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Editorial

Special issue on advanced intelligent computing theory and methodology in applied mathematics and computation

We are very pleased to offer this special issue to the readers of Applied Mathematics and Computation by selecting the candidate papers from The 2007 International Conference on Intelligent Computing, held in Qingdao, Shandong Province, China, on 21–24 August 2007. Forty-four papers were selected for inclusion in this special issue, which represent less than 2% of all eligible papers accepted at the ICIC 2007.

In recent years, we have witnessed intelligent computing techniques, such as artificial intelligence, machine learning and colony intelligence, are being dedicated to the various aspects of applications in bio/neuro/chemoinformatics, computational biology, pattern recognition, automatic control and computational intelligence, etc. Intelligent computing knowledge has been enriched by developing more solid mathematical frameworks, by elaborating more efficient and powerful algorithms as well as structures.

The goal of intelligent computing technique is to form the theory from the data automatically, and its main objective is to find the rule from limited observation examples, which cannot be obtained using the classical theory. It further extends the rule to all the objects of interest, and predicts and infers the development of the things. Hence, intelligent computing technique is supplementary to the conventional methods. Intelligent computing technique makes it possible to use computer to extract and discover knowledge from large amount of biological, commercial, automatic control, etc., information. This special issue will particularly cover several papers related to how to use intelligent computing techniques to solve the problems in various fields.

Four papers in the issue explore neural networks theory and application. Wen et al. discussed using multiscale probabilistic neural network method for SAR image segmentation. Zhang et al. addressed a fast unit pruning algorithm for feedforward neural network design. Park et al. presented a dynamic bi-linear recurrent neural network and its application to MPEG traffic prediction. Du et al. combined generalized RLS approach with a hybrid learning algorithm for radial basis function neural networks.

The next sixteen papers investigate multiple kinds of algorithms and intelligent computing techniques in image segmentation and object recognition. Han et al. used disparity map of stereo matching for real-time object segmentation. Lu et al. proposed a new approach to image segmentation based on simplified region growing pulse coupled neural network (PCNN). Wang et al. presented a fast, memory-efficient and parallelizable arc/circle segmentation algorithm. Huang et al. proposed an unsupervised image segmentation using EM algorithm by histogram. Zhang et al. used fisher linear discriminant analysis (FLDA) with single training image per-person for face recognition. Lee et al. used fuzzy integral for curvature based normalized 3D component facial image recognition. Kim et al. discussed Kansei factor space classified by information for Kansei Image Modeling. Shang et al. discussed natural images denoising based on a modified sparse coding algorithm. Tseng et al. presented automatic cloud removal from multi-temporal SPOT Images. Gao et al. discussed despeckling SAR Images using stationary wavelet transform combining with directional filter banks. Wang et al. discussed classification of plant leaf images with complicated background. Jia et al. used restricted fusion for palmprint identification. Trinh et al. proposed face-based multiple building analysis for robot intelligence. Ahn et al. discussed face recognition using a fusion method based on bidirectional 2DPCA. Yang et al. proposed a level set contour extraction method based on support value filter. Faez et al. used GA-based optimal selection of PZMI features for face recognition, and also proposed an improved feature selection method based on Ant Colony Optimization (ACO) and evaluated the method on face recognition system.

The third nine papers presented different algorithms and their applications. Chang et al. used genetic algorithm integrated with artificial chromosomes for multi-objective flowshop scheduling problems. Xi et al. presented an improved quantum-behaved Particle Swarm Optimization algorithm with weighted mean best position. Ye et al. applied a fast and flexible

ICA Algorithm to fetal electrocardiogram extraction. Ma et al. used a BYY scale-incremental EM algorithm for Gaussian mixture learning. Wang et al. applied a tri-axial accelerometer to online classifier construction algorithm for human activity detection. Tang et al. used a novel linear algorithm for *P5P* problem. Wu et al. discussed improvement of algorithm on the track recognition. Li et al. presented a recursive algorithm for nonlinear model identification. Zhang et al. discussed a pseudo parallel ant algorithm with an adaptive migration controller.

The fourth seven papers dealing with application of intelligent computing techniques in automatic control fields. Ohmi et al. used SOM-based particle matching algorithm for 3D particle tracking velocimetry. Hyun et al. discussed a novel bad data processing algorithm for analog data in substation automation systems. Du et al. proposed a fast model identification method for networked control systems. Wang et al. used differential evolution for forward kinematics of parallel manipulators. Juang et al. presented the comparison of classical control and intelligent control for a multi-input multi-output (MIMO) system. Chen et al. discussed robustness design of time-delay fuzzy systems using fuzzy Lyapunov method. Li et al. presented optimal parameter design of input filters for general purpose inverter based on genetic algorithm.

In the end, we also have six papers discussed intelligent computing techniques in computer science and data mining. Tan et al. used hidden semi-markov model for anomaly detection. Taniar et al. presented exception rules in association rule mining. Han et al. proposed a new approach for function approximation incorporating adaptive Particle Swarm Optimization and a priori information. Xue et al. presented clustering-based initialization for non-negative matrix factorization. Jie et al. proposed Knowledge-based Cooperative Particle Swarm Optimization. Liu et al. discussed the convergent results about approximating fuzzy random minimum risk problems. Huang et al. presented the analysis of the user behavior based on the BBS.

It should be stressed that the recommendation for this special issue was provided by the International Program Committee, and the final selections were made on the basis of quality, novelty, theoretical or practical importance. All papers have been subjected to two rounds of review with a minimum of three reviewers, reflecting the important trend for increasing quality of the ICIC papers. We hope that you find reading through this special issue both enjoyable and useful.

The guest editors would like to take this opportunity to thank all the authors for their contributions to this special issue, the reviewers for their valuable input, insight, and expert comments, and the Editor-in-Chief, Prof. Melvin Scott for his valuable advice and strong support in the preparation of the final presentation of putting together this special issue.

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