Computability of Reality as an Unfulfilled Dream

YUKIKO OKAMOTO, TOKYO

I Introduction

(1) Cyber-ontology[1]

Ontologies are now said to be an important technology for the Semantic Web, even indispensable for facilitating the current Web2. Such ontologies can be called "information systems ontology" in contrast to "philosophical ontology" (Smith&Welthy 2001, iv). Here I employ the name of "cyber-ontology" in order to emphasize this contrast.[2]

In information science, databases have been developed in quite different areas, for example, in law, medicine, commerce, genetics, geometry, or various kinds of archives like historical material, architecture, cultural heritage, everyday commodities like apparel, foods, cars and so forth. Although any kind of database appears to be represented by its own ontology, there has yet been no unification of ontologies. A semantic web construction should be required to integrate such a huge chaotic congregation of databases for general usage. The system should support new programs, for instance the ontologies alignments programs, or it would need to be provided with expanded and deepened ontologies in order to manage with such enormous strata of databases. Recently, in fact, within the development of a merging technology of ontologies, "large real life ontologies" are called for because "they are necessary for better evaluations" of ontology alignments (Lambrix and Tan 2007, 199).

Just as in the history of their growth, the practical and social demands of information science for their more general usage, system integration, interoperability and so on make the cyber-ontologists "look beyond the artefacts of computation and information to the big wide world". (Smith & Welty 2001, vi).

Leaving aside the question of what kind of benefits from the theories of philosophical ontology the cyber-ontologists enjoy or will be able to enjoy, it seems to be important that the information systems ontology is featured as "an enormous new field of practical application that is crying out to be explored by the methods of rigorous philosophy" (Smith & Welty 2001, vii)

(2) Unfulfilled dreams

Probably anyone who is currently engaged in the knowledge technologies or ontology engineering could scarcely be expected to accomplish a perfect reconstruction of reality itself. A perfect computability of reality might still remain a dream for cyber-ontologists at present even from a technical point of view. However, where there emerges an idea to build a common world ontology that may serve the Semantic Web, it becomes a pressing demand rather than just a dream.

The history of the theory of knowledge in philosophy tells us that to attain a perfect foundation for knowledge or absolutely transparent structure of human consciousness of intellectual activities that culminates into "the ideal of total clarity" or "the ultimate intelligibility", is an unfulfilled dream of philosophy in a sense. Without exploring the structure of knowledge or our knowledge of the world we live in by analyzing at least our consciousness or linguistic activities, we might be unable to acquire the perfect list of entities in the world with their properties and relations, or to search a transparent mechanism of our knowledge-based activities.

Also, if cyber-ontologists intend to capture all the entities and events with their properties and relations into their databases, they should primarily have the entities and events as their objects and rewrite them into formal languages in order to control them. Computability of reality, in short, fundamentally depends on how far we can attain the "ultimate intelligibility" of reality and our experience of it. It then seems to be suspicious that cyber-ontologists might not share such philosophical dreams as I just mentioned.

But what are the issues to be discussed here, if not technical ones? (Technical problems shall be solved technically, for instance as in a technology of merging ontologies.)

First, as to the computability, there are questions about language and objectification from a philosophical point of view.

Secondly, with regards to the dream, we must take a glance at the question of whether the knowledge of "knowing how" could thoroughly be converted into the "knowing that". By means of the objectification, if all our "knowing how" to cope with things could be converted into "knowing that" knowledge, a highly facilitated "large real life ontology" could be built as cyber-ontologists dreamed (Lambrix and Tan 2007, ibid.).

Without question, a total conversion is unthinkable because of our limited capacity. Cyber-ontologists appear to lose plausibility at the beginning. Is it really so? Hopes and dangers may both grow out of this gap between dreams and our limited capacity. Here the question of what would remain uncontrollable that makes the dreams remain unfulfilled at the start is left for philosophical discussions.

II Collaboration

(1) Cyber-ontology and philosophy

Taxonomy and epistemological conceptualization seemed to be the primary concern of the information scientists who wanted to look into philosophical tradition. Taxonomies with relations between objects and restrictions to control possible relations might well grow into an information systems ontology. In this respect, for them the point of the collaboration of information technology with philosophy turns out to be the question of how philosophy can be useful for the information systems ontologies.

