

Ontology (protégé.stanford.edu)

Ontology defines a common vocabulary for researchers who need to share information in a domain. It includes machine-interpretable definition of basic concepts in the domain and relations among them.

Uses:

To

1. Share common understanding of the structure of information among people or software agents.
2. Enable reuse of domain knowledge
3. Make domain assumptions explicit
4. Separate domain knowledge from the operational knowledge
5. Analyze domain knowledge

One of the possible definition of Ontology is:

A formal explicit description of concepts in a domain of discourse (classes/concepts), properties of each concept describing various features and attributes of the concept (slots/roles/properties), and restrictions on the slots (facets/role restrictions). Ontology with a set of individual instances of classes constitute a knowledge base.

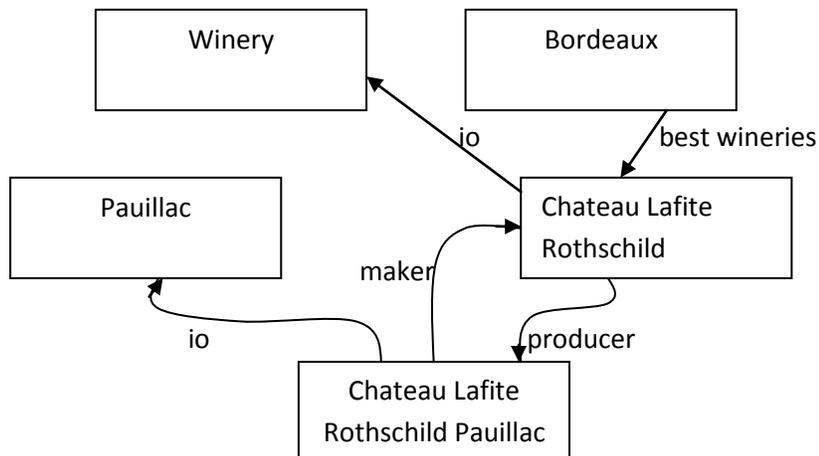
Classes describe concepts in the domain. A class can have subclasses that represent concepts that are more specific than the superclass.

Slots describe properties of classes and instances.

Developing an ontology includes:

1. Defining classes in the ontology.
2. Arranging the classes in a taxonomic (subclass-superclass) hierarchy
3. Defining the slots and describing allowed values for these slots
4. Filling in the values for slots for instances

We can then create a knowledge base by defining individual instances of these classes filling in specific slot value information and additional slot restrictions.



Ontology Development:

Rules:

1. There is no one correct way to model a domain – there are always viable alternatives. The best solution almost always depends on the application that you have in mind and the extensions that you anticipate.
2. Ontology development is necessarily an iterative process.
3. Concepts in the ontology should be close to objects (physical or logical) and relationships in your domain of interest. These are most likely to be nouns (objects) or verbs (relationships) in sentences that describe your domain.

Development:

Step 1. Determine the domain and scope of the ontology.

Step 2. Consider reusing existing ontologies.

Step 3. Enumerate important terms in the ontology.

Step 4. Define the classes and the class hierarchy.

Limiting the scope: The ontology should not contain all the possible information about the domain: you do not need to specialize (or generalize) more than you need for your application (at most one extra level each way). Similarly, the ontology should not contain all the possible properties of and distinctions among classes in the hierarchy.

Step 5. Define the properties of classes – Slots.

Inverse relations and default values.

Step 6. Define the facets of the slots.

Step 7. Create instances.

