KHRESMOI: towards a multi-lingual search and access system for biomedical information

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Abstract: **KHRESMOI is a large EU-funded project that aims to build a multi-lingual search and access system for biomedical information and documents, aimed at and adapted to two main user groups: members of the general public and medical professionals. Access to this search system via mobile devices is also planned.**

Introduction

KHRESMOI is a large EU-funded 4 year project (http://khresmoi.eu) that aims to build a multi-lingual search and access system for biomedical information and documents. This will be achieved by: automated information extraction from biomedical documents, including estimation of the level of trust and target user expertise; linking information extracted from unstructured biomedical texts to structured information in knowledge bases; support for cross-language search, including multi-lingual queries, and returning machine-translated pertinent excerpts; support for image search; and user interfaces to assist in formulating queries and display search results via ergonomic and interactive visualizations. The project is executed by a consortium 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. It is planned to make incremental versions of the proposed system available during the project.

Fig. 1 shows an overview of the proposed KHRESMOI system with a focus on input data and target user groups. As input data, KHRESMOI will use data that is available on the web, such as the health websites certified by Health on the Net and open access journals. However, interest in mining

restricted information exists – the Cochrane Collaboration has for example granted KHRESMOI access to its reviews. Use will also be made of existing semantic data, such as the Linked Life Data, and available language resources for the multi-lingual component.

Figure 1. Overview of the proposed KHRESMOI system

Target User Groups

The system will be designed for and evaluated by two target user groups: (i) Members of the general public and (ii) clinicians and general practitioners. As a group of medical professionals with specific needs, radiologists will also evaluate search in huge multidimensional images, such as MRI, CT and MRI images with a time component, although this aspect will not be treated in this paper.

Members of the General Public: 61% of American Adults seek out health advice online. Almost two-thirds of these adults admit that the information found online affected a decision about how to treat an illness or condition [1]. These searches tend to use one of the major search engines [2], leading to information of varying quality. For example, a recent study showed that about 70% of the top websites with information on oral cancers gathered by Google and Yahoo searches had serious deficiencies, such as failing to attribute authorship, cite sources and report conflicts of interest [3]. On the other hand, access to this information has allowed parents to assist in making diagnoses, for example in the case of rare diseases [4]. KHRESMOI aims to allow members of the general public to obtain reliable and understandable medical information by developing automated and semi-automated approaches to classifying information. In addition, machine translation should ease the access to information in their own language.

Clinicians and General Practitioners: Physicians often have unmet information needs. These have been reported as occurring for 2 of every 3 patients seen [5], or more recently for 41% of the questions they pursued

[6]. Although these medical professionals have many tools available for information search, in the form of PubMed, etc., studies have revealed that they do not use them to their full capabilities, or are not aware of extended capabilities of these tools, often hidden behind interface links or buttons. Physicians search on average for less than 5 minutes, and seldom search for more than 10 minutes to answer questions [7]. Hence it is important that the pertinent information is found during this time. However, the time taken to answer questions using MEDLINE averages 30 minutes [5], and furthermore, the information found is often scattered over multiple articles, making PubMed searching MEDLINE impractical for intensive clinical use [7]. KHRESMOI aims to make this information easier and quicker to access through, amongst others, interface support for query formulation, extraction and highlighting of pertinent passages from articles found, and summaries of search results.

Mobile Search

By the end of 2013, 40% of mobile phone service subscribers will be using mobile Internet [8]. Online health-information usage through mobile devices is steadily increasing. A survey conducted among American adults shows that 17% of mobile phone owners have used their phone to look up health or medical information, while 29% of mobile phone owners aged 18–29 have done such searches [9]. Mobile access to medical information is also frequently requested by clinicians who often work away from their offices and who might have to deal with cases happening in varied situations. Such mobile access is also of interest to clinicians who work in rural areas or in areas with poor infrastructure.

KHRESMOI also aims to develop mobile access to medical information. The embedded and integrated technologies of these mobile devices, such as GPS and touch screens, will be taken advantage of as far as possible. Fig. 2 shows an early prototype of access to the medical literature through a mobile device, allowing search by text queries and by image similarity.

Conclusion

The KHRESMOI project aims to develop innovative approaches to online medical information search for the general public and medical professionals. Methods to access this information from mobile devices will also be developed.

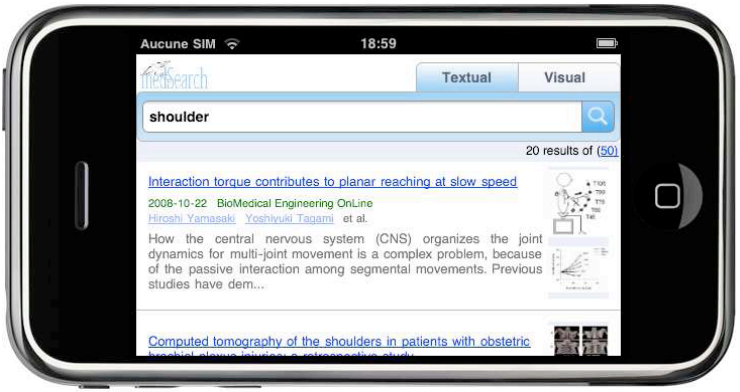

Figure 2. Result set showing text and images on a mobile device

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