



SEMANTIC WEB SHOULD BE BASED ON WELL-FOUNDED ONTOLOGIES

AN INTERVIEW WITH NICOLA GUARINO,
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‘The Semantic Web as it is advocated by people like Tim Berners Lee and James Hendler does not take enough advantage of the experience built up in knowledge engineering and conceptual modelling. There is this anarchistic idea of the Web as a place where everyone can do his or her own thing. I have no problem with that; a lot of people are able to find what they want on the Web. But if you want real interoperability, with search engines that can grasp the intended meaning of information, that approach falls short. To create a real Semantic Web we have to develop and use well-founded generic ontologies, based on linguistics and logics.’

Nicola Guarino has clear views on the Semantic Web and its development. He is a senior researcher at the Institute for Cognitive Sciences and Technologies in Italy, where he leads the Laboratory for Applied Ontology. Since 1991 he has played an active role in the Artificial Intelligence community in promoting the interdisciplinary study of ontological foundations of knowledge engineering and conceptual modelling. Guarino: ‘In our Laboratory the focus is on content and not so much on representation. The use of ontologies is unavoidable when referring to content. People do it implicitly all the time when they are communicating and trying to understand each other. If we want machines to understand each other, in other words real interoperability, we need to make these ontologies explicit in an unambiguous way.’

An ontology is a hierarchical description of the relations between concepts in a certain domain plus an unambiguous description of the concepts themselves. As they are created for a certain domain, ontologies often fail to be interoperable, because of the ambiguity that results from the use of the same terms for different concepts (and vice versa) between different domains. The term ‘net’ for instance has quite a different meaning for Web designers and fishermen. That is why there is a need for well-founded generic ontologies. An example of a generic

ontology is the term ‘part’, which can have different meanings both within a domain and between domains. For instance, the violist plays a part in the orchestra. His finger is part of him. Can his finger be part of the orchestra? According to Guarino, this is a genuine ontological problem that can only be solved by giving an unambiguous meaning to the term ‘part’.

Another example, cited by Guarino, is the term ‘in’. What exactly are you describing when you say the spoon is in the cup? Does it mean that the spoon is totally embedded in the cup or is it only partly in the cup? Guarino: ‘These examples seem trivial, but if you want real interoperability between different knowledge domains you will have to prevent the problems that come with the ambiguity of day-to-day language.’

In this respect Guarino thinks it is a drawback that computer science curricula scarcely ever contain an introduction to ontological foundations of conceptual modelling. ‘Students learn all about Java, HTML and C++ and name all the other languages, and they also learn how to use these. But when they graduate they hardly know a thing about formal ontology. I really think people should know more about the work on ontology that has been done in philosophy. It is certainly not much harder to acquire than, say, studying differential equations, or learning how to use Java.’

It seems as if it is an enormous job to develop well-founded generic ontologies, but it is not as enormous a task as it appears. Guarino: ‘I would say that a few dozen would get you on the way nicely. But you have to take the fundamental route. At the moment development of the Semantic Web is driven by the need for short-term results. Hence, interoperability is realised by putting the right tags on the information. That is not what I call semantics; that is syntax. XML and RDF are very useful for this, but they fall short when you want to create a real Semantic Web.’

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