AI Planning—Week 4

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Semantic Integration: A Survey of Ontology-Based Approaches

- Author: Natalya F. Noy
- Published: 2004

Problem

- Map ontologies to one another
- Types of differences:
    - Language level - mismatches in expressiveness and semantics - Normalization (15)
    - Ontology level:
        - Same terms for different concepts
        - Different terms for same concepts
        - Different levels of granularity

Mapping Discovery

- Shared Ontology
  - Build a common upper ontology
  - Examples: SUMO and DOLCE
  - Successes (21), and difficulties (25) with integration
  - NIST PSL - process planning and modeling

Declarative Formal Representations of Mappings

- Map ontologies that do not have any vocabulary in common
- Linguistic analysis:
    - Use natural language processing to split composite word names
    - Compare substrings to find similar concepts
    - Compare ratio of shared words in definitions of concepts
    - Users need to manually examine and approve mapping
- PROMPT SYSTEM:
    - TOOL FOR MERGING CLASSES AND PROPERTIES
    - CAN SUGGEST USING MIX OF LEXICAL AND STRUCTURAL FEATURES, AND USER INPUT
    - ANCHORPROMPT - TREAT ONTOLOGIES AS GRAPHS. FINDS CLASSES IN SIMILAR POSITIONS IN THE GRAPH.

Reasoning with Mappings

- Ways of representing mappings:
  - Instance of an ontology for mappings
  - Define bridging axioms in first-order logic
  - Views from global ontology to local ontologies