J.F. Sowa already in 1984 presented knowledge-based systems, elaborating the graph technique of conceptualization of ordinary language in order to formalize its general, practical aspects. His book proved to be one of those of epochal importance in the meaning-oriented development of knowledge engineering that resulted in an ensuing growth of information ontologies. He aimed to give ontology of "not all the things that exist in the real world, but of the entire thing that may be imagined in the mind", i.e. "a catalogue of modes of existence" (Sowa 1984, 173,361). His ways of consulting philosophical insights were not ad hoc, but systematically developed from Aristotle to the twentieth century's philosophy, naturally with inclination towards analytic, linguistic and logical theories. In this context, for example, he several times referred to Wittgenstein's concepts of "family

resemblance" or "language game" as useful in defining the meaning of a concept as the set of all its possible use (ibid. 15-17).

Even in recent investigations, Husserl is quoted particularly with regards to his logical theory of the relationship of part to whole, a mereology (Saito 2006; Mizoguchi 2004; McGuinness 2003, 183).[3] Cyber-ontologists here in a sense appear to share a philosophical dream to attain the total clarity of knowledge construction with philosophers like Husserl.

As we have just mentioned, taxonomies from philosophical ontology, or inference theories from Logic, or some significant phases of philosophy of language, or any forms of logical semantics may well benefit cyber-ontologists. The trends would become the clearer, the more the information ontology techniques are pressed for improvements in order to provide us with an amenity of Web life.

(2) The basics of the issue

These days, collaborations appear to be promising and an inclination to utilize the fruits of philosophical ontology dominates the knowledge engineering fields. But it is not only to study our forerunners' works, and we should go back to the basics of the question of computability of reality. Then we could handle the real issues concerning cyber-ontology.

At a glance, the question of computability of reality may be a question of language by means of which the description of the events and entities in the universe is possible. It appears to be the question of to what extent we can rewrite all the linguistic representations of the objects available for machine readable languages (the question of formalization) and what the relationships between such computable languages and natural language (the question of language processing) are, together with that of whether natural language could exhaust our way of life in principle. Any representation of the objects presupposes our linguistic as well as cognitive abilities.

Each of these issues is to be discussed for their own sake. But the fundamental matter for ontology is to solve the question of what there is or what is given to us as objects.

Thus, the more fundamental and essential problem here is that of objectification of entities with their features, events and relations in the world. Specifically, it is the question of whether anything capable of being manipulated by us could really be explicitly objectified. The question is answered

negatively. This is because our language use and manipulation of things are not only limited, but also only possible against the background of vast implicit meaning strata.

Particularly in the field of information science, all the efforts of objectification of what existed in the world aim to transform them into our resources. Although those efforts would banish ambiguous elements for the sake of explicit manifestations in order to construct a relatively closed semantic network, such cognitive deliberations themselves depend upon the implicit background of meaning full of obscurities with unarticulated existential situations.

III Differences

(1) The difference in attitude

In fact, philosophers like Wittgenstein or Husserl went on to penetrate into what was not explicitly articulated and tried to show it as an ineffable ground.[4] Wittgenstein revealed the ground of certainty. Husserl elucidated fundamental passive layers that underlie our perceptual as well as cognitive experience of objects. In this sense Husserl's theory of constitution and meaning (of objects) involves ontology. Here we should realize a crucial difference of attitudes between cyber-ontology and philosophical thinking. Philosophical thinking penetrates into what were implicitly presupposed and what were mostly forgotten in our everyday cognitive or linguistic activities. Cyber-ontology consciously or unconsciously remains indifferent to these implicit strata. Or it can be said that in principle information science depends solely upon explicit representations.

There might be many philosophical ways to deal with these problems. Among them, phenomenological approaches have been often and profoundly tackling these topics as their recurring themes. But, Heidegger's thoroughgoing criticism of technology appears to provide us with ever more fundamental and clearer perspectives to see the issue of objectification for today's complicated information world we now inhabit.

