UE Advanced Machine Learning: Applications to Vision, Audio and Text

Niveau d'étude
Bac +5

ECTS
6 crédits

Crédits ECTS Echange
6.0

Composante
UFR Informatique, mathématiques et mathématiques appliquées (IM2AG)

Période de l'année
Automne (sept. à dec./janv.)

Diplômes intégrant cet élément

- Master Mathématiques et applications

Langue(s) d'enseignement: Anglais

Ouvert aux étudiants en échange: Oui

Crédits ECTS Echange: 6.0

Code d'export Apogée: GBX9MO74

Présentation

Description

The course is split into two parts. During the first part, a wide range of machine learning algorithms will be discussed. The second part will focus on deep learning, and presentations more applied to the three data modalities and their combinations. The following is a non-exhaustive list of topics discussed:

- Computing dot products in high dimension & Page Rank
- Matrix completion/factorization (Stochastic Gradient Descent, SVD)
- Monte-carlo, MCMC methods: Metropolis-Hastings and Gibbs Sampling
- Unsupervised classification: Partitionning, Hierarchical, Kernel and Spectral clustering
- Alignment and matching algorithms (local/global, pairwise/multiple), dynamic programming, Hungarian algorithm,…

Informations non contractuelles.
Dernière mise à jour le 30 juin 2026

- Introduction to Deep Learning concepts, including CNN, RNN, Metric learning
- Attention models: Self-attention, Transformers
- Auditory data: Representation, sound source localisation and separation.
- Natural language data: Representation, Seq2Seq, Word2Vec, Machine Translation, Pre-training strategies, Benchmarks and evaluation
- Visual data: image and video representation, recap of traditional features, state-of-the-art neural architectures for feature extraction
- Object detection and recognition, action recognition.
- Multimodal learning: audio-visual data representation, multimedia retrieval.
- Generative Adversarial Networks: Image-image translation, conditional generation

Heures d'enseignement

CM	CM	36h

Période : Semestre 9

Infos pratiques

Contacts

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Responsable d'UE

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Campus

Grenoble - Domaine universitaire

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