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A Fast Parallel and Distributed Type-2 Fuzzy Algorithm Based on Cooperative Mobile Agents Model for High Performance Image Processing

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Abstract : The aim of this paper is to present a distributed implementation of the Type-2 Fuzzy algorithm in a parallel and distributed computing environment based on mobile agents. The proposed algorithm is assigned to be implemented on a SPMD (Single Program Multiple Data) architecture which is based on cooperative mobile agents as AVPE (Agent Virtual Processing Element) model in order to improve the processing resources needed for performing the big data image segmentation. In this work we focused on the application of this algorithm in order to process the big data MRI (Magnetic Resonance Images) image of size (n x m). It is encapsulated on the Mobile agent team leader in order to be split into (m x n) pixels one per AVPE. Each AVPE perform and exchange the segmentation results and maintain asynchronous communication with their team leader until the convergence of this algorithm. Some interesting experimental results are obtained in terms of accuracy and efficiency analysis of the proposed implementation, thanks to the mobile agents several interesting skills introduced in this distributed computational model.

Keywords : distributed type-2 fuzzy algorithm, image processing, mobile agents, parallel and distributed computing
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