Ontology Summit 2013
Track D: Software Environments for Evaluating Ontologies
Session 12 - Synthesis II

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Tools Supporting Ontology Quality Summit Communique

- Track D, as "Software Environments for Evaluating Ontologies", falls within the current Communique outline as:

  C. The State of the Art of Ontology Evaluation

  4) What tool-support is currently available to support the evaluation of the characteristics identified in C-2 and the best practices identified in C-3?

- The notion of tool support of quality is broader than the track's title and should include "guidance" as well as "evaluation" of those ontology characteristics determining an ontology's quality and fitness. Ontology tools and software environments may intentionally constrain or recommend to the user proper ontology structure and content.

- The efficacy of ontology tools to achieve or evaluate ontology quality and fitness must be judged on the factors or characteristics generally recognized as constituting ontology quality (~intrinsic) and fitness (~extrinsic). These accountable factors should be those presently identified and described in Tracks A-C.

- Given sufficient results from the Ontology Quality Software Survey, the degree to which current tool capabilities align with ontology quality priorities expressed by Tracks A-C.

- Suggest that reflections about tools may best appear across all sections of the communique as they apply, rather than being treated separately.

Tool Capabilities by Life Cycle Phase and Content

Four classes of software tool capabilities are recognized, formed from crossing a life cycle factor with a content factor.

PHASE / CONTENT	Model Quality	Domain & App Fitness
Rqmts, Design & Build	**1a**	**1b**
Validation & Post hoc	**2a**	**2b**

1. Those that, during the design or build phase, detect, determine, and/or guide the author's content that contributes to the value of an emerging ontology:
    a) model quality;
    b) domain and application fitness
2. Those that detect, assess, and/or measure the presence or degree of ontology characteristics that contribute to the value of an existing ontology:
    a) model quality;
    b) domain and application fitness

Notions about Ontology Life Cycle Phases

- Software capabilities that address ontology quality and fitness factors may be invoked in one or more phases of ontology development and use. One simple breakdown of general life cycle phases is:
  - Exploration Phase
  - Management Phase
  - Design Phase
  - Build Phase
  - Validation Phase
  - Integration & Use Phase
  - Maintenance Phase
- Tools may contribute their "evaluation" or "guidance" function at different points along the ontology life cycle, and for a given characteristic, some tools may perform better in one life cycle phase than in another phase where a different tool is better suited. Generally, appreciation of the full cycle of life of an ontology is not well established within the ontology community.
- The design, implementation, and use requirements of an ontology may affect how quality and fitness on a particular ontology characteristic are determined, as well as interpreted and valued. Perhaps all quality and fitness assessments by software should be traceable to stated ontology requirements.

Notions about Using Ontology Quality Tools

There are central aspects of ontology that may not be amenable to software control or assessment.

- The need for clear, complete, and consistent lexical definitions of ontology terms is not presently subject to software consideration beyond identifying where lexical definitions may be missing entirely.
  - An aside: *"That which we call a rose by any other name would smell as sweet."*

    There seems to be a tendency to not see term semantics clearly because of what I call "lexical glare". The meaning of a concept being modeled is often taken to be its (ultimately arbitrary) name rather than the sum of its axioms.
- Semantic fitness of an ontology is also a difficult quality for software determination:
  - Fidelity to its world domain (reality); and/or
  - Fidelity to its application domain (system and use requirements).
  - For example, software guidance may be available for the fitness of candidate ontologies for import and reuse, but not so for the novel content of a new ontology.

Notions about New Ontology Quality Tools

- Significant new ontology evaluation tools are currently becoming available to users.
- Carving a link between ontology tools and existing IT architecture and design tools (e.g., EA and SA) remains a future possibility in order to integrate ontology into mainstream application software development within enterprise or more focused IT environments. This capability could offer a definitive means of connecting ontology quality/fitness characteristics and measures to use case and application software requirements.
- New tool use cases:
  - Approximate lexical and structural matching of a new ontology or ontology component to the content of a repository of known ontologies may offer an effective means of identifying comparable ontology content for:
    - 1) demonstrable coding patterns;
    - 2) confirmation of authoring approach; and
    - 3) identification of reuse candidates.
  - Consider discoveries about the state of ontology evaluation stemming from the Hackathon and Clinic experiences.