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## Editorial

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**Biographical notes:** Manoj Kumar Tiwari is an Associate Professor in the department of Industrial Engineering and Management, IIT Kharagpur, India. He has 17 years of teaching and research experience at different levels. He works in the area of evolutionary computing, modelling and simulation of manufacturing system, supply chain management, planning and scheduling of automated manufacturing system etc. He has published around 125 articles in leading international journals and serving as Editorial Board Member of eight international journals. He is Associate Editor of two leading international journals: *Journal of Intelligent Manufacturing and International Journal of Systems Science*. He is well known for mentoring undergraduate students and motivates them to pursue career through research route.

Ravi Shankar is Group Chair of Sectoral Management and Associate Professor of Operations and Information Technology Management at the Department of Management Studies at Indian Institute of Technology Delhi, India. He has nearly 23 years of teaching and research experience. His areas of interest are supply chain management, knowledge management, flexible manufacturing systems, quantitative modelling, etc. He has over 100 publications in journals and conference proceedings. His publications have appeared in various journals including the *European Journal of Operational Research, International Journal of Production Research, Computers and Industrial Engineering, International Journal of Production Economics, Computers and Operations Research, International Journal of Supply Chain Management*, etc. He is the Executive Editor of *Journal of Advances in Management Research*.

Felix T.S. Chan received his BSc Degree in Mechanical Engineering from Brighton Polytechnic (now University), UK, and obtained his PhD in Manufacturing Engineering from the Imperial College of Science and Technology, University of London, UK. He is now an Associate Professor at the Department of Industrial and Manufacturing Systems Engineering, The University of Hong Kong. His current research interests are logistics and supply chain management, distribution coordination, systems modelling and simulation, supplier selection. To date, he has published nine book chapters, over 190 referred international journal papers and 180 peer reviewed international conference papers. He is a chartered member of the Chartered Institute of Logistics and Transport in Hong Kong.

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With great pleasure, we welcome you to this Special Issue of the *International Journal Computer Applications in Technology* (IJCAT). The topic of the issue, Intelligent Techniques to Resolve Complex Problems in Logistics and Supply Chains, is deeply justified. Recent developments reveal that modern manufacturing industries are giving priority to high production with implicit requirements on the precision, timeliness, convenience, responsiveness, quality and reliability of services offered to them in less time and at

lower cost. Further, the issues related to design, manufacturing, supply chain and logistics are independently becoming more complex. In order to overcome these challenges, problems are to be solved within a reasonable time with or without exact results. Traditional methods employed to tackle these problems often result in large computational cost and suboptimal results owing to their inefficient searching ability. Advances in artificial intelligent techniques, such as evolutionary computation,

have generated keen interest among leading researchers and practitioners to solve these problems in less computational time.

We invited people from academia and industry to submit papers on their recent research experience in the application of evolutionary computation to the fields of design, manufacturing, logistics and supply chain. We have received overwhelming response world wide. After a rigorous review, nine papers have been accepted for publication in this issue. Each of the accepted papers employs evolutionary approaches to manufacturing, design, logistics and supply chain problems. In fact, submissions were mainly about either a novel approach applied to a well-known problem or an established method exploited for solving the real manufacturing, design, logistics and supply chain problems.

We have selected high quality papers dealing with simulation-based evolutionary multi-objective optimisation, evolutionary algorithms, particle swarm optimisation, multi-agent approach, and neural networks solutions to logistics and supply chain problems.

The first paper, by H. Ding, L. Benyoucef and X. Xie, resolves the supplier selection problem using a simulation based evolutionary multi-objective approach. In addition, a simple case study from the textile industry is presented to illustrate the applicability of the proposed approach for the real-world applications.

Further, M.A. Falcone, H.S. Lopes and L.S. Coelho demonstrate the application of nature-inspired evolutionary algorithms for the optimisation of a simplified supply chain, including stocks, production, transportation and distribution, in an integrated production-inventory-distribution system. The authors have implemented a bunch of algorithms and finally suggest the evolutionary programming and differential evolution for resolving the intricacies of supply chain.

In the next paper, S.R. Yadav, Y. Dashora, R. Shankar, F.T.S. Chan and M.K. Tiwari present a multi-objective problem concerned with selecting a product family and designing its supply chain. Further, the paper accounts for the impact of process flexibility, plants location, scale efficiency and their control aspects with a concept of pre-optimisation decision making. In the testbed, a case study for a wiring harness supplier of an automated guided vehicle (AGV) manufacturer is considered and an interactive particle swarm optimisation is proposed.

Next, the paper by P.K.H. Lau and H.C.W. Lau discusses the development of an Optimized Transport Logistics System (OTLS), which adopts case-based reasoning methodology to select appropriate heuristic rules for planning the cargo loading and selecting the appropriate carrier.

The paper by B. Tenneti and V. Allada presents a methodology based on Ant Colony Optimization (ACO) for

robust supplier selection by extending the robust engineering techniques to the supply chain domain.

In the sixth paper, D. Ben-Arieh and A.M. Choubey formulate an optimisation problem of minimising the production cost using platform architecture while satisfying the part assembly constraints. In their paper, the problem is addressed via a genetic algorithm and finally an example related to the family of cordless drills is provided for the illustration.

The following paper, by Q. Cao and K.B. Leggio, describes a multi-agent framework for controlling the information distortion known as the bullwhip effect, which is present in the supply chain network. Here, a case study is undertaken to demonstrate the performance of proposed framework in a traditional sequential supply chain.

The paper by P.H. Kuo, A. Krishnamurthy and C.J. Malmberg proposes a cycle-time model for autonomous vehicle storage and retrieval systems using the queuing network approach to accomplish sufficient accuracy and computational efficiency for the system. Subsequently, the model is validated through a simulation model designed for empirical test problems considered in the paper.

The last paper, by S. Lee, X. Zhao, A. Shendarkar, K. Vasudevan, and Y.J. Son, introduces a fully dynamic epoch time synchronisation method that provides a considerable reduction in simulation runtime and communication overhead. Subsequently, the authors have implemented the introduced methodology on an automotive supply chain to demonstrate the effectiveness and accuracy of proposed approach against the traditional methodology.

## Acknowledgements

We would be most ungrateful if we do not recognise the high response we received from authors throughout the globe. Although only a small percentage of submissions could make it to the publication, having undergone rigorous blind review, we offer our most sincere thanks to all the authors who considered this special issue as a probable outlet for their research and findings.

We extend our heartfelt thanks to all the authors and reviewers who contributed to this special issue in one way or other. It was really an arduous task selecting best among the better papers. We would like to thank Prof. Mohammed Dorgham, Editor in Chief of IJCAT as, without his encouraging assistance in having the pre-requisites for the special issue, we would not have been able to produce it. Also special thanks are due to Dr. Liz Harris, Journal Manager of IJCAT, for her constant support and required updates.

Finally, we must mention the assistance rendered by Research Promotion Cell (RPC), NIFFT, in the form of its

dedicated research scholars who helped to manage the special issue from its conceptualisation through to publication.

We hope we have been successful in providing insights and state of the art for current research concerned with AI

applications and simulation in various engineering problems. Also, we anticipate stimulating further research in modelling and solving various facets of engineering design, management, logistics and supply chains using the emerging modern AI and simulation tools.