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## *Artificial Intelligence (ChatGPT) in Sports*

*[La Inteligencia Artificial (chatGPT) en el deporte]*

*[Inteligência Artificial (chatGPT) nos esportes]*

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### **ABSTRACT**

In recent years, artificial intelligence has emerged as a change agent in several aspects of sports, from the analysis of player performance on a team to the statistical evaluation of pre-competition forecasts. This paper focused on interaction and analysis (questions and answers) about various sports topics, with very interesting responses *for the future of sports, despite the current limitations*. Although artificial intelligence has explored the Internet, and it probably is a fundamental resource to help with research in sports, it only provides access to previous partial information chunks used for AI training, which is especially significant, considering the Internet also contains mistaken and inaccurate information.



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**Keywords:** artificial intelligence, ChatGPT, sports.

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## **RESUMEN**

En los últimos años, la Inteligencia Artificial ha aparecido como un agente de cambio que ha revolucionado varios aspectos en los deportes, desde el análisis del rendimiento del jugador, de un equipo, hasta la evaluación estadística de los pronósticos precompetitivos. El presente trabajo consistió en interactuar y analizar en forma de preguntas y respuestas sobre diversos temas del deporte, con respuestas muy interesantes *para el futuro del deporte, a pesar de las limitaciones actuales*. Si bien la Inteligencia Artificial ya ha explorado Internet y probablemente es un gran recurso para ayudar en las investigaciones deportivas, se debe tener cuidado, pues solo tiene acceso a la información con la que ha sido entrenado e Internet tiene mucha información errónea e inexactitudes.

**Palabras clave:** inteligencia artificial, ChatGPT, deporte.

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## **RESUMO**

Nos últimos anos, a Inteligência Artificial surgiu como um agente de mudança que revolucionou vários aspectos do esporte, desde a análise do desempenho dos jogadores, do desempenho das equipes, até a avaliação estatística de previsões pré-competitivas. O presente trabalho consistiu em interagir e analisar, na forma de perguntas e respostas, vários tópicos do esporte, com respostas muito interessantes para o futuro do esporte, apesar das limitações atuais. Embora a Inteligência Artificial já tenha explorado a Internet e provavelmente seja um ótimo recurso para ajudar na pesquisa esportiva, é preciso ter cuidado, pois ela só tem acesso às informações com as quais foi treinada e a Internet tem muitas informações erradas e imprecisas.

**Palavras-chave:** inteligência artificial, ChatGPT, esporte.

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## INTRODUCTION

The world of sports has always been a dynamic industry with a fast evolution throughout time, and significant technological advances that play an important role in its growth and development (Batista 2023). In recent years, artificial intelligence (AI) has emerged as a change agent in several relevant aspects of sports, from the analysis of player performance to the study and evaluation of several sports indicators. One of the innovations based on AI in the industry of sports is ChatGPT, an advanced language model developed by OpenAI.

### *What is ChatGPT?*

It is called Generative Pre-Trained Transformer (GPT), a type of language model that generates enormous quantities of text to interact with people.

Naturally, AI is not the solution, nor does it have answers to all the areas of knowledge, or does it produce perfect outcomes. Despite its name, it is not smart; it feeds from previous knowledge and content generated by third parties, which should be kept in memory permanently.

Brasó (2023) noted that the appearance of AI is not limited to sports; other branches of science and the economy are also favored, with faster and more efficient decision-making. Triviño (2022) said that almost every sports team in the most popular types and financially powerful sports relies on an analytical team. It was increasingly observed in the US in the 2020s, and it was regarded as the most significant recent development in the National Basketball League (NBA), by Grantland magazine. During the game, cameras record every movement on the court, as well as speed, shots, player effectiveness, and ball direction. It makes up a colossal amount of data to be compiled and studied by analysts, whose results are later sent to the coaches.

Hence, artificial intelligence is gaining more space in sports and is changing the way of playing and scouting, which helps coaches make decisions based on data analysis. Further development of AI will probably have a greater impact on sports. Accordingly,



this paper aims to elaborate a set of questions and answers about various sports topics using ChatGPT.

