irresponsible; rather, it plays a role in human responsibility. A person may not be able to maintain sufficient control over AI, leading to a gap in responsibility (Coeckelbergh, Mark, 2020).

Sports analytics have significantly improved thanks to AI but have not evolved. For instance, Germany's defeat against South Korea and elimination from the 2018 World Cup, while AI had predicted before the tournament that Spain or Germany would be the champions. German researchers simulated the World Cup matches 100,000 times and predicted that Spain and Germany were the top contenders, but Germany's loss to South Korea caused AI's second-favorite prediction to fail. Germany's elimination was disappointing for researchers and millions worldwide, while it could have been a significant step toward AI dominating the world. In traditional systems, punishment has preventive and corrective goals. However, none of the punitive forms are compatible with the characteristics of AI. In AI, like any technology, there is a possibility of error and severe damage, and sometimes accurately identifying the source of an error becomes very difficult. On the other hand, there are not enough skilled professionals in this field yet. If AI is not developed correctly and with the right knowledge, it becomes uncontrollable, and professional oversight of AI performance is essential. To regulate the civil liability arising from the use of AI, we will refer to several theories:

1. Strict Liability

Some argue that due to the impossibility of proving certain elements of general civil liability related to AI, such as in the case of defective products, it is better to use strict liability to compensate victims[1] (Safai and Rahimi, 2015).

1. In the Consumer Rights Protection Law of 2008, "there is no explicit ruling that suppliers are solely responsible for damages caused by product defects, but in Article 16 of this law, it is stipulated: "Article 16 - Responsibility for compensation for damages caused to consumers with the determination of the investigating authority, the provider is responsible for the natural or legal person, both private and public, who caused damage to the consumer. In the case of foreign companies, in addition to the parent company, its branch or representative office in Iran will be responsible."

2. Mandatory Insurance

One solution for compensating damages is to make insurance mandatory for all products and software based on machine learning. One of the positive effects of mandatory insurance is that it alleviates the fear of liability among engineers and innovators, facilitating scientific advancement, while also providing victims with the opportunity for compensation.

3. Legal Personality of AI

Some believe that just as we use legal personality to identify corporate responsibility, we can also apply legal personality to AI. Thus, in the event of damage, the legal entity of AI becomes the party to the lawsuit. In Iran, some have explored the feasibility of this theory in the context of criminal liability for self-driving cars (Atazadeh et al., 2019).

4. Ethical and Legal Principles

Given the ambiguities and theoretical nature of many issues raised, legal scholars and policymakers have drafted strategic principles for manufacturers of AI-based products. Notably, the European Commission document titled "Ethical Guidelines for Trustworthy AI," the "Beijing AI Principles" (2019), and Germany's "AI Strategy" (Artificial Intelligence Strategy 2018) can be mentioned. Recently, the United Nations Educational, Scientific and Cultural Organization (UNESCO) proposed a document of ethical principles in the field of AI after two years of negotiations with various countries. Among them, a group of researchers at the Berkman Klein Center for Internet & Society at Harvard University classified the common grounds of these documents into eight categories: privacy, accountability, security, transparency and explainability, fairness and non-discrimination, human control over technology, professional responsibility, and the promotion of human principles. According to Harvard's research, existing documents concerning liability for damages caused by AI and machine learning remain ambiguous, and there is no common overall conclusion in the available documents (Jessica et al., 2020). Some believe that work needs to be done in this area, and there is no guarantee of referring to principles of civil liability in the event of an accident. Others believe that developers and programmers should not be held liable in any case. On the other hand, transparency in the operational mechanisms of technology and the stages of product or software development can be one of the best preliminary tools for establishing responsibility mechanisms. With transparency in how a device operates, it can be easier to identify the main culprit in terms of civil liability or decide on compensation.[2]

2. Here, some companies may refuse to publish the details of AI-based programs due to their

In conclusion, concerning the responsibility of using AI, sports users should employ security measures instead of punishment in cases such as system updates, reducing software versions, limiting capabilities, and shutting down systems. All these developments indicate the beginning of a new era in the legal sector.

Conclusion

Sports events captivate millions of people worldwide, whether it be a Grand Slam tournament, the UEFA Champions League, or the Olympics. With the collaboration of artificial intelligence and virtual reality, fans can become producers of their own gaming experiences. AI uses the collected information regarding an individual's obtained indicators to provide its analysis for improving individual and team performance. As software that analyzes basic parameters, AI enhances the level of athletes, coaches, and referees and can analyze player performance in combination with sensory systems, providing real-time reports on match statistics, including scores, speed, distance traveled, power, possession percentage, and other relevant metrics depending on the sport. This technology is utilized to ensure fairer, safer, and smarter competitions. Despite the discussions presented, it is important to note that AI cannot express its opinion like a consultant, coach, or sports referee; thus, AI tools, alongside professional coaches and specialists, will yield optimal results. Now that there is no definitive answer to the challenges ahead in using AI and the civil responsibility arising from this technology's application, relying on proposed principles can pave the way for addressing future challenges. With the growing use of AI and machine learning in various fields, establishing comprehensive regulations that align with legal principles and are universally applicable is essential. Such principles could also provide solutions to the issue of civil liability for damages caused by AI.

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desire to maintain their professional insistence, which is a challenge for lawyers and politicians to achieve the necessary balance.

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