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Guidelines for the Use of Generative Artificial Intelligence in Research, Writing and Publishing Scientific Articles in JMeXFRI

(Full version)

Introduction

Generative artificial intelligence (AI) refers to AI that not only analyzes data or acts as an expert, but also generates new content[1]. Models using this technology are robust, complex, and enriched with data from multiple sources, mimicking human creativity. "*Generative modeling is an artificial intelligence technique that creates synthetic objects by analyzing training examples, learning their patterns and distribution, and then creating realistic replicas"* [2]. AI simply formulates responses to prompts based on a finite data set without having a true understanding of the information inputs or outputs: if an author chooses to learn and understand the limited capabilities of generative AI, it can be a valuable asset. Think of this tool as an assistant that supports various aspects of the research and writing process[3].

AI can perform tasks that would be time-consuming or tedious for humans. Given a simple query, a generative AI large language model (LLM) such as *OpenAI*'s *ChatGPT* can analyze a large amount of data and draw its own conclusions on a given topic, much like a human would do, which on the one hand could improve productivity in numerous processes, but on the other hand is of concern in fields related to scientific knowledge, such as health sciences, where the accuracy of data has direct impact on people´s lives. The value of generative AI for academic writing should be developed based on best practices for the responsible use of generative AI[3].

AI to support research protocols

There are a variety of options for choosing the appropriate generative AI model. It should be determined whether it is an *open-source model* (free code to consult, use and improve) or a paid model. Careful structuring and restructuring of the prompts will ensure the best possible results[3]. The Word Association of Medical Editors (WAME) recommends mentioning in the appropriate section of the protocol when making use of any generative AI tool[2].

- AI text summarizers, such as *Quillbot* or *ChatPDF* to quickly search through potential sources and find the most pertinent for your work.
- AI tool such as *INK* to generate research questions that reflect your project's unique path[3].
- *EvidenceHunt* extracts validated data from PubMed based on a question that acts as a query, applies AI, analyzes and gives the best matching results, reports through summaries[4]. The sources can be consulted and it goes to the publication page. In addition, there is a search function in the library with AI tools to filter by study type.
- *Elicit* uses data from the *Semantic Scholar* platform, a free tool for searching for publications with AI. It offers the possibility to search for articles through a query, summarizes the most relevant articles on the topic and allows an analysis between them and the content to identify the main findings, type of study, results, limitations, population, objectives, etc. It exports the data in CSV format for further statistical analysis: it is also possible to upload in PDF to the platform for analysis[5].
- Expand the research questions with an AI brainstorming session using *HyperWrite* or a similar tool. Turn ideas into an outline using an AI outline generator such as *Wordtune* and then develop a strong thesis using an AI tool such as *Smodin*[3].

AI to support the writing of a scientific manuscript

- Generative AI can be useful in analyzing data or identifying biases. Analytical systems using AI can process large amounts of information, outperforming human performance. Authors should validate the errors or biases detected by AI.
- A content generator is a handy way to start the drafting phase. AI tools like SEO.ai, Jasper and Copy.ai provide personalized content that reflects your various sources and ideas, and can streamline this process[3].

AI as support for editing the scientific manuscript

- An AI proofreading program, such as *Grammar Check* or a *Microsoft Word Add-in*, is useful throughout the writing process to catch straightforward spelling and grammatical errors. Once completed, it may improve the clarity, conciseness, flow and overall readability of the paper through *Curie*[3].
- AI can be useful for improving writing, especially if the manuscript is in a language other than the native language, and can even be used as a grammar feedback tool: author is responsible for the text presented in the manuscript.
- The translation must be validated by an expert in the final language of the manuscript, which for JMeXFRI is American English.

AI Citation

To ensure transparency and reproducibility, researchers must treat anything produced by generative AI just as they would any other source of information to avoid scrutiny and misconduct[3]. The American Psychological Association (APA) and the Chicago Manual of Style have recommended a generative AI citation format[7].

There should be a clear description of the content created and the name of the model or tool, the version and extension numbers and the manufacturer. Authors must take responsibility for the integrity of the content created by these models and tools[3].

AI does not meet the criteria for authorship

AI, machine learning and algorithmic tools in general do not meet the criteria for authorship. Above all, it cannot take responsibility for the content or be held accountable for it. Generative AI does not meet the criteria for authorship according to the International Committee of Medical Journal Editors (ICMJE)[2], Journal of the American Medical Association (JAMA)[6] and WAME[2].

Ethical aspects of generative AI

There is a debate about the ethics of using generative AI in research and academic writing[3]. In general, the use of generative AI in the writing of scientific publications in the health sciences is not recommended due to lack of regulation, in the definition of copyright and possible plagiarism[3].

AI detectors exist. They are growing in number and becoming more accurate every day. They are used extensively by professors, peers, editors, and anyone else who wants to know how a text was written[3]. Many of these tools recognize AI-generated text and images and determine what percentage of the work was done by AI by highlighting the parts.

On June 13, 2023, the National Bioethics Commission (CONBIOETICA) of Mexico published recommendations for a collaborative participation of experts, civil society, companies and developers to initiate the process of regulating these technologies with the participation of the Mexican government[8].

Conclusion

The balance between the strengths and weaknesses offered by generative AI requires learning and reasoned use of its resources to improve and accelerate the processes of research, writing and publication of scientific articles based on ethical principles. The use of wrong data should be avoided. In JMeXFRI it is not allowed to use generative AI for the generation of images, figures or tables. Authors submitting a manuscript to JMeXFRI are responsible for its content, including the use of generative AI with correct citation of all sources[3]. For this reason, it is of utmost importance that researchers carefully review, verify, and correct all AI-generated content.

Addendum:

On January 8, 2024 the Michigan Institute for Data Science[9] posted on its web portal (https://midas.umich.edu/generative-ai-user-guide/) the latest update of a comprehensive guide or the use of generative AI in scientific research, based on guidelines for publishing articles in major journals, funding agencies, and professional societies. We invite you to consult this resource for more information on this guide.

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