

Title: Implementation of the cognitive evolution in autonomous intelligent systems

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Received: November 04, 2022; Accepted: November 06, 2022; Published: November 17, 2022

Industrial technology has come close to the full automation of research and production. However, this cannot be achieved without the creation of autonomous agents capable of cognitive activity without human participation or with minimal human participation. Modern cognitive architectures are able to model various aspects of the cognition process. But they do not have the level of universality that would allow creating an autonomous technical system capable of fully reproducing cognitive activity in the paradigm of constructivism. The proposed method for modeling cognitive activity is based on the representation of cognitive activity as an interaction of five basic components: sensory, motor, emotional, intellectual and volitional components. At the beginning of cognitive evolution, these components form a functional core. Its work is initialized by an orienting-research reflex. In the process of activity, each of the basic components of the cognitive architecture and their interaction undergoes changes. The features of proposed method of modeling cognitive activity include the following. The method is based on the ideology of subjective reality, which is discussed in detail in studies on semiotics. Cognitive evolution in our approach starts from the stage of early ontogeny. Unlike existing methods, we do not define a set of elementary patterns. It is automatically formed as a result of the interaction of the basic components of the architecture when processing sensory data. We consider the proposed method for modeling the cognitive evolution of autonomous agents as a step towards the creation of technical systems capable of reproducing higher nervous activity. We associate this with the possibility of dividing all the processes involved in cognitive activity into two groups: a group of processes inseparably connected with sensory perception data and a group of processes that we called the abstract core of intelligence.

Biography

Alexander Serov has more than thirty years experience of work in various fields of science and technology. In 1988 he was graduated from the Moscow Institute of Physics and Technology (MPTI). He worked as a researcher and scientific software developer in Motorola Research Laboratory, Huawei Technologies, University of Manitoba and other research and development organizations. His expertise is associated with numerical simulation of complex physical and technical systems. Alexander's research interests last time are associated with Cognitive Science and Artificial General Intelligence. His investigations now are concentrated in the field of Autonomous Intelligent Agents. Methodology of Artificial Subjective Reality proposed by him is implemented in a new type of architecture able to the transformation during the cognitive evolution. Alexander hopes to open up a new field of numerical investigations at the intersection of Psychology, Physiology and Artificial Intelligence