ONTOLOGY AND RELATIVITY

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Introduction

The fundamental problem of Ontology is how to describe the world. This problem has not yet been solved satisfactory.

Ontology is a *conceptual* description of the world. In general, Ontology deals with *concepts* such as being, existence, enterprise, operator, resource, demand, machine, order and the like, as well as with *relations* between these concepts and their *properties* (attributes). Thus, Ontology is a set of concepts rather than a set of words (dictionary).

In defining Ontology, computer scientists use the term *classes*. In a computing parlance Ontology consists of classes of *objects*, classes of *relations* between objects and classes of their *attributes.* We have at Magenta added an additional class, the classes of object *behaviours,* (which may be given in terms of rules, constraints or scripts). Ontology does not concern itself with instances of these classes, e.g. this or that particular being, or resource, or machine; or this or that attribute. In other words *values* of attributes of objects are kept outside of Ontology. The separation of conceptual knowledge from the details (facts, values) is a considerable advance in respect to the earlier paradigm of rule-based knowledge bases; it reduces the effort of constructing domain knowledge.

In philosophy, Ontology (from the Greek *ων = being* and *λόγος = word/speech*) is the most fundamental branch of metaphysics. It studies being or existence as well as the basic categories thereof, trying to find out what entities and what types of entities exist. Ontology has strong implications for the conceptions of reality (http://en.wikipedia.org/wiki/Ontology).

Buddhist philosophical view, articulated as early as 563 BC (Sowa, J.F. 1995, Top-Level Ontological categories, *International Journal of Human-Computer Studies,* 43, 669-685) has been that existence is a collection of mental and physical phenomena (Sitagu, Sayadaw, Nyanissara, 2004, *Abhidhamma and Vipassana*, http://www.triplegem.plus.com/dhamaj2.html). Perhaps even more importantly, Buddhist doctrine maintains that each individual may have a somewhat different perception of the world (which could be justified, to use current terminology, by the differences in sensor sensitivity, emotional makeup and cognitive capability of individuals) and therefore it is problematic to talk about an objective Ontology of a complex problem domain. Anyone attempting to solicit contributions to and validate results of building Ontology in practical situations must have experienced this phenomenon. As a rule, problem-domain stakeholders exhibit surprising differences in understanding various aspects of the problem they own. Therefore, in problem domains where a consensus on the nature of the problem cannot be achieved among stakeholders, there is a strong case for building a number of

Ontologies each reflecting a viewpoint of a coherent group of stakeholders (e.g., economists, engineers, marketing experts, employees) and then finding a way of merging these "partial" Ontologies into an overall problem domain Ontology.

Early Buddhist philosophical works also emphasised the importance of knowledge development and growth, that is, the evolution of knowledge. The notion of continuously evolving knowledge is particularly important at present when we experience a number of paradigm shifts related to the transition to Information (Knowledge) Economy (Rzevski, G. 2003, *On the Internet-Based Global Economy*, MADIRA Paper 002, Version 1.1, www.brunel.ac.uk/research/madira).

A rather primitive but widespread view of Ontology, as expressed on Ontology Works website (http://ontologyworks.com/what_is_ontology.php), that Ontology must not be any conceptual model of the problem domain but the model based on "reality", ignores the fact that we do not have access to "reality" except through perception of individuals.

Hypotheses

The speaker will argue that, since perception of reality depends on cognitive, emotional and physiological characteristics of individuals, and since perception of reality evolves in time, it is necessary to:

- construct ontology of a domain as a set of linked sub-ontologies, each developed collectively by a group of individuals with similar perceptions of the domain
- include into sub-ontologies mental attributes of domain stake holders

The approaches proposed above would move ontology-based multi-agent systems one step closer to the genuine self-organising, evolving paradigm.