Editorial

Scientific Programming in Computational Intelligence

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1. Special Issue Overview

Computational intelligence has been applied to a wide range of problems arising in different fields. Evolutionary programming, stochastic local search algorithms, swarm intelligence, and machine learning, among others, have been successfully applied to a range of optimization and classification problems which otherwise could not be tackled by traditional exact methods. More specifically, many problems arising in fields related to scientific programming have been increasingly addressed using metaheuristic algorithms from AI: scientific workflows scheduling/assignment, task assignment in distributed/parallel systems, (large-scale) data mining, knowledge discovery, and text analysis/process/classification, among others. This special issue is devoted to both theoretical and practical aspects of scientific programming related to computational intelligence.

2. Summary of Included Papers

This special issue includes six papers. The paper “Hybrid Multiple Soft-Sensor Models of Grinding Granularity Based on Cuckoo Searching Algorithm and Hysteresis Switching Strategy” proposes employing the cuckoo search metaheuristic for optimizing the performance parameters of a hysteresis switching strategy used to efficiently handle an interesting prediction problem from mineral concentration factories. The paper “A Metaheuristic Approach Combining Local Search and Mathematical Programming” presents a hybrid

approach based on local search and mathematical programming for efficiently solving the facility location problem. The local search algorithm is used to select a subset of promising facilities while mathematical programming is responsible for solving the subproblem to optimality. The third paper is called “AntStar: Enhancing Optimization Problems by Integrating an Ant System and A* Algorithm” which focuses on combining the well-known Ant System and A* Algorithm, the idea being to enhance the performance of the Ant System by inserting an evaluation function, the A* algorithm, into the transition probability function of AS. Interesting experiments are performed on shortest-path problems. The fourth paper is named “Racing Sampling Based Microimmune Optimization Approach Solving Constrained Expected Value Programming” and presents a bioinspired microimmune optimization algorithm for solving a general kind of single-objective nonlinear constrained expected value programming. Comparative experiments illustrate excellent performance on higher-dimensional benchmark problems. The fifth paper is called “Efficient Parallel Sorting for Migrating Birds Optimization When Solving Machine-Part Cell Formation Problems” and describes the incorporation of parallel procedures into a relatively new metaheuristic called migrating birds optimization. The idea is to perform in parallel the several sorting tasks that this metaheuristic carries out when solving optimization problems. Interesting running time improvements are illustrated in the resolution of several machine part cell formation problem instances. Finally, the paper named “Profile Orientation and Slope

Stability Analysis” presents an analysis of soil slope stability using a terrestrial laser scanner, particle swarm optimization, and the force equilibrium method. This study compares results obtained with those of previous studies making important observations.

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