An Agent Framework with an Efficient Information Exchange Model for Distributed Genetic Algorithms

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Résumé en anglais	Genetic Algorithms (GAs) are powerful search techniques that are used to solve difficult problems in many disciplines. Unfortunately, they can be very demanding in terms of computation load and memory. Parallel Genetic Algorithms (PGAs) are parallel implementations of GAs which can provide considerable gains in terms of performance and scalability. PGAs can easily be implemented on networks of heterogeneous computers or on parallel mainframes. In this paper, we introduce a multi-agent model conceived as a conceptual and practical framework for distributed genetic algorithms used both to reduce execution time and to get closer to optimal solutions. Instead of using expensive parallel computing facilities, our distributed model is implemented on easily available networked PCs. In order to show that the parallel co-evolution of different sub-populations may lead to an efficient search strategy, we design an efficient information exchange strategy based on different dynamic migration window methods and a selective migration model. To evaluate the proposed approach, different kinds of experiments have been conducted on an extended set of Capacitated Arc Routing Problem(CARP). Obtained results show the promise and efficiency of our agent-based approach.
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