

Role of Artificial Intelligence (AI) in Sports

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Abstract. Artificial Intelligence (AI) has become an essential enabler in different fields, and its significance in sports has acted up as a revolution to the enhancement of players' performance, audience interaction, and strategies for tournaments. In cricket, football and kabaddi the role played by AI has been enormous by helping in analysis, predictions and prevention of injuries. In cricket, AI assist the team in analyzing performance, recognizing the pattern of each player, analyzing the pitch condition, and the strategies of bowling and batting using videos. In football, AI data from player positioning, movements, and games are helpful to a coach in devising the best strategies and even predicting the outcome of the games. The AI in the case of the sport of kabaddi is primarily centred towards the player tracking, match prediction, and opponent behaviour analysis that help in making the training methodology and the overall gameplay strategies better. This paper aims to understand the roles of AI in these sports as well as its relevance to decision-making processes, strategy, and performance improvement. In evaluating the current state and future possibilities of AI, this work shows how AI can transform sports analysis and the way teams compete.

1 Introduction

Something that people do for fun that mostly involves using their bodies and their skills in a competitive setting; this activity is legally recognized as a sport by various organizations because of its rules and patterns of behavior.

"Sport" refers to any physical activity that enhances social connection, mental health, and physical fitness. Play, leisure, organized or competitive sports, as well as local sports and games, are some of these. Sports may include competition as well as rules or norms.

An athletic endeavour like racing, baseball, tennis, golf, bowling, wrestling, boxing etc. that calls for talent or physical prowess and is frequently competitive in character.

1.1 Details on Artificial intelligence

The term "artificial intelligence" (AI) describes a set of technologies that enable computers to do complex tasks like visual and auditory perception, language translation, decision-making, data processing, and more. The field devoted to the study and development of computational models that mimic human intellect or handle data sets too big for humans to handle is known as artificial intelligence (AI).

The enormous area of artificial intelligence encompasses numerous subfields, including but not limited to: computer science, philosophy, psychology, linguistics, neurology, data analytics and statistics, software and hardware engineering, sports, and many more.

Data analytics, forecasting, object classification, intelligent data retrieval, recommendations, and natural language processing are just a few of the many business applications that make use of AI. Most of these technological advancements rely on deep learning and machine learning.

1.1.1 AI and sports

With the aid of data analysis, artificial intelligence in sports may recognize patterns and trends. Sports coaches and officials use the data they collect to ascertain each location on the fitness and performance scale.

AI systems look at player performance data, including endurance, speed, and gait patterns. This data can be used by coaches and analysts to identify players' advantages, disadvantages, and possible areas for development.

1.2 Objective of study

- 1) To study the structure to Sports and AI
- 2) To explore the various role of AI in sports.

1.3 Organization of thesis

Section 1 describes about the introduction to AI in sports, how decision can be improved using AI. Section 2 describes about the methodology for AI and types to detect the decision in sports using AI. Section III describes about the conclusion and lastly references are provided.

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2 Methodology

2.1 Source

The data is collected through secondary source by using published articles and reference books. Namely- Sudeep srivastava (aug 2024), Vasant dhar (2017), Sewa singh Bajwa (Aug 2024), Fabian Hammes at,al (2022).

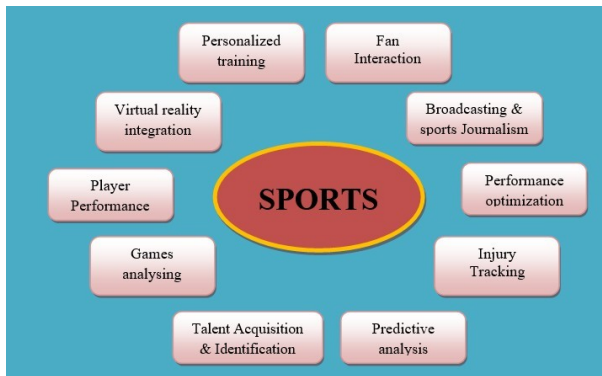


Figure 1: Role of AI in sports

- Fan interaction: AI has the potential to facilitate a greater level of fan contact and involvement in youth sports. Similar to professional sports reporting and analysis, machine
- Broadcasting & Sports Journalism: AI is used in sports broadcasting to automatically edit, assemble highlights, and give presenters real-time data.
- Performance Optimization: AI systems examine a tonne of player performance information, such as heart rate, speed, and distance travelled.
- Injury tracking: AI in sports analytics can assist organizations in controlling workload, avoiding overtraining, and lowering the chance of overuse injuries.
- Predictive analysis: In addition, the time schedule and expected attendance at the stadium are predicted using predictive and cognitive analytics.
- Talent Acquisition & Identification: Talent identification is a distinct process that includes biomechanics, player performance assessment, and player recruitment. Athletes' movement patterns and physical skills can be evaluated with the use of biomechanics.
- Games analysing: The term "game analytics" refers to a number of different sports event analysis components. This is a thorough technique that aids in the comprehension and analysis of sporting events and makes use of many technologies and methodologies to produce insightful findings. Large data sets can be efficiently analyzed by AI algorithms in game analytics to produce precise forecasts and provide new perspectives on player performance and strategy.

