Schema Discovery in RDF Datasets

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CONTEXT: Linked Data on the Web

- Structureless
- Incomplete type information
- Noisy

GOAL: Automatic Schema Extraction

- Types
- Semantic links
- Hierarchical links

TYPE DISCOVERY

- Density-based clustering
  - Groups data according to the neighbors density
  - Robust to noise and deterministic
  - Detects classes of arbitrary shape
  - No required number of classes

- Automatic detection of similarity threshold
  - According to the density distribution of the dataset

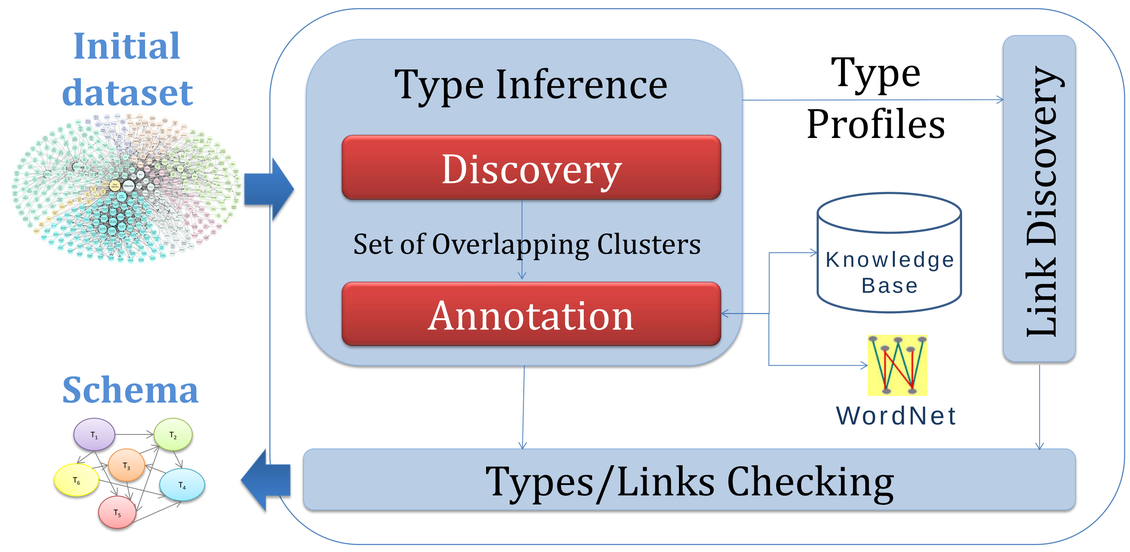
- Type profiles
  - Type properties with their frequencies
  - Probability for an instance of a type to have a property

Example: « Conference »

<(URL, 0.5), (date, 1), (made, 1), (isHeldAt, 1), (authorList, 1)>

- Overlapping types
  - Identification of the important properties for the types
  - Comparison of type profiles

SCHEMA EXTRACTION PROCESS



LINK DISCOVERY

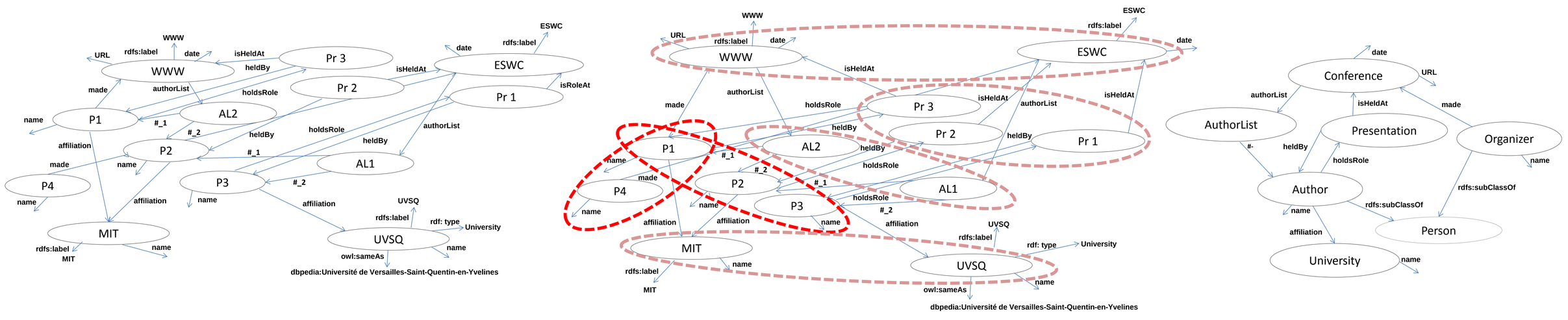
- Semantic links
  - Inferred from user-defined properties in the initial dataset
  - Considering the direction of properties in the type profiles

