Computational Intelligence and Neuroscience

Special Issue on
Big Data Analytics in Cognitive Neuroscience

CALL FOR PAPERS

Cognitive neuroscience has gained momentum in research on how the human brain works, which can be reflected by the recent launch of the US BRAIN Initiative and the European Human Brain Project. Brain activity data is generated at an unprecedented rate providing an amount of data never seen in neuroscience. It is estimated that a human brain could produce about 200 exabytes of data which will rival the entire digital content of today's world leading to the so-called big data challenge. Big data not only refers to data sets that are large in size, but also covers data sets that are complex in structures, high dimensional, distributed, and heterogamous. The vast quantities of data produced by neurological studies demand big data analytical approaches and techniques. New software tools such as Thunder have been developed which utilizes distributed computing infrastructures to speed up the analysis of data sets that are so large and complex which would take days or weeks to analyze on a single workstation.

This special issue seeks to solicit original research articles as well as review articles on big data analytic methodologies and approaches for neuroscience. It also covers topics related to high performance computational techniques in support of big data analytics.

Potential topics include, but are not limited to:

- Cognitive Neuroscience
    - Neural modeling and neural-computation in a large scale
    - Neural signal processing
    - Brain-computer interfacing
    - Big data management for neuroimaging (fMRI, EEG, MEG, PET, and NIR)
- Computational Intelligence
    - Knowledge based neural networks, probabilistic, spatial, and temporal knowledge representation and reasoning
    - Biologically inspired intelligent agents
    - Neurobiologically inspired evolutionary systems
    - Parallel machine learning techniques
- Data Summarization
    - Data approximation and dimensionality reduction
    - Data summaries for high dimensional data sets
    - Statistical analysis and feature extraction from complex data
    - New sampling methods in analyzing complex or large data
    - Big data visualization techniques
- Computing
    - Data intensive computing techniques
    - Parallel and distributed computational techniques
    - IO efficient indexing methods for big data
    - New computing tools for big data analytics in neuroscience

Authors can submit their manuscripts via the Manuscript Tracking System at http://mts.hindawi.com/submit/journals/cin/bda/.

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