Automated Generation of SADI Web Services for Clinical Intelligence Using Rule-Based Semantic Mappings

Mohammad Sadnan Al Manir, Department of Computer Science & Applied Statistics
University of New Brunswick, Saint John

The 6th Atlantic Workshop on Semantics and Services (AWoSS 2015), Faculty of Computer Science
University of New Brunswick, Fredericton, NB, Canada
December 9, 2015

Traditional approaches of performing surveillance for Hospital-Acquired Infections (HAI) are based on manual chart review, which is known to be inefficient and unreliable. Infection-control practitioners typically lack the technical expertise necessary to find and integrate relevant information from clinical databases and applications. A promising approach to this problem is semantic querying of relational databases, which was addressed in our prior work where sets of SADI Semantic Web Services are deployed over one or more databases, and can collectively be used to retrieve data using SPARQL queries. Despite the benefits of this approach, writing Web service code manually was found to be labor-intensive and error-prone. Here, we propose a framework for generating SADI services automatically from completely declarative service descriptions and semantic mappings of relational data. These mappings are specified in Positional-Slotted Object-Applicative (PSOA) RuleML. We outline a novel methodology, system architecture, and a prototype implementation for service generation. We conducted a preliminary evaluation by: generating a number of SADI services over a database; modeling a fragment of a real hospital research data warehouse; and using the generated services to answer simple SPARQL queries. The main findings were: i) Web services can be generated by non-technical users without knowledge of the Java programming language, ii) significant person hours can be saved because of the automation, iii) Web services can be reused, and iv) the implementation of the architecture is domain-independent given that mappings can be specified for each domain.