

INFS3101 / 7100 Ontology and the Semantic Web

Module 9 Uses of Ontology

Last lecture: Key Terms



Quality principles for ontologies include **clarity, coherence, extendibility, encoding bias and ontological commitment**. Want to maximise the first three and minimise the last two.

A Taxonomy of Ontologies

- ❖ Ontologies are used for all sorts of purposes
- ❖ There are many ontologies in use
- ❖ To try to get some overview we need a taxonomy
- ❖ This is a primitive ontology of ontologies
- ❖ Major divisions
 - **Model-centric**: characteristics of the conceptualisation or representation
 - **Application-centric**: characteristics of the environment in which the ontology is used

Model Centric Perspectives

Model centric perspectives characterize the ontologies themselves and are concerned with their structure, formalism and dynamics.

Perspective	One Extreme	Other Extreme
Level of Authoritativeness	Least authoritative, broader, shallowly defined ontologies	Most authoritative, narrower, more deeply defined ontologies
Source of Structure	Passive (Transcendent) – Structure originates outside the system	Active (Immanent) – Structure emerges from data or behavior
Degree of Formality	Informal, or primarily taxonomic	Formal, having rigorously defined types, relations, and theories or axioms
Model Dynamics	Read-only, ontologies are static	Volatile, ontologies are fluid and changing.
Instance Dynamics	Read-only, resource instances are static	Volatile, resource instances change continuously

Model Centric Examples

Perspective	One Extreme	Other Extreme
Level of Authoritativeness	Least Wine Ontology	Most Periodic Table
Source of Structure	Transcendent Periodic Table	Immanent Newsfeed
Degree of Formality	Informal SNOMED	Formal Engineering Mathematics
Model Dynamics	Read-only E-Commerce Exchange	Volatile Taxation Ontology
Instance Dynamics	Read-only Periodic Table	Volatile E-Commerce Exchange

Application Centric Perspectives

Application centric perspectives are concerned with how application use and manipulate ontologies.

Perspective	One Extreme	Other Extreme
Control / Degree of Manageability	Externally focused, public (little or no control)	Internally focused, private (full control)
Application Changeability	Static (with periodic updates)	Dynamic
Coupling	Loosely-coupled	Tightly-coupled
Integration Focus	Information integration	Application integration
Lifecycle Usage	Design Time	Run Time

Application Centric Examples

Perspective	One Extreme	Other Extreme
Control / Degree of Manageability	Externally focused Taxation Ontology	Internally focused Engineering Mathematics
Application Changeability	Static Taxation Ontology	Dynamic Web Services Composition
Coupling	Loosely-coupled E-Commerce Exchange	Tightly-coupled Database Integration
Integration Focus	Information integration EDI	Application integration Web Services Composition
Lifecycle Usage	Design Time Engineering Mathematics	Run Time E-Commerce Exchange

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Kinds of Applications

Business Applications
Run-time Interoperation
Application Generation
Ontology Lifecycle
Analytic Applications
Emergent Property Discovery
Exchange of Complex Data Sets
Engineering Applications
Information System Development
Ontology Engineering

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Where can this take us?

- ❖ Let's look at the characteristics of Z39.50 applications and see what happens if we vary them
- ❖ ANSI Z39.50 was developed by the library community for access to catalogs. Used eg to allow a simultaneous search of the catalogs of all Australian University libraries.
- ❖ Used also for bibliographic data, museums, government information, and others.
- ❖ One of the most advanced semantic web-type applications

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Model Centric Perspectives

Z39.50 Library applications

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Application Centric Perspectives

Z39.50 Library applications

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Opportunity for Z39.50

Look at the opposite extreme of some perspectives

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Suggests Information by Venue

- ❖ Information is published in discrete venues
 - Particular journals, faults on a particular product
- ❖ Venues are related in families
 - Journals in a field, product lines
- ❖ Can represent content of a venue by a concept map generated by a statistical process
- ❖ If we can detect changes in the concept map
 - We can see how venues in a family are related
 - Detect changes in content patterns
 - See flow of topics from one venue to another.

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Summary: Key Terms



- ❖ Taxonomy of ontologies: **model-centric perspectives** and **application-centric perspectives**. Former are **authoritativeness, source of structure, degree of formality, model dynamics, instance dynamics**. Latter are **control, application changeability, coupling, integration focus and lifestyle usage**.

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Resources

- ❖ **Essential**
 - Notes chapter 9 Uses of Ontology
- ❖ **Further**

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