




The Role of Artificial Intelligence in Arbitration and Legal Challenges Arising from Automated Decisions in Sports

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Article Info

Article type:

Review Article

How to cite this article:

Farajpour, R., Amerinia, M. B., & Pourjavaheri, A. (2025). The Role of Artificial Intelligence in Arbitration and Legal Challenges Arising from Automated Decisions in Sports. *AI and Tech in Behavioral and Social Sciences*, 3(2), 21-28.

<https://doi.org/10.61838/kman.aitech.3.2.3>



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ABSTRACT

The integration of artificial intelligence (AI) into sports arbitration has become increasingly prominent in recent years. Technologies such as the Video Assistant Referee (VAR) in football, Hawk-Eye in tennis, and various video analysis systems in basketball and baseball have enhanced the precision of officiating. However, the widespread adoption of these technologies has also introduced significant legal and ethical dilemmas. One of the primary concerns is the issue of legal liability in cases of erroneous AI-driven decisions. If an athlete or team suffers due to an AI-related error, determining accountability becomes a challenge. Furthermore, the extent to which clubs and athletes can contest these decisions remains a critical question. Another key challenge involves the transparency of AI-based decision-making processes. Many sports arbitration algorithms are developed by private entities, and their inner workings are often undisclosed. This opacity can hinder athletes and teams from effectively appealing disputed decisions, raising concerns about fairness in sports governance. Moreover, AI's influence on the traditional role of human referees is a subject of ongoing debate. While AI systems are capable of delivering rapid and highly accurate judgments, they may lack the ability to assess contextual elements of the game, players' intent, and other human factors. This study explores the legal, ethical, and operational challenges associated with AI-driven sports arbitration. It proposes regulatory frameworks for establishing accountability and analyzes contentious decisions made by technologies such as VAR and Hawk-Eye. The findings aim to support sports policymakers, legal professionals in sports law, and international governing bodies in formulating comprehensive guidelines for the ethical and effective use of AI in officiating.

Keywords: Artificial Intelligence, Sports Officiating, Automated Decision-Making, Video Assistant Referee (VAR), Goal-Line Technology, Legal Accountability, AI-Driven Refereeing

1. Introduction

The realm of sports officiating has long grappled with challenges such as human error and unintended biases. With the advancement of technology, artificial intelligence (AI) has emerged as a groundbreaking tool to improve the precision and transparency of refereeing decisions. Innovations like the Video Assistant Referee (VAR) and goal-line technology have significantly contributed to minimizing errors in officiating. However, these advancements also introduce concerns, including legal accountability for potential mistakes, the transparency of AI-driven decisions, and the risk of bias in automated systems (Spitz et al., 2021).

This study underscores the increasing integration of AI in sports, its legal and ethical ramifications, and the urgent need for regulatory frameworks to uphold fairness and accountability in officiating. The research aims to explore AI's role in sports refereeing, identify the associated legal and ethical dilemmas, and propose strategies for refining oversight mechanisms. Key research questions include assessing AI's influence on officiating, identifying legal and ethical risks linked to automated decision-making, and developing solutions to enhance transparency and minimize errors in AI-driven refereeing systems.

2. Theoretical Foundations and Literature Review

The use of artificial intelligence (AI) in sports officiating has significantly improved accuracy and neutrality while minimizing human errors (Russell & Norvig, 2016). Advanced technologies such as Video Assistant Referee (VAR) and goal-line technology have been adopted in international competitions to enhance decision-making in refereeing (FIFA, 2019). Despite these benefits, AI-driven officiating systems present challenges, including legal accountability for errors, algorithmic transparency, and potential biases (Taddeo & Floridi, 2018). Some studies suggest that AI systems may inadvertently introduce racial and gender biases, leading to concerns about fairness in officiating (Buolamwini & Gebru, 2018). Additionally, many AI-based decisions remain difficult to explain, functioning as "black boxes" that obscure the reasoning behind certain rulings. For example, while Hawk-Eye technology in tennis is known for its precision, its accuracy can be affected on specific surfaces such as grass courts (Volskyi, 2025). Another pressing issue is the protection of athlete data, as automated officiating systems rely on biometric and motion-tracking

information. Unauthorized access to such data raises concerns about privacy and potential misuse (Frawley & Schulenkorf, 2023). In Iran, research has identified several obstacles to implementing VAR in the national football league, including inadequate infrastructure and insufficient referee training (Rahmani et al., 2024). Moreover, the lack of clear regulations regarding accountability for errors made by automated systems in combat sports has raised legal uncertainties (Chu, 2024). While AI has undoubtedly enhanced the accuracy of officiating, ongoing concerns about legal responsibility, decision-making transparency, and potential biases remain (Goodman & Flaxman, 2017). To ensure fairness and public confidence in these systems, refining AI algorithms and establishing well-defined regulatory frameworks are essential (Wang & Wu, 2020).

