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Building a cognitive system based on process interaction. *Viacheslav Wolfengagen*¹, Larisa Ismailova*¹, Sergey Kosikov*²* (*jir.vew@gmail.com*).

¹NRNU MEPhI, Moscow 115409, Russian Federation, ²NAO "JurInfoR, Moscow 119435, Russian Federation.



V. Wolfengagen L. Ismailova S. Kosikov

SUMMARY

The theory of combinators is used as the main (meta)mathematical means. A diagram mechanism has been developed that implements the emerging applicative computational system of object interaction

INTRODUCTION

According to modern notions, computing is not separable from cognitive modeling and activity. This paper continues the tradition of the uniform approach and proposes a small number of general mechanisms that cope with the main known effects of computing as a science -- the interaction of objects-as-processes, the interaction of processes with the environment, generalized interaction. As shown, the applicative prestructure (objects-as-processes, application) generates an applicative structure (processes, application, values), which ensures the generation of the result -- the value of interactions, enabling the process of evaluation.

A diagram mechanism has been developed. The processes are bidirectional in nature, both with a decrease in arity -- reduction, and with an increase in arity -- expansion...

APPROACH

Building an end-to-end information technology for applying the theory of combinators at all stages of organizing computing -- formulation a problem statement, building a system of objects, organizing the interaction of objects, organizing the interaction of objects with the environment, describing the interaction as such. A uniform architecture of computing emerges, distinguished by the unity of principles. The technology potentially allows building up both system and applied interfaces.

METHODS

Additional equalities between combinators are introduced and imposed as computing boundaries. Their choice is determined by the task, which target computing system should be generated. An important case of generating semantics as embedded computing system is investigated. It is shown that in this way an evaluating mapping is generated as an operator that allows assigning values to expressions. A conceptual equational characteristic of an evaluation mapping is presented, where the environment is a hidden parameter. In addition, an equational characteristic of the evaluation mapping is established, which explicitly contains the environment.

RESULTS

Table 1. Generic and derived combinators.

Combinatory characteristic	Interaction of objects
$Kab = a$	
$Sabc = ac(bc)$	
$Ia = a$	
$Wab = abb$	
$Cabc = acb$	
$Babc = a(bc)$	
$\Psi abcd = a(bc)(bd)$	
$\Phi abcd = a(bd)(cd)$	

ANALYSIS

The area of computing continues to grow rapidly and sometimes looks diverse, covering disparate mechanisms, seemingly devoid of unity. As in any science, internal unity is established by the adoption of a system of invariants, which can be relied upon when transforming objects. Such constructions must satisfy the principles of constancy with respect to certain systems of transformations. Such a role is assigned to combinators. The applicative structure can have an equational characterization in the form of a small number of conceptual dependencies. In them, the environment parameter clearly does not have an occurrence, but it affects their appearance without changing the semantic content. An equational characterization of the structure is also obtained, in which there are explicit occurrences of the environment parameter.

DISCUSSION

By building a cognitive system based on the idea of interaction, it is possible to form an applicative computing system and representing an applicative computing technology. A metaoperation is an application, which represents the interaction of objects, as a result of which an object is generated, and this generates the prestructure.

Figuratively speaking, the applicative computing technology is kept in a coherent state due to invariants that play the role of "combinatorial glue".

CONCLUSIONS

1. By building a cognitive system based on the idea of interaction, it is possible to form an applicative computing system and representing an applicative computing technology.
2. A metaoperation is an application, which represents the interaction of objects, as a result of which an object is generated, and this generates the prestructure.

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