Introduction to Machine Learning

Course level: Master (M1) **Track(s):** MLDM

ECTS Credits: 6

Course instructors: Marc Sebban (UJM)

Education period (Dates): 1st semester **Language of instruction:** English

Expected prior-knowledge: basic mathematics and statistics

Aim and learning outcomes:
This course gives a general introduction to Machine Learning, from applications to theoretical aspects in Statistical Learning Theory.

Topics to be taught (may be modified) ~20 h

- General Introduction to Machine Learning (learning settings, curse of dimensionality, overfitting/underfitting, etc.)
- Overview of Supervised Learning: True risk/Empirical risk, loss functions, regularization, sparsity, norms, bias/variance trade-off, generalization bounds, model selection.
- Ensemble methods (homogeneous/heterogeneous methods, Boosting/Adaboost, theoretical guarantees)
- Non-parametric Methods (K-NN)

Teaching methods: Lectures.

Form(s) of Assessment: written exam + project

Literature and study materials:

Basic textbooks:

Statistical Learning Theory, V. Vapnik, 1989
Machine Learning, Tom Mitchell, MacGraw Hill, 1997
Pattern Recognition and Machine Learning, M. Bishop, 2013
Convex Optimization, Stephen Boyd & Lieven Vandenberghe, Cambridge University Press, 2012.
On-line Machine Learning courses: https://www.coursera.org/

Additional information/Contacts:

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