

IEEE TRANSACTIONS ON NEURAL NETWORKS AND LEARNING SYSTEMS
Special Issue on
Deep Integration of Artificial Intelligence and Data Science for Process Manufacturing

Process industries mainly consist of oil and gas, chemicals, nonferrous metals, iron and steel, pulp and paper, and power plants, which serve as pillars of the continuous manufacturing industry. At present, process industries are faced with several challenging demands to increase profits, reduce materials consumption, enhance safety, and protect the environment. Meanwhile, a huge amount of data generated from daily manufacturing and production remains to be analyzed, understood and used for optimization of decision-making in various levels of the manufacturing process in the presence of constant variations of the market. Therefore, it is timely and of paramount importance to deeply integrate artificial intelligence (AI), computation intelligence (CI) and data sciences for the process industries to achieve accurate control and optimal decision-makings with the help of ubiquitous sensing, proactive understanding, and automated learning. For example, deep learning, a very popular AI technique, has been shown to be effective in recognition of operation modes, fault detection and risk analysis in the process industry. Other recent advances in AI and CI, such as statistical machine learning, reinforcement learning, and evolutionary computation, are promising in dealing with environmental perception, modelling, optimization, decision-making and autonomous intelligent control in various problems in the process industry.

This special issue will feature the most recent developments and the state-of-the-art of AI, CI and data sciences for the process industry. The targeted audience includes both academic researchers and industrial practitioners. It aims to provide a springboard to facilitate interdisciplinary research and share most recent developments in various related fields. Topics of interest for the special issue include but are not limited to the following areas:

- Interpretable deep learning methods in modelling and diagnosis
- Hybrid modelling integrating first principles and data
- Data-driven dynamic and multiple-objective optimization in plant-wide optimization
- Distributed optimization and control in plant-wide optimization
- Automated machine learning in modelling, optimization and decision-making
- Human-Computer Interaction in modelling, optimization and decision-making
- Imbalanced learning in modelling and monitoring
- Zero and one-shot learning and transfer learning in modelling and monitoring
- Generative adversarial learning in modelling and monitoring
- Autonomous intelligent and cooperative control
- Computational intelligence in plant operation and troubleshooting
- Big data in safety monitoring, risk assessment and environmental protection
- Visualization and interpretation and virtual manufacturing

IMPORTANT DATES

- 30, October, 2019: Paper submission deadline.
- 30, January, 2020: Reviewer's comments to authors.
- 30, April, 2020: Submission deadline of revisions.
- 30, August, 2020: Final decisions to authors.
- 30, October, 2020: Publication date.

GUEST EDITORS

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SUBMISSION INSTRUCTIONS

- Read the Information for Authors at <http://cis.ieee.org/tnnls>.
- Submit your manuscript at the TNNLS webpage (<http://mc.manuscriptcentral.com/tnnls>) and follow the submission procedure. Please, clearly indicate on the first page of the manuscript and in the cover letter that the manuscript is submitted to this special issue. Send an email to the leading editor Prof. Feng Qian (fqian@ecust.edu.cn) with subject "TNNLS special issue submission" to notify about your submission.
- Early submissions are welcome. We will start the review process as soon as we receive your contributions.