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MULTI-AGENT SEARCH FORMAL MODEL FOR AN INTELLIGENT AGENT OPTIMAL BEHAVIOR PLAN BASED ON DISTRIBUTED NEUROCOGNITIVE ARCHITECTURES SELF-ORGANIZATION

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The paper proposes an approach to the development of intelligent decision-making and control systems based on the hypothesis of the organization of neural activity of the brain in the process of performing cognitive functions. This approach, based on intelligent software agents with a developed cognitive architecture, is able to provide the process of extracting knowledge from an unstructured data stream, generalizing the acquired knowledge and learning, to implement effective methods of synthesizing behavior aimed at solving various problems.

A formal model of a multi-agent search for the optimal behavior plan of an intelligent agent based on self-organization of distributed neurocognitive architectures is presented. In particular, the basic principles of situational analysis based on multi-agent neurocognitive architectures are formulated and an algorithm for constructing a cause-and-effect relationship between agents is developed.

The conducted simulation showed that on the basis of training neurocognitive architecture by forming new agents-neurons and connections between them, a complex logical function of behavior control (in particular, situational analysis) develops (is formed).

Keywords: multi-agent systems, neurocognitive architecture, decision making, artificial intelligence systems, intelligent agents.

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