6

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Semantic Configuration Model with Natural Transformations.

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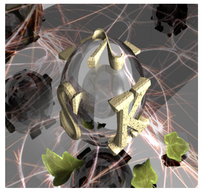

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SUMMARY

In the present work, efforts have been made to create a configuration-based approach to knowledge extraction. The notion of ranularity is developed, which allows fine-tuning the expressive possibilities of the semantic network.

INTRODUCTION

As known, the central issues for knowledge-based systems are what-in-a-node and what-in-a-link. As shown, the answer can be obtained from the functor-as-object representation. Then the nodes are functors, and the main links are natural transformations. Such a model is applicable to represent morphing, and the object is considered as a process, which is in a harmony with current ideas on computing. It is possible to represent information channels that carry out the transformations of processes. The possibility of generating displaced concepts and the generation of families of their morphs is shown, the evolvent of stages of knowledge and properties of the process serve as parameters.

APPROACH

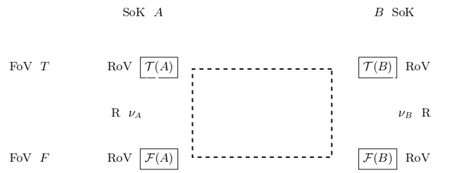

Fig. 1. Configuration. (Abbreviations: *SoK* – Stage of Khowledge, *FoV* – Field of view, *RoV* – Reflection of View, *R* – doing Reflecting; A, B – stages, T, F – properties, $\mathcal{T}, \mathcal{F}$ – functors, ν – natural transformation.)

METHODS

1. Representing an object as a system: To solve some cognitive tasks, an object must be depicted as divided into elements.

2. Constructing an object as a system: When solving practical problems, special objects are built. They are built from a set of parts according to a special `project-image', which guides the `constructor'.

3. Examining an object that is constructed: The researcher may be faced with a special task -- to isolate from the object the structure with which it is endowed.

RESULTS

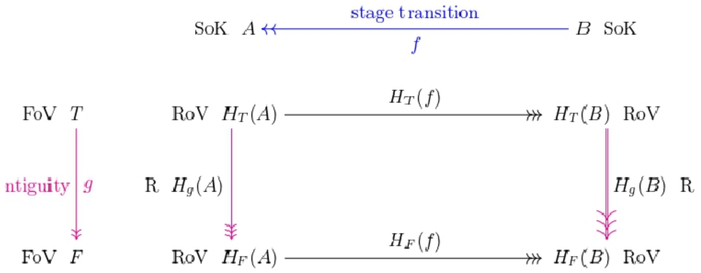

Fig. 3. Fine configurator.

ANALYSIS

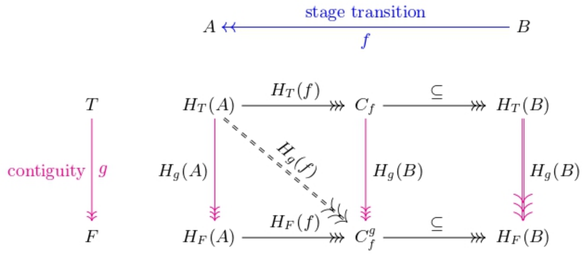

Fig. 4. Channeled fine configurator.

DISCUSSION

In this paper, the issue of the role and place of configuration was discussed from the standpoint of system analysis. The problem is not as simple as it might seem. On the one hand, the term itself is considered well-known, but there is no exact definition in the literature. On the other hand, this gives rise to a very broad and rather free interpretation of this term, which is strongly dependent on the applied field of knowledge or engineering.

CONCLUSIONS

1. An attempt was made to translate the discussion of configuration into the context of software engineering and cognitive modeling.
2. Particular attention is paid to the requirements for the computational model.
3. The idea of the configuration model, introduced by V. Lefebvre, is used in solving problems of semantic modeling and binding to cognitive stages.

ACKNOWLEDGMENTS