Guest editorial: Memetic Algorithms for Evolutionary Multi-Objective Optimization

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This thematic issue on Memetic Algorithms for Evolutionary Multi-Objective Optimization was initially motivated by the success of Memetic Algorithms (MAs) in a variety of real-world problems. Among them, the multi-objective class of problems is of great interest. This issue brings together some of the latest research developments in this field, with two papers highlighting some of the fundamental algorithmic issues and another paper focusing on a specific real-world application.

The paper by Gong et al. proposed a memetic algorithm to address static multi-objective optimization problems. The proposed algorithm, namely Multi-objective Lamarckian Immune Algorithm (MLIA), employs the general framework of Non-dominated Neighbor Immune Algorithm. Lamarckian learning was embedded in this framework as the local search method. Empirical studies showed that, with the incorporation of Lamarckian learning, MLIA achieved very appealing performance in comparison with some state-of-the-art multi-objective evolutionary algorithms, such as the Non-dominated Sorting Genetic Algorithm II (NSGA-II) and the Multi-Objective Evolutionary Algorithm based on Decomposition (MOEA/D).

Dynamic optimization has attracted significant research interests in recent years. In their work, Wang and Li

investigated multi-objective optimization problems in the context of dynamic optimization. Specifically, benchmark problems were firstly established. Then, a Multi-Strategy ensemble Multi-Objective Evolutionary Algorithm (MS-MOEA) was developed to address dynamic multi-objective problems. The efficacy of MS-MOEA is finally validated through a comprehensive experimental study. The third paper for this issue is by Sattar and Segulier, focusing on the application of MAs in a specific real-world problem, i.e., face analysis of multiple camera images, in which multi-objective optimization algorithm is required to optimize the facial analysis and search process. An MA that combines NSGA-II and gradient descent method was developed. A procedure of calculating the relevant information of each camera is also developed so as to further improve the efficiency and robustness of the algorithm. The proposed algorithm was experimentally compared against a single camera system and a multiple camera system in which NSGA-II alone is used as the optimizer. The advantages of the proposed algorithm were demonstrated from various aspects.

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