Towards Ontology-based Standards: What Can Ontologies Offer?

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1

Challenge

- How can ontologies support the development, analysis, and extension of information standards in industrial domains?

2

Discussion Questions

- Design ontologies that formalize ambiguously defined concepts within existing standards

- Ontological analysis of existing standards (i.e. identify potential problems and semantic ambiguities) and the subsequent use of ontologies to reengineer existing standards

3

Discussion Questions

- Can existing ontologies be used to support the integration of existing standards? If not, what ontologies are needed?

- What ontologies should we be designing to lay the foundations for emerging standards and standards that are are currently under development?

4

Potential Benefits of Ontologies

- Improved quality of standards, leading to more robust implementations of the standards

- Automatic conformance-checking

- Semantic integration of multiple standards

5

Going Forward

- Standards as the requirements documents for ontologies
  - correctness of an ontology with respect to a standard

- What are the use case scenarios for each standard?

- Specify competency questions for the development of ontologies for standards

- Logical evaluation of candidate ontologies

6

Speed Dating

- Units
  - Engineering Mathematics Ontology
- STEP (isPartOf), OGC
  - mereotopology ontologies
    - RCC, RT, ...
- IFD
  - geometry ontologies (Hilbert, Tarski)
- Other ontologies
  - Time
    - Catalog of Temporal Theories
  - Process
    - Process Specification Language

7

One Ring to Rule Them All?

- Ontologies allow the explicit specification of the multiple possible meanings of concepts so that people can recognize commonalities and differences in the semantics of the concepts that they use.

- Cost of ambiguity
  - disagreements about conformance
  - inability to entail queries in inference
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8

Language Barriers

- What languages do we need?

- What gets lost when translating between the different languages used to specify the axioms within an ontology?

- Languages being used:
  - Common Logic
  - OWL
  - EXPRESS
  - OBO

9