56th IEEE Conference on Decision and Control (CDC 2017)

Invited Session on Learning-based Control

Melbourne, Australia, December 12-15, 2017

Data science and machine learning have demonstrated tremendous success in the last decades in applications such as image recognition, recommender systems, or question answering. Compared to these applications, which can largely be subsumed as *static* problems, learning-based control systems take a special role within the world of statistical and machine learning. The coupling of a learning algorithm with a control loop requires a combined treatment as a *dynamic* process and raises fundamental questions about stability, robustness, and safety, which are generally less critical in most traditional application areas of machine learning. In order to leverage the potential of data-based and learning methods for control, we therefore believe that principled approaches integrating machine learning and control theory are needed, which extend beyond the methods and tools of the individual disciplines.

We invite experts working at the intersection of machine learning and automatic control to contribute to this Invited Session on *Learning-based Control*. After the success of the first Invited Session on Learning-based Control at CDC 2016, we are excited to organize one (or more) sessions on this topic also for this year's CDC in Melbourne, Australia. The session shall again provide a platform to exchange latest results among experts, foster the interest on learning-based methods within the controls community, and thus help to create a community of interest on Learning-based Control.

Albeit not uniquely defined, we understand Learning-based Control as the rather broad research area that lies at the intersection of machine/statistical learning and automatic control. Potential topics for this Invited Section include, but are not limited to:

- Machine/Statistical learning approaches to control and control design
- Machine/Statistical learning approaches to system identification
- Examples: reinforcement learning, iterative learning control, Gaussian processes, Bayesian optimization, neural networks, etc.
- Stability and robustness of learning-based control
- Safe learning
- Learning-based approaches to adaptive and dual control
- Applications of learning-based control

Organizers

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Support

This Invited Session is supported by the Max Planck ETH Center for Learning Systems and the IEEE CSS Technical Committee on Intelligent Control.

Invited Session at CDC

The IEEE Conference on Decision and Control (CDC) is recognized as the premier scientific and engineering conference dedicated to the advancement of the theory and practice of systems and control (http://cdc2017.ieeecss.org/). Invited session papers must confirm with the CDC submission policy (full papers, no abstracts) and undergo the same review process as regular papers (see http://cdc2017.ieeecss.org/cfp.php for details). Please note that invited session papers therefore **count as full peer-reviewed conference papers** (which is in contrast to e.g. workshop papers at some other conferences).

How to contribute?

Please let us know **by January 31** if you are generally interested in contributing a paper to this Invited Session (short yes/no suffices; maybe with a tentative title if available). Your definite response, whether you would like to contribute, including the submission title, abstract, and list of authors, will be required by **February 24** at the latest to give us time to prepare the proposal. The paper submission deadline is on **March 20**.

Important dates

Expression of interest (by e-mail to one of the organizers)	**January 31, 2017**
Definite response including title, abstract, authors (by e-mail to one of the organizers)	**February 24, 2017**
Initial Submission deadline for invited session paper (through conference submission system)	**March 20, 2017**
Notification of acceptance	mid-July
Final submission of accepted papers	September 20, 2017
Conference	December 12-15, 2017

We look forward to your contributions. Please do not hesitate to contact us if you have any question.

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