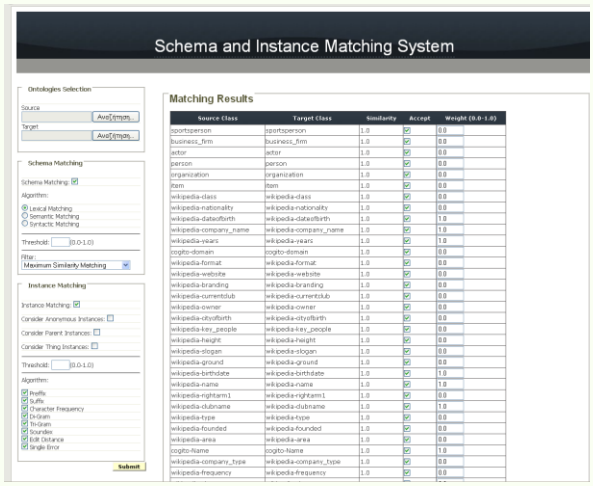
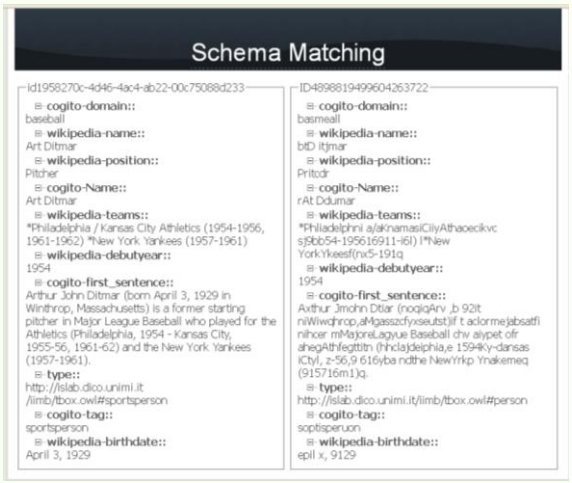
Ontology-to-Ontology Matching System

Overview

The Ontology to Ontology (OtO) Matching System is a multi- strategy matching system for **schema-** and **instance-level** matching that is **domain independent** and **fully customizable**. It implements several different ontology matching processes, which can be roughly categorized into processes that include schema matching algorithms and processes that include instance matching algorithms.



OtO Matching System



Detailed matching result snapshot

Target Domains

OtO matching system targets semantic integration applications and communities that work with ontologies defined in **OWL** or **RDF/S**. Specifically, the application of instance matching is crucial for entity resolution, ontology population and semantic integration.

Entity resolution refers to the capability of detecting whether two different resource descriptions refer to the same real-world entity, namely the individual, which is the main goal of the system.

Ontology population refers to the need of supporting experts in managing ontology changes through advanced and, when possible, automated techniques. It can be considered as part of ontology evolution, where an ontology evolves by acquiring new semantic descriptions of data, extracted from heterogeneous data sources. For ontology population, instance matching plays a crucial role in order to correctly perform the insertion activity and discover the relationship between the new incoming instances and the set of instances already in the ontology.

For **semantic integration**, the system offers advanced techniques for ontology schema matching but also instance matching, to correctly combine data describing individuals in different sources and to improve the accuracy of the schema alignment process. The notion behind this is that the more significant the overlap of common instances of two ontology concepts is, the more related these concepts are.

Description

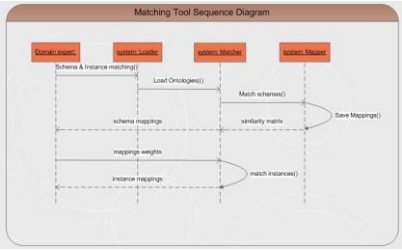
The OtO system implements seven different ontology matching processes, which can be categorized into processes that include schema matching algorithms and processes that include instance matching algorithms.

The schema matching process leverages lexical similarities, semantic similarities and syntactic similarities of the entities of the schema.

As far as the instance matching process is concerned, the system utilizes the instance matching process by using:

- the **rich semantic knowledge** gained from the output mappings of the schema matching process,
- the **implicit knowledge** of the domain expert by (semi-) automatically capturing the identification power of the instance properties and
- the **probability calculation of the result's truth**, in order to accurately and efficiently detect the ontology instances that represent the same real-world entity.

By all these means the system can detect data value differences, structural heterogeneities, as well as logical heterogeneities between the ontology instances.



OtO system sequence diagram

Additional Information

The OtO matching system has been customized and deployed for the needs of semantic integration and identity recognition in the EU projects :

- PlugIT *(http://plug-it-project.eu/)*
- eHealthMonior *(http://www.ehealthmonitor.eu/)*

Complete documentation can be found at:
http://www.ics.forth.gr/_publications/Daskalaki_Master_Thesis.pdf

Scientific documentation is available at Springer Link:
http://link.springer.com/chapter/10.1007%2F978-3-642-31095-9_19#page-1

Scientific documentation at Springer Link

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