

Course Syllabus

Statistical Learning 7.5 Credits*, Second Cycle

Learning Outcomes

Upon completion of this course, the students shall be able to:

- Select the correct statistical models, and methods for a data analysis problem in the real world based on reasoned argument, especially when the underlying data generating mechanism is unknown.
- Apply various supervised and unsupervised statistical learning algorithms in a range of real-world problems.
- Evaluate, and optimise the performances of the learning models and algorithms, and communicate the expected accuracy of the model/algorithm.
- Combine several models to achieve higher predictive accuracy.

Course Content

The course focuses mainly on the applied aspects of statistical learning. However, the most important basic properties of, and relations between different statistical learning models and algorithms are also included. The course covers supervised learning algorithms, with special emphasis on classification methods such as logistic regression, classification trees, linear discriminant analysis, quadratic discriminant analysis, K-nearest neighbour, support vector machine, and regression methods such as linear regression, smoothing splines, generalised additive model, and regression trees. The course also covers unsupervised learning methods such as principal component analysis, k-mean clustering, and hierarchical clustering. Model validation through cross validation, and bootstrap methods are covered. Regularisation for model selection, high dimensional data analysis, and improving prediction performance through model averaging, bagging, and boosting techniques are also covered.

Assessment

Assignment, and written examination.

Forms of Study

Lectures, exercises, and computer labs.

Grades

The Swedish grades U–VG.



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Prerequisites

Bachelor's degree or courses comprising 180 credits

Subject:

Microdata Analysis

Group of Subjects:

Other Interdisciplinary Studies

Disciplinary Domain:

Natural Science, 100%

This course can be included in the following main field(s) of study:

1. Microdata Analysis

Progression Indicator within (each) main field of study:

1. A1N

Approved:

Approved 21 February 2019

Valid from 29 April 2019