

Artificial Intelligence in Sports

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Abstract

Artificial Intelligence (AI) is the capacity of machines to perform cognitive tasks such as thinking, perceiving, learning, problem solving, and decision making; it is inspired by the way humans perceive, learn, reason out, and make decisions. Artificial intelligence is a developing advanced field of study and a key research direction in the domains of sports and technology. Coach's Eye is a video analysis programme for multiple sports. Appropriate for the majority of sports requiring close-up analysis of human athletic movement, such as bat swing or jump analysis. Dartfish : Apps for video analysis are ideal for capturing skill-based video and providing immediate feedback. In Officiating AI and Machine Learning are also assisting game Judge, Referee, and umpires to make informed decisions. Cricket uses the third umpire that relies on AI-driven visualization to assist umpire in making a decision where the human eye cannot catch the minute split second or millimeter level differences. Artificial intelligence is becoming increasingly important in modern sports and games. Artificial intelligence has brought about several changes in sports. AI in sports is here to stay, and it will become even more essential as the technology develops with better sensors, processors, and algorithms. Sports organizations increasingly require AI to compete at the highest levels, whether through an internal IT organization or external AI platforms.

Keywords: AI, Coach's Eye and Dartfish

Introduction

Artificial Intelligence (AI) is the capacity of machines to perform cognitive tasks such as thinking, perceiving, learning, problem solving, and decision making; it is inspired by the way humans perceive, learn, reason out, and make decisions. Artificial intelligence is a developing advanced field of study and a key research direction in the domains of sports and technology.

The Tokyo 2020 Organizing Committee (Tokyo 2020) and other Games partners, Intel's ground-breaking technology will bring innovations to the Games in a variety of fields, including 5G platforms, artificial intelligence (AI) solutions, immersive media, and e sports. With a more realistic learning environment and more precise/objective feedback, a virtual reality (VR) training system enhances training efficiency. Virtual reality can reduce costs and improve training efficiency. AI is concentrated on providing world-class technology integrations at the Tokyo 2020 Olympic Games to enhance the experience for athletes, coaches, and spectators (IOC). Technology progressively plays a leading role in the evolution of sport and improves performance in every facet. Thus, technological applications enable more effective training, stimulations, management and monitoring of athletes, precision of results, enhanced spectator viewing, performance enhancement, and injury prevention, among many other functions.

Sports Performance Apps

In sports training, artificial intelligence is used to provide real-time feedback and create individualized training programmes for athletes and coaches, thereby enhancing the efficacy of each exercise for each individual. Training and strategies prior to and during a game are being profoundly impacted by artificial intelligence. Currently, computer analysis influences lineup decisions made prior to and during the event. Understanding diverse metrics such as biomechanical components and serve placement, as well as the position and motion of players, can be used to further improve sports performance using artificial intelligence.

- **Coach's Eye** is a video analysis programme for multiple sports. Appropriate for the majority of sports requiring close-up analysis of human athletic movement, such as bat swing or jump analysis. Additionally, the application supports online coaching communication and web connectivity. The resolution of video images captured will depend on the mobile device's video recording and playback performance specifications. This app may be more appropriate for community-level coaches who lack access to more advanced and significantly more costly performance analysis solutions.
- **Dartfish** : Apps for video analysis are ideal for capturing skill-based video and providing immediate feedback. The apps available on the market today are feature-rich and highly effective instructional and coaching tools. Dartfish examines the comprehensive digital video ecosystem for sports organisations. We offer a comprehensive online platform solution, professional software suites, training, and a variety of applications to meet specific or global requirements.



The coaching system for all sports is the world's most technologically advanced high performance coaching system. Combining Hawk-Eye's signature ball tracking technology with SMART Replay and high speed biomechanical analysis, the SMART Coach software provides players and coaches with an unprecedented amount of data that improves the game. The data can provide live and post-event information on every aspect of an individual, team, or opponent's performance to team coaches and video analysts. All SMART-recorded video is time stamped, allowing it to be synchronised with data inputs for effective and insightful analysis.

Advantages of Artificial Intelligence in Sports In Officiating

AI and Machine Learning are also assisting game Judge, Referee, and umpires to make informed decisions. Cricket uses the third umpire that relies on AI-driven visualization to assist umpire in making a decision where the human eye cannot catch the minute split second or millimeter level differences. New technologies are impacting professional sports around the world. These changes are, for the most part, evolutionary — players, coaches, and officials benefit, but the games remain largely the same. When we start talking about artificial intelligence in sports, we enter into a completely new realm. Because when you link the sensors and cameras we've been talking about to AI systems, you have the recipe for fully automated officiating. As we saw with soccer, on field tracking system can detect handballs, identify penalties, and evaluate offside calls. These are working systems already in use; the capabilities of autonomous AI systems will only grow from here. Proponents of automated officiating say that AI could reduce corruption and more accurately enforce rules, and it seems likely that the technology will play an increasingly prominent role in athletics.