(2) The difference of approaches

There is a great difference in attitudes between information scientists and philosophers as mentioned above. They, however, partly share the approaches to the objects when they start from what is explicitly given to the mind.

Husserl's method to analyze the objectification is philosophically subjective and idealistic. But primordial passive strata or implicit background of our objectifying acts are apt to escape from any kind of subjective analysis and refuse explicit, verbal representations. To consult Heidegger's criticisms of technology means rather a decisive changeover of approach from the subjective looking (objectifying acts) into what are given to the mind to the listening to "Dasein" (being-there).

This is because it gives us, by its selfless "Hören", the understanding of what is hidden from our eyes and where the urgent philosophical problems concerning information technique are. It also seems to make us face the real danger of modern technology that resides in our unawareness of the existential disembodiment (Hillis 1999, 235) when we become accustomed to this powerful tool.

(3) "Dasein" and "equipmental whole"

Dreyfus gave a detailed and lucid description of "an equipmental whole (the totality of equipment)" in which "Dasein" dwells (Dreyfus 2006, 34-41). According to his interpretation, "Dasein" as "Being-in-the-world" is "transparently" coping with the things that belong to "an equipmental whole" (ibid.), i.e. equipment in the broadest sense to include anything useful, like tools, dwellings and so on. We encounter with those things as "readiness-to-hand", for example, equipment for writing (*Schreibzeug*) which is "always in terms of its belonging to other equipment: ink-stand, pen, ink, paper, blotting paper, table, lamp, furniture, windows, doors, room" (SZ 68f.). These things are placed within the constellation of the equipmental context. This state of "Dasein" is characterized by "an absorption in the world" in the manner that we dwell within such equipmental context and would not explicitly thematize or even be aware of it unless a piece of equipment is missing or breaks down.

To objectify a piece of equipment means to isolate it out of its context of the whole network and its formalization implies a sort of disembodiment, uprooting it from the background that makes it alive. Our coping with the things we encounter in our world is our "knowing how" to live in our ordinary world of equipmental whole. The concept of "knowing how" indicates this state of "Dasein" that knows how to cope with things around it fundamentally naturally. The concept of "knowing that" on the other hand implies the objectifying acts of something as its knowledge or resources.

(4) VR as an objectification

In contrast to the Dasein's absorption in the world, theoretical observation of the world would be objectifying whatever is relevant to the theory, isolating of names, concepts, properties of entities, relations between concepts from the totality of equipment and make them all into building blocks of theory. Intelligent space of a knowledge-based Semantic Web also requires such building blocks as concepts, instances, types of relations and axioms as the components of ontologies (Lambrix and Tan 2007, 184). Furthermore, those ontologies would be unified by means of the alignment techniques in order to attain an approximate 'real life' ontology. The theoretical objectification at issue here leads us into the undesirable situation.

Since "Dasein" is an inseparable single unity of "self and world", objectification of things, their properties, concepts, relations and so on would imply converting our coping with things into "knowing that". The transformation of our coping skills from "knowing how" to "knowing that" means not merely to isolate them from their background but also to reduce them to flat knowledge i.e. disembodiment. While we enjoy the highly facilitated amenity of Web life, we could be almost unconsciously deprived of our natural sense of spacio-temporal distance within tele-interactions (Dreyfus 2001, 60). While we are immersed in virtual reality (VR), we could easily forget how to cope with real things in our primary world. We might be unaware of how far we trespassed upon our natural sense of dwelling within the external anchored world. I think real danger lies in this unconscious situation and our forgetfulness.

Here we would face a danger of which Heidegger warned us about decades ago.

IV Dangers

The concept of "Ge-stell"[5] would help us to understand this danger. In the first place, according to Heidegger's criticism, the "Ge-stell" is the essence of modern technology (VA 26).

This celebrated concept from "The question concerning technology" (*Frage nach Technik*) sometimes bewilders us. Not only does it frequently occur in Heidegger's phrases of sharp criticism against modern technology, it is also employed to explain modern technology to be our destiny and suggests the time of salvation that comes to us in the very center of the crisis caused by technology.