3. The Role of Artificial Intelligence in Sports Officiating

In recent years, artificial intelligence (AI) has significantly influenced sports officiating, enhancing accuracy, reducing human errors, and improving decision-making transparency (Russell & Norvig, 2016). AI-driven technologies such as Video Assistant Referee (VAR), Goal-Line Technology, and computer vision systems for detecting infractions have been adopted in various sports, including football, basketball, tennis, and combat sports. While these innovations have improved the quality of officiating, they have also introduced legal, technical, and ethical challenges that require careful consideration and regulation (Taddeo & Floridi, 2018).

3.1. AI Technologies in Sports Officiating

AI has improved the efficiency and accuracy of refereeing through machine learning algorithms, image processing, and big data analysis. One of the most widely recognized applications is the Video Assistant Referee (VAR) system, which was first widely implemented during the 2018 FIFA World Cup. VAR relies on multiple camera angles and image processing to review controversial plays, helping referees confirm or overturn their decisions (FIFA, 2019). A notable instance was in the 2018 World Cup final between France and Croatia, where the referee, after consulting VAR, awarded a penalty to France, a decision that played a key role in their victory. Another critical AI-based officiating tool in football is Goal-Line Technology, introduced in the 2014 FIFA World Cup. This system uses optical sensors and advanced image analysis to determine

whether the ball has completely crossed the goal line (IFAB, 2014). A significant moment showcasing its effectiveness occurred in the France vs. Honduras match in the 2014 World Cup, where the system confirmed a goal that would have been difficult to detect with the naked eye. In tennis, the Hawk-Eye system has become a crucial tool for reviewing line calls. Using image tracking and 3D trajectory modeling, it accurately determines where the ball lands on the court (Veale et al., 2018). During the 2019 Wimbledon final, Novak Djokovic successfully challenged a disputed call with Hawk-Eye, ultimately securing an important point that contributed to his victory. In basketball, computer vision technology is increasingly being used to track player movements and detect fouls. However, studies have raised concerns about potential biases, with research suggesting that automated systems may register fouls against Black players more frequently than White players (Buolamwini & Gebru, 2018). Statistical evaluations of NBA games indicate that AI-based foul detection may disproportionately penalize Black players, raising questions about the fairness of such systems (European Commission, 2021). In combat sports such as taekwondo and boxing, AI-powered wearable sensors and impact analysis systems are used to assist in officiating. However, issues with accuracy have arisen. During the 2020 Tokyo Olympics, some taekwondo athletes complained that electronic sensors failed to register their strikes correctly, leading to disputed scorekeeping. As a result, certain matches were reviewed, highlighting concerns about the reliability and consistency of AI-assisted officiating (Olympic Committee, 2021).

3.2. Challenges of AI in Sports Officiating

- Accountability for System Errors

One of the key concerns regarding the use of AI in sports officiating is the issue of legal responsibility when errors occur. A notable example took place during a 2019 French Ligue 1 match, where VAR incorrectly ruled out a legitimate goal, leading to strong objections from the losing team. This incident sparked debates over who should be held accountable for such mistakes: the software developers, the football federation, or the referees who relied on the system? The absence of clear regulations defining liability in AI-assisted refereeing raises important questions about fairness and accountability in sports.

- Transparency and Explainability of Decisions

AI-based officiating systems, particularly those utilizing deep learning, often operate in a way that makes it difficult to understand how they reach certain decisions. This lack of clarity, sometimes referred to as the "black box" problem, has become a significant barrier to public trust in AI-assisted refereeing (Burrell, 2016). In Bundesliga matches, for example, some teams have demanded more transparency regarding how automated systems arrive at their conclusions. However, due to the complex nature of these algorithms, providing a clear and comprehensible explanation remains challenging. The inability to fully justify AI-driven decisions has fueled concerns about fairness and trust in the technology.

