# Preface: Computational intelligence and data science

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**Biographical notes:** Chia-Yu Hsu is a Professor at the Department of Industrial Management, National Taiwan University of Science and Technology, Taiwan. His research interests include big data analytics, machine learning and deep learning, manufacturing intelligence and predictive maintenance. He received Young Outstanding Researcher Award sponsored by the Ministry of Science and Technology, Young Outstanding Researcher Award sponsored by Chinese Institute of Industrial Engineers (CIIE), Young Outstanding Researcher Award sponsored by Computer Society of the Republic of China (CSROC), Sayling Wen's Award for Young Outstanding Researcher sponsored by Service Science Society of Taiwan, and Young Outstanding Researcher Award sponsored by Yuan Ze University.

Kuo-Yi Lin is a Professor of the College of Business in Guilin University of Electronic Technology, China. He is the Director of the China Excellent Business Decision Making Society, executive committee members of Intelligent Simulation Optimization, scheduling committee of China Simulation

Society, and member of Natural Computing and Digital Intelligent City Committee of China Artificial Intelligence Society. He is mainly engaged in intelligent manufacturing, federated learning and transfer learning.

Faming Zhang is a Doctor (Postdoctoral Fellow of Pittsburgh University), second level Professor, Doctoral Supervisor and Dean of the Business School of Guilin University of Electronic Science and technology. He is a candidate of the national 'Ten Million Talent Project', winner of the honorary title of 'Young and Middle-aged Expert with Outstanding Contributions', expert enjoying the 'Special Government Allowance of the State Council', member of the 2018–2022 Industrial Engineering Teaching Steering Committee of colleges and universities of the Ministry of Education, main scientific, technological and technological leaders of Jiangxi Province, and winner of Jiangxi Outstanding Youth Fund.

Jialun Hu is currently a Senior Lecturer (Associate Professor) in Business Analytics at the Royal Holloway University of London Business School. He was initially trained as an Automatic Control Engineer and then joined IfM for his PhD study. He has worked at multiple higher education institutes and taught courses in operations management, supply chain, sustainability and information technology management. His current research interest lies in the intersection area between low carbon management, sustainable industrial system and business analytics.

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Most companies in manufacturing and service industries are faced with the challenges for effectively making decisions induced by big data. While big data is accumulated due to the fully automated manufacturing facilities, logistics and planning systems, and service systems for business integration, various techniques in computational intelligence and data science (CIDS) have been developed to extract useful information from the growing complexity, amount, and heterogeneity data and derive effective computational intelligence with advanced decision technologies to address new challenges. By seamless integration of intelligence, modelling, and decision technologies combined recent big data analytics, machine learning, and information technology, CIDS are important to empower future manufacturing and service industries.

This special issue of the *International Journal of Internet Manufacturing and Services* (*IJIMS*) aims to address recent developments and empirical studies of CIDS in the related topics and to examine research issues concerned with quantitative and other modelling techniques to improve the decision quality and management effectiveness for manufacturing and service industries. We are seeking papers that present new research contributions in CIDS field, preferably illustrated by real world examples. They were all subjected to the double-blind peer review process and five papers were selected for this special issue.

The first paper 'Hybrid evolutionary algorithm with sequence difference-based differential evolution for multi-objective fuzzy flow-shop scheduling problem' by Zhang, Li, Yang and Gen proposed a hybrid evolutionary algorithm with sequence difference-based differential evolution (HEA-SDDE) to solve fuzzy flow-shop scheduling problem (FFSP). The experiment compares HEA-SDDE with multiple algorithms on 12 problems of different scales for the multiobjective fuzzy flow-shop scheduling problem (MoFFSP). Machine learning is not only applicable to the traditional application scenarios of manufacturing and service industries, but also plays a strong role

in the emerging fields, such as action recognition and other fusion fields based on artificial intelligence technology. For the software development of action recognition, the main problem of subject recognition is to eliminate the interference of background. The second paper 'U$^2$ Net-Plus and background removal-based PIFu-HD: human body reconstruction in complex background' by Wang, Liu, Lin and Hwang proposed a new method, background removal-based PIFu-HD, using well-constructed dance images and videos for relevant modelling and comparison.

In order to alleviate the information asymmetry in the capital market, the disclosure of corporate information with higher quality is more conducive to the decision-making of investors. In the financial industry, the timeliness of data symmetry existing in information disclosure is crucial for making optimal decisions. The third paper 'Ownership structure, fair value measurement and audit fees – empirical evidence from China' by Li, Li, Lu and Chai examined the impact of equity structure and fair value measurement on audit fees by using multiple regression analysis. Moreover, the fourth paper 'Discuss the impact of corporate governance and external auditing on the quality of corporate information disclosure based on unbalanced data' by Chai, Cui, Li, Zhu and Tang shown that the combination of corporate governance and external audit extends the influence on corporate information disclosure.

With the accumulation of large amounts of data in the financial market and service industry, how to make effective use of the data is more conducive to the managers to make investment decisions and to the policy builders to improve the current regulation of the financial market and industry. Thus, machine learning in finance is not only about prediction but also interpretation of data both qualitative and quantitative to detect the existence of financial irregularities. The fifth paper 'Research on financial irregularities identification: a machine learning perspective' by Chai, Zhu, Yang, Lan, Ou and Li verify the effectiveness of SMOTE algorithm in improving the imbalance data of financial irregularities of Chinese listed companies and use LightGBM algorithm to sort the ten factors of characteristic importance of financial irregularities of Chinese listed companies. The sixth paper 'Exploring the relationship between corporate social responsibility in China, auditor reputation and debt financing costs based on unbalanced data' by Lan, Zhu and Tang investigated the relationship between corporate social responsibility in China, auditor reputation and the cost of debt financing, and use empirical methods to verify the moderating effect of auditor reputation on the relationship between corporate social responsibility and the cost of debt financing.