

Methodological issues in developing ontologies (some thoughts)

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Language and ontology

Ontology is implicit in communication about a domain

- a set of concepts used by people talking, writing, etc.

How can we establish what these concepts are?

- how are concepts enfolded in language?

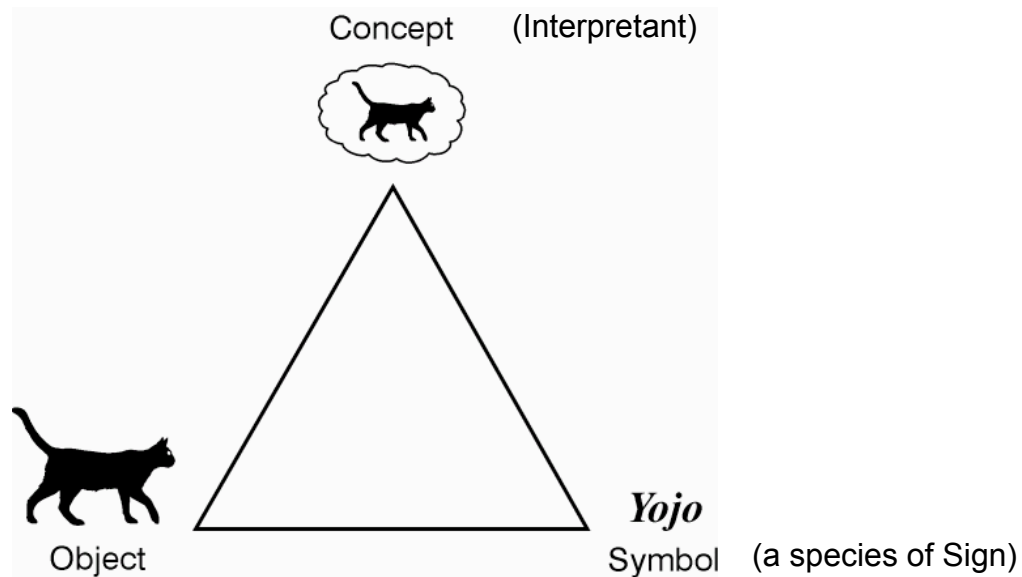
Semiotics: relationship between signs, objects and concepts

(Peirce)

- widely discussed, e.g. by Sowa

(<http://www.jfsowa.com/ontology/ontometa.htm>)

Peirce's view



A sign, or *representamen*, is something which stands to somebody for something in some respect or capacity. It addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign. That sign which it creates I call the *interpretant* of the first sign. The sign stands for something, its *object*. It stands for that object, not in all respects, but in reference to a sort of idea, which I have sometimes called the *ground* of the representamen. (CP 2.228)

Mentalism or externalism?

Peirce's view is mentalist

- speaks of *ideas* and *concepts*, which are unobservable
- mirrored in knowledge-elicitation style of approach to ontology construction

Alternative: focus on external aspects of language (and not just language),
i.e. the ways in which it's *used*

- following e.g. Wittgenstein (language games; “meaning is use”) ...
- or Wenger (communities of practice)

Question becomes: what is the system of communicative practices that
characterises the presuppositions of a domain?

- what distinctions are made?
- what are people doing?
- *why* are things done?

Externalist methodologies

Need flexible approaches to communication within and between different communities that can be interrelated

- automated assistance

Statistical methods, e.g.

- corpus processing (parsing, tagging, ...)
- latent semantic analysis

Tend *not* to involve an explicit formulation of a domain ontology

- but might form part of an ontology-derivation process

Are often aimed at a very linguistic level (“linguistic ontologies”)

- but might be abstractable to be more domain-oriented
- (are not easily made multimodal)

Still raise philosophical issues ...

- ontological relativity (Quine); “meaning relativism”

Purpose of the ontology

Commonly pursued e.g. through *competency questions*

- what questions (about the domain) will the ontology allow us to answer?
(Gruninger & Fox)
- can be closely connected to describing practice

But ...

- how sure can we be of which questions to ask in different domains?
- how are these questions interpreted with respect to different domains?
- ... and what happens if they change?

Again, important to avoid over-commitment and wide assumptions

- may have to allow for significant restructuring in the face of change

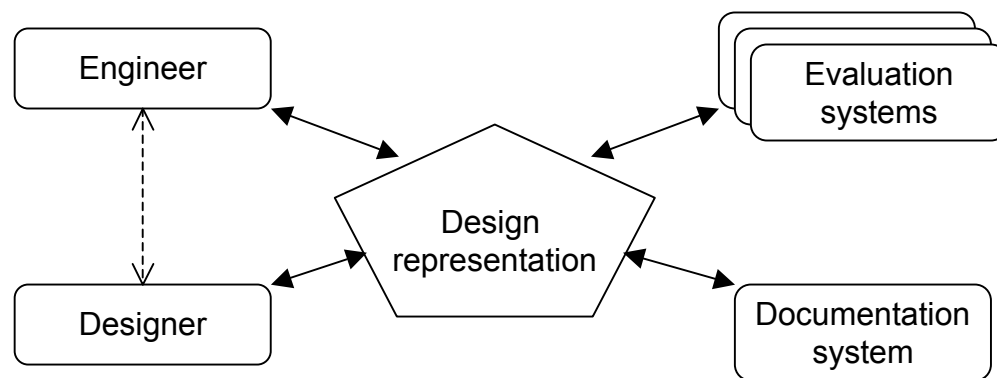
An old problem ...

How to devise representations for CAD and modelling?

- cf COMBINE work referred to in MoU

Issues of:

- recognising different representations of the same thing
- avoiding inflexibility in representations



... still unsolved

Ontologies are assumed to be part of a solution here

- standardisation of interfaces
- ... at the *semantic* level

But this inherits the problems of product modelling (or worse)

Maybe analogical processes (structure mappings) can be useful

- considered as categorisation processes * (Gentner, Holyoak)
- or in e.g. “conceptual blending” (Fauconnier)
- systems like OntoMorph (Chalupsky) seem to be moving in the right direction

* Ramscar, M, Lee, J, and Pain, H. (1996) A cognitively based approach to computer integration for design systems. *Design Studies* 17, 465-483.

Conclusion

Philosophically, ontologies might be seen as formalisation of
communicative practices

But we still have to interpret those practices

- into each other's terms and into the ontologist's
- by negotiation rather than resort to a common metalanguage

Methodologies for development need to be highly adaptive and embrace
new approaches to relating different formal systems