

AI in Medical Research – Chat GPT and Beyond

Artificial intelligence (AI) has taken the world by storm and has even been referred to as the “new electricity”.¹ It powers voice assistants like Apple’s Siri and Google’s Alexa to “understand” and respond to voice commands. Recommendation systems in Facebook, Netflix, YouTube, and other social media platforms also use AI algorithms. AI systems are machine and software systems designed to perform functions requiring human intelligence, like face recognition, understanding language, decision-making, etc. It analyses large amounts of data and self-learning.² One of the most interesting advancements in AI is the development and success of Large Language Models (LLM). These algorithms and software are trained to generate human-like language. Currently, the most popular amongst them is Chat GPT (Chat Generative Pre-trained Transformer), developed by Open AI©. While this was initially designed to have enhanced chat capabilities, it was quickly realized that it could do much more. It mesmerized young students, scholars, and researchers in various fields. It can do your homework, write essays, complete assignments, write stories, film scenes, poems, make MCQs, write “original” papers, etc. Chat GPT-1 was introduced in 2018, and version 2 was introduced in 2019. The most commonly used version chat GPT 3.5, was introduced in June 2020, but a free research preview was not introduced until Nov 2022 to get feedback from the users. In PubMed, the first paper on Chat GPT is from Dec 2022. Since then, 458 papers have been published, attesting to its rapid rise in relevance in current times.³

So, is it a hero or a villain? The debate on the use of Chat GPT for academic publications goes on. It can fool scientists, write articles, conduct a meta-analysis and even pass medical licensing exams. It can also help researchers quickly get relevant information from a large body of literature.³ However, it is important to note some limitations to using Chat GPT for medical research. Chat GPT was developed as a chatbot for human-like conversations. Its most commonly used version chat GPT 3.5, was trained on 175 Billion parameters using the Common Crawl data set (around 570 GB), Wikipedia, Web test and many books.⁴ However, the information generated may not always be correct. It can make up facts-what is called “AI hallucinations”. Hence, the hesitancy to rely on ChatGPT for research is not unfounded, as misleading and harmful data may be produced. There are also

ethical questions, like whether it can be listed as an author and whether we should use AI for scholarly activities like research and publishing. There is a consensus among various editors and publishers that Chat GPT cannot be listed as an author. Chatbots are not “legal entities” and, thus, cannot be held responsible for their actions. They also recommend that authors be transparent about how & when the chatbots are used to retrieve relevant information.⁵

AI and various LLMs are powerful tools. What we need to do is to use them appropriately and ethically. We are witnessing a new leap for humanity; we must embrace this change and learn to utilise it. There are over 2.5 million scientific papers published every year. We cannot go through each one of them. We search databases like PubMed, Google Scholar, Medline, Web of Science, etc. Ironically, most of these databases use AI-based algorithms to fine-tune search options. So, the way forward is to develop a chatbot for medical use. Chat GPT is not trained for medical use – it cannot “comprehend” various medical texts and phrases. New LLMs are being developed, which are trained on available Medical Corpus. They are not freely available yet. BioBERT (Bidirectional Encoder Representations from Transformers for Biomedical Text Mining) and Google’s Med-PaLM 2 (Medical Pathway Language Model-2). These tools have been trained on the large medical corpus, including books, full-text articles, Wikipedia, etc. In a test, Med Palm-2 performed at an expert level on the MedQA dataset for the USMLE and NEET exams.⁶ Over time, these tools are expected to evolve into more accurate versions, which can help us sift through large piles of literature to find relevant information. It will remain the responsibility of the professional using such tools to face the consequences of untoward incidents from using these non-human AI tools. Understandably, this new technology may seem daunting.⁶ However, it would be unwise to remain stagnant and unchanging in an era of rapid development. Especially when there are multitudes of benefits to be reaped, should we learn to utilise these tools ethically?

Pakistan is full of experts in any field. There is a National Centre for Artificial Intelligence in NUST, and it is already involved in many medical projects, but it needs to be strengthened more. We need to make it a priority at the institutional level to train our young generation to use such tools effectively and ethically.

REFERENCES

1. Lynch S. Andrew Ng: Why AI Is the New Electricity | Stanford Graduate School of Business, 2017. [Internet]. Available at: <https://www.gsb.forsin.stanford.edu/insights/andrew-ng-why-ai-new-electricity>
2. De Angelis L, Baglivo F, Arzilli G, Privitera GP, Ferragina P, Tozzi AE, et al. ChatGPT and the Rise of Large Language Models: The New AI-Driven Infodemic Threat in Public Health. *Front Public Health* 2023; 11(1): 1-8. <https://doi.org/10.3389/fpubh.2023.1166120>
3. Else H. Abstracts written by ChatGPT fool scientists. *Nature* 2023; 613(7944): 423. <https://doi.org/10.1038/d41586-00056-7>.
4. World Association of Medical Editors. Chatbots, ChatGPT, and Scholarly Manuscripts || WAME [Internet]. 2023 Available at: <https://wame.org/finaapprovalpage3.php?id=106>. [Accessed on May 20, 2023]
5. Google. Sharing Google’s Med-PaLM 2 medical large language model, or LLM | Google Cloud Blog [Internet]. Available at: <https://cloud.google.com/blog/topics/healthcare-life-sciences/sharing-google-med-pal-2-medical-language-model> [Accessed on May 20, 2023]
6. Hügler T. The wide range of opportunities for large language models such as ChatGPT in rheumatology. *RMD Open* 2023; 9(2): e003105. <https://doi.org/10.1136/rmdopen-2023-003105>.

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