Role of Citation Tracking in Updating of Systematic Reviews

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Abstract

We proposed to use automatic citation tracking to enhance the retrieval of new evidence for updating Systematic Reviews (SR). We tested on a Cochrane review from 2003 (updated 2010) and retrieved 12 of the papers to be added (recall 85.7%). Citation tracking yields a high proportion of the required literature.

Introduction

The four basic steps in conducting SRs: retrieval, appraisal, extraction and synthesis are worthy of automation. Omissions of relevant evidence in the first step cannot be corrected in later stages and will thus adversely affect the SR's authoritative coverage of all available evidence. Thus it is important to adapt comprehensive search strategies that include different techniques and multiple databases. Citation tracking is a method of measuring the impact of research studies based upon a systematic analysis of how often a specific research study has been cited by others. The effectiveness of citation tracking for evidence retrieval for SR updating is yet unknown. We hypothesize that citation tracking will be an effective method to identify literature for updating SRs. The objective of this study is to test how well automatic citation tracking can identify relevant literature for SR updates.

Methods

Each reference in the SR to be updated was used to query Microsoft Academic Search (MAS). Bibliographic information and the list of articles in the "cited-by" section were retrieved from MAS. The "cited-by" articles were then used to recursively search MAS again for subsequent "cited-by" articles. To control the expansion of included literature, we developed a Randomized Controlled Trial (RCT) filter. The RCT filter finds papers in PubMed, and obtains the article types. Articles not labeled as Publication Type RCT are omitted. We check manually if the new studies included in the new review but not in the original SR can be found in MAS. We evaluate based on the availability in MAS. We tested our algorithm on a Cochrane review (Antibiotics for acute maxillary sinusitis). The original review[1] was published in 2003 and an update[2] was published in 2010.

Results

A total of 52 reference strings included in the original SR. Comparing the reference lists of the two versions manually identified 21 new studies included in the update where 14 were found in manual searches in MAS. For the first iteration, we found a total of 134 unique citations including 7 (recall 50%, precision 5.2%) of the 14 citations to be added. In the second iteration, we found additional 1028 unique citations including another 5 relevant citations (recall 85.7%, precision 1.2%). With RCT filtering, the total number of citations retrieved dropped slightly to 130 (precision 5.4%) for the first iteration and 832 (precision 1.4%) for the second iteration.

Discussion

This study is the first to quantify the effectiveness of citation tracking to support SR updates. Recall of >85% shows that citation tracking using a single database is a promising technique but is not yet enough to completely automate literature retrieval for SR update. Further testing is required to show if using multiple databases would improve recall and to compare with typical SR update approach. More studies are required to derive robust conclusions.

Conclusion

We have presented a study of an automatic and recursive citation tracking system for SR update. Based on our results the system can probably be used as a decision support system for SR updaters.

References

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