In my interpretation of the concept, "Ge-stell", there is something that hinders us from seeing our primordial relation to the truth, as our primordial way of being. It may be a driving force imposed upon us to go on developing further and further, exploiting nature and earth, transforming them into our resources (by objectifying them), and at the same time disfiguring ourselves also into resources.

It is our inherent inclination rooted deep in us as cultural being and having intelligent existence. While we remain unaware of these, it won't cease to be our destiny that is inevitable. It might deprive things, human beings, or natural beings, of their "dignity" and their own existential significance. Therefore it can be called "the violence of modern technology" (Young 2002, 44).

However, technology itself is not the danger at all. "The Ge-stell", "the essence of technology, as a destining of revealing" turns out to be the danger (VA 29, English trans. 333). In my view, as we are destined to develop modern technology by revealing Nature, it would be our responsibility to understand that we are apt to forget about such destiny and about how far we have gone beyond our primary world by means of theoretical objectification as in the case of our investigation of cyber-ontology here. Creating a cyber-space is not itself a danger, but that we would easily become unaware of the disembodiment of VR. The real crisis of disembodiment in VR does not lie in the VR technology itself or in information systems ontologies themselves, but in the "Ge-stell", our inclinations that drive us to achieve it indifferently to our natural sense of existence (existential anchors)[6].

We are inclined not to listen to what is heard, but to cling to what we explicitly see and what we constructed even if they are fake rather than the given basis upon which all our constructions are possible. Cyber-evolution

is still halfway to the actualization of the dreams of human intellectual subjectivity but it represents an integration of the enormous fields of our "knowing that" originated in the history of philosophy.

Philosophy may help the information systems ontology. Furthermore it may be useful particularly in constructing real life ontologies, serving them with logical formation techniques and conceptual analysis or even with incremented insights in semantics and pragmatics etc. However, in my view, these might well be important but not yet authentic tasks for philosophy. It seems to be the authentic tasks for philosophy to continue to question the meaning of the cyber techniques for us and then to scrutinize the essence of technology and its danger we face as well as the salvation we long for.

V Conclusion

(1) On the computability

One of meanings of discussing the computability of reality is to reveal what was forgotten from any explicit conscious reconstruction of reality in a cyber space. Oversimplification aside, in some sense, all cyber technologies are reduced to mere operations on symbols acquired by means of digital objectification that entirely depends on explicit representations.

Another would reside in the following matters. Possible collaborations with philosophy in the fields of cyber-ontology might have been shown, with a shared unfulfilled dream of a perfect reconstruction of reality or the ultimate intelligibility on the one hand, but there emerged fundamental differences between them on the other. Here we could find authentic philosophical tasks.

One of the tasks would be to continue questioning the meaning of the forgotten existential relationships with things within the primary world or about the significance of natural sense of distance that tele-interactions have extinguished. These forgotten implicit strata could not be visible in principle to the eyes of cyber-technologists, still they are the basis for our existence, as an anchor. Heidegger would warn us of the danger that we might well forget how to cope with the real things with flat knowledge. He advises us to hear not what is expressed in the utterance but "unintelligible words and not a multiplicity of tone-data" (SZ 163f.) (from what we are

existentially anchored in). Heidegger suggests in his message that salvation comes from our "questioning" (VA 36). "We look into the danger and see the growth of the saving power" (ibid. 34).

(2) The task of philosophy

Another task turns out to be to find the road to salvation. What is the danger of the cyber-world as a result? It might be caused by the replacement of absorption in the primary world with the immersion into the virtual reality like the amenity of current Web2 from time to time. An entire replacement is apparently impossible. But partly we may consciously or unconsciously replace our sense of dwelling in the world with the feeling of amenity in the virtual world.

In this connection, alternative world disorder, ADW (Heim 1998, Chapt. 7)[7], may well take the form of an intellectual disease of communication disorder caused by those replacements.

Although a new kind of ADW has not yet shown up as a serious disease precisely identified, the crisis looms large whenever we forget our existential anchor and cease to question the meaning of our own intellectual development.[8]

If we could hear the voice from our own existential situations ("Dasein" in a "selfless" mode), we might be free from our destiny and face the danger. I hope it proves to be a kind of salvation, though I am not sure about it

Acknowledgements

I am grateful to all the criticisms and comments made on my draft before and after the session and also questions and interests addressed to my presentation during the session at the 30th International Wittgenstein Symposium.

