Introduction

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Biographical notes: Wencheng Wang received his MS and PhD degrees from Shandong University in 2005 and 2011, respectively. He is currently working in Weifang University. From 2006 to 2007, he was a visiting scholar at Qingdao University of Science and Technology, engaged in the research of information processing and automatic detection technology. His group has published and authored more than 40 papers on academic journals and conferences, four book chapters and seven patents. His main research interests include digital information processing and intelligent computing. He was awarded the Young Researcher's Award of Weifang University in 2010.

With the development of modern society, information science has become an important research field. Especially, the information techniques have facilitated, accelerated, and promoted the research and application on automatic systems.

Information technology refers to the technology expanding human information function under the guidance of the basic principle and method of the information science. The application includes the computer hardware and software, network and communication technology, application software development tool, etc. Since the popularity of the computer and internet, it is increasingly common for people to use the computer to produce, process and disseminate various forms of information.

Along with the rapid progress of information in the world, the world's demand on the information is rapidly increased, and the information technology has become the cornerstone of today's economic activity and social life. Under such circumstance, the information industry has become the strategic industrial department for each country in the world, especially the developed countries to compete for the investment and development. In the past 10 years, the growth rate of the world information equipment manufacturing and service industry is twice of the corresponding GDP, and becomes the key industry to promote the economic growth.

The application of information technology in the enterprise management includes four fields:

1 Strategic information system: the strategic information system can create the company's strategic advantage through the information system.

2 Office automation: The automatic processing proficiency of the daily management in the enterprise can be improved effectively through e-mail, thus reaching the 'paperless' realm.

3   Production automation: The whole process of product development, manufacturing and management can realise the computerisation, strengthen the material management, effectively implement the operation control automation system, and ensure the improvement of product quality system.

4   Artificial intelligence system: Based on the precise and high-speed computer, the system which simulates human intelligence can be developed. Using the system can solve the complex problem without fixed model and make the related decision.

The development of information technology and the application in the enterprise management make the enterprise management model which has been popularised in the Western developed countries for over one hundred years is facing or has occurred the complete change. In the new management model, the information is the core of the management, and the method to obtain the information is one of the important factors deciding the management organisation form. Therefore, in the global information economy based on the knowledge and information, the enterprise management can not leave the support of information technology. The network information technology decreases the sections to pass the information within the enterprise, quicken the speed, and make the rapid response to the internal and external environment.

The influence of information technology on the enterprise can be mainly manifested in the following aspects:

1   Reduce the enterprise cost: POS system and EDI system widely used in the world nowadays can not only ensure the work's accuracy and timeliness, and improve the product inventory. However, MRPII system commonly used in the manufacturing industry can rationally arrange the production, improve the part matching rate, shorten the production cycle and accelerate the capital turnover.

2   Shorten the development cycle of new product: such as the automobile manufacturing industry in Japan and the USA, with the application of CAD to design new car model, the development cycle is shortened from 5 years to 1 year, and the high efficiency is remarkable.

3   Improve the product and service differentiation: the enterprise uses the information technology to innovative the product service, and generally speaking, it is not easy to be followed by the peer, thus improving the product service differentiation and increasing the competitive advantage.

4   Improve the conversion cost, and improve the relationship among the enterprise, consumer and supplier: the introduction and application of information technology can make the enterprise become unique and advantageous among the peers, thus not only locking the original market, but also constantly attracting new consumers to open up new markets.

The main objective of this issue is to invite submission of highly innovative research papers on recent trends and challenges in the field of information technology and automation. And its aim is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in information technology and automation. The contribution to the state of the arts can be summarised from the following topics:

- engineering management

- business intelligence and applications

- web service and information management

- financial management and applications

- information system applications

- identity and trust management

- social aspects of information technology

- computer science and engineering

- electrical engineering and applications

- project and quality management

- data mining technology and application industrial design

- intelligent detecting technology.

In response to the call-for-papers, we received as many as 15 high-quality papers. After careful review, only five papers out of them were accepted in this special issue. They are surely very high quality papers and these papers deal with wide ranging issues on information technology; from data mining, business process reengineering, intelligent information processing technology communication engineering, to computer-aided design system, and so on.

