Linked Data Engineering

Lecture 4: Querying RDF with SPARQL

4.4 SPARQL Subqueries and Property Paths

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SPARQL - Subqueries

- Example: Select all authors, by whom they are influenced and all the influencers' notable works

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX dbo: <http://dbpedia.org/ontology/>

SELECT ?author ?influencer ?work                            subquery
FROM <http://dbpedia.org/>
WHERE {
  { SELECT ?author ?influencer
    FROM <http://dbpedia.org/>
    WHERE {
      ?author rdf:type dbo:Writer ;
              dbo:influencedBy ?influencer .
    }
  }
  ?influencer dbo:notableWork ?work .
}
LIMIT 100
```

- Subqueries are a way to embed SPARQL queries within other queries
- result is achieved by first evaluating the inner query

query SPARQL endpoint

SPARQL - Property Paths

- A **property path** is a possible route through an RDF graph between two graph nodes.
  - trivial case: property path of length 1, i.e. a triple pattern
  - **alternatives**: match one or both possibilities

    ```
    { :book1 dc:title|rdfs:label ?displayString . }
    ```

  - **sequence**: property path of length >1

    ```
    { ?x foaf:mbox <mailto:alice@example> .
      ?x foaf:knows/foaf:knows/foaf:name ?name . }
    ```
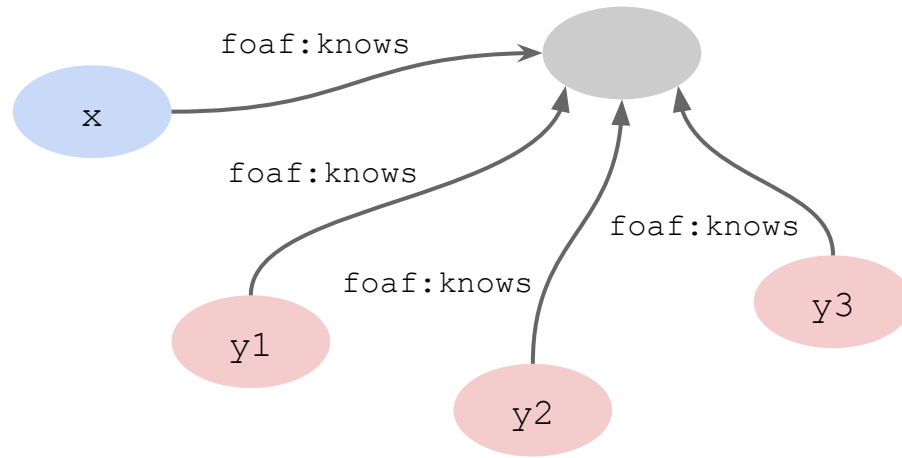
  - **inverse property paths**: reversing the direction of the triple

    ```
    { ?x foaf:mbox <mailto:alice@example> . }
                          =
    { <mailto:alice@example> ^foaf:mbox ?x . }
    ```
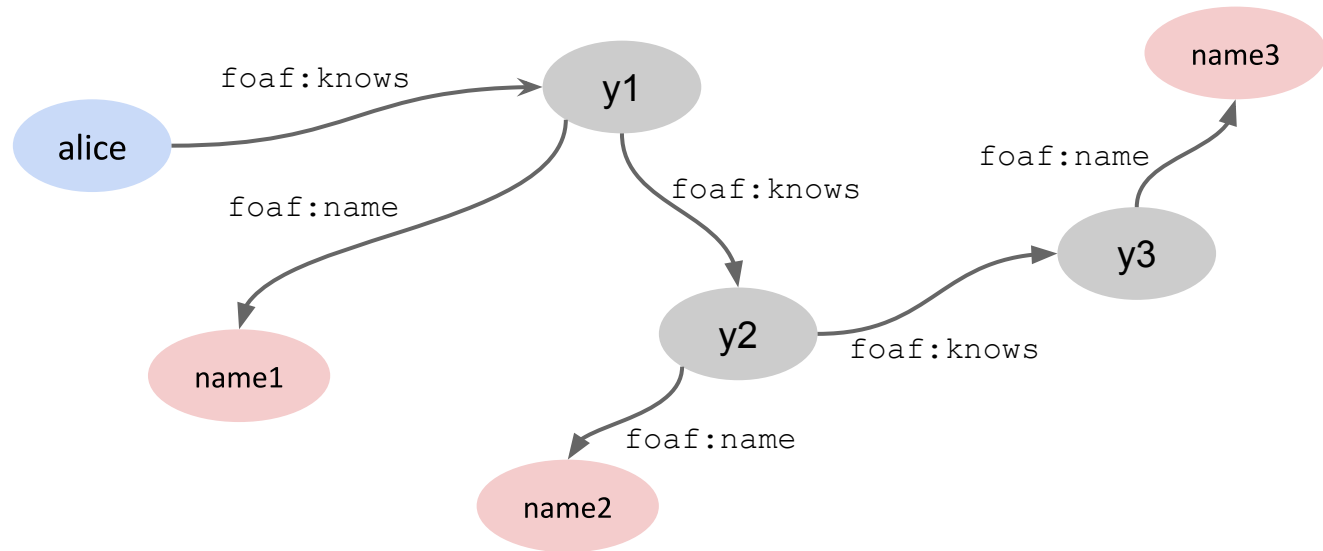
SPARQL - Property Paths

- **inverse path sequences**

```
{ ?x foaf:knows/^foaf:knows ?y .
     FILTER (?x != ?y) }
```

SPARQL - Property Paths

- **arbitrary length match**

