Relevant Evidence Acquisition and Appraisal using Knowledge-intensive Queries

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Abstract—**Information needs of the users have grown exponentially with the advent of advancements in information and communication technology. The traditional ways of searching information from the online resources has been evolved and the tendency is geared more towards getting quality contents. In healthcare domain, the clinical researchers and physicians are even more interested to find quality information to use as a clinical evidence in decision making. An increasing number of potential articles in the form of MEDLINE articles are readily available to be retrieved, helps in evidence-based clinical decisions, however, the retrieval methods pose several challenges to clinicians. The first challenge is to automatically reformulate the user query into a knowledge-intensive query in order to acquire articles that are relevant to user needs. The second challenge is to re-evaluate the retrieved articles in order to get quality studies and filter-out all the low quality articles. In this paper, we approach to solve these challenges by proposing two methods to construct knowledge-intensive query for relevant evidence acquisition and statistical model for quality evidence appraisal. The construction of knowledge-intensive query is based on the term expansion using domain model, name variants, and terminological variants. The statistical model is learnt on a corpus prepared through automatic construction of feature vectors from data and metadata features. We evaluate the results at two levels; 1) pre-appraisal stage, 2) post-appraisal stage. We compared the results based on the retrieved result sets with knowledge-intensive query approach and simple query approach. The proposed knowledge-intensive query approach successfully retrieves the potential evidences with average 12.33% improved accuracy in contrast to simple query approach. Furthermore, we performed human evaluation to identify the overall satisfaction of the proposed approach. From the user input, we learned that the proposed approach contributes to maximizing the clinical throughput of clinicians by minimizing the unnecessary intermediary manual steps in evidence retrieval and the appraisal process.**

Keyword— **Content-based retrieval, Information filtering, Keyword search, Machine learning**

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