References

Campbell, K 1981, 'The Metaphysics of Abstract Particulars', in French, P.A, Uehling, T.E and Wettstein, H.K (eds.), *Midwest Studies of Philosophy VI – The Foundations of Analytic Philosophy*, pp. 477-488.

Dreyfus, H 2001, 'Telepistemology: Descartes's Last Stand', in Goldberg, K (ed), *The Robot in the Garden*, The MIT Press, Cambridge, Massachusetts, pp. 48-63.

Dreyfus, H 2006, 'Availableness and Occurrentness', in Stephen Mulhall (ed.), *Martin Heidegger*, Ashgate, Aldershot, pp. 25-53.

Heidegger, M 2000, 'Frage nach Technik', in his *Vorträge und Aufsätze in Gesamtausgabe Band 7* [VA], Vittorio Klostermann, Frankfurt am Main, pp. 7-36. (The English translation: Krell, D.F 1993, 'The question Concerning Technology', in *Basic Writings*, Krell, D.F (ed.), Routledge, London, pp. 311-341.)

Heidegger 1962, *Being and Time*, translated by John Macquarrie & Edward Robinson, Blackwell, Oxford.

Heidegger 1967, *Sein und Zeit* [SZ], Max Niemeyer, Tübingen.

Heim, M 1998, *Virtual Realism*, Oxford University Press, Oxford.

Hillis, K 1999, *Digital Sensations*, University of Minnesota Press, Minneapolis.

Husserl, E 1966, *Analysen zur Passiven Synthesis* [APS], Fleischer, M (ed.), Martinus Nijhoff, Den Haag.

Husserl, E 1968, *Logische Untersuchungen, Zweiter Band*, Max Niemeyer, Tübingen.

Husserl, E 1973, *Experience and Judgment* [EU], Landgrebe, L (ed.), translated by J.S Churchill and K Ameriks, Northwestern University Press, Evanton.

Lambrix, P & He Tan 2007, 'A Tool for Evaluating Ontology Alignment Strategies', in Spaccapeitra, S (ed.), *Journal on Data Semantics VIII*, LNCS 4380, Spinger, pp. 182-202.

Malpas, J 2001, in Goldberg K (ed.), *The Robot in the Garden*, pp. 108-124.

McGuinness, D. L 2003, 'Ontologies Come of Age', in *Spinning the Semantic Web: bringing the WWW to its full potential*, Fensel, Hendler, & Wahlster (eds.), the MIT Press, Cambridge, MA, pp. 161-184.

Mizoguchi, R 2004, *Ontology Engineering*, Ohmsha, Tokyo.

Saito, N 2006, 'Husserl and the Question of Ontology', *Proceedings of Presentation of the 28th Symposium of Japan Society of Phenomenology*, Tokyo.

Simons P. 1994 'Particulars in Particular Clothing: Thee Trope Theories of Substance', in *Philosophy and Phenomenological Research*, Vol. LIV No. 3, pp. 553-575.

Smith, B & Welty, C 2001, 'Ontology: Towards a New Synthesis', in Smith and Weltly (eds.), *Formal Ontology in Information Systems*, The Cliff House, Ogunquit, Main, pp. i-ix.

Smith, B 2006, 'Part-Whole', in B Smith & D.W Smith (eds.), *The Cambridge Companion to Husserl*, Cambridge University Press, Cambridge, pp. 463-485.

Wittgenstein, L 1967, *Zettel*, Anscombe G.E.M and von Wright G.H (eds.), translated by G.E.M Anscombe, Basil Blackwell, Oxford.

Wittgenstein, L 1979, *On Certainty*, Anscombe G.E.M and von Wright G.H (eds.), translated by G.E.M Anscombe, Basil Blackwell, Oxford.

Young, J 2002, *Heidegger's Later Philosophy*, University Press, Cambridge.

Zúñiga, G. L 2001, 'Ontology: Its Transformation From Philosophy to Information Systems', in Smith & Welty 2001 (eds.), pp. 187-197.

