Design of Embedded Collective Computing System based on Membrane Computing Models

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ABSTRACT

This paper addresses a method of applying Membrane Computing models in the design of embedded systems with Collective Intelligence properties. Embedded system topology is presented as a network of parallel and concurrent data processing devices that ensure communication between all its components. Definition model of the Collective Intelligence presents a set of rules based on the set of knowledge consisting of data and methods of processing them. There were elaborated: the cell structure, the interaction diagram of the cells and the way of forming the hierarchical structures and of Collective Intelligence. The formal and structural description language JSON was applied to automate the process of implementing Membrane Computing models in Hardware architectures. The result is presented in the form of JSON models of an elementary cell and the structure of the hierarchical embedded system with Collective Calculation.