MSR100

Applicability of Artificial Intelligence in Targeted Literature Review

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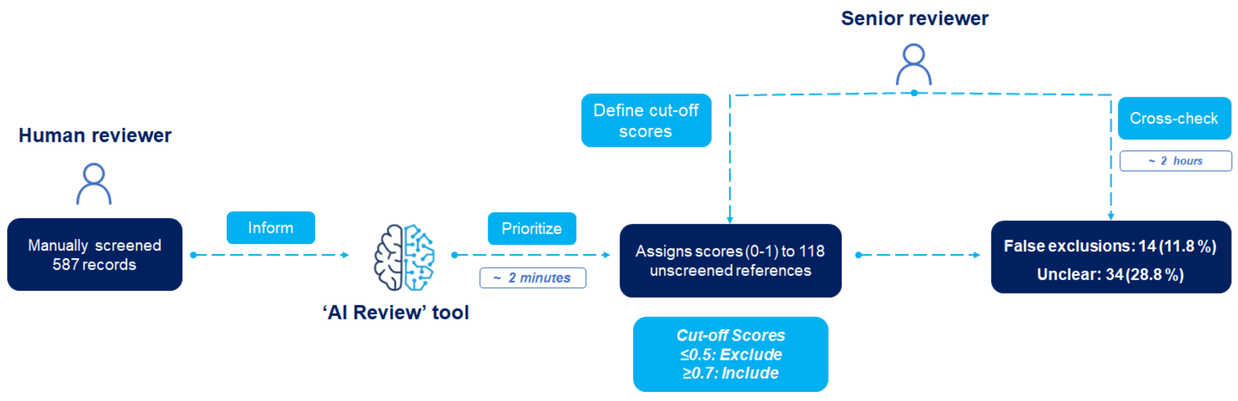
Introduction and objective

- HEOR organizations utilize literature reviews to summarize all relevant evidence for answering a specific clinical question.[1,2]
- Conducting literature reviews has become increasingly difficult due to the exponential growth in published articles.
- Using artificial intelligence and machine learning (AI/ML) in semi-automation of the conventional literature review process could expedite the literature review.[3]
- AI Review, part of DistillerSR's suite of AI tools, trains itself using the manually screened references to learn pattern in which references are classified as included or excluded.
- AI review then predicts whether unreviewed references should be included or excluded by assigning a score between "0" and "1" to each reference.
- Here, we explored the applicability of the AI review tool of the DistillerSR (Evidence Partners Inc. Ottawa, Canada) for title/abstract screening in a targeted literature review.

Figure 1: Diagrammatic representation



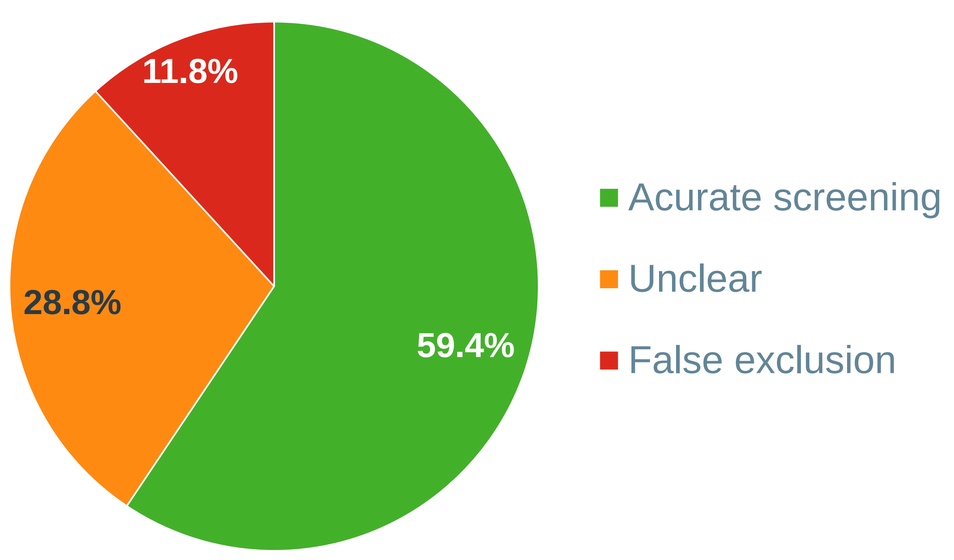
Methodology

- A targeted literature review update was conducted and AI review tool was used as a reviewer for the title-abstract screening.
- We ran the database search to identify new references for the review update.
- The tool trained itself on the set of references initially screened by a human reviewer and assigned a score between "0" (probability of high exclusion) and "1" (probability of high inclusion) to new unscreened references.
- The cut-off scores were defined to classify a reference as include, exclude, or unclear based on multiple iterations.
- The references reviewed by AI review were cross-checked by a human reviewer for the validation.

Results

- Database search refresh identified 118 references that were screened by AI review to update the review.
- The AI review decisions are based on human specified cut-off. For this pilot study we defined cut-off scores as ≤0.5 to be exclude and ≥0.7 to be include.
- After AI review, around 40.6% of the references required human intervention – 28.8% with cut-off scores between 0.4 to 0.7 (considered as unclear) and 11.8% of falsely excluded references (considered as critical error).
- The manual screening of 118 references by a human reviewer took an estimated effort of around ~3.5 hours.
- With the AI review tool, the screening time was drastically reduced to 2 minutes. However, the human reviewer took ~2 hours to cross-check exclusions and take decisions for unclear references.
- The entire process of screening 118 references could be covered in about 2 to 2.5 hours using AI review tool.

Figure 2: Accuracy of the AI-Review tool



Limitations

- The utility of AI review is limited in literature reviews conducted for regulatory submission or reimbursement dossiers, owing to its risk of erroneous exclusions.
- The identification of false exclusions requires re-visit by human reviewer which cannot be undermined.

Conclusion

- AI review tool expedites the screening process with 40-50% reduction in human effort with up to 90% accuracy.
- This process can be more efficient in reviews with extensive literature and can significantly reduce the review time.

References:
1. Green S. Systematic reviews and meta-analysis. *Singapore medical journal.* 2005;46(6):270-273; quiz 274.
2. Cook DJ, Mulrow CD, Haynes RB. Systematic reviews: synthesis of best evidence for clinical decisions. *Annals of internal medicine.* 1997;126(5):376-380.
3. Wallace BC, Trikalinos TA, Lau J, Brodley C, Schmid CH. Semi-automated screening of biomedical citations for systematic reviews. BMC Bioinformatics. 2010;11(1):55.

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