Chapter IV

What Makes Reality:
Ontological Classes and Rules

Introduction

The ultimate purpose of standard ontology is to describe and represent all the things in the world in comprehensive and consistent ways, whereby making the fundamental knowledge explicit to the formal reason of semantic systems and cognitive agents, natural, or artificial.

To build such a formal universal framework capable of including the representation of anything, one can design a general system that includes a set-theoretic (logical) ontology constructed as a formal logical system composed of its objects-primitives (classes, individuals, and properties), logical syntax (notation techniques, formation and transformation rules), and formal semantics (model theory), as currently the Semantic Web formal languages and upper ontologies usually are constructing.

On the other hand, one can design a general system presupposing the content ontology of everything and real semiotics constructed as a unified account of things, which real meanings grounded in the world itself, kept in the mind and encoded in the cultural artifacts as the natural languages and knowledge systems. Unlike the formal ontology, the content ontology is marked by caring the real entities, underlying constraints, principles, truths, and strategic rules. Accordingly, its goal is to formulate the overall patterns and fundamental laws of the universe, while the practical role is to set the world models, rules, and reasoning algorithms, or advanced information technology or ontological semantic technology. Such technology implies the real semantic system which equals to the structure:

The Real Semantic Web = Sign (symbol) system (the SW languages, UFO, Natural Language) + axioms (ontological, mathematical, formal logical) + rules (ontological, semiotic, logical) + intelligent actions

The core of the real world semantic technology is formed by the underlying axioms about reality:

- The world or reality or universe exists
- There are entities or things or beings in the world
- Entities have properties; entities have parts
- Entities stand in relationships
- Causality shapes the world and its behavior
- There are space-time relations
- Things change over time
- Entities exist as substances, states, processes, and relationships
- Substances have masses and occupy spaces; etc.

This suggests that the crucial issues of reality modeling and representation, what classes of things compose the world and which rudimentary truths, rules, and principles constitutes its essence, are among the key topics of the master content ontology, formulated as a single categorical code for all reality, superseding the multiform logical ontologies reflecting numerous personal world views, particular mental attitudes and beliefs.

The Pillars of Reality Modeling

There are two great sciences with an unlimited scope and range of investigation, without which no knowledge domain can exist and achieve. One of them is a real science of Ontology, another one is a formal science of Logic. The object of knowledge of ontology is entire reality as the being of everything which exists, with its fundamental truths or axioms of existence, while substantial knowledge as physics and mathematics are concerned with some aspects of the world, as substance (matter), change (energy), or quantity. Unlike ontology, formal logic is concerned with the entirety of discourse about anything or everything, mostly valuable in a codified representation of human knowledge, but useless for generating new knowledge and truths about the world.

So the scopes and subject matters of Ontology and Logic, under the headings of which the computing ontology and Semantic Web activities currently are performed, should not be mixed. The real semantics or meanings of any symbolism or notations or signs are defined by ontology; for this is the only knowledge domain studying the Being of Everything which is, happens and connects. Ontology is a real science and Logic is a formal science because of the latter is concerned only with the formal parts of Discourse about Anything or Everything. Logic considers the elements (the terms, propositions, inferences or syllogisms) of the whole discourse aside from their reference to the world (or their real meanings and significance). And as a formal science, it deals with the formal patterns of discourse common to all sciences.

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