
Editorial

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Biographical notes: Takumi Ichimura is an Associate Professor with Department of Management and Information Systems, Prefectural University of Hiroshima. He received his ME and DE in Engineering at Toin University of Yokohama in 1994 and 1997, respectively. His current research interests include neural networks, evolutionary computation, artificial immune system, and their applications in medical informatics, and cognitive sciences.

Hideki Katagiri is an Associate Professor of Hiroshima University, Japan and is working with the Department of System Cybernetics, Graduate School of Engineering, Hiroshima University. He received his BE, ME, and DE in Engineering at Osaka University in 1995, 1997, and 2000, respectively. His research and teaching activities are in the areas of operations research and soft computing, especially, fuzzy stochastic optimisation, multi-objective programming, data analysis, agent-based simulation analysis. He is the author or co-author of about 90 papers and three books in English. He served on the chair of IEEE SMC Hiroshima Chapter and is an Editorial Board Member of several international journals.

The purpose of this special issue is to collect excellent articles on new challenges in computational intelligence and applications. The papers in this issue are extended versions of selected papers presented at the fifth International Workshop on Computational Intelligence and Applications (IWCIA2009), held on 10–12 November 2009 in Hiroshima, Japan, following those of 2005 in Hiroshima, 2006 and 2007 in Okayama, 2008 in Hiroshima. IWCIA, sponsored by the IEEE SMC Hiroshima Chapter, aims to bring people from academia, research laboratories and industry and to offer a collaborative platform to address the emerging issues of the computational intelligence and applications and to encourage interactions across the borders of related disciplines.

High-quality technical papers were presented at the workshop by the authors, from which the following seven papers were carefully selected by the programme committee for this special issue.

- 1 ‘Borderline over-sampling for imbalanced data classification’ by Hien M. Nguyen, Eric W. Cooper and Katsuari Kamei: A new method for dealing with imbalanced data sets by over-sampling the borderline minority class instances is proposed. Compared with other over-sampling methods, the proposed method focuses only on the minority class instances residing along the decision boundary, due to the fact that this region is the most crucial for establishing the decision boundary.
- 2 ‘Behavioural analysis in network formation using agent-based simulation systems’ by Tomohiro Hayashida, Ichiro Nishizaki, Hideki Katagiri and Rika Kambara: There are some known differences between the real human behaviour and the theoretical prediction by Nash equilibrium. As an efficient tool for them, authors provide a simulation system using artificial adaptive agents for behavioural analysis of the human subjects. The decision making and learning for the agents employ Neural Network and Genetic Algorithm.
- 3 ‘Creating singing vocal expressions by means of interactive evolutionary computation’ by Akio Watanabe and Hitoshi Iba: Authors propose an optimisation system of frequency curves with Interactive Evolutionary Computation (IEC). They compared various frequency models by evaluating the convergence performance by Genetic Algorithm to fit one of frequency curves of real human singing. The IEC interface can optimise frequency curve easily by questionnaire results.
- 4 ‘Strict and efficient solution methods for robust programming problems with ellipsoidal distributions under fuzziness’ by Takashi Hasuike and Hideki Katagiri: Authors consider robust programming problems with ellipsoidal distributions including fuzziness. Since this kind of problem is not well defined due to randomness and fuzziness, it is hard to solve it directly. Therefore, introducing chance constraints, fuzzy goal and necessity measures, the proposed model is transformed into the deterministic equivalent problems.
- 5 ‘Cluster ensemble in adaptive tree structured clustering’ by Takashi Yamaguchi, Yuki Noguchi, Kenneth J. Mackin and Takumi Ichimura: Authors describe a new clustering method of adaptive tree structured self-organising feature map (SOM), which is a kind of divisive hierarchical clustering techniques. This method divides the data sets regardless of data size in feasible time. A cluster ensemble method is also embedded in their proposed method.
- 6 ‘Effects of state of eye movements before saccade on efficiency of response to stimulus – comparison of search efficiency between fixation and smooth pursuit states’ by Atsuo Murata and Makoto Moriwaka: Authors describe how the state of eye movement before saccade affected the response to a stimulus. Using an eye-tracking system, the eye movement during the experimental task was measured. The response time to a stimulus was also measured. Some implications for the application of the results to the traffic safety or automotive ergonomics were given.

- 7 'Basic study on effectiveness of tactile interface for warning presentation in driving environment' by Atsuo Murata, Kouki Tanaka and Makoto Moriwaka: The aim of this study was to get insight into the development of tactile interface for automobile warning system. It was investigated whether the important driving information such as the existence of a pedestrian in the right and left peripheral visual fields can be recognised faster using tactile warning system as compared with auditory warning system. Authors describe some experimental results such as the comparison of young adults and older adults.

Each paper presents an ambitious but realistic challenge, based on the authors' own expertise. We do hope that the journal audience will enjoy reading this special issue. As a concluding note, we would like to thank the authors for providing excellent papers and timely extended revisions. Thanks are due to all the reviewers, who help us to shape this special issue. Finally, we gratefully acknowledge the support of Professor Lakhmi C. Jain and Professor Mika Sato-Ilic, the Honorary Editor and Editor-in-Chief of this journal, respectively, for giving us the opportunity to compile this special issue.