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Ontology Alignment/Merging Methods[5]

- Mapping using an upper ontology (SUMO, DOLCE, etc)
- Mapping using (semi-)automatic processing tools
From week 2: “Enabling Cross-Disciplinary E-Science by Integrating Geoscience Ontologies with Dolce”

- Hook in GeoSciML and SWEET classes into DOLCE classes
- SWEET semantically incompatible in some areas
  - Rock subsumed by DOLCE endurant (MixedSubstance) and perdurant (State), which are disjoint
  - Could be solved my modifying SWEET, but compatibility was a goal
(Semi-)Automatic - Anchor-PROMPT[6]

- Set of heuristics to analyze non-local context
- Meant to augment other methods (PROMPT, Chimera)
- Takes set of pairs of related terms (anchors)
  - Can be provided manually or generated
  - Returns pairs of semantically close terms.
- Traverses paths between anchors, incrementing similarity score for pairs of classes traversed on same step
- Joins subclass/superclass into “equivalence groups”
  - Treated as one node in the graph
- Problems if two ontologies are modeled very differently
- Claim 75% correct results
(Semi-)Automatic - GLUE[2]

- Machine learning techniques to create mappings
- Similarity measure by using joint probability distribution
  - $P(A, B), P(A, \bar{B}), P(\bar{A}, B), P(\bar{A}, \bar{B})$
  - Jaccard coefficient - 0 if two instances are disjoint, 1 if two instances are the same concept
- Three modules:
  - Distribution Estimator - For each pair of concepts from two ontologies, calculate probability distribution
  - Similarity Estimator - User defined similarity function (Jaccard coefficient), output similarity matrix
  - Relaxation Labeler - Takes matrix, with constraints, output mapping
Other (Semi-)Automatic Methods

- Uses interactive mapping, and heuristics
- Similarity Flooding\cite{3} - Compares graphs like Anchor-PROMPT
  - ONION\cite{4}
  - Prompt\cite{7} - Interactive, suggests mappings with user input


References II

A scalable framework for the interoperation of information sources.

Natalya F. Noy.

Natalya F. Noy and Mark A. Musen.
Anchor-prompt: Using non-local context for semantic matching.
*Workshop on Ontologies and Information Sharing at the Seventeenth International Joint Conference on Artificial Intelligence*, 2001.
N.F. Noy and M.A. Musen.
The prompt suite: Interactive tools for ontology merging and mapping.