

Special Session

Code: 15m1i

Title

Intelligent operation, maintenance, and scheduling of industrial manufacturing processes

Proposer / Main Organizer

Provide complete address/affiliation, phone, email and biography.

The main organizer will be the primary contact person to whom all correspondence will be sent.

Ziyan Zhao, Postdoctoral Researcher (Main Organizer)

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Ziyan Zhao received his B.S., M.S., and Ph.D. degrees in 2015, 2017, and 2021, respectively, from the College of Information Science and Engineering, Northeastern University, Shenyang, China. He is currently a Postdoctoral Researcher and Lecturer in Northeastern University. From October 2018 to October 2020, he worked as a visiting Ph. D. student in the Department of Electrical and Computer Engineering, New Jersey Institute of Technology, Newark, NJ, USA. His research focuses on intelligent manufacturing, intelligent optimization algorithm, industrial big data, and production planning and scheduling. Till now, he has published over 20 international journal and conference papers in the above areas.

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Kaixiang Peng received his B.E. degree in automation and M.E. and Ph.D. degree from the Research Institute of Automatic Control, University of Science and Technology Beijing, Beijing, China, in 1995, 2002 and 2007, respectively. He is a Professor in the School of Automation and Electrical Engineering, University of Science and Technology Beijing, Beijing, China. He has over 120 publications, including three books. His research interests are in intelligent manufacturing, fault diagnosis, prognosis, and maintenance of complex industrial processes, modeling and control for complex industrial processes, and control system design for the industrial processes.

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Shixin Liu received the B.S. degree in mechanical engineering from Southwest Jiaotong University, Sichuan, China, in 1990, and the M.S. and Ph.D. degrees in systems engineering from Northeastern University, Shenyang, China, in 1993 and 2000, respectively. He is currently a Professor with the College of Information Science and Engineering, Northeastern University. He has over 100 publications, including

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IEEE Member or SMC Society Member

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Kaixiang Peng, IEEE Member and SMC Society Member, IEEE SMC Beijing Capital Chapter Vice Chair

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Category

Cybernetics

Number of Expected Paper Submissions:

6 or more

Keywords

Application of Artificial Intelligence; Deep Learning; Evolutionary Computation; Heuristic Algorithms; Hybrid Models of Neural Networks, Fuzzy Systems, and Evolutionary Computing; Machine Learning

Brief Description and Justification (200-250 words):

Add a short description (200 to 250 words).

Industrial manufacturing processes, including process manufacturing and discrete manufacturing, are complex systems in the real world. Operation, maintenance, and scheduling problems are the keys to an industrial manufacturing process and affect its efficiency, energy consumption, production costs, safety, and stability. In recent years, the theory and technology of artificial intelligence have been developing vigorously. The applications of artificial intelligence technology, like deep learning, machine learning, evolutionary computation, heuristic algorithms, are gradually affecting all walks of life in the real world. Combining artificial intelligence technology with a specific industrial manufacturing process to solve its intelligent operation, maintenance, and scheduling problems is an important demand of industry and a hot research field of academia. Related research can improve operation efficiency, ensure safety and stability, and save energy consumption and production costs, which can further improve the level of intelligent

manufacturing in an industrial manufacturing process. There has been some existing research on this kind of problem. However, lots of related problems keep open.

This special session provides a platform to exchange research works, technical trends, and practical experience related to fault diagnosis, process control, operation research, applied mathematics, and management science. This session is expected to broaden the intelligent manufacturing research community and promote the application of artificial intelligence in industrial manufacturing processes.