DD2431 Machine Learning 6.0 credits

Maskininlärning

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

Establishment

Course syllabus for DD2431 valid from Autumn 2016

Grading scale

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

Education cycle

Second cycle

Main field of study

Computer Science and Engineering, Information Technology, Information and Communication Technology

Specific prerequisites

Single course students: 90 university credits including 45 university credits in Mathematics and/or Information Technology and the courses SF1604 Linear algebra, SF1625 Calculus in one variable, SF1626 Calculus in several variables, SF1901 Probability theory and statistics, DD1337 Programming and DD1338 Algorithms and Data Structures or equivalent.

Language of instruction

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

Intended learning outcomes

The objective of this course is to give students

- basic knowledge about the key 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 variance trade-off
-regression
-probabilistic methods
-Bayesian learning
-support vector machines
-artificial neural networks
-ensemble methods
-dimensionality reduction
-subspace methods.

Course literature

Will be announced on the course webpage before the course starts.

Examination

- TEN1 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory Work, 3.0 credits, grading scale: P, 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.

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

In this course all the regulations of the code of honor at the School of Computer science and Communication apply, see: http://www.kth.se/csc/student/hederskodex/1.17237?l=en_UK.

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.