SPECIAL ISSUE EDITORIAL

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This special issue of Journal of Systems Science and Systems Engineering recognizes the contributions of authors and participants in the 16th ISPE International Conference on Concurrent Engineering (CE2009), 2009 ASME International Manufacturing Science and Engineering Conference (MSEC) and 2009 IEEE International Conference on Systems, Man and Cybernetics. Among related papers presented in these conferences, the guest editors have selectively identified and invited the authors to re-write and extend their works to full-length papers for re-submission to the special issue.

The papers selected for the special issue demonstrate the ideas, models, and methods used to the theory, methodology and applications relating to systems science and systems engineering. The five papers published in this featured collection illustrated how data mining and optimization methods are applied in the aspects of R&D, manufacturing and services to enhance the performance of systems.

R&D and Manufacturing Systems

Ou-Yang and Juan, the authors of “Applying Process Mining Approach to Support the Verification of a Multi-Agent System,” develop

an evaluation approach to analyze the feasibility of a developing agent system so that the improper workflow of an agent system can be found in the early design stage to reduce the failure risk of implementation. Qin and Hwang, in their paper “A Two-Level Genetic Algorithm for Scheduling in Assembly Islands with Fixed-position Layouts,” focus on the scheduling problem in assembly islands environment with fixed-position layouts. They propose a two-level genetic algorithm to obtain a near optimal solution to minimize the makespan. The performance analysis of the proposed algorithm is conducted in the case examples of airline or ship industries.

Further, in the aspect of R&D knowledge management, patent documents are critical external sources of knowledge that reveal the core technology underlying new inventions. Patents also serve as a strategic data source that can be mined to discover state-of-the-art technical development and subsequently help guide R&D investments. In “Clustering Patents Using Non-exhaustive Overlaps,” Trappey et al incorporate an ontology schema to extract and represent patent concepts. A clustering algorithm with non-exhaustive overlaps is developed to overcome deficiencies with exhaustive

clustering methods used in patent mining and technology discovery.

Service Systems

Data mining has been successfully applied in many fields to find useful information stored in vast databases. In the paper “Applying Particle Swarm Optimization and Honey Bee Mating Optimization in Developing an Intelligent Market Segmentation System” by Chiu and Kuo, a clustering methodology which integrates particle swarm optimization and honey bee mating optimization methods (PSHBMO) is developed for market segmentation. By using the cluster analysis method, enterprises can design various marketing strategies and advertisement models to target customers with common characteristics in order to meet the needs of most customers, enhance the strength of their companies, increase customer loyalty, and obtain better profits. Numerous studies in collaborative planning, forecasting, and replenishment (CPFR) have focused on exploring its implementation in retailing context. Fu et al, the author of “A Study on Factors for Retailers Implementing CPFR – a Fuzzy AHP Analysis,” investigate the importance of critical impact factor for implementing CPFR using Fuzzy Analytic Hierarchy Process (AHP) approach. The results of this study provide precise information with regard to allocating optimal resources for retailers implementing CPFR.

Amy J.C. Trappey is a chair professor and Dean of College of Management at the National Taipei University of Technology. She is also a Distinguished University Professor at the National Tsing Hua University. Dr. Trappey’s

research interests are in e-business, knowledge engineering and management, particularly focusing on intellectual property and patent analyses. She is the American Society of Mechanical Engineers (ASME) Fellow and serves as the executive board member of International Society of Productivity Enhancement (ISPE). She is also an active member of IEEE and SME.

Kai-Ying Chen received the B.S., M.S. and Ph.D. degree in Mechanical Engineering from National Taiwan University in 1988, 1990 and 1996 respectively. After graduating, he served in Industrial Technology Research Institute as an engineer for 4 years. Dr. Chen is currently an associate professor with the Department of Industrial Engineering and Management in National Taipei University Technology, Taipei, Taiwan, China. His research interests are in the field of shop floor control, manufacturing information system, Petri-Net modeling and RFID applications.

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