



Editorial: Artificial intelligence ChatGPT in medicine. Can it be the friend you are looking for?

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You must have heard about ChatGPT; you might have researched it already.

It stands for Chat Generative Pre-Trained Transformer (ChatGPT), launched in November 2022 by Open AI, a San Francisco-based company. ChatGPT is a large language model (LLM) that can answer our questions using a massive data set of texts collated from hundreds of billions of words from the Internet and books. It is a machine learning system that autonomously learns from the data. Although computer-generated chat is not new, chatGPT is fine-tuned with algorithmic machine learning and human-supervised training techniques making it capable of performing astonishingly. Already tens of millions of people are using this artificial intelligence (AI) tool.

The previous class of artificial intelligence was designed to learn and recognize patterns in data. LLMs are a new type of AI algorithm trained to predict the likelihood of a given sequence of words based on the context of the words that come before it¹. So, this model (ChatGPT) can generate

a series of logical and rational words and expressions that the model never previously observed.

One of the recent news headlines is that ChatGPT passed the medical licensing exam. A research group gave it 376 publicly available USMLE test questions from the June 2022 sample exam. ChatGPT was not trained on these questions before. The answers or related context of those questions were not indexed on Google. Surprisingly, the AI chatGPT performed at or near passing for all three parts of the USMLE exams without specialized training¹. Moreover, with training, the accuracy of the answers to the test questions was improved. ChatGPT also passed exams from law and business schools.

I asked ChatGPT to provide the following information.

Me: Write an editorial for a medical journal about the use of AI

ChatGPT: Artificial Intelligence (AI) has been making great strides in various industries and has shown tremendous potential in revolutionizing the

field of medicine. In recent years, the use of AI in the medical industry has grown significantly, with numerous AI applications being developed to aid in diagnosis, treatment planning, and even surgical procedures.

One of the key benefits of AI in medicine is the ability to analyze vast amounts of data at a much faster rate than humans. This means that AI can help healthcare professionals to quickly identify patterns and make more accurate diagnoses, leading to improved patient outcomes. In addition, AI algorithms can also be used to help identify high-risk patients and predict future health problems, allowing for early intervention and treatment.

Another area where AI is making a significant impact is in the development of new drugs and treatments. By using AI algorithms, researchers can quickly analyze vast amounts of data from clinical trials and make more informed decisions about the safety and efficacy of new treatments. This not only speeds up the drug development process, but also increases the chances of success for new treatments.

However, it is important to note that AI is not a replacement for human judgment and expertise. Instead, AI should be seen as a tool that can augment and support the work of healthcare professionals. AI algorithms must be carefully designed and validated to ensure that they are making accurate predictions and recommendations, and that they do not perpetuate existing biases in the data.

In conclusion, the use of AI in medicine is an exciting and rapidly growing field with tremendous potential to improve patient outcomes and advance the field of medicine. However, it is essential to approach AI with caution, ensuring that it is used in a responsible and ethical manner. As healthcare professionals, we must work together to embrace the benefits of AI while being mindful of its limitations and potential pitfalls.

Here are some examples of the use of AI in medicine:

1. Diagnostic support: AI algorithms have been developed to help healthcare professionals with the diagnosis of various medical conditions. For example,

AI algorithms have been used to assist in the diagnosis of skin cancer, heart disease, and eye diseases.

2. Predictive analytics: AI can be used to analyze vast amounts of patient data to predict future health problems and help healthcare professionals to intervene early.

3. Personalized medicine: AI can be used to analyze individual patient data to create personalized treatment plans and improve patient outcomes.

4. Imaging analysis: AI algorithms have been developed to assist in the interpretation of medical images, such as X-rays, CT scans, and MRI scans.

5. Drug discovery: AI can be used to analyze large amounts of data from clinical trials to speed up the drug development process and increase the chances of success for new treatments.

6. Telemedicine: AI can be used to support remote patient consultations and improve access to healthcare in remote and underserved areas.

7. Surgical support: AI can be used to assist in surgical procedures, such as guiding surgical instruments and providing real-time feedback during the procedure.

These are just a few examples of the use of AI in medicine. The field is constantly evolving, and new AI applications are being developed all the time.

Me: Can you provide me journal bibliography?

ChatGPT: Sure! Here are some examples of relevant articles from medical journals that discuss the use of AI in medicine:

1. "Artificial intelligence in radiology: current applications and future prospects." published in the European Radiology journal in 2019.

2. "Artificial intelligence in cardiovascular imaging: a review of current applications and future directions." published in the Journal of Cardiovascular Computed Tomography in 2018.

3. "Artificial intelligence in ophthalmology: a review of current applications and future directions." published in the Journal of Medical Systems in 2019.
4. "The potential impact of artificial intelligence in dermatology: a review of current applications and future directions." published in the Journal of Medical Informatics in 2018.
5. "Artificial intelligence in oncology: current applications and future directions." published in the Journal of Oncology Practice in 2018.
6. "Artificial intelligence in orthopedic surgery: a review of current applications and future directions." published in the Journal of Orthopaedic Research in 2019.

These articles provide an overview of the current state of AI in medicine, as well as a discussion of future directions for the field. I hope these references are helpful for your research.

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In the first example, ChatGPT gave impressive general information about the future of AI in medicine. However, when I asked to provide a bibliography, I was unsure how it decided to present those articles. There are undoubtedly many others, some of which have a higher impact and are more authoritative.

A few articles have been published already where ChatGPT was mentioned as a coauthor, an “artificial author”². It has generated controversy, and the very definition of authorship was reemphasized that authors take on legal responsibilities for their work. When ChatGPT was given the responsibility of writing abstracts based on several manuscripts published in JAMA, BMJ, Nature, Lancet, and NEJM, it did an excellent job. Plagiarism checkers gave an originality score of 100%, and human reviewers correctly identified only 68% of the AI-generated abstracts^{2,3}. ChatGPT also can write computer codes, among many other tasks. Even before chatGPT, AI in the form of machine learning has been incorporated into clinical trials⁴.

Based on the report of ChatGPT passing the medical licensing exam, some authors criticized the current

USMLE exam format. The argument is that the current examination format relies on memorizing information and reflects the rigidity in how medicine is taught, where there is always a right and wrong answer⁵. In practice, the answers are much more nuanced and context-specific. It is without question that practicing medicine require problem-solving skill, a strong ethical framework, and respect for the patient and care team, in addition to familiarity with information and the art of delivering/applying the knowledge. Medical care is more than being familiar with books and literature; chatGPT cannot deliver on that.

One of the active discussions now is whether ChatGPT or similar programs are intelligent. Does it only do statistical associations between words in their training set and make the response? Does it understand the meanings and make conscious decisions⁶? Using the tools of cognitive psychology, experiments were done where chatGPT was treated as a participant in psychological experiments⁷. Chat GPT could solve vignette-based tasks similarly or better than human subjects in that experiment. It was able to make decent decisions from descriptions. However, it failed miserably in the causal reasoning task⁷.

The medical and scientific community is pondering how the ChatGPT should be incorporated into the academic arena. It will likely be included in a multitude of educational activities, including text processing and editing tools, search engines, and programming tools. Will it replace many traditional jobs in academia and research? Can it come up with hypothesis generation and method of testing? These are interesting questions, and we have yet to find the answers.

ChatGPT can write eloquently and still may give incorrect answers, which are difficult to detect sometimes. It also can bias our thoughts with the information it provides. We will know how it shapes medicine in the coming days.

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