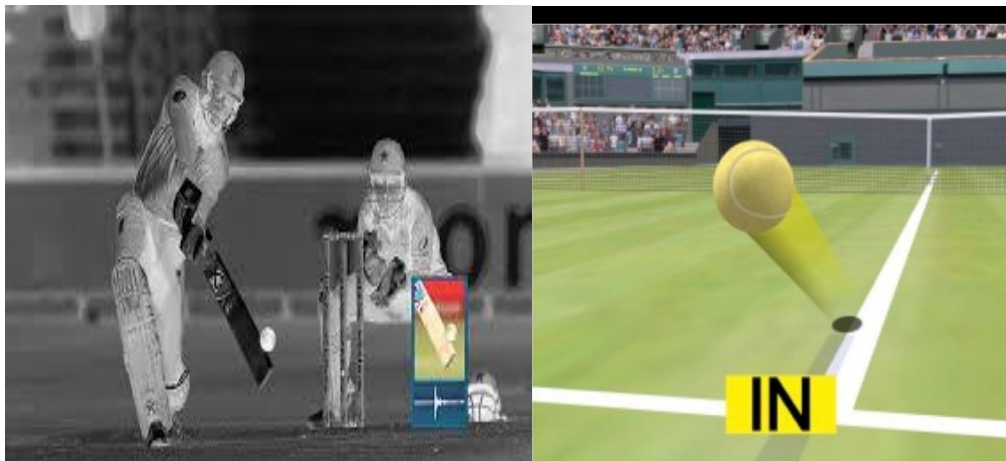
It is helping match judges and referees to apply the rules correctly, becoming the all-seeing eye when they are not able to be (e.g. VAR in football, Video Check in volleyball) and giving them, in many ways, the elements to evaluate and decide in the fairest and most impartial way possible;

Tennis

Now used in major tournaments around the world, Hawk-Eye's ITF approved Electronic Line Calling service takes the doubt out of close line calls by using the most sophisticated millimeter accurate ball tracking cameras to identify whether a ball has bounced in or out. In addition Hawk-Eye's SMART Replay technology can deliver instant video replays to assist officials with close decisions on foot faults or line calls on clay courts.

Cricket

Cricket fans and (most) professional teams now expect Hawk-Eye's verdict on LBW appeals, a testimony to Hawk-Eye's reputation for accuracy and reliability. Please refer to the 'PDF' section on this page for more information. Hawk-Eye's latest innovation Ultra Edge uses vision and audio to detect if a batsman has hit the ball, whilst our SMART Replay technology records all camera feeds and makes them available in real time to enable third umpires to make quick decisions on key incidents such as run outs, stumpings and no-balls.



Automating Sports highlights with AI

Sports broadcasters and streaming platforms are always looking for new ways to engage fans and to deliver immersive experiences that bring them closer to the real-time action. To gain speed and efficiency, and to create new revenue opportunities, live sports producers are now exploring innovative technologies, with Artificial Intelligence (AI) and Machine Learning (ML) at the forefront.

Today, advanced AI-led solutions are capable of identifying and extracting metadata for specific game objects, constructs, players, events and actions. This aids in near real-time content discovery and helps lead viewers to the content most relevant to them. Such solutions can also create sports highlight packages based on the events taking place in a game as well as what viewers want to see. AI and ML play a vital role in achieving unprecedented efficiency in sports production, boosting viewership and increasing ad monetization. Let's take a deep dive to understand how AI is transforming the live sports production landscape. (*Adrish Bera 2019*)

Conclusion

Artificial intelligence is becoming increasingly important in modern sports and games. Artificial intelligence has brought about several changes in sports. AI in sports is here to stay, and it will become even more essential as the technology develops with better sensors, processors, and algorithms. Sports organizations increasingly require AI to compete at the highest levels, whether through an internal IT organization or external AI platforms. The Hawk-Eye system is an example of a useful technology that offers a wealth of data during cricket and tennis tournaments. Recent advancements in sporting technologies have resulted in a wide range of items aimed at boosting and enhancing athletic performance.

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