Creating and Using the Knowledge Archive in the Internet Medical Consultant for Decision Support at the Point of Care

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ABSTRACT

The Internet Medical Consultant – IMC is a knowledge sharing system for physicians. The system’s main purpose is to collect and store the communication between its users and to provide easy retrieval of stored information. The system provides access to human generated knowledge at the point of care. Having that kind of knowledge at hand can be very helpful for physicians when they make decisions. This paper describes the process of knowledge capturing, creating and searching the knowledge archive, for final utilisation of that knowledge at point of care. The process of effective knowledge retrieval is represented more thoroughly by several modifications of algorithms for that purpose.

Keywords: Knowledge Capturing, Knowledge-Sharing, Knowledge-Utilisation, Medical Consultation, Medical Text Retrieval, Point of Care Decision Making

INTRODUCTION

With the emergence of the Internet and fast improvement of the ICT technologies, the demand for knowledge by the physicians greatly moves towards the cyberspace. Access to their knowledge is often done by consultations. It is common for a hospital to provide a way to ask its experts for a consultation. At present, hospitals are more concentrated in providing on-line services to potential patients and referring physicians, repositioning expert knowledge-sharing in the lower priority on-line services, if implemented at all (http://www.mayoclinic.com). Second source of information are web-forums. Although these popular knowledge-sharing networks involve experts from around the globe, drawbacks still exist: anyone can answer one’s question, there is no insight in one’s expertise, a large number of
answers can be received, there is no privacy in the communication and possibility to attach files to question, etc. (http://www.docsboard.com). Additionally, web-forums do not provide posts download and offline access to rich data content, and rarely have a mobile web-site with an option for remote collaboration.

Therefore, they do not personalize and accommodate the assistance to the physicians’ mobility at the supposed level, leading to decreased quality of point of care decision support. There are sites that provide expert consultation, enabling file attachment to the question, but are not primarily knowledge-sharing oriented (http://www.doctorinternet.co.uk). These services are commonly charged and they do not have searchable knowledge archive.

The Internet Medical Consultant – IMC system (Nakic & Loskovska, 2009) tends to overcome these problems. Its functional and logical organisation is presented in Figure 1.

This paper is concentrated on the asynchronous knowledge sharing in the system and exploiting the knowledge archive as a decision support tool at the point of care in clinical conditions. In the following sections we represent the related work, briefly describe the IMC system, present the process of knowledge utilisation at the point of care by elaborating how the knowledge archive is created. Firstly we represent the model of communication between the physicians and then the way the knowledge is captured as a product of that process. Afterwards we discuss the process of searching the archive in details, going through four modifications of an algorithm used for that purpose. In the end, a conclusion is made.

RELATED WORK

A number of systems that try to improve the knowledge – based decision making in clinical conditions exist. SANDS is distributed architecture for clinical decision support which is mainly concerned with medical information exchange (Wright & Sitting, 2008). It involves drug interaction checking, syndrome surveillance, diagnostic decision support, information at the point of care and a simple personal health record. However, it lacks a possibility for direct human consultation and knowledge generation. MDConsult (http://www.mdconsult.com) is a web-application that relies on bibliographical data and images when it comes to providing
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