DD2421 Machine Learning 7.5 credits

Maskininlärning

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for DD2421 valid from Autumn 2017

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Computer Science and Engineering

Specific prerequisites

For independent course students, 90 credits are required of which 45 credits in mathematics, informatics and/or SF1604 Linear Algebra as well as the courses SF1625 One variable calculus, SF1626 Multivariable analysis, SF1901 Mathematical Statistics, DD1337 Programming and DD1338 Algorithms and Data Structures or the equivalent.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The aim of the course is to give the students

- basic knowledge of the most important algorithms and theory that form the foundation of machine learning and computational intelligence
- a practical knowledge of machine learning algorithms and methods

so that they will be able to

- explain the principles, advantages, limitations such as overfitting and possible applications of machine learning
- identify and apply the appropriate machine learning technique to classification, pattern recognition, optimization and decision problems.

Course contents

The course is intended for both undergraduate and graduate students in computer science and related fields such as engineering and statistics The course addresses the question how to enable computers to learn from past experiences It introduces the field of machine learning describing a variety of learning paradigms, algorithms, theoretical results and applications. It introduces basic concepts from statistics, artificial intelligence, information theory and probability theory insofar they are relevant to machine learning The following topics in machine learning and computational intelligence are covered in detail
-nearest neighbour classifier
-decision trees
-bias and the trade-off of variance
-regression
-probabilistic methods
-Bayesian learning
-support vector machines
-artificial neural networks
-ensemble methods
-dimensionality reduction
-subspace methods.

Course literature

Is announced on the course web page before start of the course.

Examination

- LAB1 - Laboratory Work, 3.5 credits, grading scale: P, F
- TEN1 - Examination, 4.0 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.