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Machine learning and data mining (3IN2011)

Filières concernées	Nombre d'heures	Validation	Crédits ECTS
Master en économie appliquée	**Cours: 2 ph** **Exercice: 2 ph**	**Voir ci-dessous**	5
Master en informatique	**Cours: 2 ph** **Exercice: 2 ph**	**Voir ci-dessous**	5

ph=période hebdomadaire, pg=période globale, j=jour, dj=demi-jour, h=heure, min=minute

Période d'enseignement:

- Semestre Automne

Equipe enseignante

- Prof. Christos Dimitrakakis
- Hortence Yiepnou Nana

Contenu

* Problems
- Classification
- Regression
- Sequence prediction

* Python
- scikit-learn
- matplotlib

* Concepts and Algorithms
- Generalsation and Model Selection
- Loss functions and gradient descent
- Methodology: Reproducibility, experiment design, preprocessing, pipelines
- Probabilistic models: Maximum likelihood, Maximum a Posteriori, Bayesian inference

* Models
- k-Nearest Neighbours
- Perceptron
- Linear regression
- Generative models
- Multi-layer perceptrons and deep learning
- Tree models and ensembles

* Applications
- Text prediction
- Fairness
- Privacy

Forme de l'évaluation

Assignments (40%), Project (40%), Participation (20%)

Modalités de rattrapage

All components must be passed for a pass. Individual components that are failed can be resubmitted before the Autumn semester. Failure to participate in class means you have to retake it.

Documentation

URLs	1) https://github.com/olethrosdc/machine-learning-neuch/tree/main/BSc 2) https://www.statlearning.com/

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- Slides
- Course github
- Book: Introduction to Statistical Learning (Python)

Pré-requis

linear algebra, calculus, Python

Forme de l'enseignement

2 hours of lectures and 2 hours of exercises on average. Sometimes the lecture and exercise sessions are mixed into an 'active learning' module.

Objectifs d'apprentissage

Au terme de la formation l'étudiant-e doit être capable de :

- Simulate a process
- Combine algorithms and models
- Design pipelines
- Explain methodology

Compétences transférables

- Explain Research
- Present Results
- Formulate Scientific question
- Analyse Problem

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