Semantic Web – Tutorial #7

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June 17, 2021 | Assignment 6

1: Building an Ontology

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Main Task

Create an ontology in the domain of the **Harry Potter Universe**.

You can get some useful information at `https://en.wikipedia.org/wiki/Harry_Potter` and `https://harrypotter.fandom.com/wiki/Main_Page`. Keep in mind the steps required to design an ontology.

Task:

- Go through all the steps of ontology engineering, following the methodology presented in the lecture.
- Document steps 1–3 by outlining the respective results.
- Design an appropriate ontology defining at least 4 concepts, their (possible) hierarchy, properties and relationships. Specify the ontology in OWL and submit the file.

We will use the tool *Protégé*[1] throughout the course of this tutorial.

[1] http://protege.stanford.edu

Step 1: Determine the domain and scope of the ontology

- *What is the domain?*
  - Harry Potter universe
  - For example: places, creatures, groups, magical objects, spells
- *For what are we going to use the ontology?*
  - To model the Harry Potter franchise and cross information about the story and characters.
- *For what types of questions should the information in the ontology provide answers?*
  - Which kinds of spells exist?
  - What is the relationship between charms and curses?
  - Who owns the Marauder's Map?
  - Who lives in Little Whinging?
- *Who will use and maintain the ontology?*
  - We do not have this information.

Step 2: Consider reusing existing ontologies (or parts of them)

- We can use this ontology which includes a number of Harry Potter characters: `https://github.com/lomcin/harrypottontology`
- However, we should not use existing ontologies about plant or animal domains, as they fall outside of our scope and might just add a lot of redundant information.

Step 3: Enumerate important terms in the ontology

- *Terms we would like to talk about:*
  - "Classes" of characters, such as muggles, wizards/witches, squibs, etc.
  - Creatures, for example: phoenix, hippogriff, dragon, gnome
  - Places, for example: schools (like Hogwarts or Durmstrang), towns (like Hogsmeade or Godric's Hollow), public places of the magical world (like Diagon Alley or The Leaky Cauldron)
  - Magical objects, such as horcruxes, the Marauder's Map, Quidditch balls, the Time-Turner, and Wizard's Chess equipment
  - School subjects, like potions or charms
  - Spells, like Alohomora or Lumos
- *Which are the properties that connect those terms, and what would you like to say about these terms?*
  - A subject is *taught* at a school
  - Wizards and witches can *cast* spells
  - A magical object *belongs to* a wizard/witch.
  - Both living things (i.e., persons and creatures) and places can have names.

Examples of concepts we could model:

- A person lives at a place.
- A spell is cast by a magical person.
- A magical object can be owned by a magical person.
- A magical school subject is taught at a magical school.

1: Building an Ontology | Instantiation

Task: Specify at least 8 statements with instances for your ontology. You must cover all the elements on your ontology: concepts, properties, relationships.

```
@prefix onto: <http://www.semanticweb.org/isabelle/ontologies/
        2021/5/harry-potter-ontology>.
@prefix wiki: <https://harrypotter.fandom.com/wiki/>
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .

wiki:Hogwarts_School_of_Witchcraft_and_Wizardry
        rdf:type    onto:MagicalSchool.

wiki:Leaky_Cauldron     rdf:type    onto:MagicalPlace;
                        onto:locatedAt  wiki:London.

wiki:Defence_Against_the_Dark_Arts
        rdf:type        onto:MagicalSchoolSubject;
        onto:taughtAt   wiki:Hogwarts_School_of_Witchcraft_and_Wizardry.
```

```
15: wiki:Marauders_Map       rdf:type         onto:MagicalObject;
16:                          onto:ownedBy     wiki:Harry_Potter.
17:
18: wiki:Patronus_Charm      rdf:type         onto:Charm;
19:                          onto:castBy      wiki:Harry_Potter;
20:                          onto:castBy      wiki:Remus_Lupin.
21:
22: wiki:Buckbeak    rdf:type     onto:MagicalCreature.
23:
24: wiki:Hermione_Granger    rdf:type     onto:MagicalPerson.
25:
26: wiki:Diagon_Alley    rdf:type             onto:MagicalPlace;
27:                      onto:locatedAt       wiki:London;
28:                      onto:locatedNear     wiki:Knockturn_Alley.
```

Task:

- Make use of annotations (e.g., rdf:comment) for documenting each element (concept, property, relationship) *comprehensibly*. Add them to your OWL file.
- Create and submit a HTML documentation for the ontology (based on annotations). Make use of tools such as Protégé, WebProtégé, Parrot[2] or LODE[3]

[2] http://ontorule-project.eu/parrot/parrot
[3] http://www.essepuntato.it/lode