Can ChatGPT Take Over Human in Medicinal Exploration?

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**ABSTRACT**

In this paper, we describe the formatting guidelines for ACM SIG Proceedings.

**CCS Concepts**

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**Keywords**

Keywords are your own designated keywords separated by semicolons (“;”).

# INTRODUCTION

Chatbots are pre-trained with knowledge (Bhattacharjya et al., 2022) and showcased as programs which create human AI interaction (Adamopoulou & Moussiades, 2020a) either for satisfaction of user or simulation of offline agents. (Lowry, Romano, Jenkins, & Guthrie, 2009). Alan Turing Can Machine Think, gave rise to ELIZA, First Chatbot in 1966. ELIZA, Psychotherapist’s simulator (Adamopoulou & Moussiades, 2020a)selected output template based upon a pattern of linguistic rules provided manually. (Bhattacharjya et al., 2022) PARRY (1973) also used in experiment (1979) gave domain for further research on high-speed response and learning (Adamopoulou & Moussiades, 2020b). Similar chatbot, but AI was introduced in Jabberwacky (Jabberwacky, 2019) used CleverScript. Predictable and slow response, conversation loop was still prior problems in chatbots with no scalability. (Jwala, 2019). ALICE (1995) was working better than ELIZA by using AIML. (Bhattacharjya et al., 2022).2001, chatbots like SmarterChild started to displaying movie times, sport score. (Molnar & Zoltan, 2018) After this, Machine learning and deep learning was well prior (Bhattacharjya et al., 2022) for research which resulted Siri, Watson, Google Assistance, Cortana, and Alexa. Watson won Jeopardy winners, Even EQ and IQ was taken into consideration in terms of Microsoft Xiaolace (Zhou, Gao, Li, & Shum, 2019), Google Assistance started predicting user needs, but data privacy and malwares were key cons of this intelligent chatbots. (Cortana Security flaw means your PC may be comprised, 2018) (Adamopoulou & Moussiades, 2020b).

Nearly all businesses are in the field of research of chatbots to create a friendly toy tool chatbot for customers. (Adamopoulou & Moussiades, 2020a)Mainly they are focusing on emotional (Xu, Liu, Guo, Sinha, & Akkiraju) requests and neutral responses. (Costa, 2018)

Chatbots are seen as task oriented or conversational. (Adamopoulou & Moussiades, 2020b) Automated service are provided like specific transactions using ML for task-oriented whereas personalized, knowledgeable, and interactive conversational response are generated using predictive intelligence and machine learning for conversational chatbots. (Bhattacharjya et al., 2022)

ChatGPT can generate natural-sounding text based on a large corpus of text, which has been pre-trained using unsupervised learning techniques and fine-tuned using supervised learning techniques. (Blanchard et al., 2023)

ChatGPT is a large language model that uses deep learning to generate human-like texts in response to prompts, and it has unique use cases such as generating responses in dialogues/conversations, explaining complex subjects or themes, and generating new codes. ChatGPT has a range of use cases, including generating responses in dialogues/conversation, explanation of complex subjects, generation of new codes or fixing of existing codes for errors. It has been hailed as "scary good" by proponents and still has the potential for further fine-tuning. (Eke, 2023)

(Alberts et al., 2023) ChatGPT uses transformer-based models that process large amounts of data simultaneously, allowing for a revolution in the model's ability to understand and generate text.