Notes

1. In the following, I will employ "cyber-ontology" instead of "information systems ontology" wherever philosophical issues come to the fore.
2. Ref. Zúñiga, 2001, 189. It is the question of what philosophical ontology can add to information ontology.
3. Husserl's investigations into the theory of part-whole relations (mereology) in his *Logical Investigations* (Husserl 1968) could be reinterpreted not only in the broader context of modern ontology (for example in the context of "the trope theory" in metaphysics) but also from the perspective of information systems ontology. Ref. Simons P. 1994; Fine, K 1995; Campbell, K.1981. Though this topic attracts us even in our rough sketch of philosophical thinking, it has to be revealed from its own vistas of research and requires further elaborations and discussions.
4. For instance, there are celebrated concepts which Wittgenstein elaborated on the theory of meaning and radical investigations into pre-linguistic strata which later Husserl revealed especially in his last two decades. Not to mention the concepts of "forms of life" or "world-picture" which are said to be deeper than language-games (OC sec. 94, 167, 204), Wittgenstein also talked about some sorts of pre-linguistic primitive behavior on which language games were based (Z sec. 541). As for Husserl, I should at least like to refer to

his notion of "genetic logic" in the context of the analysis of passivity in his APS that resulted in the studies on fundamental ground of pre-predicative meaning (APS Part 1, Appendix B, etc.; EU Part I). But, there always remain issues around these concepts left for future discussions.

5. I employ this word instead of the standard English alternative "emframing" in order to make its connotation clearer.

6. The anchor here represents partly the fact that any forms of Internet technology must "depend on the integrated, place-bound character of our involvement in the world" (Malpas 2001, 118).

7. In fact, Heim's AWD (Heim 1998, Chapt. 7) appears to be no larger a threat to us, because simulations and huge machinery facilitated for VR art that were considered to cause AWD could not pervade our everyday life. Within the ordinary everyday life world we encounter them just as obtruded special spots for entertainment or mechanical training. They seemingly handed over their banner of cyber-evolution to the Internet.

8. In this connection, I refer to the questionnaire entitled "Are you a portable phone addict?" (the title could also have been "On digital interactions") in a Japanese newspaper in January 2007. The number of students questioned was 131, mainly from the age of 18 to 24 and only a few were over thirty. Students answered 5 questions with their own free remarks, as many as they liked, but within less than 15 minutes. The time-limit was set to ensure candid opinions. The relevant parts of the results are the following. The answers are sorted into typical remarks (figures represent the number of answers).

   (1) "What do you think of the difference between digital and analog dialogue?"
   - Analog: has actual voice and expressions on face and looks. 88 (88/131 67%)
   - Digital: is a superficial world with mere machine letters, 29 (22%)
   - or a fake world without real coherence. 10 (8%)
   - Digital: one has the advantage to keyboard anything without hesitation. 26 (20%)
   - Digital: It is easy to pretend or disguise the feeling in digital communications. 15 (11.5%)

   (2) "How can you characterize the reality of dialogues?"
   - face to face (understanding of the feelings from the expressions, voice, and behavior). 123 (94%)
   - with the feeling of existence. 14 (11%)
   - within situations to be able to know the others' real intentions. 13 (10%)

   (3) "What do you think of the characteristics of the digital relationships?"
   Negative remarks:
   - They are superficial and fragile. 53 (40%)
   - There is no sincerity by digital mails. 26 (20%)
   - It is a fake world without real coherence. 18 (14%)

   Affirmative remarks:
   - It is an advantage to keyboard use without hesitation. 10 (8%)
   - It is easy to pretend or disguise feelings. 37 (28%)
   - Other comments: they are out of normal orders without normal contexts.

   The majority of answers were negative remarks, although all the students use portable phones frequently. It can be said that they engage in digital interaction so

often that they realize its deficiency intimately. They find deficiencies mainly in the mental aspects of digital interaction rather than in its practical achievements. Their remarks may mean that they dwell within the real world and maintain their sense of existence. But the danger emerges that the digital world comes to surpass gradually the real world through its social effectiveness.