## *DEVELOPMENT*

Today, technology has shown a fast development, with a critical impact on several human areas, particularly in communication (Casa, *et al.*, 2023).

The appearance of text-generating artificial intelligence, known as ChatGPT, in November 2022 demanded an adjustment of this new tool. It has several applications in education, especially in teaching and the implementation of developing methodologies, including teacher training and undergraduate education, which enable more ethical uses leading to better training, as mentioned by Galisteo *et al.*, (2023).

Vallés (2023) claimed that IA might pave the way for future journalists. ChatGPT, an advanced AI, capable of imitating human language, was introduced in late 2022 and has been in the digital news currently.

Moreover, the European Union will make the companies that use any application of generative artificial intelligence, like ChatGPT, reveal if they use copyrighted material, according to Bou (2023).

Today, AI utilization should undergo bidirectional adjustment. On one hand, it must show the best way of interacting with ChatGPT; and on the other, it must share a series of applications of this tool in education, which can encourage teachers at every level to use it in any area of knowledge.

But: What are the shortcomings of ChatGPT?


1. It cannot access the Internet.
2. It may offer nonsense data.
3. It could fail to discern reality from fiction.




4. Users must be cautious about too extensive content.
5. The answers will require some extra effort from the user.
6. It can't process illegal or offensive content.
7. It offers unreliable medical or healthcare advice.
8. It fails to conduct precise research.

#### Questions and answers to ChatGPT :

The following is a group of questions made to ChatGPT in real-time, the answers were interesting (Retrieved from: <https://chat.openai.com/>).

Note: (symbol  is used for identification.

#### I. What are the ChatGPT prospects in sports?


 Until my last update in September 2021, I was unable to provide updated information about the specific future of ChatGPT in sports. However, I can give you some overall perspectives about how artificial intelligence and technology may impact the future of sports.

1. Data analysis: Artificial intelligence may play a pivotal role in sports data analysis. Teams and coaches might use advanced algorithms to evaluate player and team performance, tactics, and strategies. It can help identify strengths and weaknesses, improve performance, and make more informed decisions during the games.
2. Customized training: Athletes might benefit from artificial intelligence use to access customized training programs. The data collected on the performance, fitness, and health of athletes might be used to design specific training programs to improve performance and reduce the risk of injuries.
3. Increased virtual reality: It could be used to improve the experience of sports fans. It might provide immersive experiences, allowing the onlookers to feel as if they were at the stadium or on the track.



4. Technology-assisted refereeing, such as VAR (Video Assistant for Referees) in soccer, has proven useful for making more accurate and fair decisions during matches. Perhaps, there will be greater application of technology in other sports to enhance referee decision accuracy.
5. Interaction with fans: Artificial intelligence might be used to improve team-team and team-fan interaction. Chatbots and virtual assistants might provide real-time information, answer questions asked by the fans, and improve the overall experience of enthusiasts.

## II. Will ChatGPT replace sports coaches?

 Although artificial intelligence and ChatGPT-type language models have significantly improved in many areas, including sports, it is unlikely that they will be capable of fully replacing sports coaches shortly. Coaches have a critical and multi-sided role in athlete development and performance. There are several reasons to ensure that artificial intelligence cannot replace coaches completely.


1. Personal relationship and motivation: Sports coaches not only provide technical, tactical, and physical instruction, but they also create a personal connection with athletes. They motivate, inspire, and offer emotional support, which current artificial intelligence is unable to replicate completely.
2. Adaptability and human understanding: coaches must adapt to the particular needs of athletes, considering their personality, learning style, and physical connection. Artificial intelligence may offer objective information and analysis but lacks the capacity of human understanding to deal with personal and emotional aspects in training.
3. Real-time observation and correction: Coaches may observe athlete training in real-time, and comment and correct actions immediately. This is essential for development and improves athletes' development constantly. Meanwhile, artificial intelligence today lacks this capacity with the same precision and efficacy.



