

Séminaire Neuro : Mathieu Lefort

16 May 2013, 14:00 – 15:30

Titre du séminaire et orateur

SOMMA: Multimodal Processing with Cortically Inspired Paradigms.
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Date et lieu

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Abstract

SOMMA targets to introduce emergent functional properties of cortical computation - such as adaptability to various and changing data or unsupervised and online learning - in the computer science field. These properties are closely linked to the cortical architecture that was transposed to our computational model SOMMA. Such a cortically inspired computation and architecture is applied in SOMMA to multimodality data processing, which is a key point for an artificial - or biological - agent to interact with its environment. Indeed, an agent measures the state of its surrounding environment thanks to numerous sensors providing data in various senses - vision, audition, ... - each one having its own properties. It has to merge these multiple data to obtain a consistent perception of the environment. According to psychological experiments and sensori-motor theories, multimodal merging in SOMMA is obtained by learning and detecting spatial regularities of a multimodal input flow.

SOMMA defines generic cortical maps - one for each modality - composed of cortical columns. Each column learns to discriminate a spatial regularity of the input flow thanks to BCMu learning rule. These discriminations are self-organized in each map by using spatial coding provided by the Continuum Neural Field Theory. Learning and computation in each map is influenced by other modalities - thanks to bidirectional topographic connections between all maps - so that to obtain a joint self-organization and a multimodal perception of each stimulus.