4. Legal Challenges Stemming from Automated Decisions in Sports

The integration of artificial intelligence (AI) into sports officiating has significantly improved accuracy and transparency in decision-making. However, the reliance on automated systems has introduced several legal complexities, particularly regarding accountability, the transparency of decisions, the right of athletes to challenge rulings, system impartiality, and data privacy (Goodman & Flaxman, 2017). These concerns are evident across both team sports like football, basketball, and rugby, as well as individual disciplines such as tennis, boxing, and taekwondo (Taddeo & Floridi, 2018). The potential for disputes and legal conflicts arises especially when an automated decision directly affects the outcome of a match or competition.

4.1. Liability in the Event of AI Officiating Errors

A primary legal challenge surrounding AI-assisted officiating is determining who should be held responsible when errors occur. In traditional refereeing, incorrect calls are attributed to human referees and the governing sports federations. However, in the case of AI-driven officiating, assigning responsibility becomes more complicated (Burrell, 2016).

In football, the implementation of Video Assistant Referee (VAR) has, on multiple occasions, influenced match outcomes. One instance occurred during an English Premier League match in 2020, where VAR mistakenly disallowed a valid goal. The affected team argued that the incorrect ruling could have altered the result of the game (Premier League, 2020). Such incidents raise important legal questions: should the responsibility lie with the

referee who followed the system's recommendation, the sports federation that introduced the technology, or the developers of the AI system that made the erroneous decision? (Taddeo & Floridi, 2018). Similar controversies have surfaced in other sports. During the 2020 Tokyo Olympics, electronic sensors used in taekwondo failed to detect certain scoring strikes, leading to protests from athletes. One competitor, who missed out on a medal due to the malfunction, claimed that the faulty system led to their elimination, yet no clear framework was in place to determine liability (Olympic Committee, 2021). Given these issues, some experts advocate for clearer legal guidelines that define accountability in AI-assisted officiating. The International Association of Sports Federations, for example, has suggested that responsibility should be distributed among human referees, sports federations, and the developers of AI systems. By doing so, errors can be properly reviewed and rectified, ensuring a fairer and more transparent officiating process (Burrell, 2016).

4.2. *Transparency and Explainability of AI Decisions*

One of the key legal concerns surrounding AI-driven officiating systems is the lack of clarity in how these technologies reach their decisions. Many AI models used in sports refereeing rely on intricate neural networks and deep learning techniques, making their decision-making processes difficult to interpret—often likened to a "black box" (Burrell, 2016). A notable example occurred in Germany's Bundesliga when a team, after having a goal disallowed by VAR, requested an explanation of how the system analyzed the footage and arrived at its decision. However, due to the technical complexity of the algorithms involved, providing a clear and comprehensible explanation was not feasible. This opacity has led to growing skepticism among players and teams, raising concerns about the reliability and fairness of automated officiating systems. A similar issue has emerged in major tennis tournaments, where the Hawk-Eye system determines whether a ball lands in or out. Despite the system's widespread use, players are not granted access to the underlying data, preventing them from questioning or appealing decisions made by the technology (Rule, 2020). To address this, some researchers advocate for greater transparency in AI officiating systems, suggesting that these algorithms should be designed in a way that allows for better insight into their decision-making processes

(Binns, 2018). Others propose that every AI-generated ruling should be subject to human review, allowing referees to intervene when necessary to ensure fairness (Frawley & Schulenkorf, 2023).

4.3. *Bias and Inequality in Automated Decisions*

Several studies indicate that AI-based officiating systems may exhibit racial, gender, or structural biases, leading to unfair treatment of athletes (Buolamwini & Gebru, 2018). Research on the NBA, for instance, has found that foul-detection algorithms are more likely to penalize Black players compared to their White counterparts (Rahmani et al., 2024). In combat sports like taekwondo, discrepancies have been observed in how electronic scoring sensors register strikes from male and female athletes. During the 2020 Olympics, some female competitors voiced concerns that the system failed to accurately record their scoring strikes, whereas no such issues were reported for male athletes (Olympic Committee, 2021). To mitigate these biases, experts suggest using more diverse datasets when training AI algorithms, ensuring that the models account for a wide range of variables and athlete profiles to reduce discriminatory tendencies (Spitz et al., 2021).

