Information System Concepts based on semiotics and ontology: The FRISCO Approach

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Abstract

In 1998 the IFIP task group "FRamework of Information System COncepts" (FRISCO) published its report "Framework of Information System Concepts"[1]. This report is a first step towards a well founded, general theory of Information Systems (IS). Four features make the FRISCO approach unique in this field: (1) Its close relation to philosophy, (2) its semiotic basis, (3) its "world view" (general ontology), (4) its layered structure.

In order to be successful, the Semantic Web approach needs integration by a common, agreed basis uniting the "ontologies" of its disciplines (e.g. banking, insurances, transport, tourism, etc.). The FRISCO approach is a good candidate for such a basis since it goes beyond the common, pure technical view of information systems by adopting a well-founded, interdisciplinary, socio-technical view.

The FRISCO report

The FRISCO report comprises a general introduction and overview of the approach called "a line of reasoning", a tutorial exposing the philosophical and linguistic background and the core concepts of the framework, a formalisation of most of the concepts using a logic-based language, a sample case demonstrating the application of the defined concepts, and reflections of several authors on the work being done and their personal views on it.

The semiotic basis

The FRISCO group has extended the well-known semiotic triangle to a *semiotic tetrahedron* placing an "actor" in its centre und thus emphasising his or her central role in all sign processes (cf. [1], ch. 3). The other three corners stand for *representations (*entities of the *symbolic world), conceptions (*entities of the *mental world), and referent*s (entities of the *natural or mental world* referred to by conceptions and representations). *Conceptions* play a key role in the whole approach since all core concepts are based on it. This reflects FRISCO' s constructivist general view.

FRISCO's ontology

The FRISCO group has solved the terminological circularity problem by starting with an overall *ontology* - in singular form, as in the traditional philosophical context of the term. A couple of basic assumptions reflect the general *world view* of the FRISCO authors. This might be a good starting point to bridge the gap between different interpretations of the term "ontology" in philosophy and computer science where it is now abundantly being used (mostly in plural form) to designate standardised vocabularies of certain disciplines.

Layered structure

In its present form, the FRISCO vocabulary is grouped into the categories *static kernel concepts, dynamic kernel concepts*, and *system level concepts*. This order constitutes a layered structure which is being refined and sharpened by the present revision of the report (cf. [2]).

Conclusions and consequences

The Semantic Web initiative has to deal not only with technical requirements and communication problems but also with (well justified) questions concerning its foundations and its relationships to basic disciplines like philosophy or linguistics. FRISCO has built a (single) world ontology in a well-founded philosophical context. This makes it a good candidate for combining and uniting more specialised "ontologies" of a Semantic Web.

References:

[1] E.D. Falkenberg et. al.: FRISCO - A Framework of Information System Concepts - The FRISCO Report. IFIP WG 8.1 Task Group FRISCO. Web version: ftp://ftp.leidenuniv.nl/pub/rul/fri-full.zip (1998)

[2] W. Hesse, A.A. Verrijn-Stuart: Towards a Theory of Information Systems: The FRISCO Approach, in: H. Kangassalo, H. Jaakkola, E. Kawaguchi (eds.), *Information Modelling and Knowledge Bases XII*. IOS Press, Amsterdam 2001, pp. 81-91.