

Agent/Group/Role Organizational Model to Simulate an Industrial Control System

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Abstract : The modeling of complex systems is generally based on the decomposition of their components into sub-systems easier to handle. This division has to be made in a methodical way. In this paper, we introduce an industrial control system modeling and simulation based on the Multi-Agent System (MAS) methodology AALAADIN and more particularly the underlying conceptual model Agent/Group/Role (AGR). Indeed, in this division using AGR model, the overall system is decomposed into sub-systems in order to improve the understanding of regulation and control systems, and to simplify the implementation of the obtained agents and their groups, which are implemented using the Multi-Agents Development KIT (MAD-KIT) platform. This approach appears to us to be the most appropriate for modeling of this type of systems because, due to the use of MAS, it is possible to model real systems in which very complex behaviors emerge from relatively simple and local interactions between many different individuals, therefore a MAS is well adapted to describe a system from the standpoint of the activity of its components, that is to say when the behavior of the individuals is complex (difficult to describe with equations). The main aim of this approach is the take advantage of the performance, the scalability and the robustness that are intuitively provided by MAS.

Keywords : complex systems, modeling and simulation, industrial control system, MAS, AALAADIN, AGR, MAD-KIT

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