4.4. *Athletes' Rights and the Ability to Challenge AI Decisions*

Another pressing issue in AI-assisted officiating is whether athletes have the right to contest automated decisions. In traditional refereeing, players can appeal calls and request a review, but a clear process for challenging AI-generated rulings has yet to be established (Rahmani et al., 2024). For example, in Grand Slam tennis tournaments, players are not allowed to dispute decisions made by the Hawk-Eye system, whereas they could previously request a review when human referees were responsible for line calls. This lack of recourse has led some athletes to advocate for the introduction of an official appeal mechanism for AI-generated decisions, ensuring that contested rulings can be reassessed when necessary (Volskyi, 2025).

5. **Comparative Study and Practical Applications of AI in Arbitration**

As AI-driven technologies continue to expand, numerous countries and international organizations are seeking to incorporate artificial intelligence into arbitration

and legal dispute resolution. While AI has helped accelerate legal processes and reduce costs, it has also introduced several challenges. This section examines the experiences of leading nations that have implemented AI in arbitration and judicial decision-making. One of the earliest and most prominent examples of AI in arbitration is the "COMPAS" system in the United States, designed to assess the likelihood of reoffending and assist in decisions regarding bail and parole. By analyzing historical data from defendants, the system provides risk assessments (Angwin et al., 2016). Despite its potential benefits, reports have revealed biases within its algorithms, particularly racial disparities that have led to concerns about fairness in decision-making (Dressel & Farid, 2018).

In the European Union, the European Commission has initiated multiple projects to explore AI's role in arbitration and legal judgment. One of the most notable initiatives is the "AI4Law" system, which utilizes AI to analyze legal cases and offer advisory recommendations to judges and lawyers (European Commission, 2021). This system has proven effective in reducing case processing time and leveraging extensive legal data to provide more accurate suggestions. However, concerns persist regarding decision-making transparency and determining accountability when errors occur (Veale et al., 2018).

China has been a frontrunner in integrating AI into its judicial and arbitration systems. A significant development in this regard is the introduction of "Internet Courts" in cities like Hangzhou, Beijing, and Guangzhou. These courts employ AI-powered systems to manage cases related to commercial disputes, e-commerce transactions, and intellectual property rights (Wang & Wu, 2020). In some instances, virtual AI judges have been introduced to evaluate legal arguments and offer recommendations. While this initiative has significantly eased the workload of human judges, critics argue that AI systems may struggle to grasp the nuances of human behavior and ethical considerations in judicial decision-making.

In Canada, AI has been increasingly adopted for dispute resolution in commercial and civil matters. The "Online Dispute Resolution (ODR) System", which relies on machine-learning algorithms, has facilitated faster resolution of conflicts between businesses and consumers (Cortés, 2010). A successful implementation of this model is the British Columbia system, which allows users to resolve financial disputes remotely via digital platforms, eliminating the need for in-person court appearances. While this system has helped reduce the burden on courts and

expedite decision-making, concerns remain regarding digital accessibility for certain segments of society (Rule, 2020).

Australia has also embraced AI in early-stage dispute resolution. The "Modria" platform, originally developed in the U.S., has been integrated into some Australian legal institutions to automatically assess legal documents and propose resolution strategies (Katsh & Rabinovich-Einy, 2017). This system is primarily applied in e-commerce disputes, intellectual property cases, and family law matters. However, questions have been raised about the reliability of its recommendations and the extent to which parties involved in disputes are willing to accept AI-generated decisions (Veale et al., 2018). Conversely, some countries, such as Germany and France, have taken a more cautious stance on the use of AI in legal decision-making. In Germany, while AI tools are employed for legal data analysis and providing support to judges and lawyers, strict regulations prohibit AI from making final rulings (Hacker, 2018).

Similarly, France has adopted AI for legal case analysis but passed legislation in 2019 that prevents AI from independently predicting judicial outcomes to safeguard against potential misuse (Michaud, 2019).

These global examples underscore both the opportunities and challenges associated with AI in arbitration and legal systems. While AI has the potential to streamline legal proceedings, concerns related to fairness, transparency, and accountability remain critical considerations.

6. Proposed Solutions to Address Legal Challenges

To tackle the legal and technical challenges associated with AI-driven officiating, concrete measures need to be implemented to build public trust in automated arbitration systems. These solutions include establishing clear legal frameworks, improving algorithmic transparency, enhancing human oversight, reducing biases, educating stakeholders, and developing appeal mechanisms for AI decisions (Goodman & Flaxman, 2017). While AI has significantly improved the accuracy of officiating, continuous refinements are necessary to ensure it can effectively complement or, in some cases, replace human referees (Taddeo & Floridi, 2018).

