

Review Article

Artificial Intelligence Tools for Academics in Medicine

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A B S T R A C T

The emergence of ChatGPT in December 2022 has sparked significant interest in Artificial Intelligence (AI) across the public and academic communities. However, AI's applications in research extend far beyond ChatGPT, offering tools that can enhance various stages of the research process, from idea generation to dissemination.

Research Rabbit is an AI assistant that helps researchers discover and organize academic papers into shareable collections, fostering a sense of community and making literature exploration more efficient and collaborative.

SciSpace (formerly Typeset) simplifies the understanding of complex research papers by providing clear explanations and offering tools for literature reviews, citation generation, and document formatting. This saves researchers valuable time and streamlines the research writing process.

Scite Assistant leverages Smart Citations to provide context on how articles are cited. It offers insights into whether a citation supports or contrasts the referenced work, helping researchers assess the credibility and impact of studies.

Consensus is an AI-driven search engine that finds relevant papers based on research questions, providing summaries and a consensus meter to quickly gauge the overall stance on a specific topic.

Elicit automates literature reviews by identifying relevant papers, summarizing key information, and offering tools for brainstorming, argument structuring, and text classification.

These AI tools significantly enhance productivity and efficiency by aiding in the organization, analysis, and understanding of academic research. While they offer substantial benefits, using them alongside human expertise and critical thinking is important, as AI is not infallible and may have limitations, such as data biases and ethical concerns.

Keywords: Artificial Intelligence,; Medicine,; Applications,; Research,; Academics

Introduction

With the advent of ChatGPT in December 2022, there has been increased interest in Artificial intelligence in the public and the academic community. Since then, a slew of articles have discussed how ChatGPT can be used to write scientific papers, its reliability, etc.¹ However, the field of Artificial Intelligence (AI) is not restricted to ChatGPT. Multiple applications can be used constructively in aiding researchers through the entire process of conducting research, from idea generation to methodology development, as well as conducting, analyzing, and disseminating research.² In this article, I shall elaborate on a few that should be explored in detail.

Research Rabbit (<https://www.researchrabbit.ai/>)

It is a free tool for finding and organizing academic papers. It is an AI research assistant that searches and contains research papers in your field. It adds these articles to a collection, which can be shared with other researchers. It helps streamline the entire process and makes it easier to filter through the collection to get the articles you seek. You can do various actions such as explore an abstract, order publications by date, move papers across collections, automatically search preferred authors' works, suggest other authors for your field, and get updates for the search via email regularly. It allows for interactive visualizations to understand the literature better.³

SciSpace (<https://typeset.io/>)

SciSpace is a wonderful AI-powered tool to help us understand research papers. It explains and elaborates on most academic texts in simple words. It has tools such as Literature review, Copilot to read with AI, Citation generator, paraphraser as well as an AI detector. Typeset is a platform built for research writing and collaboration that helps disseminate knowledge effectively. Academics can execute the research-creation workflow end-to-end, from writing and reviewing the document to formatting using Typeset. One of the key advantages of Typeset is the deeply integrated services beyond text and formatting that help researchers publish the best content possible. Built-in grammar correction improves the small issues that can change the narrative, and integrated plagiarism detection saves hours. The citation management system and support for various styles allow authors to automatically generate in-text citations and bibliographies in addition to features for journal selection and recommendations.⁴

Scite Assistant (<https://scite.ai/>)

Scite is an AI-powered tool that extracts key information from papers and evaluates scientific articles via Smart Citations. The information includes research questions,

methods, results, and conclusions. Smart Citations shows how a publication has been cited by giving the context of the citation along with a classification elaborating whether it provides supporting or contrasting evidence for the citation. Scite AI allows authors to search citation statements, create a dashboard, and visualize research through interactive Scite visualizations, in addition to reference checks, etc. Scite AI uses 1.2 billion Citation Statements and metadata from over 181 million full-text papers, which will keep on increasing.⁵

Consensus (<https://consensus.app/>)

Consensus is an AI search engine that uses machine learning to find papers relevant to a specific research question despite not using the same keywords. In addition, it provides summaries, allowing users to interpret their relevance to their topic of interest. For searching, direct questions can be used, inquiries related to the relationship between two concepts, and open-ended concepts. More than 200 scholarly peer-reviewed documents in medical sciences, social sciences, physics, and economics are included. The results cite actual studies and use large language models and GPT4 for the analysis. If you slide the Synthesize button in response to a question, you can see a Summary and the Consensus Meter. The Summary answers the query by analyzing multiple journal articles. The Consensus Meter analyzes the journal articles and gives you a Yes, No, or Possibly answer.⁶

Elicit (<https://elicit.com/?workflow=table-of-papers>)

