AI Resources for Systematic Reviews: Outlining the Benefits to AI and Things to Consider

By Annie Wescott, Research Librarian

Systematic reviews are known for being both rigorous and time intensive. Artificial intelligence (AI) tools, which can be employed to perform and streamline tasks, have the potential to expedite elements of the review process. There is a balance to be had, however, as AI tools introduce complex limitations that must be considered before introducing them to the evidence synthesis process. The following AI tools have the potential to simplify, aid or streamline steps in the systematic review process. The tools and resources mentioned here are just a sampling of AI resources available. Additional tools, resources and considerations are covered in Galter Library's AI Resources for Literature Reviews GalterGuide developed by librarian Q. Eileen Wafford. New AI tools continue to be released, and it is always worth checking for new tools that may support the systematic review process.

Search Development

Several free tools are available to streamline the comprehensive search development process. Generative AI tools like Google Gemini and ChatGPT can be used to enhance searches by providing candidate terms and building search strings. Tools like WordFreq and PubReMiner aid search development through word frequency analysis of selected relevant citations. Additionally, tools like Polyglot Search Translator can support the search translation process by adapting search syntax and formats for various databases.

Generative AI tools require strong prompts to maximize their impact. Experts suggest clearly defining your question with concise language. You should include any relevant context in the prompt, and break down the more complex elements into smaller, direct prompts. Providing the AI tool with a persona and specifying the desired style and format of the results can create stronger outputs.

Citation Discovery and Management

To enhance efficiency in the citation discovery and management stages of the systematic review process there are tools like LitSuggest and Scite, which employ machine learning to generate citation recommendations, and others that use AI-driven search and discovery like Semantic Scholar.

Screening and Data Extraction

Screening records is one of the most time intensive steps of the systematic review process. AI assisted screening tools include those that detect discrepancies between reviewers like Disputatron, those that employ active learning techniques to assist in the screening process like ASReview, or those that index citations across multiple fields and simplify discovery like Semantic Scholar.

Appraisal Synthesis

At the critical appraisal stage, AI tools can aid in the creation of elements like forest plots and risk-of-bias tables. RevMan is one such tool from the Cochrane Collaboration, which can be used for a fee. OpenMeta is an open-source platform that can be used to support the meta-analyses process.

Multipurpose Tools

There are several tools that aim to support multiple steps in the systematic review process. Covidence, Rayyan, and DistillerSR support teams in some manner through every stage of the systematic review process. In addition to other features, these tools perform automatic deduplication, simplify screening and create charts that may be used for reporting. Tools like Systematic Review Accelerator offer a suite of tools that may be used for one or more stages of the systematic review process.

Limitations

Systematic reviews play an important role in patient care and decision making. It is important that the systematic review process is done with intention and rigor, to

ensure reliability and quality in the final output. While these AI tools hold promise in streamlining the process, thereby synthesizing evidence for clinical use more efficiently, one must be aware of their limitations. It is important to note that AI tools often focus on pattern recognition and cannot read context in the questions asked. The review process still requires a human element. Additionally, because these tools are trained on existing data, the results are vulnerable to the biases present in that data. Outside of the ethical considerations of bias, accountability, and transparency in results, AI tools also can require initial time and resource commitment to properly learn the tools. Several other limitations should be considered when introducing AI to the systematic review process.

Conclusions

There is great potential for added efficiency in the systematic review process as more AI tools emerge or are improved. With the promise of more efficiency comes risks and limitations that should always be considered at the outset of a systematic review. Researchers should be sure to explore their AI tool options, maintain human oversight and validation, and always cite the tools they use in the systematic review process.

References

Blaizot A, Veettil SK, Saidoung P, et al. Using artificial intelligence methods for systematic review in health sciences: A systematic review. Res Synth Methods. 2022;13(3):353-362. doi:10.1002/jrsm.1553

Fabiano N, Gupta A, Bhambra N, et al. How to optimize the systematic review process using AI tools. JCPP Adv. 2024;4(2):e12234. Published 2024 Apr 23. doi:10.1002/jcv2.12234

van Dijk SHB, Brusse-Keizer MGJ, Bucsán CC, van der Palen J, Doggen CJM, Lenferink A. Artificial intelligence in systematic reviews: promising when appropriately used. BMJ Open. 2023;13(7):e072254. Published 2023 Jul 7. doi:10.1136/bmjopen-2023-072254

Wafford, QE. AI resources for literature reviews. GalterGuides. Published 2024.