
Editorial

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Biographical notes: Kai Gao is a Professor at the School of Information Science & Engineering, Hebei University of Science and Technology, Shijiazhuang, China. He received his PhD from Shanghai Jiaotong University in 2007. From 2010 to 2010, he was a visiting scholar in the University of the West of England, Bristol, UK. Currently, he is the Director of the Discipline Construction Office of the School of Information Science & Engineering, Hebei University of Science and Technology. He is an associate editor of the *International Journal of Computer Applications in Technology*. His research interests are broadly in the area of artificial intelligence and big data mining. He has been in charge of several scientific research projects, and published three monographs and more than 50 papers in international journals and IEEE conferences.

The 7th International Conference on Modelling, Identification and Control (ICMIC-2015) was conducted during 18–20 December 2015 at Sousse, Tunisia. The conference provided an excellent forum for professionals, academics, and researchers to share knowledge and results on Modelling, Identification and Control, Computer Science and Information Technology. The broad areas of ICMIC-2015 were Control & Computer Science, and Innovation & Engineering Management.

With the fast development of computer application technology, the research and application on modelling, computing and information fusion have become more and more important. Generally, modelling is a representation of a system using mathematical concepts and language, while system identification is a set of mathematical models of complex systems. Information fusion, on the other hand, is the process of integration of multiple data and knowledge representing the same real-world object into a consistent, accurate, and useful representation, and its goal is to combine relevant information from more data sources into a single one that provides a more accurate description than any of the individual data sources.

In this special issue of the *International Journal of Computer Applications in Technology*, we are delighted to select 12 research articles reporting on some important applications of computer science and information technology. These papers presented in the ICMIC-2015 have been expanded in line with the reviewer recommendation and audience questions.

The Guest Editor would like to thank all the authors for submitting their manuscripts in this special issue, and to acknowledge the reviewers for their contributions in reviewing the papers and providing constructive comments to the authors. The Guest Editor would like to specially thank Prof. Quan Min Zhu (the Editor-in-Chief of *IJCAT*) for his great help and support in organising and coordinating the publication of this special issue. Finally, the Guest

Editor would also like to specially thank Prof. Lijie Jiang (the Standing Deputy Editor of *Journal of Hebei University of Science and Technology*) for her great help and support in coordinating the special issue.

It is hoped that this special issue will provide a useful reference for informing recently developed applications of computer science and information technology. The contents of the selected 12 articles are described briefly as follows:

First, there are some pattern recognition and processing papers. The paper titled ‘Study on licence plate location algorithm in complex weather’ presents an adaptive licence plate location algorithm to improve locating accuracy of licence plates in the case of images collected in conditions of complex weather or insufficient light, and the wavelet coefficients are used to adjust the contrast of image. The paper titled ‘An improved image denoising method based on contourlet transform and NeighShrink algorithm’ presents a new improved image denoising method, and an improved NeighShrink algorithm based on contourlet transform has been proposed, and the proposed algorithm is used in image denoising of the non-destructive testing for elevator parts. The paper titled ‘Research on face recognition based on DRNLGBP’ proposes a DRNLGBP algorithm based on DIMPCA and non-uniform local Gabor binary pattern method combined with random sampling. The paper titled ‘Research on the image segmentation of icing line based on NSCT and 2-D OSTU’ proposes a segmentation method based on NSCT and 2-D OSTU, by using NSCT to implement de-noising processing of images and introducing combined threshold methods of improved genetic algorithm and 2-D algorithm OSTU for image segmentation.

Second, there are some researches on information integration and soft computing, merging of information from heterogeneous sources with differing conceptual, contextual and typographical representations. The paper titled ‘Research of intelligent professional search engine

based on agent' proposes an improved fusion algorithm combined the rtf and page-rank algorithm which can retrieve according to the synonym and the relevant word to increase the precision and the recall ratio of the professional engine. The paper titled 'Analysis on sustainable development of manufacturing industry in Hebei Province based on synergetic degree' presents a synergetics theory based application, and it analyses the order degree of each subsystem and the synergetic degree of the sustainable development manufacturing industry system, and then proposes relative suggestions for improving the sustainable development of manufacturing industry based on the analysis. The paper titled 'Construction of logistics level evaluation system and application on Wuhan city circle' presents an evaluation system built from the aspects of politics, economy, society, transportation and resident consumption level to estimate the logistics levels of the cities in Wuhan city circle.

Third, there are some papers focusing on control. The paper titled 'Application of control quality evaluation technology in complex industrial process' shows that the control quality evaluation technology is used to evaluate industrial control system of the synthetic ammonia decarbonisation process, and then the particle filter method is used to estimate and predict the reason of control quality becoming poor, and the simulation results show that the control quality evaluation technology can not only be simple and effective for complex industrial process, but also estimate the cause of quality control index variation.

Fourth, there are some papers on information fusion, focusing on integrating multiple data and knowledge into a consistent, accurate, and useful representation. In the paper 'Application of EEMD and neural network in stress prediction of anchor bolt', signals are decomposed into intrinsic mode functions (IMFs) by ensemble empirical mode decomposition (EEMD), and the normalised ratios of energy and correlation coefficients of IMFs are also discussed. Meanwhile, a de-noising method based on empirical mode decomposition and spectral kurtosis is proposed in paper titled 'Non-destructive test method of rock bolt based on D-S evidence and spectral kurtosis', and the experiment results demonstrate that the method can improve spectral kurtosis of the reconstructed signal and decrease the error of anchor length.

Fifth, two papers focus on modelling and identification. In the paper 'Mechanical acoustic fault diagnosis based on improved semi-blind extraction method', a mechanical failure diagnosis method based on reference signal frequency domain semi-blind extraction is proposed. A dynamic particle swarm algorithm is used to construct improved multi-scale morphological filters which are applicable to mechanical failure in order to weaken the background noises. In the paper 'Analysis on seismic dynamic response and liquefaction area of tailings dam', the dynamic response of the dam under the action of flood and earthquake is simulated by using a finite element software, and the seismic dynamic responses of the dam with respect to acceleration, stress, displacement, liquefaction area and stability are analysed.