Elicit is another AI research assistant that automates research workflows such as literature reviews. It will find relevant research papers without needing a perfect keyword match. It will then extract important information from these papers and summarize them in one sentence for the specific question. In addition, it can help in brainstorming, structure arguments, and help with text classification. Additional options such as Intervention, Outcomes Measured, and Number of Participants for each paper are also available. It can also be used to create presentations and posters.⁷

ChatPDF (<https://www.chatpdf.com/>)

ChatPDF is an AI tool that evaluates research papers uploaded by you. It can extract text, translate languages, and improve the accuracy of research. Users can interact with any PDF they upload without signing in, such as books, research papers, manuals, articles, and legal documents.⁸

Semantic Scholar (<https://www.semanticscholar.org/about>)

Semantic Scholar is a free, AI-driven search and discovery tool with open research resources launched in 2015. It indexes over 200 million academic papers from 50+

publisher partnerships, data providers, as well as web crawls. Semantic Scholar extracts meaning and identifies connections from within papers. It provides these insights to help academics to understand research. Semantic Scholar distributes open code and datasets and maintains a Semantic Scholar Open Research Corpus (S2ORC), a general-purpose corpus for natural language processing and text mining of scientific archives. It has TLDR (Too Long; Didn't Read) super summaries of manuscripts' main results and objectives using expert background knowledge and the most recent GPT3 NLP techniques.⁹

ChatGPT (GPT - Generative Pre-trained Transformer) (<https://chat.openai.com/>)

ChatGPT is an OpenAI chatbot released in November 2022 that has a lock on updated knowledge at the end of September 2021, unlike many of the AI tools described previously which have access to the current Internet. However, it has a simple chat-like feature that allows us to ask simple and complex questions. It can assist in the initial stages of a literature review by suggesting key papers, authors, or trends, but requires a proper follow-up search. However, to fully exploit ChatGPT, one needs to understand the best prompts to get accurate information. It has severe limitations as it can often confidently provide false information, including generating inaccurate citations. The free version of ChatGPT-3.5 allows a maximum token limit of 4096 tokens, meaning around 800 to 1000 words can fit in a response.¹⁰

BingAI (<https://www.bing.com/>)

It is a conversational LLM 4.0+ search engine that builds on GPT4 technology and is connected to the Internet. It is best used with the Microsoft Edge browser. Three conversation styles can be used: More Creative, More Balanced, or More Precise.¹¹

Quillbot (<https://quillbot.com/>)

Quillbot is an AI tool for writing and language enhancement. It is based on algorithms that paraphrase to avoid plagiarism, give alternate word choices, and offer various vocabulary suggestions and explanations. It has an Expand feature that helps with brainstorming by generating content from a few keywords or phrases during the writing process. It can also translate text into various languages to ensure accurate referencing.¹²

Traditional Tools

Many traditional apps used in academic writing and research, such as Grammarly and Zotero, are adding AI capabilities to their arsenal, allowing us to improve our productivity. Many browsers, such as Chrome, Firefox, etc, have extensions that work with AI tools, making it easier for researchers and academics to improve their work.

Limitations

There are several limitations to using AI in research.¹³

1. **Data Limitations:** AI requires large amounts of data to learn and improve performance. If the data is biased or incomplete, it can lead to inaccurate or unreliable results.
2. **Lack of Transparency:** AI models can be complex and difficult to interpret, making it hard to understand how they arrive at their conclusions.
3. **Ethical Concerns:** AI can raise ethical concerns about privacy, security, and bias.
4. **Cost:** Developing and implementing AI models can be expensive, requiring specialized hardware and software.
5. **Human Expertise:** AI is not a substitute for human expertise and judgment. Researchers still need to interpret the results generated by AI models and make decisions based on their own knowledge and experience.
6. **Limitations of Current Technology:** Despite recent advances in AI, there are still many limitations to what it can do. For example, AI models may struggle with tasks that require common sense reasoning or creativity.

It's important to consider these limitations when using AI in research. While AI has the potential to revolutionize the way we do research, it's not a panacea and should be used judiciously.

Links to A Few Websites that Have a List of AI Tools

- <https://tamu.libguides.com/c.php?g=1289555>
- <https://guides.library.ttu.edu/artificialintelligencetools/aitools>
- <https://wordvice.ai/blog/8-best-ai-tools-for-researchers>
- <https://www.futurepedia.io/ai-tools/research-assistant>
- <https://www.analyticsinsight.net/top-10-ai-tools-for-academic-research/>
- <https://intellipaat.com/blog/top-artificial-intelligence-tools/>

Conclusion

Many AI tools will continue to improve with time, and the interface for user interaction will change regularly. Also, most tools will have subscription features if one wants to utilize their full capability. It is important for academicians to learn about and use these tools appropriately to improve their productivity. Change is the only constant; those who fail to adapt will face oblivion and find themselves on the sidelines. It is important to learn and develop these skills so that the best interests of students and children are foremost among our leaders.

Conflict of Interest: None

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