Machine Learning

**ECTS** : 5

**Volume horaire** : 36

**Description du contenu de l'enseignement :**

Volume horaire : CM : 18h TD : 18h

1. Introduction
    1. What is Machine Learning
    2. A simple method: k-nearest neighbors
    3. Evaluation of classifiers
    4. Maximum Likelihood and Maximum A posteriori
2. Generative Learning
    1. Maximizing the Likelihood of the examples
    2. Linear Discriminant Analysis and Naive Bayes
3. Discriminative Learning
    1. Maximizing the likelihood and the a posteriori probability of labels
    2. Logistic Regression
    3. Stochastic gradient descent (SGD)
    4. SGD for generalized linear models
    5. Beyond linearity: kernelization of the SGD
4. Unsupervised Learning
    1. Learning latent models: the Expectation-Maximization Algorithm
    2. clustering: k-means, DBSCAN
    3. Learning probability density functions: mixtures of gaussians
5. Introduction to Bayesian Learning
    1. Bayesian Linear Regression
    2. Laplace method
6. Introduction to Neural Networks

**Compétence à acquérir :**

Understand most useful machine learning algorithms

**Mode de contrôle des connaissances :**

CC+Examen

**Bibliographie, lectures recommandées :**

- Friedman, Tibshirani, Hastie. The Elements of Statistical Learning - Chloé Azencott. Introduction au Machine Learning - Cornuéjols, Miclet. Apprentissage artificiel: Concepts et algorithmes