LABORATORY OF COMPUTATIONAL NEUROSCIENCE (LCN)

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Friday, February 17th, 2011
15h15, Room BC03

Computational Neuroscience Seminar

Jonathan BINAS,
Institute of Neuroinformatics, ETH Zurich

State-Dependent Computation in Spiking (Neuromorphic) Systems

Electronic Very Large Scale Integration (VLSI) spiking neural networks are candidate information processing systems for carrying out complex cognitive sensorimotor tasks in real-world applications. However, due to conceptual and technical challenges in configuring these devices and the lack of a clear computational methodology it is difficult to achieve sophisticated behavior.

We introduce a model-based procedure which can be used to implement systems able to solve arbitrary state-dependent tasks. The resulting behavior is comparable to that of classical finite-state machines (FSMs).

The neural architecture is based on interconnected winner-take-all networks, using attractor dynamics to maintain persistent activity states and drive transitions between them.

This provides a first declarative configuration language which can map a high-level computational model onto a network of (VLSI) spiking neurons