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Contribution ID: **20** Contribution code: **T-7**   Type: **Talk**

CA1 Human Hippocampus Model

Monday 17 June 2024 14:50 (20 minutes)

We developed a biologically grounded model of the human hippocampus CA1 region. The model includes all the pyramidal cells and interneurons with a realistic number of cells (about 5 millions) and their connections (31 billions). The connectivity matrix was generated using previously published methods [1] and stored in the SONATA data format. The model is set to run in the NEST simulator using a previously published adaptive leak integrate and fire neuron model [2] able to faithfully reproduce the spike trains observed in vitro and in vivo. Here, we present the NEST implementation choices that we had to take to run our model on the supercomputer Galileo100 at CINECA facility in Italy.

Acknowledgements

References

1 Gandolfi, D., Mapelli, J., Solinas, S.M.G. et al. Full-scale scaffold model of the human hippocampus CA1 area. Nat Comput Sci 3, 264–276 (2023).
https://doi.org/10.1038/s43588-023-00417-2
2 Marasco, A., Spera, E., De Falco, V. et al. An Adaptive Generalized Leaky Integrate-and-Fire Model for Hippocampal CA1 Pyramidal Neurons and Interneurons. Bull Math Biol 85, 109 (2023). https://doi.org/10.1007/s11538-023-01206-8

Preferred form of presentation

Workshop

Keywords

hippocampus, pyramidal cells, adaptive, network model

Topic area

Models and applications

Speaker time zone

UTC+2

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Session Classification: Talks