4. Experience and specific knowledge: Often, sports coaches sit on dozens of years of experience and sports knowledge, which cannot be easily replicated using artificial intelligence. Their practical experience and understanding of real situations are invaluable to guiding athletes to success.
5. Emotional aspects and leadership: Coaches not only focus on technical performance, but they also are critical in the development of character, work ethics, and athlete leadership.

Although artificial intelligence may be used as a complementary tool useful in sports training, it is very unlikely to fully replace the presence and relevance of human coaches. Artificial intelligence could assist coaches with data analysis, performance optimization, and additional information supply. However, human relationships, empathy, and comprehension are still pivotal for athlete development and success.

### III. Will ChatGPT replace referees?

 It is very unlikely that ChatGPT or any other artificial intelligence will replace referees completely shortly. Although technology has significantly advanced in many areas of refereeing in sports, there are several reasons against the full replacement of human referees by artificial intelligence.

1. Game interpreting: In many sports, refereeing depends on human interpretation and experience to make decisions in complex and often controversial situations. Referees not only apply the game's rules but also evaluate the players' intentions, the game's context, as well as other variables.
2. Emotions and context: Human referees may perceive the game's emotional atmosphere, understand the circumstances, and adjust their approaches accordingly. Artificial intelligence lacks empathy and the capacity to understand the emotional context of the game fully.
3. Adaptability and flexibility: Referees should be able to adapt quickly to changing situations of the game, and make real-time decisions. Artificial intelligence may have a limited capacity for handling unexpected or complex situations, which have not been programmed in an algorithm.






4. Player interaction: Often, referees must interact with the players to communicate decisions and maintain order in the field. Human interaction is essential to maintain discipline and respect in sports.
5. Errors and controversies: Although artificial intelligence may be objective in terms of decision-making, it could also err or generate controversies, especially if enough data and complex scenarios have not been input.

Rather than replacing referees, artificial intelligence and technology have been used in refereeing as helping tools for more accurate and fair decision-making. Technologies like VAR in soccer, or the Hawk-eye system in tennis, are examples of how artificial intelligence has been used to assist referees and avoid errors in certain situations.

In short, further artificial intelligence-technology integration will take place to improve accuracy and fairness in sports decisions, though it is very unlikely that it will replace human referees completely, due to the complexities and emotional aspects involved in sports refereeing.

#### IV. ChatGPT in chess?

 Chess is an area where artificial intelligence, including ChatGPT, has made significant progress and impact. Artificial intelligence algorithms have revolutionized chess, both professional and amateur players. The following are ways in which artificial intelligence, including ChatGPT, has influenced chess.


1. Match analysis: The artificial intelligence algorithms have permitted deep analysis of chess matches. Chess engines based on AI, such as Stockfish and AlphaZero, can evaluate positions and calculate variants with incredible accuracy. Now the game can be better understood, improving players' skills by providing real-time analysis.
2. Entertaining and training: Artificial intelligence has assisted players in improving their skills and strategies. Coaches and players can use artificial intelligence to study historical matches, analyze their matches, and work on specific improvement areas.



3. Generation of positions and problems: Language models, like ChatGPT can also be used to generate interesting chess positions or to create problems or challenges. It provides an opportunity for players to practice and enhance their tactical and calculation skills.
4. Automatic learning: Artificial intelligence has been essential in the development of automatic chess learning systems. AlphaZero, for instance, learned to play chess without human guidance, only through self-learning and the analysis of millions of matches. It proved that artificial intelligence can develop strategies and surprising movements that have changed the theory and practice of chess.
5. Broadcasting and entertainment: Artificial intelligence has improved spectator experience through chess broadcasting. The chess engines and AI-based analysis have been integrated into streaming platforms and match analyses, offering the public a deeper vision of the game, and making it more exciting and educational.

Overall, artificial intelligence has changed many aspects of chess, from analysis and training to the creation of content and entertainment. Surely, the future will hold more advances in this area, which will improve the experience of chess for players and followers.

#### V. ChatGpt for the redaction of scientific manuscripts?

 As a language model, ChatGPT may be useful in the redaction of scientific papers to some extent, though its practical limitations and proper approach must be taken into consideration.

