Special Issue: Multivariate Approaches in Neuroimaging: Assessing the connectome of Alzheimer Disease.

Journal of Alzheimer Disease

Guest Editors:

Dr. JM Górriz[1], Dr. J.E. Iglesias[2] and Dr. J Ramirez[1]

[1]Dpt Signal Theory, Networking and Communications, University of Granada Spain, gorriz@ugr.es; javierrp@ugr.es

[2]Translational Imaging Group, University College London, UK, e.iglesias@ucl.ac.uk

Abstract:

The increasing spread of in vivo imaging technologies, such as Magnetic Resonance Imaging (MRI), Diffusion Tensor Imaging (DTI), functional MRI (fMRI), Single Photon Emission Computed Tomography (SPECT), Positron Emission Tomography (PET) and other non-invasive techniques such as Electroencefalography (EEG) or Magnetoencefalography (MEG), have meant a breakthrough in the diagnosis of neurodegenerative diseases, such as Alzheimer's Disease (AD). A crucial aspect of AD is the disruption of brain connectivity. Neuroimaging enables the detection and visualization of structural and functional connectivity abnormalities found in these disorders. However, the connectivity matrices describing these processes are still poorly understood, as is their evolution in the course of the disease.

Most of the approaches for brain image analysis are based on *univariate methods*. These kinds of analyses are performed using one single feature at the time. They frequently consist of voxel-wise comparisons of either tissue probability maps (voxel based morphometry) or measures derived from image registration – typically the Jacobian deteminant (tensor based morphometry). However, there exists an increasing interest in *multivariate approaches*. These, in contrast to univariate analysis, can effectively handle information that simultaneously affects the whole brain as well as to characterize the relationship between different regions of interest. Additionally, another solution is to perform a reduced number of discriminative features, such as eigenbrain-based methods, multivariate Gaussian methods, codebook based methods or SVM-based methods.

The aim of this Special Issue in the **Journal of Alzheimer Disease** is to present the current state of the art in the theory of multivariate approaches to assess the evolution of neurodegeneration in Alzheimer Disease, and to provide a quantitative prediction of changes in connectivity as disease progresses. We are interested in articles that explore changes in brain connectivity caused by neurodegenerative disorders such as AD; prediction or evolution from Mild Cognitive Impairment (MCI) to AD; and characterization of AD by multivariate approaches. Potential fields of research covered in the special issue include (but are not limited to):

•Advanced Graph Methods

•Deep Learning Architectures

• Bayesian networks

• Static and dynamic graph analysis

• Prediction networks

• Sparse modeling

• Decomposition Methods

With your agreement to take part, we would request you to submit an abstract in advance of any manuscript submission to the guest editors' email. After that, all contributors should format their articles per the instructions to authors (http://www.j-alz.com/prep/) and submit the manuscripts to our online submission site (http://mstracker.com/submit1.php?jc=jad). Authors should specify in their cover letter that is for the supplementary issue and mention the lead editor´s name.

Please note the submission deadline for this issue: Apr 30, 2017