Neurorobotic model of a spiking cerebellum: trajectory prediction during a reaching task

Marco Celotto (BA: Physics; MA Physics Student)
Gianluca Baldassarre (Researcher ISTC-CNR)
Daniele Caligiore (Researcher ISTC-CNR)

Topic

- Cerebellum is thought to have a key role in movement refinement and, in general, in the organization of time-locked sequences of actions
- Inferior Olive spikes might have the role of error signals that trigger STDP in cerebellum, implementing a learning mechanism similar to supervised learning
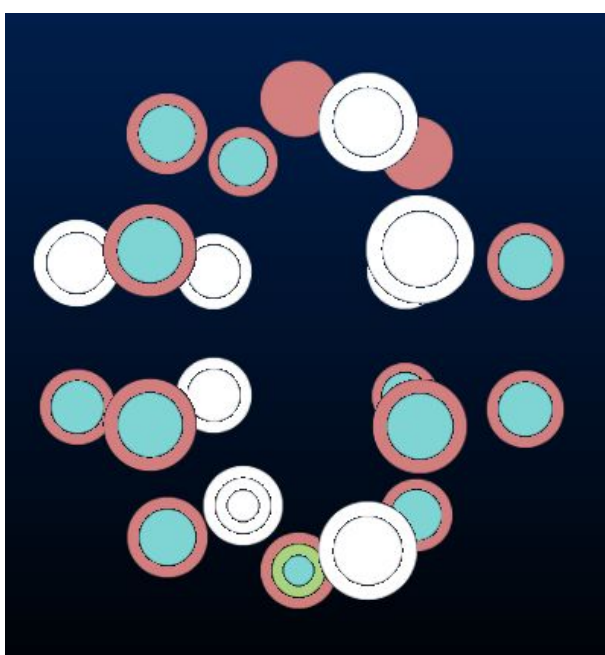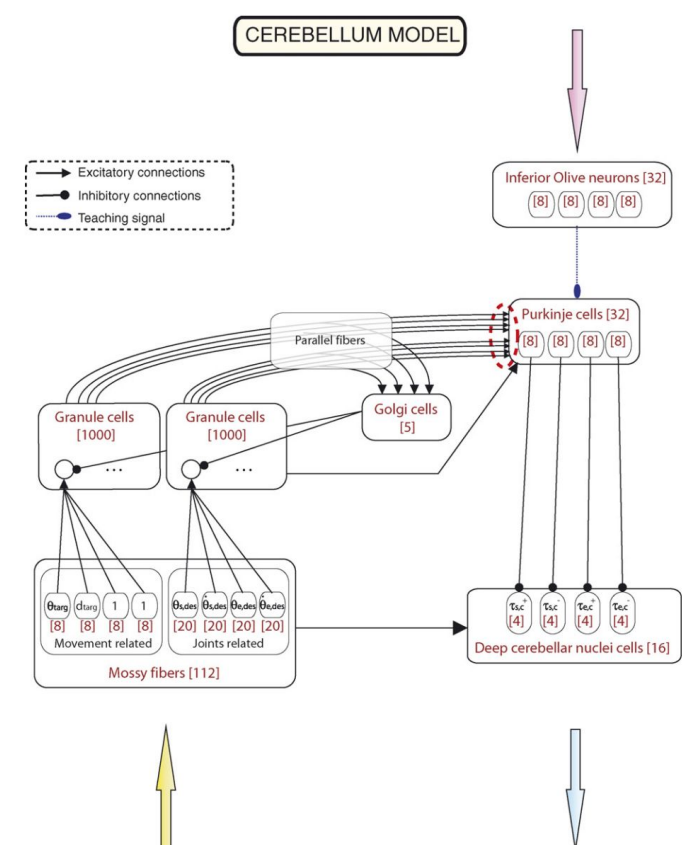
Problems

- Could the cerebellum carry out, through a series of temporal delays, a form of anticipative learning for trajectories prediction?
- How is the learning mechanism of cerebellum linked to other forms of learning that take place in cortex and basal ganglia (*super learning* framework)?

Objectives

- Understanding how a typical cerebellar module processes information when dealing with a reaching task, focusing on the mechanism of anticipative correction
- Simulate the reaching task on the Neurorobotics platform (HBP) linking a realistic cerebellar model to a virtual robot arm