Accepted Tutorials, May 31st

Tutorial 4: Semantic technologies for data integration using OWL2 QL (Half Day)

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In this tutorial, we present a comprehensive approach to ontology-based data integration. In our approach, we are compliant with the classical conceptual architecture for data integration which accounts for systems exposing a global schema connected to data sources through mappings. We consider global schemas that are ontologies expressed in the OWL2 QL profile, i.e., a tractable fragment of the forthcoming OWL 2, whereas sources are relations, managed through a data federation tool that wraps the actual data. The mapping language has specific mechanisms for relating values stored at the sources to objects that instances of concepts in the ontology. By virtue of the careful design that we propose for the various components of a data integration system, answering unions of conjunctive queries can be done through a very efficient technique which reduces this task to standard SQL query evaluation. We show that such a property still holds if we introduce identification, denial, and epistemic constraints on OWL2 QL ontologies, and consider epistemic queries over them, thus significantly enriching the expressiveness of integration systems. Finally, we present a management system for ontology-based data integration, called MASTRO-I, which completely implements our approach. Based on the use of MASTRO-I, we present significant examples of data integration through OWL2 QL ontologies.