
Editorial

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Biographical notes: Jurij Šilc received his PhD in Electrical Engineering from the University of Ljubljana, Slovenia, in 1992. In 1980, he joined the Jožef Stefan Institute, where he is now a Senior Research Associate at the Computer Systems Department. At the institute, he served as the Head of the Computer Architecture Laboratory from 1986 to 1994. He is presently also an Assistant Professor at the Jožef Stefan International Postgraduate School, Ljubljana, and at the Faculty of Mathematics, Natural Sciences and Information Technology, Koper. His research interests include bio-inspired optimisation methods, parallel processing, and processor architectures. He is a member of the IEEE.

Bogdan Filipič received his PhD in Computer Science from the University of Ljubljana, Slovenia, in 1993. He is now a Senior Research Associate at the Department of Intelligent Systems of the Jožef Stefan Institute, Ljubljana, and an Associate Professor of Computer and Information Science at the University of Ljubljana. His research interests include stochastic optimisation, evolutionary computation and intelligent data analysis. He has published extensively in international scientific journals and was a principal investigator in national and international projects dealing with information technology for production processes optimisation, energy efficiency and cultural heritage preservation. He serves as an editorial board member and a reviewer of several scientific journals, and a programme committee member for major international conferences on evolutionary computation.

Natural phenomena, like the evolution of species, emergent behaviour of biological societies, and functioning of the vertebrate immune system, have inspired computer scientists to design advanced problem-solving techniques, known as evolutionary algorithms, ant colony optimisation, and artificial immune systems. These and many other bioinspired algorithms that continue to emerge, overcome many limitations of traditional algorithms and have been widely accepted in science, engineering and business. Solving intricate optimisation problems in these domains is of particular interest to both designers and practitioners of bioinspired algorithms.

The special issue ‘Advances in bioinspired computing’ contains extended versions of selected contributions to the field of bioinspired optimisation presented at the Fifth International Conference on Bioinspired Optimisation Methods and their Applications, BIOMA 2012 (<http://bioma.ijs.si>), held in Bohinj, Slovenia, on 24 and 25 May 2012. After a rigorous review by the members of the conference international programme committee, seven out of 30 papers presented at the conference were selected for

this special issue. These papers deal with a wide range of problems and propose some novel techniques to solve these problems. The contents of the papers are as follows.

The first paper is ‘Focusing the search: a progressively shrinking memetic computing framework’, by Ilpo Poikolainen, Giovanni Iacca, Fabio Caraffini, and Ferrante Neri. This work describes a memetic computing optimisation scheme that progressively perturbs a candidate solution by alternating three search operators: a stochastic global search, a random sampling within progressive narrowing hyper-volume, and a deterministic local search.

The second paper, ‘Solving dynamic optimisation problems with revolutionary algorithms’, contributed by Ronald Hochreiter and Christoph Waldhauser, presents revolutionary algorithms that provide a framework to model and optimise dynamic problems in an efficient fashion.

The third paper, ‘Solving variational and Cauchy problems with self-configuring genetic programming algorithm’, by Sergey V. Burakov and Eugene S. Semenkin, proposes an effective genetic programming algorithm for solving variational and Cauchy problems. The algorithm is

capable of finding an exact solution to a problem in analytical form (if it exists) or, alternatively, an approximating analytical expression, if the solution cannot be represented as a combination of elementary functions.

The fourth paper is entitled ‘GAME: GPU accelerated multipurpose evolutionary algorithm library’ and contributed by Péter Cserti, Szabolcs Szondi, Balázs Gaál, and István Vassányi. This paper describes a genetic algorithm library containing fully parallelised GPU implementations of multi-objective genetic algorithms.

The fifth paper, entitled ‘NMPC and genetic algorithm-based approach for trajectory tracking and collision avoidance of UAVs’, by Luca De Filippis and Giorgio Guglieri, addresses a non-linear model predictive control system with a genetic algorithm that tracks the reference path provided by an unmanned aerial vehicle path planning and exploits a spherical camera model to avoid unpredicted obstacles along the path.

The sixth paper in this special issue is ‘Steganography content detection by means of feedforward neural network’, by Zuzana Komínková Oplatková, Jiří Hološka, and Roman Šenkeřík. This work presents the principle of hidden information revealing in multimedia files, such as jpeg, by means of artificial neural networks.

Finally, the seventh paper ‘Scalar vs. vector approach to bi-objective resource allocation in spatially distributed networks’ contributed by Bogdan Filipič, Risto Vesänen, and Erkki Laitinen deals with a bi-objective problem of optimal resource allocation in communication networks which consists of maximising the total network utility and minimising the costs of implementing these resources.

We are grateful to the following external reviewers for their valuable contributions: Janez Brest, Dirk Büche, Kusum Deep, Rolf Drechsler, Peter Korošec, Barbara Korušić-Seljak, Shin-Hsi Liu, Marjan Mernik, Edmondo Minisci, Franciszek Seredynski, El-Ghazali Talbi and Jim Tørresen.

Our thanks go to the authors who submitted high-quality papers and timely provided their revisions. Last but not least, we are deeply grateful to the Editor-in-Chief Nadia Nedjah and the publishing staff of *International Journal of Innovative Computing and Applications* for their support and guidance during the preparation of this special issue.

As guest editors, we hope the readers will find the special issue interesting and informative, as well as that the papers will stimulate further progress in the field of bioinspired optimisation.