IG.3513 – Advanced Deep Learning

Titre : Advanced Deep Learning
Module code: IG.3513
Person in charge : Jérémie Sublime
ECTS : 5
Workload : 100h to 150h, including 42h face-to-face
Teamwork : Yes
Keywords : Neural Networks, AI, transformers, attention gates

Presentation

Deep learning methods are now ubiquitous in industry and research and are applied to a wide range of tasks: image analysis and processing, predictive analysis in medicine, natural language analysis and processing, translation, speech recognition, financial market analysis, ...
In-depth mastery and understanding of these methods is therefore essential for working and developing in the field of artificial intelligence.

Academic Objectives

The knowledge and skills developed in this module relate to the field of Artificial Intelligence and aim to present the advanced concepts of deep learning.

Prerequisits

- Knowledge of basics of Machine Learning/Deep Learning

Content/programme

Concepts

- Reminders
    - Classification indices
    - Gradient descent
    - Cross-validation
- Neural network basics :
    - Perceptron, MLP
    - Retro-propagation
    - Simple autoencoders: example in Word2Vec
    - RNN
    - Basics of convolutions
- Convolutional neural networks:
    - Simple CNNs
    - Common networks: U-Nets, W-Nets, YOLO

Pedagogical Methods

Learning Methods

For the 3 components, the theoretical course is followed/accompanied by tutorials and practical work on a machine in Python. This enables students to assimilate theoretical knowledge experimentally and with practical examples from everyday life.

This module is based on a problem-based approach, through the systematic use of contextualized problems, particularly in the dimension designed to improve the skills of "Ensuring the quality and safety of a system (availability, reliability, maintainability, security, confidentiality - integrity)".

Assesment methods

Project and written examination.

Working Language

- English