FOAF Basics

The basic idea is pretty simple. If people publish information in the FOAF document format, … So, what is the 'FOAF document format'? … For example, one interesting relationship type is foaf:depiction. …

Theory (FOAF)

Imports: OWL, First Order Logic

WordNet, Dublin Core (dc:creator → maker), …

Classes

Symbol (Project): Project owl:Class

The Project class represents the class of things that are 'projects'. These may be formal or informal, collective or individual. It is often useful to indicate the homepage of a Project.

Axiom: Project owl:wordnet:Project

We reuse and specialize WordNet's project class.

Axiom: Project owl:Document = 1

A Project is not a Document.

Properties

Symbol (made):

made: owl:ObjectProperty(Agent → owl:Thing)

The made property relates an Agent to something made by it.

Symbol (maker):

maker: owl:ObjectProperty(Agent)

Axiom: made = maker→

Type Assertion: maker:owl:ObjectProperty(owl:Thing → Agent)

Proof: We prove this using the declared type of made, using axiom …, and the OWL direct semantics of owl:inverseOf.

Lemma: maker = made

Proof:

1. We know that made = maker→

2. Interpreted using the OWL semantics, this means that made^T = (maker)^T→

3. Now we apply the inverse on both sides, eliminate double inverses, and obtain (made^T)−1 = ((maker)^−1)→ = maker^T

4. This is the interpretation of maker = made−1, which we had to prove.

Axiom: ∀ t, m, n. maker(t, m) ∧ name(m, n) ⇒ dc:creator(m, n)

Symbol (membershipClass):

The membershipClass property relates a Group to an RDF class representing a sub-class of Agent whose instances are all the agents that are a member of the Group.

Axiom: ∀ m, g, C. g ⊆ member m ∧ membershipClass(g, C) ⇒ m rdf:type C

Modeling ontologies like in textbooks!

Related work:

• CASL/Hets (modular, heterogeneous, no documentation)

• XHTML+RDFa (emerging for ontologies, we also generate it)

From a single OMDoc source, we can obtain:

• various formal representations
• various human-readable presentations

Add documentation to an ontology – but how?

Inferred vs. declared facts

Modeling ontologies as mathematical theories

Write ontologies in OMDoc (Open Math. Documents).

We have formalized RDF, RDFS, and OWL (symbols and partial semantics) as theories.