



SEMINARIO PRESENCIAL

Viernes, 26 de Abril de 2024
12:30 h. Instituto Cajal - CSIC

Dr. GONZALO G. DE POLAVIEJA
Champalimaud Foundation, Lisbon

UNDERSTANDING AND APPLYING ARTIFICIAL NEURAL NETWORKS IN RESEARCH

Abstract

I will explain what artificial networks (ANNs) are, from the simplest one neuron case to deep networks to gain some intuition. We will train during the seminar some ANNs in simple datasets and in datasets that we have obtained studying animal behavior. I will use my own research to illustrate how to use them and I will also try to convey their power and their limitations.

This is intended to be practical seminar, so, if possible, bring a laptop. You will need to have Google Drive to see these files: <https://drive.google.com/drive/folders/1qsnAhWozfGuUyw2LUGelnJHRYBDySNBh?usp=sharing> If you want to play with them before the seminar, don't directly open them but work on a copy of them.

Affiliation and short bio

Gonzalo G. de Polavieja did a D.Phil. in Physical Sciences as 'Marie Curie' fellow (Oxford, UK) working in quantum geometric phases, a postdoc in Neurobiology as 'Welcome Trust' fellow in Mathematical Biology at the Laughlin Lab (Cambridge, UK). He was then Junior PI as 'Ramon y Cajal' fellow (Theoretical Physics, UAM), tenured at Cajal Institute (CSIC, Spain). In 2014 he moved to the Champalimaud Foundation in Lisbon as Group Leader of the Collective Behavior Laboratory. His research aim is to reach a quantitative understanding of individual and collective behavior, including collective coordination, collective decisions and collective intelligence. His group's approach to this problem is by using a variety of techniques, including behavior, mathematical modelling, machine learning and artificial intelligence, virtual reality and neurobiology. As the lab extensively uses and develops AI techniques, a research line in the lab consists in new mathematical approaches in AI.

Related publications with the topic

F. Romero-Ferrero, M.G. Bergomi, R. C. Hinz, F. J. H. Heras, and G. G. de Polavieja. idtracker.ai: Tracking all individuals in large collectives of unmarked animals. *Nature Methods* 16, 179 (2019)

F.J. Heras, F. Romero-Ferrero, R.C. Hinz, and G. G. de Polavieja. Deep attention networks reveal the rules of collective motion in zebrafish. *PLoS computational biology*, 15(9), e1007354 (2019)

F. Romero-Ferrero, F. J., Heras, D., Rance, & G. G. de Polavieja. (2023). A study of transfer of information in animal collectives using deep learning tools. *Philosophical Transactions of the Royal Society B*, 378(1874), 20220073 (2023)