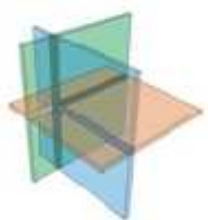


Semantic Web

- Query Languages -

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Requirements

Digest RDF

Digest OWL

Precise queries

Conjunctive queries

Similarity querying

...

„Standards“:

Sparql for RDF

Approaches:

OWL QL for OWL [Fikes]

Similarity: [Anyanwu]

Relevance feedback: [Stojanovic]

More recent work by [Parsia et al07], [Kubias et al, 07]

Candidate recommendation

SPARQL is a query language for getting information from such RDF graphs. It provides facilities to:

extract information in the form of URIs, blank nodes, plain and typed literals.

extract RDF subgraphs.

construct new RDF graphs based on information in the queried graphs.

There is also remote access protocol: SPROT

Data:

```
<http://example.org/book/book1>  
    <http://purl.org/dc/elements/1.1/title>  
"SPARQL Tutorial"
```

Query:

```
SELECT ?title  
WHERE
```

```
{  
<http://example.org/book/book1> <http://purl.org/dc/elements/1.1/title> ?title .  
}
```

Query Result:

Triple pattern

title
"SPARQL Tutorial"

```
PREFIX dc: <http://purl.org/dc/elements/1.1/>
SELECT ?title
WHERE
{
<http://example.org/book/book1> dc:title ?title
}
```

```
BASE <http://example.org/book/>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
SELECT $title
WHERE
{
<book1> dc:title ?title
}
```

```
PREFIX dc: http://purl.org/dc/elements/1.1/
PREFIX : <http://example.org/book/>
SELECT $title
WHERE
{
:book1 dc:title $title
}
```

```
BASE <http://example.org/book/>
PREFIX dcore: <http://purl.org/dc/elements/1.1/>
SELECT ?title
WHERE
{
<book1> dcore:title ?title
}
```

Data:

```
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
_:a foaf:name "Johnny Lee Outlaw" .
_:a foaf:mbox
<mailto:outlaw@example.com> .
_:b foaf:name "A. N. Other" .
_:b foaf:mbox
<mailto:other@example.com> .
```

Query:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?mbox
WHERE
{
  ?x foaf:name "Johnny Lee Outlaw" .
  ?x foaf:mbox ?mbox
}
```

Query Result:

mbox
<mailto:outlaw@example.com>

Data:

```
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
_:a rdf:type foaf:Person .
_:a foaf:name "Alice" .
_:a foaf:mbox <mailto:alice@example.com> .
_:a foaf:mbox <mailto:alice@work.example> .
_:b rdf:type foaf:Person .
_:b foaf:name "Bob" .
```

Query:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?name ?mbox
WHERE
{
    ?x foaf:name ?name .
    OPTIONAL { ?x foaf:mbox ?mbox }
}
```

Query Result:

name	mbox
„Alice“	<mailto:alice@example.com>
„Alice“	<mailto:alice@work.example>
„Bob“	

Data:

```
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
_:a foaf:givenname "Alice" .
_:a foaf:family_name "Hacker" .
_:b foaf:firstname "Bob" .
_:b foaf:surname "Hacker" .
```

Result:

```
@prefix vcard:
  <http://www.w3.org/2001/vcard-rdf/3.0#>
_:v1 vcard:N      _:x .
_:x vcard:givenName "Alice" .
_:x vcard:familyName "Hacker" .
_:v2 vcard:N      _:z .
_:z vcard:givenName "Bob" .
_:z vcard:familyName "Hacker" .
```

Query:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX vcard:
  <http://www.w3.org/2001/vcard-rdf/3.0#>
CONSTRUCT
{
  ?x vcard:N _:v .
  _:v vcard:givenName ?gname .
  _:v vcard:familyName ?fname
}
WHERE
{
  UNION
    { ?x foaf:firstname ?gname }
    { ?x foaf:givenname ?gname } .
    { ?x foaf:surname ?fname }
  UNION
    { ?x foaf:family_name ?fname } .
}
```

Boolean combinations

Testing for types (e.g. datatypes)

Regular expressions

Comparisons (corresponding to datatype, e.g. integer comparison)

External function texting (function named by IRI)

- Kemafor Anyanwu, Angela Maduko, Amit P. Sheth: SemRank: ranking complex relationship search results on the semantic web. WWW 2005: 117-127
- Nenad Stojanovic: On Analysing Query Ambiguity for Query Refinement: The Librarian Agent Approach. ER 2003: 490-505
- Fikes, R.; Hayes, P.; & Horrocks, I. OWL-QL - A Language for Deductive Query Answering on the Semantic Web. Knowledge Systems Laboratory, Stanford University, Stanford, CA, 2003.
ftp://ftp.ksl.stanford.edu/pub/KSL_Reports/KSL-03-14.pdf.gz
- Parsia et al. In: Proc. OWL-ED 2007 workshop
- Kubias, Staab, Pan. In: Proc. OWL-ED 2007 workshop

Thank You