

## COGNITIVE COMPUTING SYSTEM BASED ON DISTRIBUTED KNOWLEDGE

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In the current paper the results of research and development of a computational system with cognitive properties based on inhomogeneous knowledge distributed by a set of Intelligent Agents are presented [1, 2, 4]. The Multi-Agent system represents a network with the Mesh topology in which each Agent  $A_i, \forall i = \overline{1, I}$  is defined by: the initial state  $X_i(t_0)$ , where  $X \in \mathbf{R}^N$ ; a strategy  $S_i$ , or a set of data processing rules for system evolution; and a target  $X_i^{opt}(T)$ , which also determines the purpose of the Multi-Agent system evolution.

An Agent is defined as a computing structure with Wireless communication properties that manages two data structures: the knowledge storage model and the knowledge search model [3, 4]:

*The knowledge storage model* of an Agent presents a data structure in XML that includes: Agent's name  $A_i, \forall i = \overline{1, I}$ ; keyword list (target goal)  $X_i^{opt}(T)$ ; and the list of knowledge (the status of the Agent  $X_i(t)$ ), where  $t_0 \leq t \leq T$ :

*The knowledge search model* presents a data structure in the XML that includes: Agent name  $A_i, \forall i = \overline{1, I}$ ; list of keywords  $X_i^{opt}(T)$ ; and the list of rules for data processing ( $S_i$  strategy), for searching the knowledge, in order to reach the target objective  $X_i^{opt}(T)$ .

The evolution of the Multi-Agent system over time is determined by the expression:

$$X(t_0) \xrightarrow{S} X(t_1) \xrightarrow{S} X(t_2) \cdots \xrightarrow{S} X^{opt}(T) .$$

**Keywords:** *Multi-Agent system; cognitive computing; distributed knowledge; initial state; strategy; target goal.*

### References

1. Dishari, S., Sumathy, S. Cognitive IoT incorporating intelligence in building smart environment. *IOP Conf. Series: The 14th ICSET-2017, Materials Science and Engineering*, 263 (2017) 042012 DOI:10.1088/1757-899X/263/4/042012.
2. IBM. *Artificial Intelligence, Machine Learning and Cognitive Computing*. [online: <https://www.ibm.com/blogs/nordic-msp/artificial-intelligence-machine-learning-cognitive-computing/>] [Accessed: 02.09.2019].
3. Ababii, V.; Sudacevschi, V.; Melnic, R.; Munteanu, S. Multi-Agent System for Distributed Decision-Making. *National Science Journal (Ekaterinburg, Russia)*, Vol 2, No 45, 2019, pp. 19-23, ISSN 2413-5291. DOI: 10.31618/nas.2413-5291.2019.2.45.
4. Ababii, V.; Sudacevschi, V.; Munteanu, S.; Bordian, D.; Calugari, D.; Nistiriuc, A.; Dilevschi, S. Multi-Agent Cognitive System for Optimal Solution Search. *The International Conference on Development and Application Systems (DAS-2018) 14th Edition, May 24-26, 2018, Suceava, Romania*, pp. 53-56, IEEE Catalog Number: CFP1865Y-DVD, ISBN: 978-1-5386-1493-8.