Diagram

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# Literature Review

ChatGPT responded to biomedical queries from HS Kumar within 120 seconds (about 2 minutes) with 300–500-word responses that were innovative and well-structured but lacked academic rigor and precision. (HS Kumar, 2023) ChatGPT was employed to summarize Chinese articles, but its reply was with accuracy and citation issues. They encouraged users not to rely entirely on its feedback. (Chen, 2023) Medical chatbot's efficiency in identifying external writing was commendable, but they proposed concerns regarding unfairness and plagiarism in the responses need to be addressed.(Kitamura, 2023) The user tested ChatGPT on various medical topics and obtained responses with unrealistic insights and text similarity. Therefore, the user advises against using ChatGPT for research articles and recommends cross-checking for originality and accuracy. (Lubowitz, 2023) A study measured ChatGPT ability to provide clinical and mathematical input for cardiovascular nursing. It generated concise explanations and cited evidence-based journals. However, it lacked recent evidence beyond 2021. (Moons & Van Bulck, 2023a) The application of ChatGPT in stem cell research revealed that the answers were superficial, lacking depth and complexity. It may function as a timesaving tool but should not be relied upon as a sole source of information. (Cahan & Treutlein, 2023) They conducted nursing discussions with ChatGPT and found it to be a positive experience, however, it was lacking emotional and distinctive touch. (Gunawan, 2023) With 96 objective and 30 subjective queries, the obtained credit line using ChatGPT was 89.5%, and the responses were relevant and knowledgeable.(Fijačko et al., 2023) ChatGPT underwent rigorous training and was able to pass the USMLE exam, however, it cannot replace nurses due to its inability to provide human interaction. (Mbakwe et al., 2023) ChatGPT demonstrated potential in aiding medical papers, histories, and Computer Aided Design systems. However, the flaws of ChatGPT must be put into action due to the risk of providing outdated or hallucinatory information. (Shen et al., 2023) The study yielded insightful results concerning the applicability of ChatGPT in surgical procedures. 15 diverse questions were posed to the model, spanning various time periods and categories, resulting in favorable patient outcomes. (Hassan et al., 2023a) It is important to be mindful of cybersecurity when using ChatGPT and avoid sharing confidential information to obtain better results. (Mijwil et al., 2023) The user should be cautious of false experts and aware of issues related to attribution and originality. This was demonstrated through a study that analyzed 20 papers sourced from Google Scholar and PubMed. (Fatani, 2023) A study on ChatGPT reveals inconsistencies, inaccuracies, and disregard for fundamental medical journal writing conventions. While utilizing ChatGPT can improve medical writing efficiency, but total reliance on it should be cautioned. (S. Biswas, 2023) A study comparing ChatGPT responses to those of Korean students on parasitology questions revealed a 67.4% acceptability rate for ChatGPT, compared to 87.3% for students. Inaccuracy was identified as the primary reason for the lower acceptability score. (Huh, 2023) Researchers assessed ChatGPT proficiency in producing discharge reports and outcomes. ChatGPT provided results like those of medical experts, albeit with a quicker turnaround time. Nevertheless, it occasionally provided ambiguous information that did not align with medical protocols. (Patel & Lam, 2023) A survey of seafarers showed overall satisfaction with ChatGPT electronic consultation and health condition identification. However, few researchers expressed concern about potential biases towards certain ethnic groups and the risk of generating misleading data with harmful consequences. (Sharma & Sharma, 2023) Research supports the use of ChatGPT in clinical decision-making, but only after ensuring its accuracy. However, some companies have banned its use due to concerns regarding plagiarism and inaccurate information. (Kleesiek et al., 2023) Supports ChatGPT's use for research and analysis but emphasizes the need for human oversight. While ChatGPT can accelerate operations and generate ideas, it cannot replace human expertise. ChatGPT should be used as a tool to complement human judgment, not as a substitute for it. (Salvagno et al., 2023) Researchers surveyed 100,000 health workers using ChatGPT to estimate the impact of vaccination, finding a hazard ratio of 0.48 and reducing research time. However, questions of research ownership arose, raising concerns over whether ChatGPT should be credited for its contributions. (Macdonald et al., 2023) The use of large data sets to improve health policy and decision-making is supported, with credit given to ChatGPT for its valuable input. (Sifat, 2023) Researchers analyzed ChatGPT use in four clinical areas: practice support, scientific production, misuse in medicine, and