Computational Intelligence and Neuroscience

Special Issue on

Simulation and Validation in Brain Image Analysis

CALL FOR PAPERS

The development of novel data analysis approaches in brain imaging has been extremely fast paced during recent years and novel data analysis tools are essential for the progress in understanding of the brain in health and disease. The quantitative validation of these tools and image processing methods, which they rely on has, however, been lacking far behind. It would be extremely valuable for the method developers and appliers to better understand the advantages and limitations of a particular data analysis method and be able to compare different methods. The major challenge for researchers developing new methods for brain image analysis is the lack of a ground truth against which to validate the newly developed methods. In many areas, there is no public benchmark datasets that are systematically included in validation studies, so that the results could be easily compared across studies. The probable cause for this is that the physiological (e.g., neuronal and metabolic) and physical (e.g., magnetic and electrical) processes underlying brain images are extremely complex. One possible (but not the only one) solution is the development of advanced image simulation platforms which mimic complex physical phenomena behind the brain imaging techniques and build as well on simplified models of neuronal dynamics.

This special issue seeks to solicit original research articles as well as review articles on the development of advanced validation methodologies for brain imaging (fMRI, MRI, EEG, MEG, and PET) as well as the applications of such methodologies to evaluate data analysis algorithms. It also covers image databases for method validation purposes and computational (neuroinformatics) aspects of the method validation.

Potential topics include, but are not limited to:

- Brain image simulation in PET, EEG, MEG, fMRI, and MRI
- Modeling ground-truth in image simulation and the development of valid and realistic simulation models
- Methodologies for method validation in brain imaging (not necessarily to be simulation-based)
- Databases for method validation (with a demonstration of their potential usage)
- Validation studies of data analysis methods in brain imaging
- Studies demonstrating the value of quantitative validation in brain imaging

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

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