Knowledge Representation and Reasoning in IKS

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Try it

KReS working Demo at
http://150.146.88.63:9090/kres

KReS now part of Stanbol Apache incubator

KReS is the semantic part of the semantic CMS stack for the IKS project
http://www.iks-project.eu
KReS: main components

- Ontology Network Manager (ONM)
- Rules & Inference (R&I)
- Semion

Release as
- RESTful services
- Java API
Ontology Network Manager

A scope contains (actually is) an ontology network and serves a specific purpose.

Ontologies that are not changeable, shared with the other clients.

Ontologies that can be modified, shared with the other clients.

Private session of a client e.g. for in-memory operations.

IntegrityCheck Scope

DBpedia ontology

Valid Content ontologies

DBpedia and GeoNames retrieved datasets

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Rules and Inference Manager

- Support for rules
  - Expressed in KReS syntax → SWRL compliant
  - Executed as SWRL or SPARQL
  - Can be executed on a specified scope
- Support for reusable rules through definition of recipes i.e. sets of rules
- Reasoning support
  - Through OWLink interfaces
  - HermiT built-in
• **Reengineering**
  - Transformation of non-RDF sources to RDF
  - Support for XML and relational DB

• **Refactoring**
  - RDF to RDF based on transformation patterns (recipes)
Lessons learnt so far

• The usage of a reasoner improves recall
  – Additional valid content retrieved (inferred knowledge vs. asserted knowledge)
  – sameAs entities are included in the results
• Reasoning based on linked data ontologies produces noise, hence
• External datasets e.g. LOD, need some cleaning
  – We will provide ontology patterns for improving reasoning results on DBpedia datasets
  – So called “washing machines” external services could be integrated for cleaning data e.g. datatype value format
• Interesting research challenges in both stories
In ONM, ontologies are grouped in scopes.

Ontologies

Ontology/Patterns

Events

Content

InteractionContext

User

... 

An immutable space, shared/read-only

A mutable space, changes are shared.

Sessions allow changes to be not propagated (ticket based)

Applications operate on these spaces through RESTful services:

*/ontology (Get, Create, Modify, Delete)

*/session (Get, Create, Modify, Delete)

www.interactive-knowledge.org

“Interactive Knowledge” is part-funded by the European Commission and develops new technology for intelligent content management.
KReS core: R&I
rule management

In R&I, rules are grouped in recipes.

Enhancement_Refactoring

Person_check

... is a

Recipe

collects

Rule

Applications operate through RESTful services:
* /recipe (Get, Create, Modify, Delete)
* /rule (Get, Create, Modify, Delete)
KReS core: R&I inference engine

Input

includes

User

Person-check

Reference to a Scope

Reference to a Recipe

Inference engine

Consistency check

Classification

Enrichment

Output

RDF Data

* Posted file
* Dereferencable URI
* Stored Graph URI

RDF Data

* Returned to the caller
* Stored in Graph

RESTful services

* /consistency-check
* /classification
* /enrichment
KReS: Semion refactoring

RDF Data
* Posted file
* Dereferencable URI
* Stored Graph URI

Reference to a Recipe

RDF Data

Person-check

Input

Refactoring engine

Consistent refactoring

Lazy refactoring

Output

RDF Data
* Returned to the caller
* Stored in Graph

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KReS: Semion reengineering

A parameter tells the engine whether it has to reengineer the data or not (only the schema).

RDF Data
- Returned to the caller
- Stored in Graph

Input document, can be:
- Posted file
- Dereferencable URI

Input is a set of parameters that defines a JDBC connection

db connection info

Data (XML) produces Document (XML)

Reengineering engines

DB

Output

The reengineering engines use a pre-defined scope through the ONM

uses ONM

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KReS services

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