

Agentic exploration of knowledge graph data schemas

An API and an MCP interface for exploring knowledge graph data schemas

Uldis Bojārs, Lelde Lāce, Mikus Grasmanis, Kārlis Čerāns
Institute of Mathematics and Computer Science, University of Latvia
uldis.bojars@lumii.lv

This demo presents ongoing work on exploring data schemas of SPARQL endpoints.

The system consists of a data shape server (DSS) that contains information about more than 200 SPARQL endpoints, an API for accessing this information from the command line, and an MCP server that makes this information available to large language models.

What classes are used together with the bio:has_family_relation property in the s26_https_idf_fl_yoma_sparql schema?

Ran a command, used dss integration >

Only two classes appear on the subject side, and the object side is the `y-rel:` relation-type family. DSS resolves 71 distinct target classes for this property.

Subjects: `:Person` (233) and `:ReferencedPerson` (20). Together those cover the property's 74,032 distinct subjects, which is very nearly the full `:Person + :ReferencedPerson` population (75,205).

Objects: `y-rel:fnn` relation nodes — never a person directly. Each object is an anonymous relation instance whose `rdf:type` names the kinship role.

Top pairs by triple count:

Subject	Object class	Triples
<code>:ReferencedPerson</code>	<code>y-rel:f6</code> (Son)	40,843
<code>:ReferencedPerson</code>	<code>y-rel:f12</code> (Husband)	34,880
<code>:Person</code>	<code>y-rel:f3</code> (Mother)	25,509
<code>:Person</code>	<code>y-rel:f4</code> (Father)	25,492
<code>:Person</code>	<code>y-rel:f11</code> (Wife)	22,141
<code>:Person</code>	<code>y-rel:f22</code> (Brother)	13,578
<code>:ReferencedPerson</code>	<code>y-rel:f55</code> (Mother-in-law)	13,267
<code>:ReferencedPerson</code>	<code>y-rel:f11</code> (Wife)	13,055
<code>:ReferencedPerson</code>	<code>y-rel:f73</code> (Daughter-in-law)	12,849
<code>:ReferencedPerson</code>	<code>y-rel:f56</code> (Father-in-law)	11,442
<code>:Person</code>	<code>y-rel:f6</code> (Son)	9,146
<code>:Person</code>	<code>y-rel:f75</code> (Sister-in-law)	8,384
<code>:ReferencedPerson</code>	<code>y-rel:f77</code> (Brother-in-law)	8,250
<code>:Person</code>	<code>y-rel:f73</code> (Daughter-in-law)	7,644
<code>:Person</code>	<code>y-rel:f72</code> (Nephew)	5,830

This work has been partially supported by a Latvian Science Council Grant lzp-2024/1-0665 “What is in Your Knowledge Graph?”.

This work has been partially supported by COST Action CA24121 – Knowledge Graphs in the Era of Large Language Models (KGELL), supported by COST (European Cooperation in Science and Technology, <https://www.cost.eu>).

https://viziquer.lumii.lv/projects/lzp_2024/

<https://github.com/LUMII-Syslab/dss-ai-tools/wiki>

