

PhD Thesis
Semantic Interoperability in Healthcare Applications
Based on Software Agents and Web Services

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Abstract

Medical institutions worldwide have operated and continue to operate to the fullest extent as separate entities without communicating to each other. This has had a strong impact on the quality of the medical act.

Think for example about the patient's medical record, which presently consists - in most cases - in documents printed on paper and spread over the hospitals where the patient was investigated over the years. Normally, for a specific diagnosis or treatment, a doctor needs the medical history - for example, a drug may not be prescribed for the patient who manifested allergy to certain substances, or a cesarean surgery is not recommended if the patient had a herniated disc recently.

This thesis proposes an architecture based on software agents and web services, which aim to provide semantic interoperability between healthcare entities, so that communication between these entities becomes more efficient and includes as many actors in healthcare as possible (hospitals, doctors, patients, insurance companies, etc.). As the basis of this architecture, we propose the use of existing standards and ontologies.

As a vehicle of integration between software agents and web services in healthcare we propose a semantic search engine that aims at recording and indexing service descriptions, and at semantically matching them, which provides far better accuracy than purely syntactic matching.