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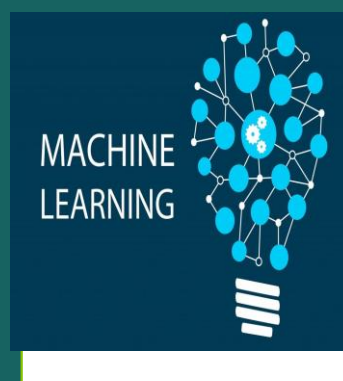
Introduction

- The most sought-after methodology to synthesize evidence is through systematic reviews (SRs).
- Despite being a crucial component of evidence-based decision-making, SRs are the traditional, expensive, time-consuming, and resource-intensive approach.
- To aid in the process, many tools with integrated artificial intelligence (AI) are now available. But there is a lack of literature on the capabilities of the available tools.

Objectives

We conducted a review to investigate the AI features of the various web-based and software tools and their potential use in systematic reviews.

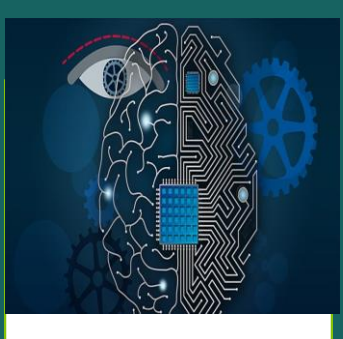
Primary benefits of AI integrations



CLASSIFIERS - large language models (classifiers) are used to find certain group of studies. For example, the Cochrane RCT classifier can remove non eligible studies prior to screening



SCREENING - with the help of natural language and algorithms, tools can be trained to apply eligibility criteria within individual review to semi-automate the process of screening. In practice, after a period of training, the tool can rank and prioritize studies to be screened



EXTRACTION - AI can be used to extract specific information from text such as participant size, demographics and other study characteristics. Most of the current tools support qualitative data and are still in early stage for quantitative extractions.

Methods

- We conducted a search of previously published literature in PubMed that discussed about tools used for SR using keywords like ‘systematic review’, ‘literature review’, ‘tools’, ‘automation’, ‘software’.
- We also performed a google search using phrases like ‘AI based tools for systematic review’ to identify any additional AI tools used for conducting SR. We included only tools that 1) have incorporated AI in conducting a SR, 2) have given detailed information about the use of AI, 3) do not require coding for conducting SR or evidence synthesis. Tools that are under launch and required coding were not considered in our review.

Results

Overall, we found 37 SR tools, of which, 11 were excluded as they did not provide details on AI integration. Of the remaining 26 tools, 23 used AI integration for screening, 10 for extraction, one for report writing and two tools did not confirm the phase where AI was integrated. DistillerSR, Covidence, Nested Knowledge, SWIFT-Active Screener, EasySLR, and LASERAI integrated AI or ML to support prescreening, screening and extraction (auto-populating highlighted qualitative information). Abstrackr, Litsuggest, Rayyan, SysRev, Research Screener, AS Review, SR Accelerator, LitStream, SyRF, and Sorcero iSLR tools were predominantly focused on the integration of AI during the screening. Covidence, DistillerSR, Nested Knowledge, Rayyan, RobotAnalyst, SysRev, and EasySLR have integrated AI to autonomously train the machine language-based model to predict the likelihood that records are screened based on the previous decisions made by the human reviewer.

