Impact of AI-based tools on Literature search in research

Subject: Literature search, search engines

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Abstract

This paper explores the evolving role of artificial intelligence (AI) in literature searches, comparing its capabilities to traditional methods. AI tools, such as Research Rabbit, SciSpace, ChatPDF, Elicit, and ChatGPT, are transforming how researchers access, organize, and review scholarly articles, offering time-saving benefits and greater efficiency. The paper evaluates the impact of AI on workflows, highlighting both the advantages and challenges of integrating AI into literature search processes. Through interviews with experts and a review of the literature, it is shown that while AI can uncover unique insights and streamline the search process, traditional methods still excel in accuracy and quality. Emerging tools combining AI with classical search techniques offer a promising approach, but a hybrid model integrating both AI and traditional methods may provide the most effective solution for researchers.

Introduction

The purpose of this paper is to discuss the current trends in AI and how it compares to traditional methods. In addition it adopts a qualitative approach by providing insights into the research field through interviews with experts in the area.

A literature search is a fundamental process in academic research that involves systematically reviewing existing research to gather relevant information on a particular topic. This process allows researchers to identify key studies, theories, methodologies, and gaps in knowledge within a specific field. Conducting a thorough literature search not only provides a comprehensive understanding of the current state of research but also helps in refining research questions, guiding experimental design, and ensuring that new studies build on previous work.

In today's digital age, researchers have access to a wide range of databases,

journals, and AI-powered tools that make the literature search more efficient, enabling them to quickly find pertinent papers and relevant data to support their own research. Effective literature searching is essential for ensuring the quality, validity, and originality of a research project. The integration of artificial intelligence (AI) in literature search engines is transforming the way researchers access and organize scientific information. This shift is driven by the need to manage the growing volume of research literature and improve the efficiency and effectiveness of literature searches.

Analysis

A few years ago search engines did not yet fully leverage cutting-edge AI technologies, which limited their ability to enhance findability and discoverability of scientific documents. This can be shown by evaluating the literature from before the big hype around AI that was most prevalent 2022. Then concerns where that systematic search results had an epistemic costs associated, which rely heavily on these engines [1]. Traditional search methods are increasingly inadequate in handling large datasets, necessitating new approaches to meet user information needs [2].

Today most search engines and other tools like Research Rabbit, SciSpace, ChatPDF, Elicit, ChatGPT or Consensus are either fully or partially using AI. AI-powered search engines, have shown promise in facilitating more focused literature searches. In a study using a Hackathon format(an event where people engage in rapid and collaborative engineering over a relatively short period of time), AI search engines were found to help researchers conduct more targeted searches, although they did not significantly increase the number of results compared to traditional methods[3]. AI search tools can challenge preconceptions and reduce cognitive bias, but concerns remain about the quality of literature they identify [4]. So traditional research methods generally excel in terms of accuracy and quality when compared to AI-based tools [5].

New emerging Tools and Techniques uses a combining classical keyword search with neural retrieval to enhance literature discovery and organization. These systems offer search capabilities at various levels of textual granularity and integrate domain-specific knowledge graphs for improved navigation and insights[6]. Additionally, methods like R-tree indexing and improved clustering algorithms are being developed to enhance retrieval efficiency and precision in large-scale literature searches [2].

Discussion

The integration of AI in literature searches has significantly impacted workflows, offering both time-saving benefits and new challenges. Tools like Research Rabbit, SciSpace, Chat with PDF, Elicit, and ChatGPT are increasingly popular for

their ability to streamline the search process. These tools not only help identify relevant papers but also provide summaries, enabling researchers to focus on the most relevant papers. When asked - researchers seems value its speed, and unique capabilities of AI tools. But traditional tools like Google scholar still fulfills roles in finding information about specific researchers, see their work, and finding their collaborators.

When an researcher was asked to use the AI-driven tool Consensus on their own research, according to Appendix A. It successfully summarized the topic and was overall correct. However the order of references left more to be desired, i.e. the impact of papers seems not to be considered which is not ideal and highlight areas for improvement.

AI vs. Traditional Methods: - Accuracy and Quality: Traditional methods often outperform AI tools in accuracy and quality of results, as evidenced by studies comparing conventional searches with AI-generated results[5]. - Uniqueness and Efficiency: AI tools can uncover unique articles that traditional searches may miss, thus complementing literature reviews and saving researchers time[5] [7]. AI Techniques in Literature Search: - Automation: AI can automate labor-intensive tasks, such as screening large volumes of studies, which can drastically reduce the time researchers spend on literature reviews[7].

Overall, while AI tools enhance efficiency, they are seen as complementary rather than replacements for established platforms like Google Scholar.

Conclusion

AI technologies are reshaping the landscape of literature search by offering new tools and methods that improve search efficiency and focus. However, challenges such as ensuring the quality of search results remain. Therefore a pluralistic approach that combines traditional and modern AI-search methods seems to offer the most comprehensive solution for researchers today.

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Appendix A

Interview with Nina Reustle

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Profile

- Name: Nina Reustle
- Email: nina.reustle@liu.se
- Profession: PhD in Applied physics

Questions and Answers

Question	Answer
What tools do you use when performing a literature search?	Research rabbit, Sci space, Chat with pdf, Elicit, ChatGPT
In what way has AI changed your workflow?	It saves a lot of time by helping you find relevant papers in the same field and summarizing them, allowing you to focus on the most interesting ones.
If you use a tool like Consensus, how does it summarize your research?	It summarizes it quite good, and overall it is correct. However the first reference in this particular instance was a low impact paper, which is not ideal.
What are your thoughts on the more traditional methods like Google scholar?	Google scholar is not really replaceable, people are used to it. Everyone is using it for something. For example when I want to look up researchers, see their work, and who they are collaborating with google scholar is superb. Not sure that the other tools can do that. Also it is fast.