SWARM LIKE AUTONOMOUS AGENTS FOR SEED REGION GROWING SEGMENTATION OF DIGITAL IMAGE

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ABSTRACT:

In computer vision, segmentation refers to the process of partitioning a digital image into multiple regions. Among many innovative approaches of image segmentation, seed region growing is known to be the conceptually simplest algorithm which is based on growing of some limited number of seeds into region. Besides, considering incredible advances in computation science towards innovative soft computation techniques such as Agent based modelling and Swarm intelligence, the exploration of these approaches in such processes is found interesting. Autonomous Agents are computational systems that inhabit some complex dynamic environment, sense and act autonomously to reach predefined goals while swarm intelligence is defined as a type of artificial intelligence based on the collective behavior of decentralized, self-organized agents. The integration of both systems for region growing image segmentation is the main theme of this research. In this method initial seeds are placed in the digital image and by the deployment of swarm agents in the environment and indirect stigmergic communication practiced in swarms the region growing is optimally guided towards proper image segmentation. In each iteration, agents are navigated stigmergically through following the trace of other agents towards similar pixels as regions grow. The invented approach is applied to sample images and also tested considering different initial numbers of seed points. As experimented, it is observed to have the highest conformity of the regions when compared to similar same condition results when only one initial seed region is chosen.

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