

EDITORIAL

Use of Artificial Intelligence in Scientific Publications

Marcella dos Santos Lopes da Silva,¹ Jayme Portasio Lopes,² Thaís Amadeu Pol² Claudio Tinoco Mesquita¹

Universidade Federal Fluminense,¹ Niterói, RJ – Brazil

Sociedade Brasileira da Cardiologia,² Rio de Janeiro, RJ – Brazil

The term "artificial intelligence" (AI) was created by John McCarthy and a group of researchers who believed that the human mind could be replicated in machines at the 1956 Dartmouth Conference.¹ Until the beginning of the 2000s, computers had limitations in data processing and storage, which prevented the development of more advanced applications such as machine learning (ML). Progressive improvements have facilitated the use of computers to perform tasks that emulate human behavior, being the basis of what we know today as AI.²

There are several definitions of AI, ranging from computer systems capable of dealing with a problem in a manner no different from that a human being would deal with to algorithms and systems capable of processing a high volume of data and information to simulate human reasoning.³ This technology has changed the way individuals interact in teaching, research and social habits.

There are subareas in AI that offer countless possibilities for use. ML is characterized by systems that learn to improve automatically based on their experience, without explicit programming.⁴ "Artificial neural networks" are models inspired by the human brain that recognize patterns to generate learning.⁵ Furthermore, there is the "natural language processing" (NLP) which is focused on the relationship between humans and computers through the use of natural language, such as the popular "virtual assistants".⁶ Finally, "computer vision" enables computers to interpret and make decisions based on images and videos, like facial recognition and image-based diagnosis.⁷

Keywords

Artificial Intelligence; Scientific and Technical Publications; Science.

Social explosion

The creation of various types of AI has led to the generation of a large cluster of data, called "Big Data". This data storage brings countless possibilities for use, such as in health and education, data interpretation, recognition of writing patterns, and analysis and construction of texts.⁸ The social explosion of AI occurred in November 2022, with the launch of the chatbot ChatGPT, developed by OpenAI, which was the first use of generative AI to be successful and reach millions of users quickly. Generative AI consists of algorithms that, once trained with extensive databases, can provide original texts, images, and audios, based on learned patterns.⁹

Currently, the use of high-performance software, chatbots and virtual assistants permeates society and impacts all spheres of human thought thanks to the constant development of NLP, computer vision and robotics.² However, along with these advances come ethical and social issues that need to be addressed, such as privacy, security, the use of original data created by third parties, plagiarism and the impact on the job market.

Potentials and risks

Chat GPT and similar models have potential applications in several areas due to the ability to process large volumes of data, review languages and literature, summarize texts, correct spelling and grammatical errors and even write scientific articles. However, its results are still imprecise, and its limitations on a given topic can compromise data reliability and lead to significant errors.¹⁰ Besides, the indiscriminate use of generative AI can lead to a decrease in the creativity of authors, since AI is limited to the database that was inserted for its

Mailing Address: Marcella Lopes

Universidade Federal Fluminense. Av. Marquês do Paraná, 303. Postal code: 24033-900. Centro, Niterói, RJ – Brazil

E-mail: marcellalopes@id.uff.br

training and its everyday use can make authors dependent on this model.¹¹

It is important to know that the use of generative AI is associated with the risk of disclosing personal and confidential data, as several AI platforms make the information entered into them accessible to the public domain.¹¹ Therefore, published data, even intellectual property of the author, will be considered plagiarism because it is available in an IA.¹⁰

Generative AI, despite being used by millions of people around the world, also has limitations. This modality is not capable of understanding commands and responses, given that its responses come from language standards on the internet.¹¹ Therefore, generative AI can reproduce dominant social views and compromise the opinions of minorities, further reinforcing pre-existing prejudices in society.¹¹

In the scientific-academic context, the smart database technology has been part of the daily lives of researchers, students and teachers in Brazil. Due to the lack of consensus on the use of AI in publications and dilemmas faced by scientific journals, there is an urgent need for a broad discussion on its use, as shown in Figure 1.¹²

Possible applications

The most promising contribution of AI to scientific publications is the high capacity for data analysis.⁷ It is difficult to observe new discoveries in the large volume of articles published around the world each year using traditional database search methods. AI can be easily applied to mine, analyze and select data, identifying possible gaps in the literature, highly relevant citations and even self-plagiarism in works.¹³

For authors who want to get their first article and still don't know where to start, AI can provide help in organizing thoughts, generating written summaries, editing spelling errors, reviewing texts, suggesting improvements in writing and even assisting in preparation of figures.¹⁴ Furthermore, AI can be used to translate texts into different languages, facilitating the global dissemination of knowledge.

