Editorial

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Biographical notes: P.K.S. Prakash received his PhD in Industrial Engineering from University of Wisconsin-Madison, USA in 2010 and another PhD in Engineering from University of Warwick, UK in 2012. His other educational background includes a BTech in Metallurgy and Materials Engineering which he gained in 2005 from National Institute of Foundry and Forge Technology, Ranchi, India, and an MS in Industrial and System Engineering from University of Wisconsin-Madison, USA awarded in 2006. His work on root cause analysis (RCA) for resolving no-fault-found issues has resulted in an award-winning spin-out called Warwick Analytical Software Ltd, UK (SAP Most Innovative Start-up 2013, DEMO god winner 2013). He is currently working as a Project Manager at University of Warwick, UK. He has provided business and research consulting services in several industrial domain including manufacturing, banking, e-commerce and healthcare services. His current research focuses on developing fundamentals for self-resilient system and big data analytics.

Nagesh Shukla is a researcher in the field of industrial and systems engineering, particularly in the areas of data analytics, simulation modelling and computational intelligence. He has a PhD in Engineering from University of Warwick, UK and Bachelors in Technology from National Institute of Foundry and Forge Technology, India. He has research experience in working with industries and government agencies on large scale projects. He has contributed to more than 30 research publications in conferences, journals, book chapters, and technical reports. He has a patent on healthcare systems data analysis in USA Patent Office based on his PhD research work. He is also part of infrastructure simulation and modelling team at SMART, University of Wollongong, Australia. In 2013, he has been named as one of the Chief Investigators to support modelling work in National Health and Medical Research Council (NHMRC) funded project where lifetime simulation models of drug users in NSW is being developed for cost benefit analysis of treatment mix available for drug addicts. He also acts as a reviewer to journals such as *International Journal of Production Economics*, *International Journal of Production Research*, *Sensors*, *IEEE Systems Man Cybernetics, Computers and Mathematics with Applications*, and others.

Availability of large amount and variety of information and decision-making problems in various complex systems ranging from transportation, supply chain, energy to logistics; have placed the need for the development and successful application of advanced intelligent approaches. It is argued that intelligent approaches such as analytics and optimisation techniques drive smarter decisions, faster actions and optimise outcomes in this era. However, there are no single best analytical or optimisation technique to deal with the challenges in various complex systems. It is due to the fact that a technique/approach may show a better performance for a given problem instance; but, it does not guarantee better solution when applied to decision-making problems in other areas. Hence, the development of new solution techniques or modifications of existing techniques are very much needed to suit the decision-making problem at hand. This special issue focuses on fast-growing and promising area of intelligent approaches applied to complex systems that have drawn great deal of attention from researchers over the years.

One particular focus of this special issue is to bring together different aspects of nature inspired computing research work on neural networks, support vector machines, fuzzy logic and evolutionary computation. This special issue cover a wide range of applications from pattern recognition and system modelling, to intelligent control problems and biomedical applications. These methods in itself or combined with others can inform each other for better accuracy, computational time, and computational cost. The anticipated areas of application for this research theme are transportation systems, manufacturing and industrial systems, logistics and supply chain, healthcare systems.

One of the major methodological areas which have received considerable attention in past decade is nature inspired evolutionary optimisation approaches. These methods have been successfully used in resolving optimisation problems in variety of areas such healthcare (Buscema et al., 2005), transportation (Lau et al., 2009; Shukla et al., 2013b), logistics (Shukla et al., 2012, 2013a), industrial planning (Kim et al., 2003), scheduling (Burke and Newall, 1999; Hindiet al., 2002; Marchiori and Steenbeek, 2000), manufacturing (Gonçalves and Resende, 2004; Fleming and Purshouse, 2002; França et al., 2005; Moon and Seo, 2005; Verma et al., 2008), and service systems (Canfora et al., 2005; Shukla et al., 2014). Das et al. (Das et al., 2014) have tried to link different phases of product life cycle (PL) such as design, manufacturing and service via surrogate modelling and multi-disciplinary optimisation (MDO) approach. Prakash et al. (2012b) proposed a constraint-based simulated annealing (CBSA) approach to solve the disassembly scheduling problem. Prakash et al. (2012a) presented approach for metrology site selection in semi-conductor industry using forward component site selection (FSCA). Shukla et al. (2013a) presented a novel approach by using portfolio of algorithms to address logistics problem considering stochastic demands and mobility allowance. Tyagi et al. (2007) proposed an evolutionary sticker-based DNA algorithm to solve an optimal part orientation problem in layered manufacturing. Tyagi et al. (2011a) developed a fuzzy goal programming model for optimisation of lead time and cost in an overlapped product development using a Gaussian adaptive particle swarm optimisation-based approach. Further, a non-discrete ant colony optimisation (NdACO) has been proposed by Tyagi et al. (2011b) in order to find out the optimal lead time and cost in a product development project.

Another area is data mining and machine learning where several intelligent approaches have been used to resolve real life problems. Such examples include rainfall prediction (Kusiak et al., 2013a), wastewater influent flow prediction (Wei et al.,

2012), wastewater quality prediction (Kusiak et al., 2013b; Verma et al., 2013), over-temperature prediction (Kusiak and Verma, 2012) where authors have developed/utilised advanced neural network approaches to develop long-term prediction models. Shukla et al. (2013c) have used fuzzy-neural network approach for solving travel mode choice prediction for large scale urban transportation systems simulation and planning. Another approach based on pattern mining has been applied to the radio frequency identification dataset in hospital for staff and patient movements analysis (Shukla et al., 2014).

We are happy to edit this special issue and believe that it brings together the some of the cutting edge research in multi-disciplinary domain. The special issue on intelligent approaches to complex systems is a compilations of some of the cutting-edge research going in different domains by utilising advance analytics and optimisation tools from decision sciences to address the problems in manufacturing processes, inventory management, weather prediction, and supply chain. The guest editors would also like to thank Professor Nickolas S. Sapidis, Editor-in-Chief of *International Journal of Intelligent and Engineering Informatics* and, for his invitation to edit the special issue. Special thanks are herewith extended as well to all contributors and anonymous referees for their valuable time and efforts in the review process.

The special issue starts with bibilometric analysis by Mukherjee on two most utilised methods in decision sciences analytic hierarchy process (AHP), technique for order preference by similarity to ideal solution (TOPSIS) and their hybrid methods. The issue presents a novel knowledge driven approaches by Tiwari and Tiwari to solve sensor placement problem in assembly processes. Verma et al. propose an approach for capacity planning under price and demand uncertainty using inter programming or optimisation and Markowitz mean-variance model for risk assessment. To address one of the complex predictive problem of weather forecasting recurrent neural network is proposed and validated by Biswas et al. To enhance the classification capability, Iquebal and Pal have proposed integration of the Mahalanobious Taguchi transformation with artificial bee colony optimisation. To further enhance the autonomous decision-making capability at different stages in the lamb supply chain a multi-agent architecture-based framework is proposed by Mishra et al. Fergani et al. developed discrete particle swarm optimisation (DPSO) and applied it to reconstruct image structure.

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