Computational Neurosciences

Crédits ECTS
2 crédits

Présentation

Prérequis

- Linear algebra, probability, and statistics
- Algorithms and programming (Python)

Objectifs d'apprentissage

By the end of this course, students should be able to:
- Understand the fundamental principles of computational neuroscience.
- Model individual neurons and neural networks.
- Apply computational neuroscience concepts to solve problems in engineering and artificial intelligence.

Description du programme

Computational neuroscience is a broad research field at the intersection of neuroscience and computer science.
Studying the nervous system from a computational perspective has two key goals:
- Explore bio-inspired alternative computing mechanisms (distributed computing, neural networks, event-driven programming).
- Understand brain function, from the representation of the external environment and internal processes to the operations performed on these representations.
The lecture is divided in 2 parts
I- Neural Coding.
- Decoding and Interpretation of Neuroscience Data
- Binary coding
- Rate coding
- Spike-based coding

II- Neural networks:
- Plasticity and learning
- Perceptron theories
- Attractor networks

- Autoencoders and generative networks

Total des heures **0h**

Infos pratiques

Nom responsable UE

Responsable pédagogique

Emmanuel Dauce
emmanuel.dauce@centrale-marseille.fr