An IR-based Knowledge Management System Integrated with Ontology Structure for Clinical Medical Information Retrieval

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Abstract

Clinical medical information exists in scientific literature, structure database, and patient data such as patient record, medical image and laboratory test report, etc. Consequently, it will be helpful for clinical personnel to have integrated patient information in disease prevention, diagnosis, treatment, and research issues. In addition, when facing an acute infectious disease, it is very important to retrieve relevant patient information for making a correct decision in a short time. Therefore a knowledge management system which can integrate diverse patient data and have efficient information retrieval ability has been developed in this research. In order to narrow down the knowledge scope, we focused on Severe Acute Respiratory Syndrome (SARS) as an example to build the knowledge management system, Anti-SARS KMS. In this research, we have integrated SARS related data including electronic medical record (EMR), chest x-ray image, standard operating procedures (SOP) in a public hospital, literature, news, and bioinformatics database into the system and developed an information retrieval procedure based on the Vector Space Model (VSM) to locate the relevant information. To make the search engine more flexible and efficient, the SARS ontology has been developed and applied in this research to expand the user's query for more relevant information. The ontology has five category branches which contain biomedicine, diagnostics, epidemiology, management, and syndrome to cover the SARS related field. This effort is not the main purpose of this research, but the result has been adopted in this research. Although the Anti-SARS KMS focuses on the SARS topic, we expect the same concept and procedure can also be applied on other diseases. Therefore the main purpose of this research is to provide an efficient way to integrate different data source and retrieve relevant information according to user's query.