Languages of P Colony Automata*

Erzsébet Csuhaj-Varjú1, Kristóf Kántor2, and György Vaszil2

1 Department of Algorithms and Their Applications, Faculty of Informatics, ELTE Eötvös Loránd University, Pázmány Péter tér 1/c, 1117 Budapest, Hungary
csuha@inf.elte.hu
2 Department of Computer Science, Faculty of Informatics, University of Debrecen, Kassai út 26, 4028 Debrecen, Hungary
{kantor.kristof, vaszil.gyorgy}@inf.unideb.hu

P colonies are tissue-like membrane systems modeling a community of very simple computing agents (cells), interacting in a shared environment, see [5]. The environment and the computing agents are both described by multisets of objects which are processed by the colony member cells using rules which enable the transformation of the objects and the exchange of objects between the cells and the environment. Despite the fact that they are extremely simple computing systems, P colonies are computationally complete, even with very restricted size parameters and other syntactic or functioning restrictions.

P colony automata were introduced in [2]. They are called automata, because they accept string languages by assuming an initial input tape with an input string in the environment. A variant called genPCol automaton, reading multiset sequences from the environment, thus being closer to the spirit of so-called P automata, was studied in [4]. Other interesting variants called APCol systems where the environment consists of a string and the communication rules of the cells are for substituting, inserting, or erasing symbols of the current environmental string were studied in [1].

We review the different approaches to the description of string languages by P colonies and also pursue an interesting research direction proposed in [3] to study the possibilities of deterministic parsing of languages using their P colony automata characterization.

References


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