- Player Performance: The health and performance of players are tracked and enhanced through the use of AI-driven predictive analytics. Athletes and players can gather data on strain and tear levels and take preventative measures to prevent serious injuries by utilizing the appropriate technology. This enables the group to develop a potent plan to optimize strength as well. In addition, player performance is examined by AI-based programs.
- Virtual reality integration: In VR stimulation, coaches and players will practice, create strategies and review content within VR- simulated environments.
- Personalized training: Personal training has reached a new height in the sports sector with the emergence of artificial industry. Athletes and sportspeople can use AI to tailor their food plans and personal training sessions to meet their specific needs.

2.2 PRESENTLY AI IS USED IN SPORTS

- Cricket- Leg before wicket (LBW), Hawkeye, Ultra edge also uses AI to predict the flow of the ball.



Figure 2: Ultra edge in cricket

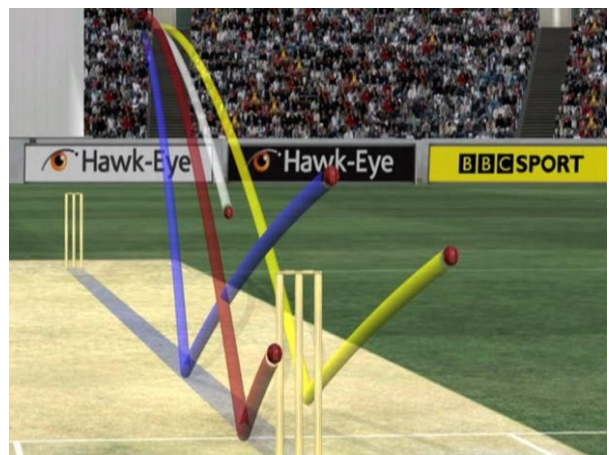


Figure 3: Hawk eye

- Kabaddi- One such device is the hot spot imaging system, which uses infrared cameras positioned in opposite directions to continuously record photos of the ongoing match.



Figure 4: Kabaddi

- Basketball: Accuracy of shot in the basketball is predicated using AI and the instance is shown in Fig.5.

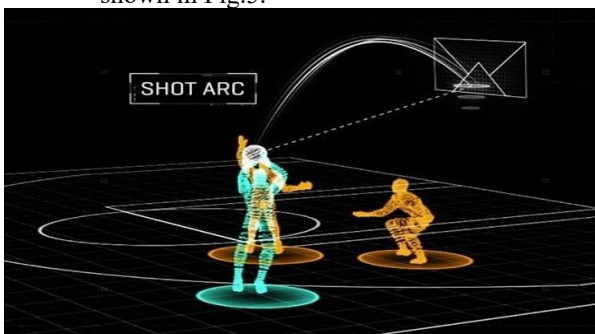


Figure 5: Basketball shot accuracy detection using AI

- Tracking of football players is predicted using AI and the instance of it as shown in the Fig.5.

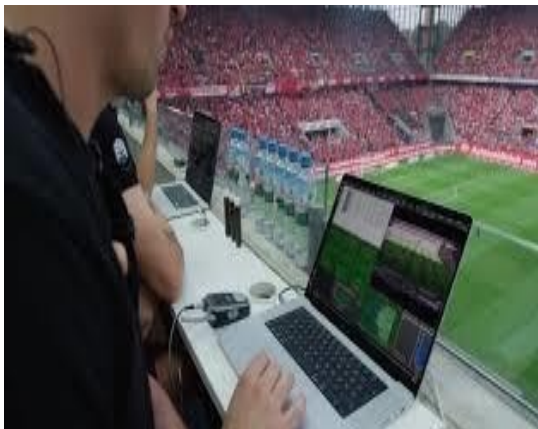


Figure 6: Tracking of players in football match

3 Conclusion

Artificial intelligence has opened up a wide range of prospects for sports corporations, game strategists, fans, and franchise owners through the use of sophisticated algorithms and sensors. Modern corporations are heavily investing in AI development companies to create tailored solutions because of the vast breadth of implementations. The AI revolution in sports will continue to have a significant influence in the near future and increase player safety and effective gaming strategy.

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