

## 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