Visual Computing Forum

Assessing brain connectivity using RS-fMRI and graph theory in the context of open discovery science

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Store Auditorium, floor 2,
Høyteknologisenteret (data blokk),
Thormøhlensgate 55

Abstract:

The observation that spontaneous BOLD fMRI activity is not random noise, but is organized in the resting human brain as functionally relevant resting state networks (RSNs), has generated a new avenue in neuroimaging and cognitive research - where brain connectivity and graph theory are increasingly important concepts for understanding and for computation. One important application area of this technology is the assessment of healthy aging, mild cognitive impairment, and Alzheimer's disease. In this talk I will present ongoing research on brain connectivity and graph analysis methodology applied to the aging brain of healthy elderly people in the Bergen area as part of a larger longitudinal study of cognitive aging, where multimodal MRI examinations, neuropsychological testing and genome wide association (GWAS) data are included. In the functional brain imaging part, two quite different time scales are coming into play: epochs of ~10 min resting state fMRI recordings sampled at 0.5 Hz; and long-term changes in such recordings over a period of ~3 years. The talk will be put in the context of the recent paper by B. Biswal et al. “Toward discovery science of human brain function”, PNAS 2010;107(10): 4734-4739, and the Norwegian Academy of Science and Letters’ Centre for Advanced Study (CAS) 2011-2012 project “Cogniton in aging - contributions of cognitive neuroscience and cognitive neurogenetics”, headed by Prof. Ivar Reinvang, UiO