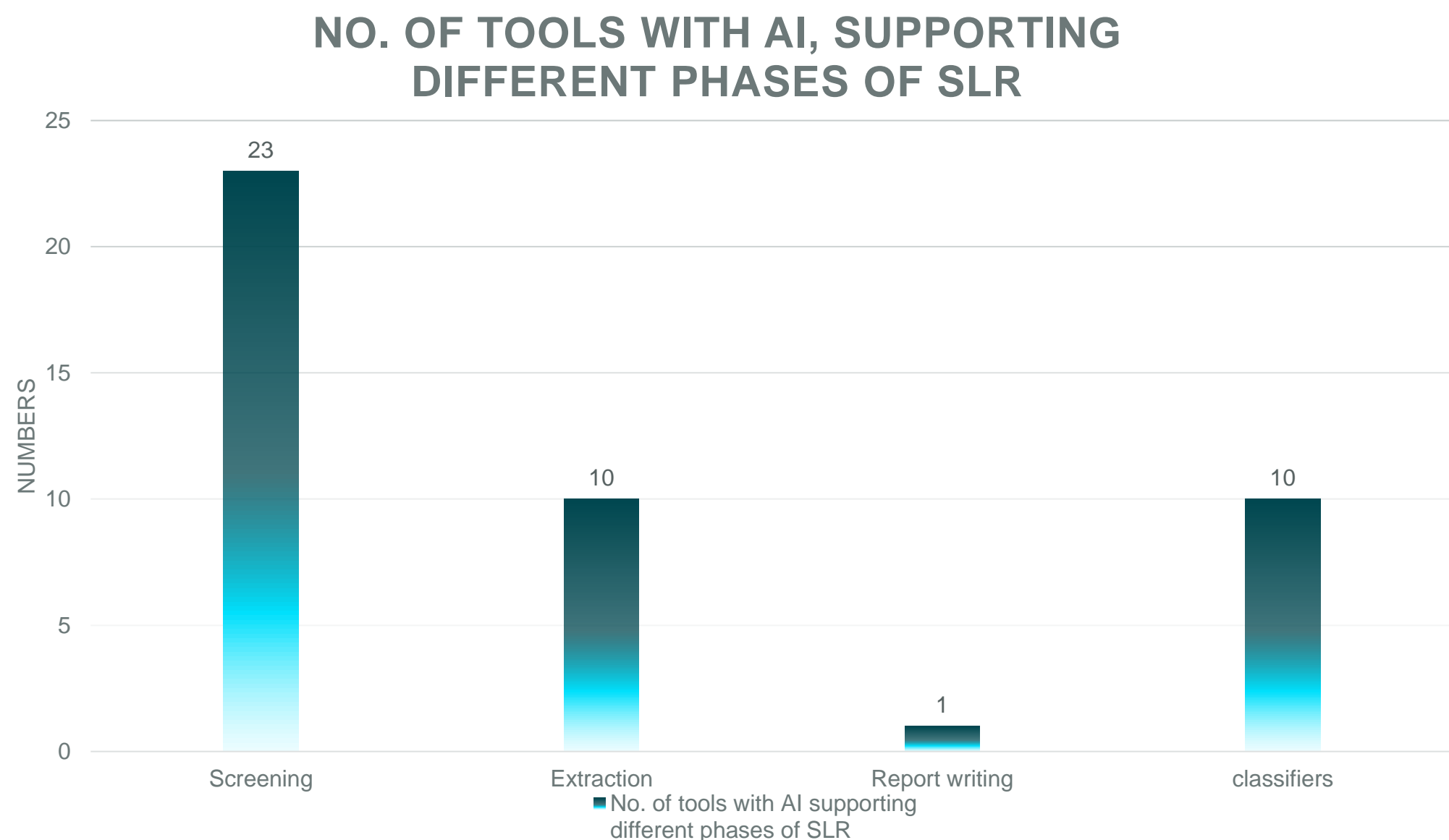


Figure 1: Number of tools with AI supporting different phases of SLR

Results (cont’d)

S:NO	Tools	AI Integrated	De-duplication	Classifiers	Screening	Extraction	Report
1	Covidence	Yes	-	Yes	Yes	Exploring	-
2	DistillerSR	Yes	-	Yes	Yes	Exploring	-
3	Rayyan	Yes	-	Yes*	Yes	-	-
4	Abstrackr	Yes	-	-	Yes	-	-
5	EPPI Reviewer	Yes	Yes	Yes	Yes	-	-
6	Nested Knowledge	Yes	-	Yes	Yes	Yes (qualitative)	-
7	RobotAnalyst	Yes	-	Yes	Yes	-	-
8	SWIFT-Review	Yes	-	Yes	-	-	-
9	Colander	Yes	-	-	Yes	Yes	-
10	Litsuggest	Yes	-	-	Yes	-	-
11	SWIFT-Active Screener	Yes	-	Yes	Yes	Yes (qualitative)	-
12	SysRev	Yes	-	-	Yes	-	-
13	Pitts.ai	Yes	-	-	Yes	Yes	-
14	Research screener	Yes	-	-	Yes	-	-
15	AS review	Yes	-	-	Yes	-	-
16	PICO Portal	Yes	Yes	-	Yes	-	-
17	Iris.ai	Yes	Yes	-	Yes	Yes	Yes
18	RobotReviewer	Yes	-	-	Yes	Yes	-
19	SR Accelerator	Yes	Yes	-	Yes	-	-
20	EasySLR	Yes	-	Yes	Yes	Yes	-
21	LitStream	Yes	-	-	Yes	-	-
22	SyRF	Yes	Yes	-	Yes	-	-
23	Sorcero iSLR	Yes	Yes	-	Yes	-	-
24	LASER AI	Yes	-	Yes	Yes	Yes	-

* SVM Classifiers – Support vector machine

Table 1: Tools integrated with AI and its features

Conclusion

Primary benefit of AI integration is to benefit reduction in human time and efforts.

Most of the available tools integrated AI for screening abstracts and full texts whereas very few tools explored AI for the data extraction process. Recent review by Van Dijk et al found 77% reduction in human screening time.

Perhaps recommendations from HTA agencies on acceptance of AI augmented SRs may encourage AI developers to build more robust tools. It is evident that the integration of AI in the various steps of the systematic reviews is almost here.

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