
Editorial

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This special issue on new trends in computational intelligence is dedicated to a selection of related papers accepted and presented at the XII Brazilian Congress on Computational Intelligence that was held in Curitiba, PR, Brazil between 13 and 16 of October 2015.

In the paper titled ‘Stock market volatility prediction using possibilistic fuzzy modelling’, the authors suggest a recursive possibilistic modelling approach for assets return volatility forecasting with jumps. The model employs memberships and specific properties to cluster data, and affine functions in the fuzzy rule consequents. The performance of the proposed model is validated and compared to well-established recursive fuzzy and neural fuzzy modelling. The results show that the proposed method produces parsimonious models with better accuracy than the alternative approaches.

In the paper titled ‘Evolutionary computation methods for the schedule optimisation of pipeline networks’, the authors propose two evolutionary computation methods, which are variants of the differential evolution (DE) algorithm. The main difference when compared to existing algorithms resides in the encoding process that is binary and continuous. Both methods are successfully applied to the pipeline network schedule problem. The overall comparison of results obtained by the proposed variants and mixed integer linear programming supports the efficiency, robustness and convergence speed of the proposed algorithms proving its usefulness to real-world problems of limited complexity.

In the paper titled ‘Modified firefly algorithm applied to image vector quantisation codebook design’, the authors propose some modifications of the firefly algorithm – Linde-Buzo-Gray for the purpose of vector quantisation

codebook design. The modified version differs from the original algorithm in an attempt to guarantee a stronger influence of the training set on the codebook design. Simulation results show that the modified algorithm outperforms both the original one as well as the traditional Linde-Buzo-Gray algorithm in terms of codebook quality, which is evaluated via the peak signal to noise ratio of the reconstructed images.

In the paper titled ‘Resolution of one-dimensional bin packing problems using augmented neural networks and minimum bin slack’, the authors compare the augmented neural network meta-heuristic to the minimum bin slack heuristic, which are used to solve combinatorial optimisation problems. This is done specifically in this case, the 1-dimensional bin-packing problem, which is a class of cutting and packing problems. Tests, developed in many benchmark problems found in the literature, show that the proposed heuristic has, in general a superior performance, both in terms of solution quality and computational time.

In the paper titled ‘Evolutionary computation and swarm intelligence for the inference of gene regulatory networks’, the authors present a feature selection approach to the identification of gene regulatory networks using optimisation strategies inspired from evolutionary computation and swarm intelligence. The explored techniques are DE, bat algorithm (BAT) and artificial bee colony (ABC) algorithms. The results showed that DE algorithm leads to best results when compared to BAT and ABC, and the inferred network is more similar to the original network.

In the paper titled ‘An improved genetic algorithms-based seam carving method’, the authors propose a modification that mitigates the drawback of a fixed base-pixel position, the pivot. This problem can decrease the retargeting performance so that flexible seams are achieved and evolved. They also present new genetic operators. The proposal outperforms the seam carving and the genetic seam carving in terms of image quality.

In the paper titled ‘Clustering algorithm based on asymmetric similarity and paradigmatic features’, the authors present a novel similarity, unilateral Jaccard similarity coefficient, which does not only take into consideration the space among two points but also the semantics among them. They also propose a novel graph clustering technique modelling the relations of a node using the paradigmatic analysis. Extensive experiments and empirical analysis are performed to evaluate the proposed algorithm on synthetic and real data.

The editors are very much grateful to the authors of this issue and to the reviewers for their tremendous service by critically reviewing the submitted papers. The editors would like also to thank all the members of the editorial team of the *International Journal of Innovative Computing and Applications*, Inderscience Publishers, Switzerland for the editorial assistance and excellent collaboration to produce this scientific work. We hope that the reader will share our excitement to present this volume and will find it useful.