

An Open, Trustworthy and Multilingual Search Engine for Medical Practitioners

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Abstract. Medical practitioners often have unmet information needs that impact patient care. However, currently available web-based search engines are not suitable for routine use. Here we introduce the European Khresmoi project, which aims to address these issues by building an open, trustworthy and multilingual search engine for medical practitioners.

Keywords. Medical Practice, Information Retrieval, Semantic Technologies, Decision Support, Multilinguality

1. Motivation

It has been reported that physicians have unmet information needs for 41% of the questions they pursued [1]. Although these medical professionals have many tools for information search available (such as PubMed), studies have revealed that they do not use them to their full capabilities. Search engines such as Google can have a role in the medical decision making process [2,3], but physicians mistrust the quality of results [4]. Physicians are currently willing to use a search engine for simple questions and as an initial source to help them find their way to higher quality websites.

Based on findings reported in current literature, medical practitioners could benefit from a widely deployed search engine that: 1) provides relevant, summarised output, yielding answers to complex questions in just a few minutes, 2) is openly available on the web without barriers, 3) is multilingual and supports terminologies, 4) is portable, fast, and easy to use, 5) is developed in close cooperation with medical practitioners, 6) is able to deal with short and underspecified queries, 7) is continuously kept up-to-date, and 8) responds to the need for psychological support and affirmation.

The European FP7 project *Khresmoi* [5] aims to build such a search engine. The project consortium consists of 12 academic and industrial partners and has a budget of approximately € 10 million. It started in September 2010 and will run for four years.

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2. Results

The Khresmoi infrastructure is based on mature existing software tools developed by the consortium partners. The GATE framework [6] is used for natural language processing and information extraction. The BigOWLIM semantic repository [7] is used to house the large medical knowledge base required by the search engine. The Information Retrieval Facility (IRF, [8]) provides its infrastructure and expertise for crawling, processing and querying several terabytes of medical literature on the web.

The creation of the search engine is guided by user requirements gathered by the Society of Physicians in Vienna [9]. The society has over 2400 members and around 200 new members join each year. The website of the Society is one of the leading Austrian websites for continuing medical education. In the Khresmoi project, the Society of Physicians conducts a large-scale user study to collect current data about the use of online information sources by medical practitioners in Austria and other European countries, based on interviews and questionnaires. Initial results will be presented at the MIE2011 conference.

3. Conclusions

The Khresmoi project is at an early stage. In order to increase the uptake of web-based search systems by medical practitioners and to have a meaningful impact on medical decision making, the development of the system needs to be done in close collaboration with medical practitioners. The community of physicians in Vienna could spearhead the uptake of web-based decision support in the daily medical routine.

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References

- [1] Ely, J.W., Osheroff, J.A., Maviglia, S.M., Rosenbaum, M.E. Patient-Care Questions that Physicians Are Unable to Answer,” *Journal of the American Medical Informatics Association : JAMIA*, vol. 14, 2007, S. 407-414.
- [2] Yu, H., Kaufman, D., A cognitive evaluation of four online search engines for answering definitional questions posed by physicians, *Pacific Symposium on Biocomputing. Pacific Symposium on Biocomputing*, 2007, S. 328-339.
- [3] Tang, H., Ng, J.H.K. Googling for a diagnosis—use of Google as a diagnostic aid: internet based study, *BMJ*, vol. 333, Dez. 2006, S. 1143 -1145.
- [4] De Leo, G., LeRouge, C., Ceriani, C., Niederman, F., Websites Most Frequently Used by Physician for Gathering Medical Information, vol. 2006, 2006, S. 902-902.
- [5] “Khresmoi - Medical Information Analysis and Retrieval” Available: <http://khresmoi.eu/>
- [6] Cunningham, H., Maynard, D., Bontcheva, K., Tablan, V. GATE: A Framework and Graphical Development Environment for Robust NLP Tools and Applications, 2002.
- [7] BigOWLIM - OWL Semantic Repository Available: <http://www.ontotext.com/owlim/big/>
- [8] Home - IRF Available: <http://www.ir-facility.org/>
- [9] Gesellschaft der Ärzte. Available: <http://www.billrothhaus.at>