

## Statistical Learning

### Objectives

- To learn some of the traditional as well as the more recent tools for classification and regression
- To understand these concepts from within a statistical decision theoretic framework
- To learn some of the statistical inference tools for model selection and inference.
- To get hands-on experience in using some of these techniques, through the homework assignments

### Contents

1. Overview of supervised learning
2. Linear regression and related methods
3. Linear methods for classification
4. Basis expansions and regularization
5. Generalized additive models
6. Kernel smoothing
7. Gaussian mixtures and EM algorithm
8. Model assessment and selection

### Evaluation

- CC: Continuous assessment that include either a 2-hour written within-semester test or a final project, homeworks, smaller projects, class participation. The final grade is determined according to the following weighting system: 60% exam/final project, 20% smaller projects and homeworks, 20% class participation.
- Reexamination session (September) : 2h written test

### Textbooks

- T. Hastie, R. Tibshirani, J. Friedman, *The Elements of Statistical Learning*, Springer, 2001
- C. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2006.

### Characteristics

- 3 ECTS credits
- Compulsory course for the master in statistics
- Spring Semester
- Learning activities: 2 hours of lectures/presentations per week. The students will actively participate in the presentation and explanation of the concepts involved.
- Prerequisite: knowledge of probability and statistical inference, regression, linear algebra.

### Teaching team

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