Knowledge Engineering

HL7 v3 Message Extraction using Semantic Web Techniques
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Healthcare system integration is an area of utmost importance in the overall eHealth strategy of countries. The overall goal of these efforts is to provide a large scale and unified view of clinical information to healthcare practitioners, thereby enabling them to deliver accurate and timely services to the general public in a cost-efficient manner. In this paper, we present a novel framework for identifying HL7 v3 messages to represent healthcare transactions that take place in an integration scenario. The proposed technique provides a new categorization of HL7 v3 message functionality according to a set of message contexts extracted by extensive study of HL7 v3 information hierarchies and messaging infrastructure. These contexts allow us to map the key terms in a healthcare scenario to the corresponding HL7 v3 messages using Semantic Web technology. We have developed a prototype tool and will present two healthcare case studies to demonstrate our solution.

Scenario-Oriented Information Extraction from Electronic Health Records
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Providing a comprehensive set of relevant information at the point of care is crucial for making correct clinical decisions in a timely manner. Retrieval of scenario specific information from an extensive electronic health record (EHR) is a tedious, time consuming and error prone task. In this paper, we propose a model and a technique for extracting relevant clinical information with respect to the most probable diagnostic hypotheses in a clinical scenario. In the proposed technique, we first model the relationship between diseases, symptoms, signs and other clinical information as a graph and apply concept lattice analysis to extract all possible diagnostic hypotheses related to a specific scenario. Next, we identify relevant information regarding the extracted hypotheses and search for matching evidences in the patient’s EHR. Finally, we rank the extracted information according to their relevancy to the hypotheses. We have assessed the usefulness of our approach in a clinical setting by modeling a challenging clinical problem as a case study.

Identifying Distributed Features in SOA by Mining Dynamic Call Trees
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This paper proposes a new approach for identifying the implementation of web service features in a service oriented architecture (SOA) by mining dynamic call trees that are collected from distributed execution traces. The proposed approach addresses the complexities of SOA-based
Minimized Domain Knowledge for SOA-based Interoperability

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The variety and heterogeneity of legacy systems at the application level have contributed to the complexity of interoperability provision among different application domains. In this context, most research activities are focused towards standardization and interoperability among the legacy systems within the same domain. However, an emerging challenge is to address the communication of information among heterogeneous legacy systems in different domains. The first step in achieving such a large interoperability is to follow similar development processes for collaborating domains, which provides homogeneity in their architectures. The second step would be to provide cross-domain semantic interoperability through proprietary and shared ontology systems. In this paper, we address the above challenges through description of a framework that employs healthcare standards and clinical terminology systems to achieve semantic interoperability between distributed systems in different domains. The main focus in our proposed framework is the minimal use of domain knowledge for cross-domain interoperability. Two case studies are provided, first we present how HL7 v3 is over-specified and then the proposed framework is applied to achieve semantic interoperability between two domains healthcare and insurance.