

Knowledge Graphs, Description Logics and Reasoning on Data Hands-On Session with Protégé

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Hands-on Session with Protégé

Protégé ontology editor: <http://protege.stanford.edu/>

- ▶ Free
- ▶ Open-source
- ▶ Lots of plugins
- ▶ Integrate several DL reasoners
 - ▶ check ontology consistency
 - ▶ classify the ontology (infer new subclass relationships)
 - ▶ query the ontology
 - ▶ explain some inferences

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View selection

Active ontology x Entities x Individuals by class x DL Query x

Ontology header:

Ontology IRI <http://www.co-ode.org/ontologies/pizza>

Ontology Version IRI <http://www.co-ode.org/ontologies/pizza/2.0.0>

Annotations +

rdfs:label [type: xsd:string]

pizza ✕ +

dc:title [language: en]

pizza ✕ +

dc:description [language: en]

An ontology about pizzas and their toppings.

This is an example ontology that contains all constructs required for the various versions of the Pizza Tutorial run by Manchester University (see <http://owl.cs.manchester.ac.uk/publications/talks-and-tutorials/protog-owl-tutorial>).

dc:license [type: xsd:string]

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Ontology metrics:

Metrics

Axiom	801
Logical axiom count	322
Declaration axioms count	120
Class count	100
Object property count	8
Data property count	0
Individual count	5
Annotation Property count	12

Class axioms

SubClassOf	259
EquivalentClasses	15
DisjointClasses	14
GCI count	0
Hidden GCI Count	2

Object property axioms

SubObjectPropertyOf	4
EquivalentObjectProperties	0
InverseObjectProperties	3
DisjointObjectProperties	0
FunctionalObjectProperty	4

Imported ontologies:

Direct Imports +

Indirect Imports

Select class to
get description

Expressions of super classes using Manchester syntax

Cajun $\sqsubseteq \exists \text{hasTopping.TomatoTopping}$

Explain

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The screenshot displays the Protégé ontology editor interface for the 'pizza' ontology, specifically focusing on the 'hasIngredient' sub-ontology. The browser address bar shows the URL: <http://www.co-ode.org/ontologies/pizza/2.0.0>.

Left Panel: Object property hierarchy: hasIngredient

- owl:topObjectProperty
 - hasCountryOfOrigin
 - hasIngredient**
 - hasBase
 - hasTopping
 - hasSpiciness
 - isIngredientOf
 - isBaseOf
 - isToppingOf

Right Panel: Annotations: hasIngredient

Annotations (+)

- `rdfs:comment` [language: en]
NB Transitive – the ingredients of ingredients are ingredients of the whole

Bottom Panel: Characterization: hasIngredient

Characterization (+)

- ☐ Functional
- ☐ Inverse functional
- ☒ Transitive
- ☐ Symmetric
- ☐ Asymmetric
- ☐ Reflexive
- ☐ Irreflexive

Description: hasIngredient

Description (+)

- Equivalent To (+)
- SubProperty Of (+)
isIngredientOf
- Inverse Of (+)
- Domains (intersection) (+)
Food
- Ranges (intersection) (+)
Food
- Disjoint With (+)
- SuperProperty Of (Chain) (+)

Handwritten Annotations:

- hasIngredient \sqsubseteq isIngredientOf
- \exists hasIngredient \sqsubseteq Food

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The screenshot displays the Protégé ontology editor interface for the 'pizza' ontology. The browser address bar shows the URL: <http://www.co-ode.org/ontologies/pizza/2.0.0>. The interface includes a top navigation bar with tabs for 'Active ontology', 'Entities', 'Individuals by class', and 'DL Query'. Below this, there are tabs for 'Annotation properties', 'Datatypes', and 'Individuals'. The main workspace is divided into several panes:

- Left Pane (Individuals: America):** Displays a list of individuals under the class 'America':
 - America (selected)
 - England
 - France
 - Germany
 - Italy
- Top Right Pane (Annotations: America):** Displays a list of annotations for the selected individual 'America'.
- Bottom Left Pane (Description: America):** Displays the description of the class 'America'. It shows the types 'Country' and 'owl:Thing', and the assertion 'Same Individual As' with the individuals 'England, France, Germany, Italy'.
- Bottom Right Pane (Property assertions: America):** Displays a list of property assertions for the selected individual 'America', including 'Object property assertions', 'Data property assertions', 'Negative object property assertions', and 'Negative data property assertions'.

The interface also includes a search bar in the top right corner and a set of navigation icons at the bottom.

Hands-on Session with Protégé

The screenshot displays the Protégé ontology editor interface. The top browser bar shows the URL `pizza (http://www.co-ode.org/ontologies/pizza/2.0.0)`. The main window is divided into several panes:

- Class hierarchy:** Shows `owl:Thing` as the root class.
- DL query:** The query is `SpicyPizza and NonVegetarianPizza`. It includes buttons for `Execute` and `Add to ontology`.
- Query results:** Displays the results of the query, showing subclasses (7 of 7):
 - AmericanHot
 - Cajun
 - CheesyVegetableTopping
 - IceCream
 - PolloAdAstra
 - SloppyGiuseppe
 - owl:Nothing** (highlighted)
- Query for:** A sidebar with checkboxes for:
 - ☐ Direct superclasses
 - ☐ Superclasses
 - ☐ Equivalent classes
 - ☐ Direct subclasses
 - ☒ Subclasses
 - ☐ Instances
- Result filters:** Includes a `Name contains` text box and checkboxes for:
 - ☒ Display owl:Thing (in superclass results)
 - ☒ Display owl:Nothing (in subclass results)