6.1. *Establishing Legal and Regulatory Frameworks for AI Officiating*

A crucial step in addressing legal concerns related to AI-assisted refereeing is the development of comprehensive regulations that govern the use of these technologies. At present, many AI officiating systems operate without well-defined legal guidelines, which can lead to inconsistencies and errors (Burrell, 2016). Sports federations and governing bodies must introduce clear directives to ensure that AI-based rulings can be reviewed in case of disputes. These regulations should include:

- 1- Clarifying responsibility for AI errors: It should be explicitly stated whether the accountability lies with human referees, AI developers, or sports federations when incorrect decisions occur (Volskyi, 2025).
- 2- Mandating human review for crucial decisions: If an AI-based decision has a significant impact on the outcome of a match, human referees should have the authority to review and, if necessary, overturn it (Volskyi, 2025).
- 3- Standardizing international rules for AI officiating: Consistent regulations should be established across all competitions that utilize AI-assisted refereeing. For instance, after a controversial incident in the English Premier League in 2020, where VAR mistakenly disallowed a legitimate goal, several clubs urged the Football Association to set clearer guidelines on the technology's use (Premier League, 2020).

6.2. *Enhancing Transparency in AI Decision-Making*

One of the key challenges with AI-driven officiating systems is the lack of transparency regarding how decisions are made. Many deep-learning models, particularly neural networks, function as "black boxes," making it difficult to understand the rationale behind their judgments (Burrell, 2016). This opacity prevents athletes, coaches, and teams from comprehending why a specific ruling was issued. For example, in the Bundesliga, a team whose goal was disallowed by VAR requested an explanation of how the system processed the data. However, due to the complexity of the algorithms, no clear response was provided. Such ambiguity has fueled dissatisfaction and increased protests among players and teams. To address this issue, AI officiating systems should be designed with the following principles:

- 1- Providing access to decision-making data: Athletes and teams should be able to access relevant information explaining how AI-generated decisions were made.
- 2- Ensuring explainability of AI models: Algorithms should be interpretable, allowing stakeholders to understand the reasoning behind AI-assisted calls.
- 3- Allowing human oversight for AI rulings: Trained officials should have the ability to review and assess AI-driven decisions to maintain fairness and accountability.

6.3. *Strengthening Human Oversight in AI Officiating Systems*

Despite the advancements in artificial intelligence, AI-driven officiating should not operate entirely without human supervision. Research suggests that a balanced approach, integrating both AI and human referees, can improve accuracy and fairness in decision-making (Taddeo & Floridi, 2018). For instance, during the 2022 Wimbledon tournament, errors in the Hawk-Eye system resulted in incorrect point calls, prompting human officials to intervene and correct some decisions (Chu, 2024).

To ensure proper human oversight in AI-assisted refereeing, the following steps are recommended:

- 1- Every automated decision should be reviewed or validated by a human referee.
- 2- AI technology should be used as a support tool rather than a complete replacement for human officiating.
- 3- Referees should receive specialized training to interpret AI-generated decisions and assess their accuracy.

A critical issue with AI officiating is the potential for algorithmic bias. Research has shown that some AI-based systems may unfairly penalize Black athletes more frequently than White athletes (Buolamwini & Gebru, 2018). In the NBA, studies have found that automated foul detection systems tend to call fouls against Black players at a higher rate, raising concerns about fairness in sports officiating (Chu, 2024). To address these biases, the following measures should be implemented:

- 1- AI systems should be trained on diverse and representative datasets to prevent skewed decision-making.
- 2- Continuous monitoring and evaluation of AI performance should be conducted to detect and correct biases.

- 3- Sports federations should establish strict oversight on the development and deployment of AI officiating systems.

6.4. *Improving Education and Awareness*

To successfully integrate AI into sports officiating, referees, coaches, and athletes must be well-informed about how these systems work. Misunderstandings regarding AI decisions often arise due to a lack of awareness about their functionality (Taddeo & Floridi, 2018). During the 2018 FIFA World Cup in Russia, many players and coaches were unfamiliar with the proper implementation of the VAR system, leading to avoidable disputes. This situation underscored the necessity of better education on AI-driven officiating (FIFA, 2019). To bridge this knowledge gap, the following steps are suggested:

- 1- Training programs should be developed for referees and coaches to familiarize them with AI-assisted officiating.
- 2- Comprehensive guidelines and instructional resources should be provided to teams and players.
- 3- Practical workshops and on-field demonstrations should be organized to ensure a thorough understanding of AI-based refereeing technologies.

