

IEEE Transactions on Neural Networks and Learning Systems

Special Issue on

Biologically learned/inspired methods for sensing, control and decision making

Traditional methods for sensing, control and decision making do not easily tolerate errors or unpredictable failures, nor do they adapt to changing environments. On the other hand, system reliability relies on its ability to tolerate and adapt to changing environments and unexpected faults. This requires that the system should have learning and self-reconfiguring capabilities and must also have the ability to be aware of itself and the environment under which it is operating, which calls for reliable sensing and decision making. Adding such adaptation and fault-tolerance from traditional engineering perspective is rather costly. By contrast, biological systems are adaptable to new environments, can handle a large amount of uncertainty in their perception and processing of the surrounding world, and can collaborate with other biological systems to solve complex problems. These facts tend to suggest that biologically learned and inspired methods may offer a fundamentally new domain in addressing system robustness and reliability, thus seeking for inspiration from biological systems for modeling, control and decision making has become a promising avenue. The goal of the special issue is to collect new ideas and contributions at the frontier between the biological systems and engineering systems.

SCOPE OF THE SPECIAL ISSUE

We invite original contributions related to biomimetic research and methods, adaptive neural network control, theories, algorithms for learning, reasoning, and decision making, modeling and analysis, as well as experimental studies and applications. Topics include but not limited to:

Bio-inspired/learned neural network structure for signal processing and control design

- Brain-like control design and application
- Reinforcement learning and/or Spike neuron-based control
- Cognitive computing and intelligent control
- Multiscale and Meta-learning by novel neural network
- Stability, robustness, performance issues of dynamical systems including biology elements in the loop
- Autonomous decision and control using neural network
- Generative adversarial networks (GANs) and zero-shot learning
- Neural plasticity based neural network with application to control system
- Modeling and control of self-restructuring systems

IMPORTANT DATES

- 31 October 2020 — Deadline for manuscript submission
- 31 December 2020 — Notification for authors
- 28 February 2021 — Deadline for submission of revised manuscripts
- 30 April 2021 — Final decision of acceptance

GUEST EDITORS

- Yongduan Song, Chongqing University, China, ydsong@cqu.edu.cn
- Jennie Si, Arizona State University, USA, si@asu.edu
- Sonya Coleman, Ulster University, UK, sa.colman@ulster.ac.uk
- Dermot Kerr, Ulster University, UK, d.kerr@ulster.ac.uk

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 guest editor Prof. Yongduan Song (ydsong@cqu.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.

