Editorial

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Biographical notes: Zhihua Cui is an Associate Professor in the School of Computer Science and Technology at Taiyuan University of Science and Technology, China. He received his PhD in System Engineering from Xian Jiaotong University in 2008. His current research interests are in swarm intelligence and bio-inspired algorithms. He has published nearly 100 international journal and conference papers. He takes the Editor-in-Chief of *IJBIC*, *IJWMC* and *JBIC*, and several international journals editorial members, while he also serves as the Conference Chair, Local Chair, and Programme Chair for nearly 30 international conferences.

Halina Kwasnicka is the Deputy Director for Scientific Researches of Institute of Informatics, and the Head of Division of Artificial Intelligence at the Faculty of Computer Science and Management, Wroclaw University of Technology. She was or is a Leader in a number of research projects on applications of intelligent methods, images similarity, images auto-annotation, and medical images analysis. She is active in international cooperation. She has published over 150 papers, five books (in Polish) and has presented a number of invited lectures. She is currently serving in editorial boards of several journals and many conferences. Besides reviewing the scientific works in Poland, she has been invited to review candidates for the award of tenure/professors and PhD thesis in different countries.

Rajan Alex is a Professor in Computer Science at West Texas A&M University, Canyon, Texas. He has been with the university for more than 17 years. He earned his PhD in Applied Mathematics and MS in Computer Science from Texas Tech University. His research interests include applications in artificial neural networks and resolution of problems using fuzzy logic. He has resolved problems in supply chain management, regression analysis, linear and non-linear programming, and neural networks using fuzzy logic. He has authored and co-authored over 40 publications including journal papers and conference proceedings. He currently serves as the Conference Chair for the 2012 Conference on Computing Science in Colleges (South Central Region). He has also served on the organising committees of several conferences.

Bijaya Ketan Panigrahi is working as an Associate Professor in the Department of Electrical Engineering, IIT Delhi, New Delhi, India. He has been in teaching and research since 1990. His research interests are in swarm intelligence and evolutionary computing algorithms and its application in power system planning and operation. He also works in the area of machine intelligence and its application to various domain of engineering.

Swarm intelligence is the discipline that deals with natural and artificial systems composed of many individuals that coordinate their activities using decentralised control and self-organisation. In particular, the discipline focuses on the collective behaviours that result from the local interactions of the individuals with each other and with their environment. Examples of systems studied by swarm intelligence are colonies of ants and termites, schools of fish, flocks of birds, herds of land animals.

We believe that the series of works in this special issue provide a useful reference for learning the current progress on swarm intelligence. In total, six papers have been selected to reflect the call thematic vision. The contents of these studies are briefly described as follows.

In the paper, 'A new chaos particle swarm optimisation algorithm and its applications for transportation continuous network design problem', Changxi Ma et al. propose a chaos multi-population particle swarm optimisation algorithm for dealing with the optimisation of transportation continuous network design problem. In this algorithm, multi-population parallel tactics are introduced to improve the global optimising ability, and the chaotic search, which behaves well in local searching, is introduced to improve the solution. The transportation continuous network design problem is solved based on chaos multi-population particle swarm optimisation algorithm. Two examples are presented to compare the proposed method with some existing algorithms. The simulation results show the new particle swarm optimisation algorithm can effectively alleviate the problem of premature convergence and strengthen the global searching ability.

In the paper, 'Optimising maximum power output and minimum entropy generation of Atkinson cycle using mutable smart bees algorithm', Mofid Gorji et al. propose a new improved artificial bee colony (ABC) algorithm which uses 'mutable smart bee' (MSB) instead of conventional bees to optimise the maximum power output (MPO) and minimum entropy generation (MEG) of an Atkinson cycle as a multi-objective constraint thermodynamic problem. The results have been checked with some of the most common optimising algorithms, such as Karabogas original ABC, bees algorithm (BA), improved particle swarm optimisation (IPSO), Lukasik firefly algorithm (LFFA) and self-adaptive penalty function genetic algorithm (SAPF-GA). MSB is capable of maintaining its historical memories for the location and quality of food sources, and also a small chance of mutation during the searching process is considered for this bee. These features were found as strong elements for mining data in constraint areas and the results will prove that claim.

Consensus protocols are distributed algorithms in networked multi-agent systems. An important measure of the protocols is the convergence speed. In the paper, 'Fast distributed consensus seeking in large-scale sensor networks via shortcuts', Yilun Shang considers the convergence behaviour of a discrete-time consensus protocol over large-scale sensor networks with uniformly random deployment in an area. This paper locates specific nodes in the network and adds shortcuts among them so that the number of iterations to reach average consensus drops dramatically. Numerical simulations are provided to demonstrate the effect of different amounts of shortcuts.

Social emotional optimisation algorithm (SEOA) is a new swarm intelligent technique that simulates human behaviour. In human society, the emotion guides each individual to make decisions so that his/her behaviour may provide some profits. However, due to the simple setting motion, the emotion changes cannot provide enough materials. Therefore, in the paper, 'Social emotional optimisation algorithm with emotional model', Zhanhong Wei et al. design a new emotional model based on the OCC model. In this model, one three-dimensional emotional space is used to calculate individuals' different emotion according to different emotional changes. Simulation results show the proposed method is effective and efficient when dealing with multi-modal famous benchmarks, especially for high dimensional cases.

As a new swarm intelligent algorithm, group search optimiser (GSO) attracts many scholars' attention. However, it is performance is not good. To overcome this shortcoming, a new group search optimiser based on quadratic interpolation method (QIGSO) is proposed by Jian Yao et al. in which one local optimum is estimated. In this paper, 'Using QIGSO with steepest gradient descent strategy to direct orbits of chaotic systems', Zhuanghua Zhu incorporate a new strategy, steepest gradient descent strategy into the methodology of QIGSO to enhance the exploitation capability. This new variant of QIGSO (QIGSO-SDO) provides little estimation error, and obtains a better performance near the local optima. In this paper, QIGSOSDO is employed to solve the directing orbits of chaotic systems, simulation results show this new variant increases the performance significantly when compared with the standard version of group search optimiser.

Agent-based computational economics (ACE) is used to study on the social science fields. It can powerfully advance a distinctive approach to social science. In the paper, 'Agent-based model and simulation on firm size', by applying the ACE idea, Zhentao Shi et al. built a group behaviour evolution model in order to directly study the

emergence of organisation behaviour from individual interactions. This model shows the effect of the interactions among behaviour agents on the size and maximum benefits of the firm. Firstly, through analysing the organisation behaviour, the based-agent group behaviour evolution model is provided, and the modelling method and the internal architecture are described in detail. Then, the local details and implementations of the model are shown. Finally, the simulation results explain how the micro-individual interactions affect the macro-organisation behaviours, and the analysis of the simulation results show that infinite expansion of the firm size could lead to profit shrinkage. In the summary, the paper briefly summarises the research contents and significance, and further illustrates that by paying attention to the micro level of a general behaviour, the complex phenomena may emerge from a set of given rules in a simulation. Moreover, the direction of further research is brought forward.

For this special issue, we received abundant responses from researchers. Overall, we feel that six papers cover quite a spectrum of what is a novel yet highly important research field.