7. Conclusion

The use of advanced technology in sports officiating has significantly improved decision-making by reducing errors, increasing transparency, and addressing potential biases. Systems like Video Assistant Referee (VAR), goal-line technology, and sophisticated video analysis have enhanced the accuracy and fairness of officiating across various sports. However, despite these benefits, the implementation of AI in refereeing has also introduced several challenges that require careful examination and continuous refinement. One of the key issues is determining accountability when AI-assisted officiating systems make errors. Since these technologies are developed and overseen by sports federations, technology providers, and human referees, it remains unclear who should be held responsible for incorrect decisions. Without clear guidelines, concerns about trust and reliability in AI-driven officiating could increase. Another major challenge is the opacity of AI decision-making processes. Many AI algorithms, especially deep-learning models, operate in ways that make their reasoning difficult to interpret. This lack of clarity has led

to frustration among athletes and coaches, who often struggle to understand the rationale behind certain officiating decisions, ultimately affecting the acceptance of AI in sports. Bias in AI-based officiating remains a significant concern. Research indicates that some AI systems may unintentionally favor or disadvantage certain groups, such as athletes from different racial backgrounds or genders. Such inconsistencies could lead to unfair officiating, raising ethical concerns and undermining the integrity of competition. To address these issues, several solutions have been proposed, including the development of well-defined regulations for AI officiating, improving transparency in decision-making, maintaining human oversight to review AI-generated calls, minimizing bias in data and algorithms, and providing proper training for referees, athletes, and coaches on AI-assisted officiating systems. Ultimately, AI should be used as a tool to support, rather than replace, human referees. The best approach involves a combination of AI technology and human judgment to ensure greater accuracy and fairness in decision-making. Looking ahead, the establishment of comprehensive legal and ethical frameworks will be essential to prevent disputes and ensure that AI contributes positively to sports officiating.

Authors' Contributions

R. F. conceptualized the study, developed the research framework, and led the legal analysis of AI-driven arbitration in sports. M. A. contributed to the examination of case studies, ethical considerations, and the impact of AI on human refereeing. A. P. conducted the literature review, analyzed regulatory frameworks, and assisted in drafting and refining the manuscript. All authors reviewed and approved the final version of the paper.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethics Considerations

Ethical concerns were addressed by ensuring transparency in the selection and analysis of sources. Proper citations were maintained throughout the review to credit original authors and avoid plagiarism. Additionally, care was taken to evaluate the potential biases inherent in the reviewed materials, particularly when analyzing industry reports or whitepapers that may have vested interests.

