

Ontology Summit 2013:
Ontology Evaluation Across the Ontology Lifecycle
Symposium, NIST, May 2, 2013

Track A: Intrinsic Aspects of Ontology Evaluation

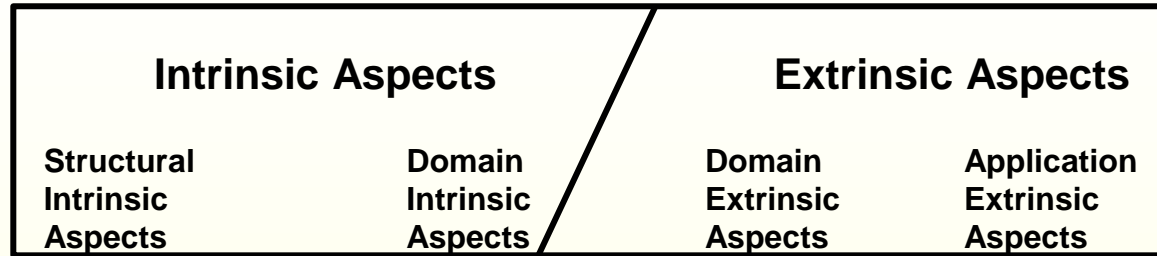
Co-Champions:

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Intrinsic Aspects

- Track A focused on the evaluation of ontologies under the following intrinsic aspects
 - Is the ontology free of obvious inconsistencies and errors in modeling?
 - Is the ontology structurally sound? How do we gauge that?
 - Is the ontology appropriately modular?
 - Is the ontology designed and implemented according to sound principles of logical, semantic, and ontological analysis?
 - Which intrinsic aspects of ontology evaluation are of greater value to downstream extrinsic ontology evaluation?
 - Intrinsic Aspects Comparable to White/Glass Box Testing?

One Cut: Structural Intrinsic and Domain Intrinsic



- ***Structural Intrinsic Evaluation***

- Draws upon **mathematical and logical properties** such as graph-theoretic connectivity, logical consistency, model-theoretic interpretation issues, inter-modularity mappings and preservations, etc.
- **Structural metrics** such as branching factor, density, counts of ontology constructs, averages, and the like are intrinsic
- **Meta-properties** such as transitivity, symmetry, reflexivity, and equivalence may also figure in intrinsic notions
- Does not depend at all on knowledge of the domain being modeled

- ***Domain Intrinsic Evaluation***

- Evaluation where **some understanding of the domain** is needed
- Focus on ontological content methods such as **better ontological and semantic analysis**, including meta-property analysis (as provided by methodologies like OntoClean, etc.), and use of sound ontological theories of parts, 3D/4D, essence, identity, intentionality, causation, social roles
- **Domain knowledge and better ways to represent that**, divorced as much as possible from application-specific domain requirements from extrinsic evaluation issues

Example Structural and Domain Intrinsic Evaluation Tools

- **OOPS!:** Reports on suspected improper uses of various OWL DL modeling practices
 - Described by MariaPovedaVillalon
- **OntoQA** to develop metrics for any ontology based on structural properties and instance populations
 - Described by SamirTartir
- **Macleod** for automatically checking the consistency, detecting invalid vocabulary terms, and determining provability of competency questions in Common Logic ontologies
 - As used in TorstenHahmann's PhD dissertation
- The **OQuaRE** framework combines both context dependent and independent metrics
 - Described by AstridDuqueRamos
 - The OQuaRE team has stated their desire to better distinguish between these two categories of metrics
- The **OntoClean** methodology
 - Not reported on in Ontology Summit 2013, but generally well-known
 - Draws upon standard evaluative criteria originating from ontological analysis

Discussion Questions

- 1) Structural evaluation tests are the easiest set of tests to apply. Agree or disagree?
- 2) Structural evaluation provides the greatest ROI during ontology development. Agree or disagree?
- 3) Is ontology quality always relative to some external criteria? Can an ontology intrinsically be of high quality without respect to some criteria? Is ontology quality inherently second-order?
- 4) Does ontological analysis in terms of relatively agreed upon and sound theories (e.g., mereotopology, a theory of parts; distinguishing semantic vs. metaphysical analyses or commitments, a theory of referring expressions and their referents; 3D vs. 4D analyses; parsimony of representation; explicit intentional and causal focus; etc.) enable a better ontology?
- 5) If we were to rank criteria that a good (“quality”) ontology would have, what would be the first five criteria in order of importance?