Tentative Outline

Special Thematic Issue for the journal : Current Bioinformatics

Title of a thematic issue: Deep Learning in DNA- and RNA-sequence Analysis: Advances and New Challenges

Sectional Editor: Dr. Xiangtao Li

Scope of the Thematic Issue:

The recent increase in biomedical data resulting from sequencing technologies has inevitably necessitated machine intelligence approaches to address problems in genome-wide DNA and RNA sequence analysis. Advances in machine intelligence methods mainly derived from machine learning and deep learning to address various tasks pertaining to DNA and RNA profiles.

Compared to the conventional machine learning, deep learning can learn effectively from millions of sequences through parallel implementation on a graphics processing unit (GPU).

However, the existing tools in these tasks are far from perfect and rely heavily on hand-crafted features, and parameter optimization process. Recently, the artificial intelligence algorithms have been utilized to extract the latent information in a self-supervised manner and enable to automatically select the optimal hyperparameters and model architecture, alleviating the need for careful and time-consuming hand-tuning. Importantly, a trained model can also be applied to find biologically relevance that can affect gene regulation.

This research topic aims to bring state-of-the-art research contributions in deep learning to address new problems and improve over existing tasks using DNA- and RNA-sequence. Submitted articles will be evaluated based on their quality and relevance to the research topic.

Keywords: DNA-sequence, RNA-sequence, Computational Biology, Sequence Analysis, Deep Learning, Artificial Intelligence, Machine Learning

Sub-topics:

The sub-topics to be covered within the issue should be provided:

- Artificial Intelligence
- Evolutionary Data Mining
- Deep Learning
- Machine Learning
- Classification and clustering

Tentative titles of the articles

1. A novel deep learning architecture for DNA sequence classification.
2. Analysis of DNA sequence classification using CNN-based models.
3. Trans-Ubiquitination: Transformer-Based Protein Ubiquitination Site Prediction Across Multiple Species.
4. Comparison of artificial neural network models using gene expression data of Alzheimer's disease.
5. High-throughput identification of heme-binding proteins by using multi-feature fusion and selection strategy.
6. SOFB: An Interpretable Deep Learning to Capture Nucleic-acid-binding Residues from Sequence

Information.

Schedule:

✧ Thematic issue submission deadline: 2023/12/31

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