Special Section on:
Data Driven Control and Learning Systems

With the development of information sciences and technologies, practical processes, such as chemical industry, metallurgy, machinery, electronics, transportation, and logistics, pose enormous research and technical challenges for control engineering and management due to their size, distributed and multi-domain nature, safety and quality requirements, complex dynamics and performance evaluation, maintenance and diagnosis. Modeling these processes accurately using first principles or identification is almost impossible although these plants produce and store huge amount of impersonal valuable data on the plant and equipment operations in every moment during production. This challenges the existing control theory and technology, and meanwhile urgently pushes scientists and engineers to develop new data driven control and methodology to solve control and optimization issues for these complex practical plants. The high-tech hard/software and the cloud computing enable us to have ability to perform a complex computation real time, which makes the implementation of data driven control and methodology in practice possible. Thus, it would be very significant if we can learning the systems’ behaviors, discovering the correlation relationship of system variables by making full use of those on-line or off-line process data, to directly design controller, predict and assess system states, evaluate performance, make decisions, perform real-time optimization, and conduct fault diagnosis. For this reason, the establishment and development of data-driven control theory and methodology are urgent issues in both the theory and applications.

This Special Section is to provide a forum for researchers and practitioners to exchange their latest achievements and to identify critical points and challenges for future investigation on modeling, control and learning of complex practical systems in a data driven manner. The papers to be published in this issue are expected to provide latest advances of data driven approaches, particularly the novel theoretical-supported ideas and algorithms with practical applications. Topics include, but are not limited to, the following research areas:

- Model-free or data-driven control approaches and applications
- Data driven learning and control approaches and applications
- Data driven decisions, performance evaluation, fault diagnosis, etc. and applications
- Complementary controller design approaches and applications between data driven and model based control methods
- Data driven modeling approaches for complex industrial processes
- Data driven optimization methods and applications
- Robustness on the data driven control
- Neural network and reinforcement learning control and practical applications in model-free environment.

Manuscript Preparation and Submission


Please submit your manuscript in electronic form through: [https://mc.manuscriptcentral.com/tie-ieee/](https://mc.manuscriptcentral.com/tie-ieee/).

On the submitting page, in pop-up menu of manuscript type, select: “SS on Data Driven Control and Learning Systems”, then upload all your manuscript files following the instructions given on the screen.

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**Timetable**

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