```
{ ?x foaf:mbox <mailto:alice@example> .
  ?x foaf:knows+/foaf:name ?name .        }
```

SPARQL - Property Paths

- **inverse path sequences**

  ```
  { ?x foaf:knows/^foaf:knows ?y .
      FILTER (?x != ?y) }
  ```

- **arbitrary length match**

  ```
  { ?x foaf:mbox <mailto:alice@example> .
    ?x foaf:knows+/foaf:name ?name .        }
  ```

- **negated property paths**

  ```
  { ?x !(rdf:type|^rdf:type) ?y . }
  ```

SPARQL - Property Paths

- Example: Who are the authors who were influenced by the influencers of Jules Verne?

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX :    <http://dbpedia.org/resource/>
PREFIX dbo: <http://dbpedia.org/ontology/>

SELECT ?influencedByInfluencers
FROM <http://dbpedia.org/>
WHERE {
    :Jules_Verne dbo:influencedBy/^dbo:influencedBy ?influencedByInfluencers .
    FILTER (?influencedByInfluencers!= :Jules_Verne)
}
```

property path expression

Disclaimer
This query was used in the video, but does not deliver any result in the current release of DBpedia.

SPARQL - Property Paths

- Example: Who are the authors who were influenced by the influencers of Emilio Salgari?

```
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
PREFIX :    <http://dbpedia.org/resource/>
PREFIX dbo: <http://dbpedia.org/ontology/>

SELECT ?influencedByInfluencers
FROM <http://dbpedia.org/>
WHERE {
    :Emilio_Salgari dbo:influencedBy/^dbo:influencedBy ?influencedByInfluencers .
    FILTER (?influencedByInfluencers!= :Emilio_Salgari)
}
```
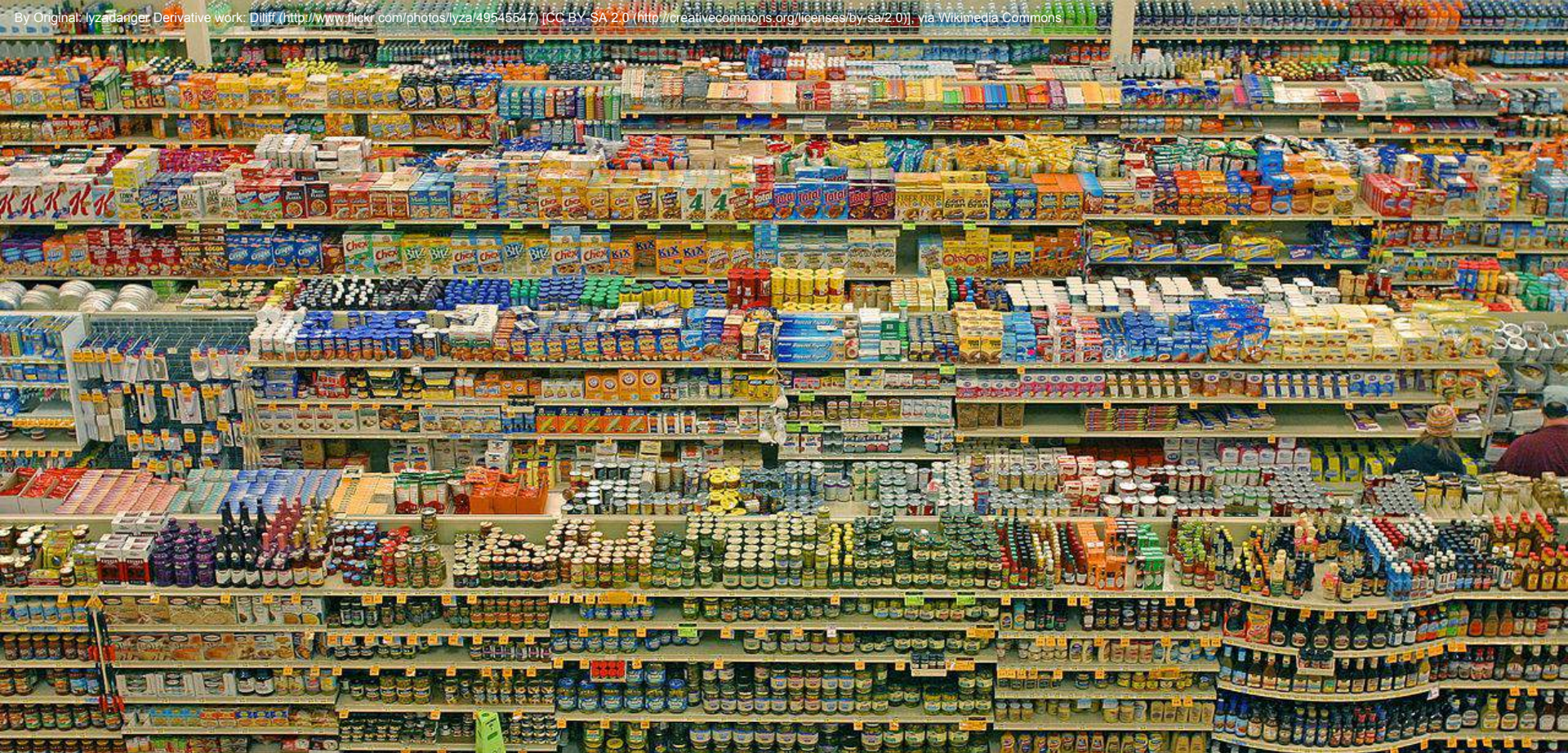
property path
expression

Disclaimer
This query was not used in the video, but delivers a non-empty result in the current release of DBpedia.

query SPARQL endpoint

Next: 05 - RDF Databases

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