The contributions presented in this special issue provide ample discussions of the above perspectives. The paper by James T. George and Elizabeth Elias proposes an optimal and multiplier-less implementation of a continuously variable bandwidth sharp FIR filter. The key features essential for fractional changes in the bandwidth ratio are low complexity, easy re-configurability and fine-tuning capability. So, an FRM filter with continuous coefficients is designed and the filter coefficients are synthesised in the canonic signed digit format. It is formulated as an optimisation problem and meta-heuristic algorithms such as differential evolution algorithm (DEA) and harmony search algorithm (HSA) are deployed to determine the optimised filter coefficient values. To preserve the canonical nature of the filter coefficients, the latter are encoded using a look-up table. The look-up table also provides the number of signed power-of-two (SPT) terms in the CSD numbers.

Professor Kannimuthu Subramanian and Dr. Premalatha Kandhasamy propose a high-utility pattern mining algorithm for the itemsets featured with negative utility values. The traditional frequent pattern mining can withdraw the frequency pattern from the transaction database, while it fails to take the utility factor into account. The utility-based data mining concerns the economic utility in data mining and intends to incorporate the predictive and descriptive data mining task utility. The high-utility itemset mining process can produce various candidate itemsets, for the frequent itemset mining's downward closure property is not suitable for the utility mining, and the existing algorithm fails to support the itemsets featured with negative utility value. In the paper, the author proposes the mining high utility itemset with negative item value

through UP-GNIV method, and compares with HUINIV-Mine. The proposed approach is proved to be better.

Mrs. B. Sridevi and Dr. S. Rajaram propose to reduce the automated secured handoff delay through minimising the authentication cost in the mobile WiMAX network entry process. Due to the huge bandwidth, high speed and large distance, it is unbelievable to enhance WiMAX. However, the key challenge weakens WiMAX, such as the handoff delay, and it is the most important factor presently. It is vital to help the authorised user to avoid the security threat in handoff, while it can increase the handoff delay. Considering the importance of authentication and handoff, it needs an adaptation to reduce the authentication cost without the security compromise. In the paper, three different mechanisms are proposed to reduce the authentication cost in the handoff through the users, and it can enhance the mobility of users. Concerning the users frequently to the visited base station, the technique introduces three kinds of important caching, and it can save over a half of the authentication cost. Moreover, it is suitable for ping-pong users travelling in the border and moves between BSs, and it can minimise the authentication cost to 88.57%. The proposed method is proved to reduce the handoff delay.

Mr. Arnab Banerjee proposes the information technology enabled automation and process reengineering for supply chain leagility. In the paper, in order to realise the lean and agile supply chain, a framework is proposed to match the business process reengineering with information technology. The framework is capable to offer a whole perspective on the business process and the detailed steps by properly adopting the technology enabled process. Suited tools are proposed to automate and simplify the business tasks and process. A successful case is proposed to strengthen the research approach. Adopting ERP and supply chain systems automates and reengineers the business process enabling leagility. The case can help prove that a leagile supply chain can be adopted for a technology enabled process reengineering and automation.

Yongwen Huang, Zuhua Jiang, Lijun Liu, Bo Song and Lijie Han propose to build a knowledge map model for product design. The knowledge share and reuse become difficult due to the knowledge presentation and the scattering distribution of knowledge resources. Knowledge map is an important knowledge management tool to provide the knowledge sharing platform for the knowledge assets. In the paper, a knowledge map model and the building approach are proposed. The knowledge map based on knowledge reuse process and the support to product designs are presented, and a framework of knowledge map system is built. The key techniques of knowledge indexing, knowledge operation on the knowledge map, and the implementation of knowledge map are analysed. With XML description method and scalable vector graphics format map, the concept knowledge map and process knowledge map can reduce the islands of knowledge. The automotive interior design process can verify the methods and technologies.

In this special issue, you will find papers regarding intelligent information processing technology, computer engineering, computer-aided design system, and so on.