Advantages of ChatGpt for the redaction of scientific manuscripts:

1. Content generation: ChatGPT may help generate relevant and coherent content associated with science. It can provide information and explanations about complex concepts.
2. Information synthesis: It can summarize and synthesize large amounts of scientific information, guiding researchers with a quick overall glance at a specific topic.




3. Helping with the redaction: ChatGPT may suggest the structure of paragraphs, keywords, and adequate technical lexicon to improve the redaction of the manuscript.
4. Exploration of ideas: It may be used to explore different approaches and perspectives about a research topic, which might encourage scholars to develop new hypotheses or ideas.

#### Shortcomings and cautions:

1. Accuracy and veracity: Although ChatGPT has access to huge amounts of information, it does not always ensure the accuracy or veracity of responses. There must be verification and information contrasting through reliable sources.
2. Lack of context: ChatGPT may generate context depending on the context given in the question, though it may have difficulty understanding a broader context of the particular scientific topic.
3. Knowledge limitations: ChatGPT's knowledge is limited to the previously input data (until September 2021). Therefore, it does not have updated information with the most recent advances in science.
4. Necessary editing and reviews: ChatGPT-generated content may require detailed editing and review to ensure coherence and scientific and academic standards.

In short, ChatGPT may be useful as a support tool to create scientific articles, but should not be used as a full replacement of research and academic work. Scholars and scientists should use it cautiously, verifying the information included and the findings mediated by models based on trustworthy sources and proven scientific knowledge.

#### VI. What is the future of sciences applied to sports?

 It is exciting and promising. As technology advances and understanding of the human body and sports performance spreads, sport-applied sciences will continue to play a pivotal role in athletic development and performance. Some trends and key areas expected to develop in the future are the following.



1. Outfit technologies and data analysis: The inclusion of portable devices and sensors attached to the athletes will continue to spread, with a large amount of collectible real-time data about athlete performance and health. These data will be used to analyze and enhance performance, prevent injuries, and optimize training.
2. Artificial intelligence and advanced analysis: Artificial intelligence and automatic learning will be increasingly used to analyze complex data and find hidden patterns. It will help improve training design, tactical analysis, decision-making in the game, and training program customization for individual athletes.
3. Increased virtual reality: These technologies will further integrate into athlete training and preparedness. Athletes could use virtual settings for training, and analyzing games with different perspectives that permit them to visualize competitive scenarios in real-like simulations.
4. Sports nutrition and genetics: Sport-applied sciences will be increasingly useful in sports, based on a broader approach to customization of nutrition and training. Hence, more specific nutritional and training plans will meet each athlete's needs and capacities.
5. Sports medicine and recovery: new advances in sports medicine will help speed up recovery from injuries, and enhance rehab processes. Besides, recovery and regeneration therapies, such as cryotherapy and compression therapy will become more effective and accessible for athletes.
6. The holistic approach to performance: There will be greater emphasis on a sports performance holistic approach, considering the psychological, emotional, and social aspects that come along with physical and technical development. Athlete mental health and wellbeing will be more significant topics of research and approaches.

Consequently, the future of sport-applied sciences will be better with the assistance of advanced technologies, deeper data analysis, and an ever-increasing customized approach to sports performance. These advances will not only benefit high-performance athletes but also sports fans and the general public, since they will encourage more active and healthier lifestyles.



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## CONCLUSIONS

Although ChatGPT has already explored the Internet, and it will probably become a fundamental aid for research in sports, it only provides access to incomplete information which has been previously fed to the system. This is especially significant, considering the Internet contains mistaken and inaccurate data.

It can be used to help with the redaction of scientific papers, but it is advisable to remain cautious about ChatGPT-generated information. After all, it is not a human scholar and has weaknesses and flaws.

Users should know ChatGPT thoroughly to get the most out of this tool, though it may send incorrect information. In sports, for instance, it will not stress factors like athlete weight or possible injuries, since it suggests exercise routines regardless of the human condition (personal and psychosocial aspects) and support, which requires professional human coaches.

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*Conflict of interest statement:*

The authors declare having competing interests.

*Author contribution statement:*

The authors have participated in the redaction of the manuscript and the documentary review.



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