public health research. They concluded that ChatGPT was proficient in language generation but lacked medical expertise and experience. Additionally, ethical concerns were raised regarding plagiarism and nonsensical output. (Cascella et al., 2023) Researcher suggested using ChatGPT to answer health queries and devise disease prevention tactics while acknowledging its drawbacks, like no direct communication with health experts and plagiarism risk. Nevertheless, he asserted that ChatGPT could expedite research and advance medical innovations. (S. S. Biswas, 2023) Speaker noted ChatGPT proficiency in handling big data, streamlining repetitive tasks, and enhancing research precision. Nevertheless, they cautioned that ChatGPT still requires refinement before being applied to challenging subjects and recommended additional investigations. (Doshi et al., 2023) A team of researchers assessed ChatGPT performance in generating ideas for plastic surgery. They reviewed 12 topics and obtained 10 specific ideas. ChatGPT overall accuracy was 55%, with 35% accuracy for general ideas and 75% for specific ideas. The team found ChatGPT to be a useful tool for plastic surgeons, especially for consultation, patient support, and marketing purposes. (Gupta et al., 2023) A team of researchers studied the possible health risks of using ChatGPT and found that it could be addictive. However, it could also promote healthy habits, such as exercise, reading, and cooking. Further research is needed to determine whether ChatGPT is a safe personal assistant. (Haman & Školník, 2023) The scholar expressed concern over promoting flawed or fabricated research and suggested that higher education institutions develop curricula to instruct students about the safe and ethical use of AI (Artificial Intelligence). He emphasized the importance of careful management, regulation, and monitoring of LLMs like ChatGPT, particularly in dentistry, where they could be beneficial. (Hill-Yardin et al., 2023) The benefits of ChatGPT were acknowledged, but concerns were raised about its lack of distinct writing style, transparency, and critical thinking skills. The argument was made that innovative technologies should be embraced, but with human oversight and input. ChatGPT was integrated into an emergency department triage system and accurately identified urgency to prioritize patients for treatment. (Eggmann et al., 2023) Study found ChatGPT could aid nurses with repetitive duties, yet it also poses the risk of deskillment and furnishing erroneous or partial data. Researchers concluded that ChatGPT could not substitute human nurses who offer patients a compassionate approach and an ameliorating setting. (Scerri & Morin, 2023) ChatGPT utilized to study the 2022 monkeypox outbreak, identified a range of factors that contributed to the emergence of the disease, including environmental changes, human behavior, pathogen evolution, immunocompromised individuals, and public health response. (Cheng et al., 2023) criticized current medical education after ChatGPT passed USMLE. He emphasized teaching students to identify gaps in knowledge.(Solomon et al., 2023) The speaker criticized medical education after ChatGPT passing of USMLE and emphasized teaching students to recognize knowledge gaps. (Mbakwe et al., 2023b) The author employed ChatGPT to examine patients in reproductive endocrinology and infertility. However, due to limited knowledge of the physical realm, the results were prejudiced. The author proposed that experts in the domain should participate in developing and applying AI technology to enhance processes. (Alvero, 2023) JAMA (Journals of the American Medical Association) will require authors to disclose AI use in manuscripts and take responsibility for accuracy of content and images to address errors in literature reviews and inaccuracies about patient populations. (Thomas, 2023) ChatGPT is useful, but not a substitute for rheumatologists. Ethical and philosophical issues arise, including authorship, plagiarism, and critical thinking. Its impact on the field will depend on its appropriate use. (Verhoeven et al., 2023) A study demonstrated ChatGPT ability to create clinically accurate letters on skin cancer care. The researcher recommended close regulatory monitoring and a "human-in-the-loop" approach during the initial phases of integration. (Ali et al., 2023) ChatGPT abstracts mislead reviewers in 32% of cases. Proper citation of sources is recommended, and KSSTA is working on developing detectors to identify AI-generated manuscripts. (Johnson et al., 2023) A study reported that ChatGPT has a 96.1% accuracy rate in responding to cancer-related inquiries, compared to the National Cancer Institute's 100% accuracy. The author urged more research to guarantee that ChatGPT can offer precise and impartial information to patients. (Dahmen et al., 2023) ChatGPT can aid urologists in prioritizing patient care by lessening their physical workload. Nonetheless, its use should be judicious and accompanied by human supervision. (Gabrielson et al., 2023)

