Ontology Engineering Assignment 1

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Question 1

An ontology can be defined as "An explicit specialization of a conceptualization" Gruber (1993)

Genesereth and Nielson (1987) claims that "A conceptualization is an abstract, simplified view of the world that we wish to represent for some purpose". We can see it as a mental model of the world. It is not yet expressed formally. Genesereth and Nielson (1987) also more formally define a conceptualization as, *a tuple,(D,* $\boldsymbol{R}$*) where*

- *D is a set called the universe of discourse*
- $\boldsymbol{R}$ *is a set of relation on D*

In a conceptualization of an insect classification system (insect taxonomy) the elements of D would be things like the insects themselves, what the insects eat, insect body parts ect. $\boldsymbol{R}$ would be relationships like insect A eats insect B or Unitary relationships like insect C can fly.

According to Guarino, Oberle, and Staab (2009) we need a language (formal or informal) to express our conceptualization. We say that the language commits to a conceptualization and that once we commit we only admit models that are intended(Guarino et al., 2009, p.8). In other words only the models that fit our conceptualization. In our insect example the relationship "to eat" could be interpreted in many ways. Does it mean that insect A can or cant eat and insect of the same type? Also if insect A can eat insect B and insect B can eat insect C, can insect A eat insect C.

The language that is used need to only have the relations with the meaning intended in the conceptualization. There should be no ambiguity.

Conceptualizations can be specified in 2 ways: *extensionally* and *intentionally*(Guarino et al., 2009, p.8). To *extensionally* specify our example we have to list every possible relationship in R, which is impossible Guarino et

al. (2009). We can only partially specify our world. In contrast a we can specify our conceptualization *intentionally* by fixing "a language want to use to talk of it, and to constrain the interpretations of such a language in and *intentional* way." (Guarino et al., 2009, p.8) This can be done by *meaning postulates* Carnap (1956). For example we define that "to eat" in our previous example is reflexive and transitive. In other words an insect can eat an insect of the same type i.e. cannibalism. Also, if insect A can eat insect B, which can eat insect C, then insect A can eat insect C. Thus by *intentionally* specifying the conceptualization we have created an *approximate* specification Guarino et al. (2009), in contrast to the explicit specification we would get from specifying the conceptualization explicitly. Thus by specifying the conceptualization explicitly all assumptions will be made explicit.

References

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Guarino, N., Oberle, D., & Staab, S. (2009). *Handbook on Ontologies*.