

Semi-Automated Mapping From RDB To Ontology

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Abstract. In this paper a semi automated approach for mapping entities from relational database to existing ontology classes is presented. We use Wordnet for extracting shared concepts between RDB and ontology. Having extracted similar concepts, data replication from DB to ontology can be accomplished.

I. INTRODUCTION

The construction of ontology can be a time-consuming process, requiring the services of experts both in ontology engineering and the domain of interest. Whilst this may be acceptable in some high value applications, for widespread adoption some sort of semiautomatic approach to ontology construction will be required [9].

Although many semantic web applications have been crafted in recent years, there is still a lack of semantic data for these applications. Usually one can extract pertinent data from existing relational database and convert them to semantic meta-data representation. There are several approaches introduced for replicating data from RDB to ontology, most of them build the ontology structure from scratch and according to the ER model of original database.

In this paper we present how to replicate data from relational database to OWL existing model. We make use of Wordnet [4] for denotation of shared concepts between database and ontology. Having found these concepts, system provides user with most related pairs from database and ontology, and let the user decide about which concepts he/she prefers to match. In addition to explained mechanism in which system interacts with user for mapping the concepts, in our proposed approach user can denote mappings manually like what other systems already provide user with. Actually proposed system in this paper can automate notable portion of work by recommending similar concepts between RDB and existing ontology to user.

This paper is organized as follows: Section 2 describes a couple of performed experiences in the field of replicating database legacy to ontology. Section 3 discusses different mapping cases. Section 4 provides a full description of

proposed approach. Section 5 draws some conclusions and gives hints about unresolved problems and future works.

II. PERFORMED ACTIVITIES REVIEW

A. Database to Semantic Web Mapping using RDF Query Languages

In [1], Perez and Conrad have proposed a method for mapping database to ontology using RDF query language. They suppose that there is no pre-existing ontology model and user can build it as he/she desires.

First step in Perez approach is to convert RDB data to a modified version of OWL, named Relational OWL [2].

Despite being processable by any application understanding RDF, the data extracted using Relational OWL still lacks real semantic meaning. Indeed, the information originally stored in relational tables is represented within a table object and not within an appropriate Semantic Web object.

Having created the Relational OWL representation of the relational database, the second step including the actual mapping can be performed. The RDF model just created may now be queried with an arbitrary RDF query language. As long as the query language is closed, the resulting query response is again within the Semantic Web, i.e. it is a valid RDF model or graph and may then be processed by other Semantic Web applications using their own built-in functionality for reasoning tasks [5]. Perez proposed mapping approach is illustrated in Fig. 1.

B. R2O, an Extensible and Semantically Based Database to ontology Mapping Language

As it was described there is no pre-existing ontology model in Perez approach. Yet another system [3] named R2O is designed for mapping RDB to existing ontology model. R2O is database independent so the user has to introduce DB schema in R2O syntax in the first step. Having specified DB schema, one can map similar concepts from RDB to existing ontology model and replicate pertinent data. R2O overall architecture is presented in Fig. 2.