References

- Angwin, J., Larson, J., Mattu, S., & Kirchner, L. (2016). Machine bias risk assessments in criminal sentencing. *ProPublica*, May, 23.
- Binns, R. (2018). Fairness in machine learning: Lessons from political philosophy. Conference on fairness, accountability and transparency.
- Buolamwini, J., & Gebru, T. (2018). Gender shades: Intersectional accuracy disparities in commercial gender classification. Conference on fairness, accountability and transparency.
- Burrell, J. (2016). How the machine 'thinks': Understanding opacity in machine learning algorithms. *Big Data & Society*, 3(1), 2053951715622512. <https://journals.sagepub.com/doi/abs/10.1177/2053951715622512>
- Chu, Y. R., Shaowei Wang Xiangyu Wang Jun. (2024). Emerging Trends in Sports and Artificial Intelligence: A Scientometric Analysis in Citespace. *Jes*, 20(2), 1897-1910. <https://doi.org/10.52783/jes.1637>
- Cortés, P. (2010). *Online dispute resolution for consumers in the European Union*. Taylor & Francis. <https://library.oapen.org/handle/20.500.12657/34626>
- Dressel, J., & Farid, H. (2018). The accuracy, fairness, and limits of predicting recidivism. *Science advances*, 4(1), eaao5580. <https://www.science.org/doi/abs/10.1126/sciadv.aao5580>
- European Commission. (2021). *AI4Law: Exploring artificial intelligence applications in the legal sector*. E. U. Publications.
- FIFA. (2019). *VAR implementation: Guidelines and best practices*. FIFA.
- Frawley, S., & Schulenkorf, N. (2023). *Routledge handbook of sport and COVID-19*. Routledge. <https://api.taylorfrancis.com/content/books/mono/download?iidentifierName=doi&iidentifierValue=10.4324/9781003176329&type=googlepdf>
- Goodman, B., & Flaxman, S. (2017). European Union regulations on algorithmic decision-making and a "right to explanation". *Ai Magazine*, 38(3), 50-57. <http://ojs.aaai.org/aimagazine/index.php/aimagazine/article/view/2741>
- Hacker, P. (2018). Teaching fairness to artificial intelligence: existing and novel strategies against algorithmic discrimination under EU law. *Common market law review*, 55(4). <https://kluwerlawonline.com/journalarticle/Common+Market+Law+Review/55.4/COLA2018095>
- IFAB. (2014). *Goal-line technology: A new era for football*. International Football Association Board.
- Katsh, E., & Rabinovich-Einy, O. (2017). *Digital justice: technology and the internet of disputes*. Oxford University Press. [https://books.google.com/books?hl=en&lr=&id=7tU-DgAAQBAJ&oi=fnd&pg=PP1&dq=Katsh,+E.,+%26+Rabinovich-Einy,+O.+\(2017\).+Digital+justice:+Technology+and+the+internet+of+disputes.+Oxford+University+Press.&ots=GS7FrnJB71&sig=kzmdPIjz3bQkmtmLGzaVHiQlaFo](https://books.google.com/books?hl=en&lr=&id=7tU-DgAAQBAJ&oi=fnd&pg=PP1&dq=Katsh,+E.,+%26+Rabinovich-Einy,+O.+(2017).+Digital+justice:+Technology+and+the+internet+of+disputes.+Oxford+University+Press.&ots=GS7FrnJB71&sig=kzmdPIjz3bQkmtmLGzaVHiQlaFo)
- Michaud, S. (2019). *Artificial intelligence and judicial predictions: Challenges and ethical concerns* [French Ministry of Justice Report]. F. M. o. Justice.
- Olympic Committee. (2021). *Technology and officiating at the Tokyo 2020 Olympics: Lessons and improvements*. International Olympic Committee.
- Premier League. (2020). *VAR review and future implementations in English football* [Report]. E. F. Association.
- Rahmani, N., Naderi Nasab, M., Taheri, M., & Biniaz, S. A. (2024). The Future of Sports Industry: AI and Economic Transformations. *AI and Tech in Behavioral and Social Sciences*, 19-29. <https://journals.kmanpub.com/index.php/aitechbesosci/article/view/2876>
- Rule, C. (2020). Online dispute resolution and the future of justice. *Annual Review of Law and Social Science*, 16(1), 277-292. <https://www.annualreviews.org/content/journals/10.1146/annurev-lawsocsci-101518-043049>
- Russell, S. J., & Norvig, P. (2016). *Artificial intelligence: a modern approach*. Pearson. <https://thuvienso.hoasen.edu.vn/handle/123456789/8967>
- Spitz, J., Wagemans, J., Memmert, D., Williams, A. M., & Helsen, W. F. (2021). Video assistant referees (VAR): The impact of technology on decision making in association football referees. *Journal of Sports Sciences*, 39(2), 147-153. <https://doi.org/10.1080/02640414.2020.1809163>
- Taddeo, M., & Floridi, L. (2018). How AI can be a force for good. *Science*, 361(6404), 751-752. <https://www.science.org/doi/abs/10.1126/science.aat5991>
- Veale, M., Van Kleek, M., & Binns, R. (2018). Fairness and accountability design needs for algorithmic support in high-stakes public sector decision-making. Proceedings of the 2018 chi conference on human factors in computing systems.
- Volskyi, D. S. (2025). Artificial Intelligence in Sports: A Retrospective of the Formation and Integration Processes in the Sports Industry, International Experience and State of the Issue in Ukraine. *Scientific Journal of National Pedagogical Dragomanov University Series 15 Scientific and Pedagogical Problems of Physical Culture (Physical Culture and Sports)*(1(186)), 40-44. [https://doi.org/10.31392/udu-nc.series15.2025.01\(186\).07](https://doi.org/10.31392/udu-nc.series15.2025.01(186).07)
- Wang, N., & Wu, G. (2020). A systematic approach to effective conflict management for program. *Sage Open*, 10(1), 2158244019899055. <https://journals.sagepub.com/doi/abs/10.1177/2158244019899055>