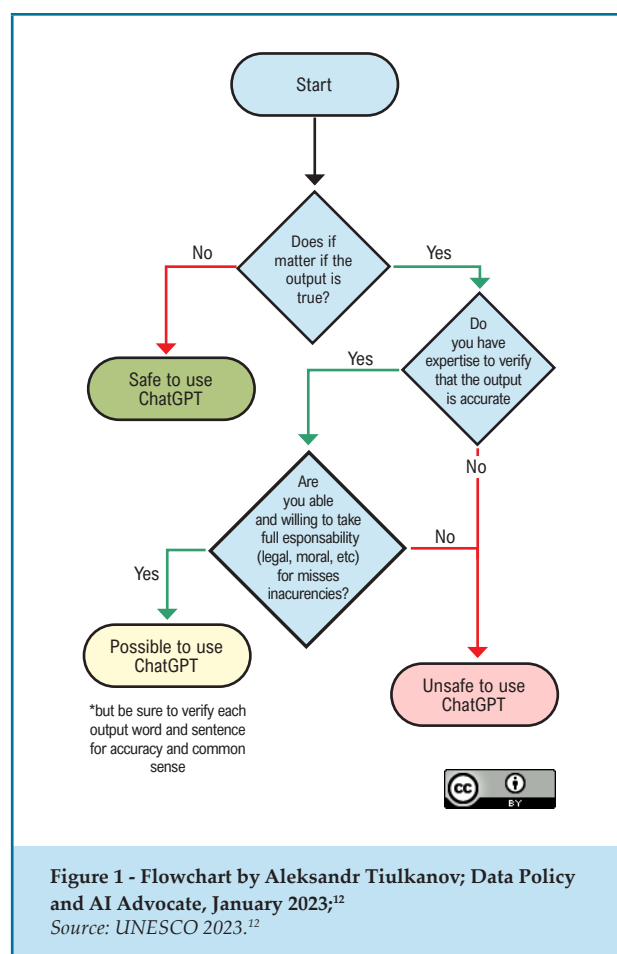
In addition, AI can become a strong ally for editors, especially in the process known as peer review, by ensuring that articles are of excellent quality and that their content is accurate and reliable.¹⁵ Also, AI can help identify potential reviewers based on their area of expertise, and detect the originality of works

submitted to the journal.

In the process of choosing a journal to submit a scientific article, AI can assist both the authors by analyzing the journals' most common publication themes and metrics and editors-in-chief by predicting the number of citations that an article may receive based on various metrics and characteristics of the article.

Future perspectives

The integration of AI in scientific publications has revolutionized the way research is conducted, published, reviewed and disseminated. Despite the challenges, such as the need to ensure transparency and ethics at all stages, the potential benefits are vast, as shown in Figure 2. Ongoing collaboration between AI researchers and developers is essential to maximize these benefits and drive significant advances at the frontier of scientific knowledge.



Applications	Ethical issues
Data mining, analysis and selection	Loss of creativity
Spelling and grammar check, language translation	Dependence on the use of AI
Writing and summarizing texts and scientific articles	Inaccurate and generalized results
Creation of figures and images	Lack of data security
Identification of relevant citations, periodicals, metrics and self-plagiarism	Reproduction of standards on the internet

Figure 2 - Applications of AI in scientific production and ethical issues .
Source: Silva et al.¹⁵

References

1. Kaufman D. Desmistificando a inteligência artificial. Belo Horizonte: Autêntica; 2022.

2. Haug CJ, Drazen JM. Artificial Intelligence and Machine Learning in Clinical Medicine, 2023. N Engl J Med. 2023;388(13):1201-8. doi: 10.1056/NEJMr2302038.

3. Dobrev D. A Definition of Artificial Intelligence. Math Balk. 2005;19:67-73.

4. Forero-Corba W, Bennasar FN. Techniques and Applications of Machine Learning and Artificial Intelligence in Education: A Systematic Review. Rev Iberoamer Educ Dist. 2024; 27(1):1-35. doi: 10.5944/ried.27.1.37491.

5. Souza VSS. Introdução à Interpretabilidade de Redes Neurais Convolucionais [dissertation]. Ouro Preto: Universidade Federal de Ouro Preto; 2023.

6. Chowdhary KR. Fundamentals of Artificial Intelligence. New Delhi: Springer; 2020.

7. Guo MH, Xu TX, Liu JJ, Liu ZN, Jiang PT, Mu TJ, et al. Attention Mechanisms in Computer Vision: A Survey. Comp Visual Media. 2022;8(3):331–68. doi: 10.1007/s41095-022-0271-y.

8. Ramos MC, Gomes DF, Mello NF, Silva EN, Barreto JOM, Shimizu HE. Big Data and Artificial Intelligence for Translational Research in COVID-19: A Rapid Review. Saúde Debate. 2022;46(135):1202–14. doi: 10.1590/0103-1104202213518

9. Gutiérrez JLM. On Actor-network Theory and Algorithms: ChatGPT and the New Power Relationships in the Age of AI. AI Ethics. 2024;4:1071-84. doi:10.1007/s43681-023-00314-4.

10. Golda A, MekonenK, Pandey A, Singh A, Hassija V, Chamola V, et al. Privacy and Security Concerns in Generative AI: A Comprehensive Survey. IEEE Access. 2024;12(2): 48126-44.

11. Marchandot B, Matsushita K, Carmona A, Trimaille A, Morel O. ChatGPT: The Next Frontier in Academic Writing for Cardiologists or a Pandora's Box of Ethical Dilemmas. Eur Heart J Open. 2023;3(2):oead007. doi: 10.1093/ehjopen/oead007.

12. United Nations Educational, Scientific and Cultural Organization. ChatGPT and Artificial Intelligence in Higher Education: Quick Start Guide. Paris: UNESCO; 2023.

13. Heldwein FL, Almeida SHM. ChatGPT na publicação científica – A Era da IA chegou: oportunidades, desafios e ética. Recet. 2023;10(1). doi: 10.55825/recet.sbu.0164.

14. Machado G, David JM, Morgon NH. Publicação de Artigos Científicos e IA: Uma Revolução em Curso. Quim Nova. 2024;47(4):e-20240039. doi: 10.21577/0100-4042.20240039.

15. Silva MSL, Mesquita CT. Publication of a Scientific Article: What Authors Need to Know. Int J Cardiovasc Sci 2023;36:e20230115. doi: 10.36660/ijcs.20230115.

