A multi-agent based optimization method applied to the quadratic assignment problem

Titre	A multi-agent based optimization method applied to the quadratic assignment problem
Type de publication	Article de revue
Auteur	Sghir, Ines [1], Hao, Jin-Kao [2], Ben Jaâfar, Inès [3], Ghédira, Khaled [4]
Pays	Pays-Bas
Editeur	Elsevier
Ville	Amsterdam
Type	Article scientifique dans une revue à comité de lecture
Année	2015
Langue	Anglais
Date	15 Déc. 2015
Numéro	23
Pagination	9252–9262
Volume	42
Titre de la revue	Expert Systems with Applications
ISSN	1873-6793
Mots-clés	combinatorial optimization [5], Cooperative search [6], Heuristics [7], Multi-agent based optimization [8], quadratic assignment [9]
Résumé en anglais	Inspired by the idea of interacting intelligent agents of a multi-agent system, we introduce a multi-agent based optimization method applied to the quadratic assignment problem (MAOM-QAP). MAOM-QAP is composed of several agents (decision-maker agent, local search agents, crossover agents and perturbation agent) which are designed for the purpose of intensified and diversified search activities. With the help of a reinforcement learning mechanism, MAOM-QAP dynamically decides the most suitable agent to activate according to the state of search process. Under the coordination of the decision-maker agent, the other agents fulfill dedicated search tasks. The performance of the proposed approach is assessed on the set of well-known QAP benchmark instances, and compared with the most advanced QAP methods of the literature. The ideas proposed in this work are rather general and could be adapted to other optimization tasks. This work opens the way for designing new distributed intelligent systems for tackling other complex search problems.
URL de la notice	http://okina.univ-angers.fr/publications/ua15263 [10]
DOI	10.1016/j.eswa.2015.07.070 [11]
Lien vers le document	http://www.sciencedirect.com/science/article/pii/S0957417415005308 [12]
Titre abrégé	Expert syst. appl.

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