Chapter II

Ways to View the World: A Standard Ontology as the Reality Framework and the World Code

Introduction

As a general science of the universe dealing with the most universal truths about all existence, an account of what there is in the world and the study of reality with its content, ontology has long had a critical import only for a small set of professionals. For the majority of researchers, not mentioning the non-committed people, it has been the realm of the occult, an esoteric domain of discourse, the region of most abstract reasoning, or the sphere of philosophical opinion. Today the field is rapidly increasing its audience and practical value. Maybe only a few people will call into question the importance of world models for such advanced knowledge domains as information sciences and computing technology. Increasingly, the universal science is identified with the life and soul of knowledge technologies and intelligent systems. The search for the **world description standard** as an exhaustive theoretical account and model of generic entities is becoming a research activity promising unprecedented advancements in the new cross area of science and technology. Particularly, this is important for creating knowledge systems of extraordinary performance, such as the emerging Semantic Web, implying the entire gamut of novel applications: knowledge management, intelligent databases, conceptual/semantic search and retrieval, software agents, speech and natural language understanding, e-commerce, and ubiquitous computing (Semantic Web Topic Hierarchy, 2007; Semantic Web Technology, 2007). Considering these design purposes, there are several technical requirements for building an ontology standard: expressivity, efficiency, scalability, compatibility, extensibility, and relative simplicity. But

the most significant prerequisite appears to be its consistency with existent commonsense models of the world and scientific learning.

From a commonsense position, the whole world usually is viewed as consisting of several sorts of things:

i. Those that exist (objects)
ii. Those that take place or done (events or actions)
iii. Those that organize all the content (relationships).

In the way of the classification, it is commonly suggested: (i) that objects are in space as events are in time; (ii) that physical objects possess properties occupying different states over time; (iii) and that they are in a relationship with other objects undergoing changes through their properties and states, whereby being involved in some processes. Also, it generally is thought that events have the power, force, or tendency to be connected with other events as their effects, consequences, outcomes, or results. Following this general belief, modern professional researches are leaning to describe the concrete things, or named factual items, as objects (existing actually or mentally); parts, kinds and structures of objects; properties of objects; states of objects; changes of states of objects; processes occurring in or with objects; or complex systems of interrelated objects or processes (Bunge, 1977; Bunge, 2006).

To adhere to the established tradition, information sciences and computing ontology researchers tend to define their subject matter as the study of the ways things are: the kinds and structures of objects, properties, events, processes and relations providing a definitive and exhaustive classification of all entities in all parts of being, in every realm of reality (Smith, 2003).

In the way of methodology, there is another common trend widely practiced in designing a standard ontology: a cumulative approach marked by adding one model to another with a view that merging, aligning, and fusion of different conceptual models somehow will end up with an accumulative effect (Sowa, 1997; SUO, 2004).

In fact, to incorporate and integrate a set of generic and domain ontologies into a single and consistent whole as a comprehensive ontology library, a more fundamental approach is required. This is nothing less but formulating a universal theory of reality capable to give clear resolutions for such cardinal issues for any knowledge system:

- What is the World (Reality, Universe) of things?
- What are its basic features and contours or which ways are its things?
- What key categories, classes and rules determine the world's content and structure and behavior?
- How are all the things in the world ordered by such ontological classes and rules?
- What should the intelligent software system know about the world?
- What are the ultimate categories and meanings of reality and how should they be represented by knowledge systems?