Proposal of Master Research Project / Proyecto fin de Master for the academic year 2025-26

Group name:
IP name:
Group web:

Title of the MRP/TFM:
Neuronal dynamics of perceptual decision making in temporally fragmented input

Summary of the Project:

Recent experimental results from our lab using a perceptual decision-making task have shown that when sensory information is presented intermittently and a temporal gap is introduced within stimulus segments, human participants base their choices on less total information and disproportionately weight the evidence presented after the gap. Traditional models of decision making, such as drift diffusion or urgency-gating models, fail to account for this behavior, highlighting a critical gap in our understanding of decision making under intermittent input -conditions that closely mimic the dynamics of naturalistic stimuli. This project seeks to develop a new computational framework capable of capturing the dynamics of perceptual decisions in the presence of temporal discontinuities, moving towards more realistic models of human decision making.

Sospedra A, Canals S, Marcos E (2024). A temporal gap in sensory streams amplifies the influence of subsequent input on decision making. bioRxiv. DOI: 10.1101/2024.07.17.603868v2

Methods and technology involved in the MRP/TFM Project:

The student will design and develop a recurrent neuronal network (RNN) to explain the observed behavioral results under conditions of temporally fragmented stimulus presentation. The project will involve constructing RNN architectures capable of performing the task and analyzing the internal dynamics of the network to understand how information is represented, maintained and integrated over time. New predictions will be tested with the model.
The project will involve the use of python and/or other programming languages.

Yang GR, Wang X-J (2020). Artificial neural networks for neuroscientists: a primer. Neuron 107: 1048-1070. DOI: 10.1016/j.neuron.2020.09.005

Member/s of the lab who will act as tutor/co-tutor of the project (if different from the group IP; PhD required to be tutor / co-tutor): Encarni Marcos
Contact: emarcos@umh.es