



TDT44 - Semantic Web

OWL

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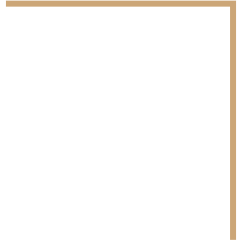
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Outline

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 - Terms and Language Constructs
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Introduction



OWL: Web Ontology Language

- Most popular ontology language
- More complex and richer relationships than RDF Schema
- Much stronger reasoning ability
- Two versions: OWL 1 and OWL 2
 - OWL 1 is a subset of OWL 2

OWL = RDF Schema + new constructs for better expressiveness

A Brief History

- 1990s: SHOE, OIL, DAML → **DAML+OIL**
- 2001: Revision of DAML+OIL → **OWL (1)**
- 2004: OWL 1 formal W3C recommendation
- 2005: Suggestions for incremental revisions (*OWL 1.1*)
- 2008: ~~OWL 1.1~~ → **OWL 2**
- 2009: OWL 2 W3C standard



OWL 1: Terms and Language Constructs



OWL 1: Classes

- Localizing global properties
 - Value constraints: `allValuesFrom`, `someValuesFrom`, `hasValue`
 - Cardinality constraints: `cardinality`, `minCardinality`, `maxCardinality`
- Set operators
 - `intersectionOf`, `unionOf`, `complementOf`
- Enumeration
 - `oneOf`
- Equivalent
 - `equivalentClass`
- Disjoint
 - `disjointWith`

OWL 1: Properties

- ObjectProperty VS DatatypeProperty
- Property characteristics
 - SymmetricProperty
 - TransitiveProperty
 - FunctionalProperty **and** InverseFunctionalProperty
 - inverseOf



OWL 2: Terms and Language Constructs



OWL 2: Common Patterns

- Disjointedness
 - `AllDisjointClasses`,
 - `disjointUnionOf`
- Negative assertions
 - `Negative (Object | Datatype) PropertyAssertion`
 - `sourceIndividual`
 - `assertionProperty`
 - `target (Individual | Value)`

OWL 2: Improved Expressiveness for Properties

- Property cardinality restrictions
 - `qualifiedCardinality`
- Reflexive, irreflexive, asymmetric
 - `ReflexiveProperty, IrreflexiveProperty, AsymmetricProperty`
- Disjoint properties
 - `propertyDisjointWith, AllDisjointProperty`
- Property chains
 - `propertyChainAxiom`

OWL 2: Other Features

- Datatypes
 - More built in
 - Creating/extending datatypes
- Entity Declarations
 - Helps OWL tools
 - Optional
- Imports and Versioning

OWL 2: Language Profiles

OWL 2: Language Profiles

- OWL 2 Full vs. OWL 2 DL
- OWL 2 profiles
 - OWL 2 EL
 - OWL 2 QL
 - OWL 2 RL



Summary



Summary

- OWL extends on the idea behind RDF Schemas, allowing for more expressiveness, and thus stronger reasoning abilities
- OWL 1 does this by
 - Add restrictions to subclasses, such as ways of localizing global properties
 - Add characteristics to properties
- OWL 2 expands on this by
 - Adding constructs to simplify some common patterns
 - Adding improved expressiveness for properties
 - Defining 3 language profiles for different use cases



Thanks!



References

Yu, L. (2014) *A Developer's Guide to the Semantic Web*. 2nd edn.
London: Springer