Cover Letter

Thinning images simulating Computational Algebraic Topology techniques using Membrane Computing

Dear Editor:

Please find attached for your kind review our manuscript entitled “Cell Complexes and Membrane Computing for Thinning 2D and 3D Images”.

In this paper we present a bio-inspired parallelization of the algorithm of Liu for thinning. It was developed using Forman theory. To do this parallelization we use a model of Membrane Computing called Tissue-like P system. So, we achieve a new algorithm where the time complexity is logarithmic with respect to the input data. Of course, the space complexity is bigger than the algorithm of Liu.

The big reasons to work with this kind of models are two. First, we can control what happen in each computation step. So, we can proof our algorithm does what it should do. We should remember we are talking about parallel discrete algorithm, where it is not usual to see formal proofs. Second, we can simulate this models using CUDA. We can find easily several examples in the literature. The translation from Membrane Computing to CUDA is not direct, but it is really close.

Daniel Díaz Pernil
Raúl Reína Molina
Miguel A. Gutiérrez Naranjo

University of Seville