EDITORIAL

Does chatGPT (or any other artificial intelligence language tool) deserve to be included in authorship list?

Mohamad Amin Pourhoseingholi[1], Mohammad Reza Hatamnejad[2], Ali Solhpour[3]

[1] *Gastroenterology and Liver Diseases Research Center, Research Institute for Gastroenterology and Liver Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
[2] *Basic and Molecular Epidemiology of Gastrointestinal Disorders Research Center, Research Institute for Gastroenterology and Liver Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran*
[3] *Department of Anaesthesiology, College of Medicine, University of Florida, Gainesville, FL, USA*

Open AI Company, located in San Francisco, California, released the latest version of the large language model (LLM), chatGPT-3, on November 30, (1). ChatGPT is a chatbot that operates based on an artificial intelligence (AI) neural network and is designed to aid users through instant messaging. Inquiries are entered as input, and chatGPT complies with the high amount of facts and stats and subsequently tries to assemble relevant texts and return responses (1). Chatbots were first employed in the retail industry; however recently, they have ventured into other fields like healthcare, education, and research. Documenting or accessing patients' medical records has become more convenient for physicians using these chatbots; on the other side, patients can attain the service-providing benefits of chatGPT, like appointment booking, assistance with prescription fulfillment, bill payments, and accessing test outcomes (2). Evidence has illustrated that chatGPT can be a graceful educator. In an observational survey,

inspectors monitored the amount of accuracy and evidence-based being of chatGPT replies to pharmacological queries of medical students. They realized that chatGPT facilitates learning as a virtual instructor (3). This generation of software, rather than another academic toolbox, can more rigorously affect research, as they can not only enhance the compiled quality of the manuscript, but also serve as the search engine, coding assistant, and integrity assessor (4).

Today, investigators grapple with ethical issues and the pros and cons of chatGPT utilization, and it has become mainstream in the research field; however, the freshest debate that comes to mind relates to considering the chatGPT as an author. Aljanabi et al. wrote an article with the aid of chatGPT and listed it as the last author (4). King reported the challenges of AI and plagiarism in higher education and mentioned chatGPT as the co-author (5). Eventually, the most disputable paper was released; Zhavoronkov ordered chatGPT to write a perspective research on rapamycin consumption based on Pascal Wagner's theory, then positioned chatGPT in first place on the authorship list (6). For as much as no explicit instruction on authorship rights of any AI language tools exist, a principal question arises.

Does chatGPT deserve to be included in the authorship lists?

At first glance, chatGPT seems to be the most humanized-pattern language facilitating operator; nevertheless, it is still a tool like other ever-growing academic applications. Because of such resemblance, do authors treat the rest of the research instruments like chatGPT? For example, if the "R statistical package" analyzes data of a large-scale cohort or high-throughput bioinformatics project, do the authors have the right to list the R application as an author based on the claim that the mentioned application conducted the central part of the research? No, this is not sufficient; as evident as it is, instruments are designed to give science a hand, which is the pedestal of their construction, without taking any responsibility. Authorship is interlaced with liberation and authorization, appearing in different stages of an investigation timeline. Before the implementation phase, researchers have the option to decline the contribution proposal, but can chatGPT deny the employer's request? In the conduction stage, authors negotiate with each other to enhance the quality of the manuscript; is chatGPT able to insist on what it composed and attempt to convince the other authors? Such argument may take place between the reviewers and authors. If the reviewers are wrong, though, how does chatGPT attempt to satisfy the referees? The relationship between chatGPT and the other author(s) is mandatory-commercial rather than collaborative; chatGPT is a service provider, and the authors are customers. This obligation deprives chatGPT of any responsibility. Thus, how does this matter adhere to the guidelines of journals and ethics committees?

According to the standard guidelines of international journals (7), authors should declare that their research is an original investigation and has not been submitted elsewhere, and they should specify the authors' contributions and any possible conflicts of interest. ChatGPT is a chatbot capable of providing the demander with a new face of existing data; therefore, it can mix and rearrange prior documentation to display it as a new paper. This method may sound appropriate for review or expert-opinion articles, but for research schemes that deal with raw data, e.g., control trials or cohort studies, the risk of fraud and falsification exist, which is against journal rules. Until now, the usage of chatGPT has been limited to rendering conference abstracts and editorials. In the case of adding or removing an author, the journal's editor appeals to authors to sign consent forms; in such circumstances, how is chatGPT's consent achieved? Furthermore, it needs to be wholly understood how conflict of interest is defined for chatGPT, and how chatGPT distinguishes immoral situations, such as duplicate journal submissions and announcing its objection.

Last but not least, the transparent policies of international guidelines have challenged the attributed role of chatGPT. The International Committee of Medical Journal Editors (ICMJE) and Committee on Publication Ethics (COPE) defined four criteria to meet authorship (7):

✓ Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND

✓ Drafting the work or revising it critically for important intellectual content; AND

✓ Final approval of the version to be published; AND

✓ Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

ChatGPT does not meet the first condition and accounts for no significant participation in conceptualization, data gathering, or interpretation. The next topic of dispute is the author's order. The customary way, defined in the guidelines, is to serialize the participants based on their contributions. ChatGPT can only collaborate in scientific writing; thus, how is it placed as the first author? Could chatGPT be the corresponding author? Does it protest when it is placed in the wrong order position? Altogether, these examples represent ambiguities of chatGPT's authorship and need action for clarification.

The preliminary controversy centers on the use or banning of chatGPT in investigations because of ethical issues. Recently, an international conference on machine learning to be held in Hawaii in July, has banned chatGPT-written manuscripts from participating. Nevertheless, it is clear that it is only possible to keep up with technology. The journal Nature has reported that 32% of all chatGPT-generated abstracts cannot be spotted by plagiarism or AI-output

detectors or expert scientists (8); therefore, participation prohibition seems meaningless. This editorial has forged one step ahead and examined the circumstances of assuming chatGPT as an author. One approach is to put policies in place to stamp out the inclusion of chatGPT on authorship lists by those evaluating scientific research papers and conference proceedings. In the occasional case of permission to use chatGPT in certain cases, publishers and journals should disclose transparent policies. Furthermore, this action will be more fruitful and practical in extended dimensions when international institutes like ICMJE or COPE come up with the appropriate adjustments and establish robust criteria to scheme the AI authorship.

Conflict of interests

The authors declare that they have no conflict of interest.

References

1. OpenAI. (2023, January 25). CHATGPT: optimizing language models for dialogue. OpenAI. Retrieved January 26, 2023, from https://openai.com/blog/chatgpt/.

2. Bates M. Health care chatbots are here to help. IEEE Pulse 2019;10:12-14.

3. Nisar S, Aslam MS. Is ChatGPT a good tool for T&CM students in studying pharmacology? (January 14, 2023). Available at SSRN: https://ssrn.com/abstract=4324310.

4. Aljanabi M, Ghazi M, Ali AH, Abed SA, ChatGPT. ChatGpt: Open Possibilities. Iraqi Journal For Computer Science and Mathematics 2023;4:62-64.

5. King MR, Cellular cJ, Bioengineering M. A Conversation on artificial intelligence, chatbots, and plagiarism in higher education. Cell Mol Bioeng 2023;16:1-2.

6. Transformer CGP-t, Zhavoronkov AJO. Rapamycin in the context of Pascal's Wager: generative pre-trained transformer perspective. Oncoscience 2022;9:82-84.

7. Defining the role of authors and contributors. ICMJE. (n.d.). Retrieved January 27, 2023, from https://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html.

8. Else H. Abstracts written by ChatGPT fool scientists. Nature 2023;613:423.