

On the Use of Semantic Knowledge Bases for Temporally-aware Entity Retrieval

Krisztian Balog and Kjetil Nørkvåg

Norwegian University of Science and Technology, Trondheim, Norway

Proposal

for the development of entity retrieval models that are *temporally-aware* using semantic knowledge bases enriched with temporal information.

The task

we address is *ad-hoc entity retrieval*: “answering arbitrary information needs related to particular aspects of objects [entities], expressed in unconstrained natural language and resolved using a collection of structured data” [1].

Query type	Example
Entity query* Finding a particular entity	08 toyota tundra
Type query* Retrieving entities of a particular type or class	composers of the 18th century
Attribute query Finding the value of a particular attribute	population of New York in 2010
Relation query Describing the relationship between entities	Tom Cruise and Nicole Kidman
Complex query* Listing entities constrained on complex relationships	albums released by Leonard Cohen after he wrote Suzanne

* our focus, where the unit of retrieval is entities

References

[1] J. Pound, P. Mika, and H. Zaragoza. Ad-hoc object retrieval in the web of data. In Proceedings of WWW'10, 2010.

The temporal dimension in YAGO2 [2]

Entities (people, groups, artifacts, events) time span to denote their existence	(id,s,p,o) tuples in the knowledge base (168532100, Allan_Dwan, isMarriedTo, Pauline_Bush)
Facts - time point if they are instantaneous events - time span if they have an extended duration	(id,t _b ,t _e) associating the fact identified by id with the time interval [t _b ,t _e] (168532100, 1915-##-##, 1921-##-##)

Representing entities

- Extending subject-predicate-object triples with temporal information following the principles laid out in YAGO2 [2]

Representing information needs

- As a set of constraints on nodes and edges of the knowledge graph concerning the existence of entities and relations

Matching entities and information needs

- IR-style ranking as opposed to SPARQL-like querying
- Probabilistic models to deal with uncertainty (e.g., Language Models)

Challenges

- Completeness and correctness of the underlying knowledge base
- Detection and resolution of temporal expressions in queries

[2] J.Hoffart, F.M.Suchanek, K.Berberich, E.Lewis-Kelham, G. de Melo, and G. Weikum. YAGO2: exploring and querying world knowledge in time, space, context, and many languages. In Proceedings of WWW'11, 2011.