

COMP718: Ontologies and Knowledge Bases

Answers Lecture 5—foundational ontologies

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DOLCE and BFO

General Notions

1. Some of the differences are: descriptive, possibilism, and multiplicative for DOLCE versus prescriptive and realist, actualism, and reductionist for BFO.
2. There are several differences. The major differences are that DOLCE also has relationships and axioms among the categories using those relationships (i.e., richly formalised), whereas BFO v1 and v1.1 is a ‘bare’ taxonomy of universals (some work exist on merging it with the RO, but not yet officially). Others are the **Abstract** branch and the treatment of ‘attributes’/quality properties in DOLCE that do not have an equivalent in BFO. The BFO-core has a more comprehensive inclusion of parthood and boundaries than DOLCE.

Contents

1. dolce:Endurant maps (roughly) to bfo:Continuant, dolce:Process as a sub-class of bfo:Process, and dolce:quality to bfo:quality.
2. Amount of Matter, Accomplishment, Agentive Physical Object, and Set do not have a mapping. An example of the possible reasons: Set is abstract, but not existing in nature (hence, by philosophical choice, not in BFO).

Considering more ontologies

1. This was discussed in the lecture. The real problem with having a separate relation ontology is that many of the relations don’t mean much without the restriction on the domain and range. For instance, take **participates in**: intuitively we know what it means by understanding the English word, but that won’t do for adequate processing by a computer. We can add that an ‘object’ **participates in** a ‘process’—or: declare the domain of **participates in** to be ‘object’ and range to be ‘process’—but we have to be precise on what we mean with ‘object’ and what with ‘process’, beyond a possibly ambiguous natural language description. The latter can be solved by committing to a foundational ontology, therewith answering questions like: is the ‘object’ to mean **Object** in BFO or **PhysicalObject** in DOLCE or **Material_Object** in GFO? Or perhaps DOLCE’s **Endurant**, hence, that also non-physical objects and amounts of matter can participate in some ‘process’?

Having the relations integrated in the rest of a foundational ontology (cf. separate) definitely increases precision of the representation of the meaning of the relations, and each ontology language has the capability to declare domain and range axioms anyway.

2. The most oftenly recurring relationships are parthood, participation, constitution, and inherence or dependence.
3. Options may vary:
 - (a) DOLCE or GFO
 - (b) BFO or GFO
 - (c) Depends on you chosen topic
4. We will consider ONSET in more detail next week. You can have a look at it w.r.t. the previous question by downloading it from <http://www.meteck.org/files/onset/> (platform-independent jar file).

Modelling

1. N/A (I use the version with DOLCE in the following answers)
2. To have RockDassie classified as a subclass of Herbivore (still both animals, and physical objects, and physical endurants, and endurants), it needs to have more, or more constrained properties than Herbivore. In Protégé notation, each Herbivore is equivalent to: (eats only plant) or (eats only (is-part-of some plant)). Rockdassies eat grasses and broad-leafed plants. The easiest way to modify the ontology is to add that grasses are plants (already present), that broad-leafed plants are kinds of plants, and that rockdassies eat only grass or broad-leafed plant. This is not to say this is the best thing to do: there are probably also other animals that eat grasses and broad-leafed plants, which now inadvertently will be classified as rockdassies.
3. The ontology does not contain any knowledge on ‘living in’ and ‘nature reserves’. Nature reserves are administrative entities, but also can be considered only by their region-of-space aspect; for the sake of example, let’s add NatureReserve \sqsubseteq space-region. Trickier is the living, or living in: one could add it as an OWL object property livesIn or as a subclass of Process and add participation relations between that, the nature reserve, and the lions, impalas, and monkeys. The former is less cumbersome, the latter more precise and interoperable (see lecture notes p53). We’ll return to this choice in the bottom-up section.

Part-whole relations

TBA next week

ODPs

TBA next week