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A Health Surveillance Software Framework to Deliver Information on Preventive Healthcare Strategies

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Abstract

A software framework can reduce costs related to the development of an application because it allows developers to reuse both design and code. Recently, companies and research groups have announced that they have been employing health software frameworks. This paper presents the design, proof-of-concept implementations and experimentation of the Health Surveillance Software Framework (HSSF). The HSSF is a framework that tackles the demand for the recommendation of surveillance information aiming at supporting preventive healthcare strategies. Examples of such strategies are the automatic recommendation of surveillance levels to patients in need of healthcare and the automatic recommendation of scientific literature that elucidates epigenetic problems related to patients. HSSF was created from two systems we developed in our previous work on health surveillance systems: the Automatic-SL and CISS systems. The Automatic-SL system aims to assist healthcare professionals in making decisions and in identifying children with developmental problems. The CISS service associates genetic and epigenetic risk factors related to chronic diseases with patient's clinical records. Towards evaluating the HSSF framework, two new systems, CISS+ and CISS-SW, were created by means of abstractions and instantiations of the framework (design and code). We show that HSSF supported the development of the two new systems given that they both recommend scientific papers using medical records as queries even though they exploit different computational technologies. In an experiment using simulated patients' medical records, we show that CISS, CISS+, and CISS-SW systems recommended more *closely related* and *somewhat related* documents than Google, Google Scholar and PubMed. Considering recall and precision measures, CISS+ surpasses CISS-SW in terms of precision.

Keywords:

Software Framework, Reuse, Biomedical Informatics, Information Extraction, Retrieval and Application of Biomedical Knowledge and Information, Recommender Systems: Medical Records and Scientific Papers, Ontology

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