# Critical Analysis

## Ethical issues

ChatGPT lacks the capacity to diagnose complex medical conditions. Therefore, it should focus on administrative tasks and improving patient care.(DiGiorgio & Ehrenfeld, 2023) Artificial intelligence (AI) can be used to assist in disease prediction, diagnosis, and treatment. For example, AI can be used to develop cancer treatment guidelines from MRI radiomics. (Xue et al., 2023) ChatGPT is efficient in decreasing anxiety, but it is not a substitute for medical care. Regulators and healthcare professionals must establish standards and raise awareness. (Hopkins et al., 2023) ChatGPT has been evaluated for medical education and clinical decision-making, with encouraging outcomes. It can be utilized to assist students compose and audit material, yet it ought not be utilized to create unique substance. A observation framework ought to be presented to forestall understudies from utilizing ChatGPT for scholastic bad behavior, and approaches ought to be set up to direct the utilization of AI in human services. (Arif et al., 2023) ChatGPT is a promising instrument, yet it very well may be utilized for scholastic bad behavior. Educators ought to extend their measures to forestall understudies from utilizing ChatGPT on various decision tests. (Morreel et al., 2023) The authors suggest the requirement for an open science research foundation to standardize experimental techniques, readouts, and benchmarks to portray and quantify human-AI collaborations. (Kung et al., 2023) ChatGPT poses ethical concerns in the medical field. It must be appropriately trained and validated before being used. There is a risk that students and medical professionals may misinterpret medical knowledge. (Baumgartner, 2023) To safely integrate ChatGPT into otolaryngology, safeguards must be implemented. These include reviewing the literature, understanding capabilities, pilot testing, and protecting patient privacy. (Park et al., 2023) ChatGPT has a strong understanding of AI in surgery and robotics. It could be a valuable tool, but careful consideration of its use is important. AI could improve accuracy and efficiency, predictive analytics, training and education, and new treatments and technologies. (Hassan et al., 2023b) AI-generated written content is virtually identical to text authored by human beings, thereby presenting a risk to the credibility of scientific literature and the safeguarding of intellectual property in the field of sports and exercise medicine. (Cox et al., n.d.) In the context of academic inquiry, the utilization of ChatGPT as a research tool may not invariably engender outcomes that are precise or impartial and could potentially contribute to a diminution in the exercise of discernment and innovation amongst researchers. (Marchandot et al., 2023) The prospective capacity of AI-generated recommendations to enhance clinical decision support alert reasoning is considerable. Notwithstanding, there are certain obstacles to surmount, such as the susceptibility of the ChatGPT framework and the requisite for supplementary informatics endeavors. (Liu et al., 2023) It is incumbent upon researchers to meticulously fact-check and authenticate their work, and for scientific journals to establish robust verification mechanisms to identify any potential interference by language models, to safeguard the credibility and validity of the research findings. (Dergaa et al., 2023)

