Call for Papers

Special Issue on Deep Learning in Biological Image and Signal Processing

Studies of the fundamental structural and functional properties of life, from molecules to cells, tissues, organs, and complete organisms including human life, nowadays critically depend on advanced imaging systems and measurement devices generating data of ever-increasing quantity and complexity. Deep learning of artificial neural networks has emerged as a powerful tool for extracting the relevant information from such data and helping researchers to detect patterns that may be unnoticeable to the human senses.

Many scientific and engineering challenges remain to improve the efficacy of deep learning methods and make them trustworthy enough for use in critical biological image and signal processing tasks. Deep learning needs to become more explainable and interpretable, more generalizable and transferable across applications, especially where little or only weakly annotated data is available, and optimal network design needs to become more automated. Signal processing theory, information theory, statistics and other fields could play a key role in filling the gaps.

This Special Issue of the IEEE Signal Processing Magazine provides a venue for a wide and diverse audience to survey recent research advances in deep learning for applications in biological image and signal processing. Fostering cross-pollination between data-driven and model-driven approaches, the Special Issue aims to inspire researchers in developing novel solutions to current challenges of deep learning in biological applications.

Topics of interest include but are not limited to:

- Deep multimodal bioimage/biosignal processing
- Integrated data-driven and model-driven approaches
- Explainable deep learning for bioimage/biosignal analysis
- Unsupervised and weakly-supervised deep learning
- Deep learning strategies in imaging genetics
- Graph neural networks for connectivity analysis
- Privacy-preserving distributed deep learning
- Deep learning for biomarker discovery
- Generative deep models for disease fingerprints
- Annotation-efficient deep learning strategies

Important Dates

White papers due:	1 February 2021
Invitation notification:	1 March 2021
Full manuscripts due:	1 May 2021
First review to authors:	1 July 2021
Revision due:	1 September 2021
Final decision:	1 November 2021
Final materials due:	1 December 2021
Publication:	1 March 2022

All topics are to be covered from the perspective of applications in biological research. Papers focusing entirely on clinical medical applications will not be considered.

White papers are required, and full articles will be invited based on the review of white papers. The white paper format is up to 4 pages in length, including the proposed title, motivation and significance of the topic, an outline of the proposed paper, and representative references. An author list with contact information and short bios should also be included. **Submitted articles must be of tutorial/overview/survey nature, in an accessible style to a broad audience, and have a significant relevance to the scope of the Special Issue.** Submissions must not have been published or be under review elsewhere, and must be made online at https://mc.manuscriptcentral.com/sps-ieee. For submission guidelines, see the Information for Authors at https://signalprocessingsociety.org/publications-resources/ieee-signal-processing-magazine/information-authors-spm.

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