- Hierarchical links
  - Hierarchical clustering of type profiles

TYPE ANNOTATION

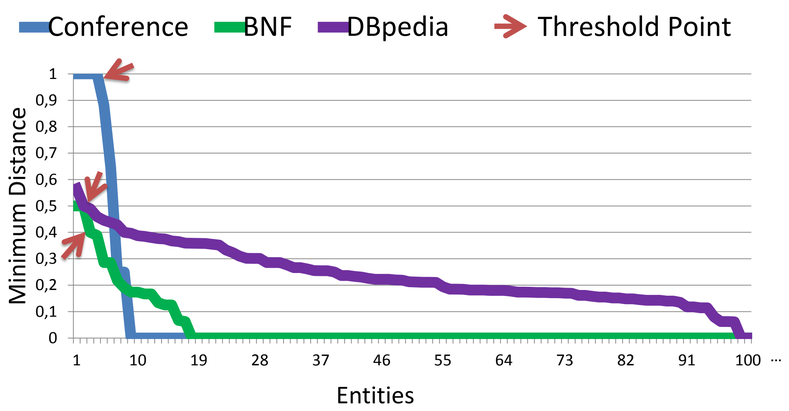
- Types extracted from a knowledge base
- Name based annotation
  - Searching for the types of resources having the same value of the name property
- Property based annotation
  - Searching for the types of resources having the same properties than the type profile, using WordNet for terminological conflicts
- Vocabulary based annotation
  - Searching for the domain/range of the properties in a standard vocabulary

USE CASE

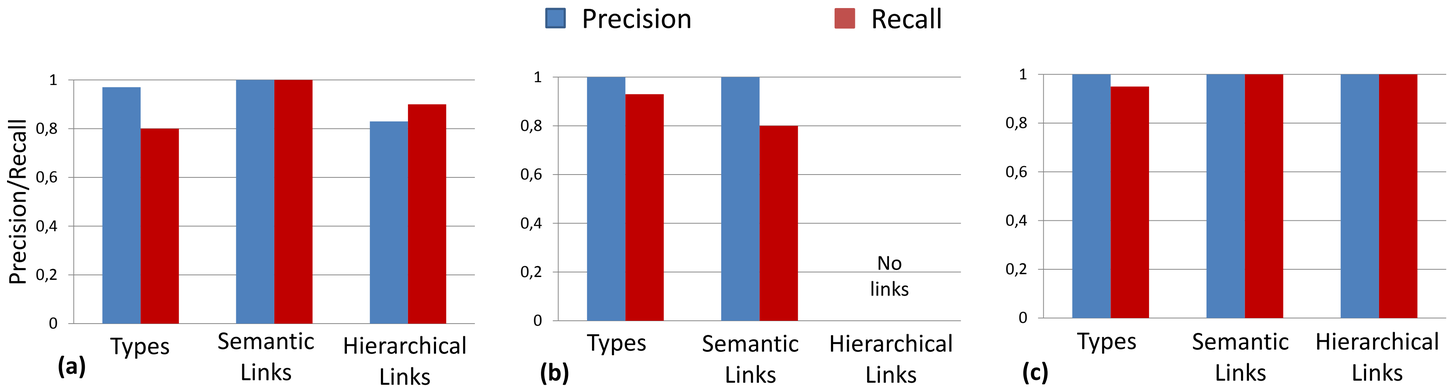


- ***Initial Dataset*** ➢ ***Type Discovery*** ➢ ***Resulting Schema***

EXPERIMENTATION



Automatic detection of similarity threshold



Evaluation of schema discovery quality in Conference (a) BNF (b) and DBpedia (c) datasets