Theory and practice of natural computing: fifth edition

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This special issue of the journal *Soft Computing—A Fusion of Foundations, Methodologies and Applications* offers extended versions of some of the best papers presented at the Fifth International Conference on the Theory and Practice of Natural Computing, TPNC 2016, held in Sendai, Japan, on December 12–13, 2016. The conference was organized by the Cyberscience Center of Tohoku University and the Research Group on Mathematical Linguistics (GRLMC) from Rovira i Virgili University, Tarragona, Spain.

TPNC 2016 was the fifth event in a series dedicated to presenting and promoting research on the wide spectrum of computational principles, models, and techniques inspired by information processing in nature. We intended to attract both theoretical and applied contributions to nature-inspired models of computation, synthesizing nature by means of computation, nature-inspired materials, and information processing in nature.

Out of 39 submissions to the conference, 16 papers were accepted (which represents a competitive acceptance rate of about 41%). Among them, the authors of five papers were invited to submit to this special issue. Each submission was reviewed by three experts, and based on their comments, the guest editors decided to accept two papers for this special issue (which represents an acceptance rate of about 5% out of the submissions to the conference).

Next, we briefly present the papers included in this special issue. For each paper, we mention the most important results.

In their paper A Multi-objective Evolutionary Approach to Pareto Optimal Model Trees, Marcin Czajkowski and

Marek Kretowski discuss the multi-objective evolutionary approach to the induction of model trees, a sort of decision tree for regression problems. The aim of the paper is to show how a set of non-dominated model trees can be obtained using the global model tree framework. The uses of this framework for the evolutionary induction of decision trees are multiple. Thanks to the novel Pareto approach to it, the decision maker can select the model better reflecting preferences on conflicting objectives. Some cases are analyzed, and an experimental evaluation is performed.

Abtin Nourmohammadzadeh and Sven Hartmann, in their paper Fuel-efficient Truck Platooning by a Novel Meta-heuristic Inspired from Ant Colony Optimisation, approach so-called platooning, i.e., driving trucks in a queue and in close proximity, which is considered as a promising way of reducing fuel consumption because of the aerodynamic advantage. Under realistic time constraints, this problem is NP-hard. The article proposes a meta-heuristic methodology inspired by ant colony optimization to address the problem. The results are claimed to demonstrate the advantages of this approach over others based on a genetic algorithm.

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