
Editorial

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1 Introduction

Asia is nowadays the biggest manufacturing centre in the world, which calls for a broad range of applications of Industrial Engineering techniques. Emerging economy, such as service and environmental industries, also brings in new challenges and opportunities for Industrial Engineers. We need to innovate theories and methodologies of IE that have been long traditionally orienting manufacturing industries to satisfy the requirement of service industries for IE now and in future.

This special issue presents a selection of papers presented at the 1st IIE Asian Conference 2011 held on June 10–12, 2011 at Shanghai Jiao Tong University (SJTU), Shanghai, China. The conference was jointly organised by SJTU and The Hong Kong University of Science and Technology. The conference provided a chance for the scholars to share their theoretical results and practical experiences.

2 Overview of the papers included in the special issue

On the conference, nearly 100 authors presented the results of original research or innovative practical applications relevant to industrial engineering. Totally 11 papers were selected after the review process. All the papers were improved according to the comments from the reviewers.

The first paper by Song et al. proposes a block queuing model with a batch service size to model the current patient flow congestion in China healthcare system. An incentive rule is used for referral patients in order to improve the service efficiency. The experimental results show that this method is effective.

The second paper by Pan et al. proposes a three-phase method for assigning proper staff to specific task in MRO (Maintenance, Repair and Overhaul/Operation) services. An improved genetic algorithm and specific evaluation pattern are used to rank the feasible service staff group. This paper is practical and easily implemented.

The third paper by Zhang et al. proposes an improved electromagnetism-like mechanism (EM) algorithm with modified solid and wets local search for global optimisation. Numerical experiments show that the proposed algorithm performs better than the others including original EM algorithm and all kinds of particle swarm optimisation methods.

The fourth paper by Long et al. proposes a method of product feature usability analysis based on web semantic mining. The information related with product feature usability is extracted via web miner, and then measured and evaluated by evaluation model. Finally, a case study is used to validate the proposed method.

The fifth paper by Ma et al. reviewed the three stages of the evolvement of Industrial Engineering from the human-oriented perspective and analysed the new problems faced by existing theories in modern production process. Meanwhile, the differences between traditional IE and Neuro-IE, between Neuroergonomics and Neuro-IE were discussed.

The sixth paper by Yan et al. presents a demand model where the demand follows a homogeneous Poisson process and demand changes with seasonal trend. This model is analysed by Laplace transforms to obtain the general demand calculation formulae. Finally, the experiment study shows the effectiveness of the proposed model.

The seventh paper by Chen et al. proposes a multistage-EDA-enhanced logistic regression approach to classify the patients in ICU (intensive care unit) in order to have the proper treatment. Three stage analysis are introduced: (1) risk factor screening based on exploratory data analysis (EDA); (2) patient classification by multiple logistic regression (MLR); (3) stepwise MLR for further factor elimination. Finally, the experiments show that the proposed method provides more satisfactory identification performance in terms of receiver operating characteristic curve and area under the curve.

The eighth paper by Meng and Zhang first summarises the virtual reality (VR) systems for wayfinding studies, including desktop, large display, head-mounted display (HMD), Fish Tank and CAVE (Cave Automatic Virtual Environment) systems. And then

the evaluation metrics, including task performance, physical behaviours and cognitive rationale, are reviewed for wayfinding performance. The factors affecting wayfinding performance are divided into four categories: personal factors, wayfinding strategy factors, environmental factors, and navigation support tool factors. Finally, the summary and perspective research are provided.

The ninth paper by Wang and Chiu proposes a genetic algorithm (GA) combining with response surface method to solve unrelated parallel machine scheduling problems with setup times. GA is used to achieve initial processing sequences on unrelated machine. Experimental design with response surface method is used to determine the parameter for GA. Numerical experiments show that the proposed methods can achieve good results.

The tenth paper by Cheng et al. describes the system and method for streamlining the design processes in order to minimise design waiting and waste and to balance design task flow. The basic objects of design stream line and their relationship are modelled. Based on complex network theory, fuzzy logic and genetic algorithm, the key technologies, including process breakdown, task analysis, resource skill definition and line balance, are used to build the design stream line. Finally, a prototype system verifies the feasibility of the concepts of design stream line.

The eleventh paper by Kawamura et al. proposes a method of assigning factors to three-level supersaturated design to screen many potentially relevant factors with a smaller number of runs. The usefulness of the assignment columns created using this method is shown by comparing the presented factor assignment method with the existing one in terms of level of non-orthogonality.

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