

Ontology

CSC480: Semantic
Web Technologies

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Limitations of RDF and RDFS

- Properties only have local scope
- No disjoint
- No Boolean combinations
- No cardinality restrictions
- No special characteristics of properties
 - Transitive
 - Inverse

Ontology Introduction

- Foundation in philosophy
 - “a branch of metaphysics concerned with the nature and relations of being”
- Computer Science
 - Data model representing knowledge and relationships in a domain
 - Shared understanding with a world view

Advantages

- Interoperability
- Inference
- Reusability
- Reliability
- Sharability
- Portability

Ontology Languages

- A well-defined syntax
- Formal semantics
- Sufficient expressive power
- Convenience of expression
- Efficient reasoning support

Additional Reasoning Capabilities

- Class membership
- Classification
- Equivalence and equality
- Disjointness and difference
- Boolean combination of classes
- Local scope of properties
- Special characteristics of properties
- Cardinality restrictions
- Consistency

Classifications on Ontologies

- Expressiveness
 - Lightweight
 - Heavyweight
- Generalization of domain concepts
 - Upper
 - Middle
 - Lower

Ontology Applications Areas

- Search, linguistics, reasoning
 - SUMO
- Healthcare
- Manufacturing
- Agriculture
- Computer Science

Development Methodology

- Determine domain and its scope
- Consider reusing existing ontologies
- Identify important terms
- Define classes and class hierarchy
- Define class properties
- Define characteristics of properties
- Create instances
- Validate ontology