International Journal of Computational Intelligence Systems, Vol. 7, Supplement 2 (July 2014), 1-2

Guest Editorial

Special Issue on Artificial Intelligence & Industrial Engineering

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Industrial engineering theories and applications are facing ongoing dramatic paradigm shifts due to the evolutionary artificial intelligence research and the advance of information techonologies[1]. The introduction of new information, communication, and sensing technologies have enhanced the capabilities and potentials for artificial intelligence that are having profound effects on the management decisions[2], demand forcast[3], services[4], production[5, 6,7],quality control[8, 9, 10, 11, 12], unit commitment[13], optimal versioning of information products[14], and logistics and supply chain management[15] involved in conventional industrial engineering fields in different industries from high-tech manufacturing to food production. While big data is accumulated due to the fully automation manufacturing facilities and logistics systems for business integration, various solutions and techniques have been developed to extract useful information[8,9,10,11,12,16] and derive effective manufacturing intelligence to address new challenges[2,3,4,5,6,7,15]. In particular, this special issue aims to provide a systematic overview of state-of-the-art research and applications of artificial intelligence & industrial engineering. Original, high quality papers of theoretical developments and empirical studies with scientific novelty and insights were invited from the scholars in various fields for review and publication. All the submitted manuscripts were carefully blind peer reviewed by at least two referees, in accordance with *International Journal of Computational Intelligence Systems (IJCIS)* review procedure and finally fourteen papers were selected for this special issue.

The paper "A joint optimization strategy for scale-based product family positioning" by Y. Ji et al. proposes a multi- objective joint optimization model that balances the external competitive advantage and internal manufacturing cost. Pareto solutions for product family positioning are generated by genetic algorithm. Based on a case of motor product family positioning, results reveal that the joint optimization model excels in supporting product family positioning.

The paper "A simulation study of outpatient scheduling with multiple providers and a single device" by X. Wu et al. deals with reducing patient waiting time and operational costs, and improving resource utilization by developing an model which was structured for a multi-provider clinic with a single device and with revisit procedures. The results reveal that the total patient waiting time and total resource idle time are minimized.

The paper "A QoS-oriented web service composition approachbased on multi-population genetic algorithm for Internet of things" by Q. Li et al. focuses on minimizing the objective function value and reducing the execution atthe same time. This study proposes a multi-population genetic algorithm (MGA) that is developed to solve a multi-criteria goal programming (MCGP) models for QoS-oriented service composition. The experiment results demonstrate that the outstanding performance of MGA in terms of powerful searching capability and increasing population diversity.

The paper "Adaptive generalized ensemble construction with feature selection and its application in recommendation" by J. Tian et al. presents an adaptive generalized ensemble method with refined feature selection strategy and self-adjusted mechanism for ensemble size. Experimental results indicate that the proposed algorithm can achieve good classification performance, small feature subsets and compact ensemble structure.

Co-published by Atlantis Press and Taylor & Francis

The paper "Analysis of manufacturing systems using simulations in terms of material flow cost accounting" by S. Takakuwa et al. focuses on the environmental impacts of production lot-size determination by structuring simulation models of a multi-variety and small-batch production system in an actual forging factory. It demonstrates that the proposed procedure of application of simulation with material flow cost accounting (MFCA) can perform both a dynamic analysis and a static analysis.

The paper "A data mining approach for analyzing semiconductor MES and FDC data to enhance overall usage effectiveness" by C.-F. Chien et al. proposes a data mining framework that integrates fault detection and classification (FDC) and manufacturing execution system (MES) data to enhance the overall usage effectiveness (OUE) for cost reduction. The empirical study clearly shows that the practical viability of this approach. The extracted information and knowledge is helpful to engineers to enhance decision quality and enhance operational effectiveness.

The paper "A virtual metrology approach for maintenance compensation to improve yield in semiconductor manufacturing" by K.-Y. Lin et al. applies a virtual metrology (VM) approach for maintenance compensation in semiconductor manufacturing that uses the real time tool process parameter streams to predict the product metrology value, and thus builds the relation model to compensate values of the product recipe to adjust the equipment settings. An empirical study was conducted and validated in a fab. Now the intelligent system embedded with the developed algorithm has been implemented successfully.

The paper "Application of interactive algorithm based on hesitancy degree in product configuration for customer requirement" by R. Dou and C. Zong applies interactive algorithm based on hesitancy degree for product configuration to meet customer requirements and thus enhance customer satisfaction.

Finally, the paper "Demand forecasting procedure for short life-cycle products with an actual food processing manufacturer" by R. Gaku employs artificial intelligence approach to deal with the needs for demand forecast for short life-cycle products and conducts an empirical study for food processing manufacturer.

While this special issue has successfully addressed some of critical research needs for artificial intelligence and industrial engineering for emerging research needs for future production and services, we would like to express our sincere appreciations to all of the authors, the anonymous reviewers, and the Editors of *International Journal of Computational Intelligence Systems*, for their invaluable contributions and great supports to this special issue.

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