

Class 2 Methodologies and Knowledge Representation

Assignment 1: Semantic eScience (10 points of total credit score)

Due: September 19, 2011 (by 11:59 am EST)

Late submission policy: First time with valid reason -no penalty, otherwise 20% of score deducted for each late day.

Naming scheme: CSCI2011-6962_Assignment0_YOUR_NAME.ext

Submission method: email to dlm@cs.rpi.edu, chenw8@rpi.edu

Note: Your report for this assignment should be the result of your own individual work. Take care to avoid plagiarism (“copying”), including all web resources, texts, and class presentations. You may discuss the problems with other students, but do not take written notes during these discussions, and do not share your written solutions. Please use the numbering below when completing this assignment.

General assignment: extend an existing knowledge base with additional information and ask and answer questions about the extended KB. There is an equal weighting score for each question.

Note that the important aspect of this homework assignment is the review of the ontology and the extension of it. Many will find it easier to do using a tool such as protege or cmap but this tool usage is NOT required for this assignment. (Future work in the class will require use of such a tool but there is a future class that will go over these tools).

1. Examine the Wine and Food Ontology (represented in an OWL-DL ontology at <http://www.w3.org/TR/owl-guide/wine.rdf>). You will extend the representation using an additional source of knowledge/ information (suggestions are below). You will choose the required representation and the method you will use to represent it.
 - a. Provide a written description of the Knowledge Base extension, the source of knowledge you used, and your reason for choosing it.
 - b. Provide a written description of your chosen method for the extension and reason for choosing it.
 - c. Indicate what knowledge you could and could not express and why.

Note: We suggest using one of three methods for editing the Ontology:

1. CMap COE: Much more user-friendly for basic editing (which you will mostly be doing). You need to explicitly import the ontology and export it when finished. Visit <http://tw.rpi.edu/web/guide/GettingStartedWithCMapCOE> to get started with CMap. CMap will not support the queries asked for in question 2 or consistency checking.
2. Protege: Very complete with a sophisticated user interface, but can be complex for a first-time ontologist. Protege has plugins for DL Query (to answer queries in the second question) and for reasoning. A reasoner will tell you if your ontology is consistent, but not that it's correct. Visit <http://bit.ly/OD3EE> to download and install.

3. Write the ontology extension by hand using a text format. This can be done using Turtle (<http://www.w3.org/TeamSubmission/turtle/>) or Manchester Notation (<http://www.w3.org/TR/owl2-manchester-syntax/>). Both can be loaded into Protege for query and classification using a reasoner. Manchester Notation has the added benefit of being the de facto language used in Protege to represent complex OWL assertions. The Turtle version of this file is available at <http://tw.rpi.edu/~jimmccusker/eScience/wine.ttl> and the Manchester Notation version is at <http://orion.tw.rpi.edu/~jimmccusker/eScience/wine.omn>.
4. With special permission from the instructor, if you cannot work the other options at this point in the class, you can describe your extension using plain English. Please submit the result as a Word Document. A graphical representation of the Wine Ontology is available at <http://tw.rpi.edu/~jimmccusker/eScience/wine.html>

2. Pose and answer two questions (label them a. and b.) to your extended knowledge representation. Provide a written description of the questions (a. and b.) and the result. (Hint: they can be easy questions, choose ones that you can answer well, with some detail, they can be queries, inference or a combination).

Suggested additional knowledge sources related to food and wine:

- A categorization of food types:
http://dir.yahoo.com/Society_and_Culture/Food_and_Drink/Types_of_Food/
- A categorization of different kinds of alcoholic and non-alcoholic drinks:
http://dir.yahoo.com/Society_and_Culture/Food_and_Drink/Drinks_and_Drinking/
- Your knowledge about the food and beverages that you like best.
- A theoretical or actual restaurant menu.

Reference descriptions for the wine and food ontology:

Michael K. Smith, Chris Welty, and Deborah L. McGuinness. OWL Web Ontology Language Guide. World Wide Web Consortium (W3C) Recommendation. February 10, 2004. Available from <http://www.w3.org/TR/owl-guide/>.

Natalya Noy and Deborah L. McGuinness. "Ontology Development 101: A Guide to Creating Your First Ontology". Stanford Knowledge Systems Laboratory Technical Report KSL-01-05 and Stanford Medical Informatics Technical Report SMI-2001-0880, March 2001. [abstract](#).

Translations available in French, Russian, and Spanish. <http://www.ksl.stanford.edu/people/dlm/papers/ontology-tutorial-noy-mcguinness-abstract.html>