Internal Representation of Knowledge in an Interactive Multimedia System with Encyclopaedic Vocation

Abstract: The work we present is done in the framework of a research project of ERSICO team, on the development of an information system characterized by the points cited in this communiqué's title, and elaborated by means of a methodology of cooperative development (Vidalenc 1996). The particularity of our work lies on the decomposition into two knowledge representation spaces: notional or internal, sensitive or external (Vidalenc, Bouzidi 1997). The notional space corresponds to the internal representation of knowledge. The sensitive space rises from perception and corresponds to visual and sound elements. By the way of staging it allows the user to access the information of the Encyclopedia. The notional space, that of organized knowledge, is independent from the visual representation of the sensitive level; that what distinguishes it from the actual multimedia applications, where the dependence between internal and external space is narrow.

We are particularly interested in the internal space where we record more or less formalized knowledge in a knowledge-based system. We use it as a tool of representation of knowledge, the "object" model. Our objects correspond to complex, pluridisciplinary knowledge. They are considered as logical, mathematical objects. Thus they need to be represented by the way of appropriate knowledge structures. We use for this the frames of Minsky and the scripts of Schank. The first one corresponds to the "point of vue" principle: frames represent "situation", including presumptions. Scripts concern events defining stereotypic situations. We distinguish four dimensions for our complex objects according to the specialized points of vue and in order to record knowledge. The structural dimension which lies on mereology system (the only primitive element of which is "part-of") of Lesniewski. This system in the Lesniewski theory allows the manipulation of collective classes constituted by "Discourse Objects". These objects do not constitute distributive classes, so they cannot integrate a set based organization. We are particularly interested in the relationship "has-a" which refers to an object as the class of all its ingredients (i.e. elements which compose it). The functional dimension, in which an object is described by what it does and how it does it. The relational dimension following which we are interested in all objects entering in interaction with the considered object, by means of ternary relations. The dynamic dimension lies on chronological relation (temporal order relation) and describes evolutive and operational aspects of the object. Our poster will make these points clearer, and will give more details particularly on structural and functional dimensions, by considering the "telephone" and the "telephonic-network" objects.

References

Advances in Knowledge Organization, Vol.6(1998)