

Open Semantic Technology for Intelligent Systems

Vladimir V. Golenkov, e-mail: golen@bsuir.by

Natalia A. Guliakina, e-mail: guliakina@bsuir.by

Daniil V. Shunkevich, e-mail: shu.dv@tut.by

Belarusian State University of Informatics and Radioelectronics, Minsk, Belarus

The report is devoted to the open project, aimed at creation of technology of component design of intelligent systems. The report considers basic principles of this technology, oriented on semantic representation of knowledge. One of the basic ideas of such a technology is an expansion of the contingent of developers and design time reduction via using component design principle. This technology is a main product of the open source project OSTIS (Open Semantic Technology for Intelligent Systems), which is aimed at creation of open technology, which will allow to design commercial and non-commercial intelligent systems for different purposes. At least the technology should provide such an opportunity not only to experienced IT-specialists, but for all those, who has a goal to create an high-functional intelligent system for a necessary subject domain, for example, scientist in the sphere of biology, history etc. Much attention is paid to the intelligent metasystem IMS.OSTIS, designed for complex support of intelligent systems design.

We base our investigation on the results of the researches in the field of artificial intelligence which are not only in the development of particular intellectual systems with the high intellectual opportunities but also in the development of technologies which help to create different intellectual systems quickly and easily – and this has a great practical value. It is clear that the parts of such technologies are:

- formal theory of intellectual systems (formal description of their construction)
- methods of projecting of intellectual systems
- instruments (means of automatization of projecting intellectual systems)
- information management tools(information service) of intelligent systems development;
- means of computer support of control over the collective development of intellectual systems.

Modern technologies of the projecting of intellectual systems have some imperfections like:

- technologies are not directed to the wide range of the developers and wasn't spread wide
- period of development is very long and its maintaining is difficult.
- degree of dependence of intellectual system technologies on the platforms which they are build on is very high – which provokes a lot of changes in the technologies after the start of using the new platform.
- for the effective implementation of even the existing models of knowledge representation and models solutions of difficult to formalize problems of today's computers are not well-suited, which requires the development of fundamentally new computers;
- a modern state of intelligent computer systems development is a "Tower of Babel" of variety models, methods, tools, platforms;
- there is no approach that lets us integrate scientific and practical results in the field of artificial intelligence which leads to a high level of overlapping results. In particular, the labour coefficient of the integration of different types of information presentation, problem solving schemes and different intellectual computer systems is very high.

Artificial intelligence is an interdisciplinary scientific discipline. That is why it has a great potential as the science achieve the most significant results on the science junction. But the same reason causes the main difficulties as the development of the artificial intelligence requires a great deal of mutual understanding between the researchers who has different ways of thinking, different attitude to the object, different mentalities, different directives and customs. A modern stage of artificial intelligence development has a deep need for struggling with the difficulties mentioned [1]

The most important goal of the artificial intelligence nowadays is gaining a general complex theory of intellectual systems which would have contained different types of artificial intelligence: the theory of presenting the knowledge and the theory of problem solving (also different calculus, heuristics and strategies), the theory of programs (procedural, declarative, parallel, and sequential) and the architectures of intellectual systems (detailed properly deep to the level of hardware support) and the theory of intellectual users interfaces and computer linguistics.

Today a deep semantic integration is in the centre of the development of artificial intelligence which aim is not only the theory of intellectual systems but also a general available technology of its complex development.

Our approach is aiming on the removal of disadvantages and is based on several principles. These principles were discussed in details in [2].

The proposed technologies are essential OSTIS not the principles discussed above, some of which look obvious and indisputable, and the whole coherent set of principles and their consistent as possible.

The key problems the solution of which is the basis of the proposed technology are:

- providing semantic interoperability (integrating) of various models of representation and processing of knowledge;
- creation of a general theory of abstract semantic models of intelligent systems, and not contradicting integrating a variety of approaches;
- providing maximum possible independence of intelligent systems from the variety of options and their technical implementation platforms (including from future computers, specially focused on hardware support for knowledge processing).

Table 1 - OSTIS Technology Standards [3].

sc-model of intelligent systems:			
<ul style="list-style-type: none"> ● sc-model of user interfaces; ● sc-help-system model; ● sc-model sub-project management; ● sc-model design support systems; ● sc-model subsystems for information security management 			
sc-models of problem solvers			
sc-models of of information retrieval		sc-models of knowledge Integration	
sc-models of knowledge bases			
SCK language		Unified identifiers of sc-elements	
ontology SC- language	sc- languages of purpose, questions and problems	Logical sc-language	Programming sc-languages
SCP Language			
scp-machine			
SC-code	SCg-code	SCs-code	SCn-code
Program interpreters of scp-machine			scp-computers
Internet	Local platforms		

References

[1] Golenkov, V.V., Gulyakina N.A. Design principles of mass semantic technology component of intelligent systems. - In the context of Intern. Scientific-Technical.Conf. "Open Semantic Technology of Intelligent Systems» (OSTIS-2011).Conference proceedings.[Minsk, Feb 10-12. 2011]. - Minsk: BSUIR, 2011, p. 21-59..

[2] Golenkov, V.V., N.A. Gulyakina Grafodinamic model of a parallel processing of knowledge: construction principles and implementation of design. - In the context of the Intern. Scientific-Technical.Conf. ."Open Semantic Technology of Intelligent Systems» (OSTIS-2012).Conference proceedings.[Minsk, Feb 16-18. 2012]. - Minsk: BSUIR, 2012.

[3] OSTIS project [Web source]. Minsk, 2013. – Access mode: <http://ostis.net/>. – Access date: 30.10.20