## Trust issues

ChatGPT enables algorithmic medicine, but concerns have been raised that it may supplant clinical judgment with procedural metrics. (DiGiorgio & Ehrenfeld, 2023) Real-time updating of training data is not feasible with ChatGPT, and the responses generated by the model may exhibit a tendency towards generality and vagueness, necessitating careful consideration of any possible adverse effects. (Xue et al., 2023) An article underscores the primacy of research quality vis-a-vis quantity, as demonstrated by a comparative study of abstracts generated by ChatGPT against the originals, which were evaluated via a plagiarism detection system and impartial human reviewers, in a double-blind fashion. (Moons & Van Bulck, 2023b) A study observed a commensurate level of response quality from ChatGPT and Google's feature snippets, with respect to queries related to healthcare. (Hopkins et al., 2023) There is a pressing need to regulate LLMs and AI, while simultaneously embracing their potential to expedite research endeavors and mitigate inequitable outcomes. (Graf & Bernardi, 2023) Experts have raised concerns over the potential for ChatGPT to supplant critical thinking, generate superfluous and illogical information, and engender ethical, medicolegal, copyright, and methodological challenges. (Arif et al., 2023) A Dutch family medicine examination comprising 47 questions was utilized to evaluate ChatGPT's performance, yielding scores of 8/20 and 10/20 when prompted to provide singular responses and rank possible responses, respectively. (Morreel et al., 2023) Evaluation of ChatGPT using the United States Medical Licensing Examination evinced performance at or near the passing threshold, with explanations demonstrating a high degree of concordance and insight. (Kung et al., 2023) Ensuring the reliability and validity of information necessitates cross-checking with reputable and peer-reviewed sources. (Park et al., 2023) In an evaluation comprising 15 questions concerning AI in surgery encompassing aspects such as history, potential, limitations, and ethical concerns, ChatGPT demonstrated a nuanced and comprehensive understanding of the subject matter through its responses. (Hassan et al., 2023b) A study revealed that AI has the capacity to expeditiously generate research papers, albeit with potential for inaccuracies and ethical implications. (Anderson et al., 2023) To preempt AI scraping articles, the authors advocate for ongoing human inspection by topic experts and publication of papers within "free paywalls." (Anderson et al., 2023) While ChatGPT-4 can offer prompt and secure medical recommendations for blepharoplasty, its training data may be obsolete, and it lacks the capacity to deliver tailored advice. (Cox et al., n.d.)In enhancing clinical decision support (CDS) alerts, both AI-generated and human-generated suggestions were deemed beneficial, according to a study. The AI-generated suggestions demonstrated a high degree of relevance and comprehensibility, with nine of the top 20 recommendations originating from the AI system. (Liu et al., 2023) ChatGPT's ability to incorporate false or partial information in academic papers can result in inadvertent plagiarism and incorrect attribution of ideas. (Dergaa et al., 2023)

## Accountability issues

Concerns arise regarding the potential misuse of ChatGPT for producing fraudulent content in academic settings. Thus, guidelines must be implemented for proper usage. Additionally, ChatGPT has shown comparable performance to Google Feature Response, yet there are reservations regarding inadequate citations and inaccurate responses. (Moons & Van Bulck, 2023b) ChatGPT and Google Feature Response gave similar results, but there are concerns about the lack of references and the possibility of incorrect responses. (Hopkins et al., 2023) The article explores methods to detect fraudulent manuscripts, such as data sharing, training, education, new technology, and blockchain. Blockchain can boost security and originality by creating an unalterable record, monitoring progress, handling intellectual property, storing data, and identifying plagiarism. (Ollivier et al., 2023)Researchers propose including ChatGPT as an author, but editors-in-chief reject this idea due to the lack of accountability and consent from the AI. (Graf & Bernardi, 2023) ChatGPT can assist with writing paper content using online search engines. However, its ability to perform a comprehensive literature search and critical analysis is limited, due to the constraints of its training data. As a result, its use is primarily limited to abstract writing. (Arif et al., 2023)Thorough evaluation, monitoring, and adherence to ethical guidelines are necessary to prevent harm to patients and protect intellectual property rights. (Park et al., 2023) AI-generated research papers raised plagiarism and ethical concerns due to potential inaccuracies and unreliability, as revealed by an experiment to generate papers instantly. (Anderson et al., 2023) LLMs may misattribute information, necessitating researchers to verify their work, establish fact-checking procedures, and design an NLP plagiarism checker to support editors and publishers in detecting problems. (Dergaa et al., 2023)

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# ACKNOWLEDGMENTS

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