ActiveRDF: Object-oriented semantic web programming

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Abstract
Object-oriented programming is the current mainstream programming paradigm but existing RDF APIs are mostly triple-oriented. Traditional techniques for bridging a similar gap between relational databases and object-oriented programs cannot be applied directly given the different nature of Semantic Web data, for example in the semantics of class membership, inheritance relations, and object conformance to schemas. We present ActiveRDF, an object-oriented API for managing RDF data that offers full manipulation and querying of RDF data, does not rely on a schema and fully conforms to RDF(S) semantics. ActiveRDF can be used with different RDF data stores: adapters have been implemented to generic SPARQL endpoints, Sesame, Jena, Redland and YARS and new adapters can be added easily. In addition, integration with the popular Ruby on Rails framework enables rapid development of Semantic Web applications.

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Keywords: Semantic Web, Object-oriented programming, Cooperative design Categories: D.1.5, D.2.2, D.2.13. 1 Introduction. As an evolving extension of the World Wide Web, the Semantic Web [Bemers-Lee, 01] uses semantic relationships among data to perform automated sharing and processing functions. Applications focus on process automation, data searches, data integration, and data reuse. Resource description frameworks (RDFs) [Lassila, 99] are used to represent Semantic Web data models.  2.2 ActiveRDF. This RDF object-oriented API is based on the Ruby language [Oren, 06] [Oren, 07]. To perform the task of abstracting triple-oriented APIs, it uses O-O methods to manipulate RDF documents so as to simplify low-level API calling. Thus, applications in Object-Oriented (OO) programming languages over the Semantic Web, need to cope with RDF individuals. However, there are inherent differences between objects of OO programming languages and RDF individuals. Essentially, differently from objects, RDF individuals have URIs, properties and they can be members of more than one class. The architecture of Ruby on Semantic Web is depicted in Figure 1. The prototype is built on top of the ActiveRDF architecture [3]. The parts that we added appear hatched. In the figure, the enterprise data reside in several data sources—in documents, in several relational databases, in an RDF Store and in some non-relational database. Object-Oriented Programming and Protected - Semantic Scholar. Department of Computer Science, Colorado Technical University, USA. Email: [email protected], [email protected]. J. Kienzle and T. Wolf. Concurrent Object-Oriented Programming - Semantic Scholar. Although there is no word of inheritance in the specification documentations of Semantic Webs, the domain and range constraint in RDFS and the local property constraint in OWL are clearly inherited from superclasses to subclasses. In contrast, we have no way to designate the default slot value that is often used in frame systems and some of object systems.