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

On 2020-10-13, the Head of School of EECS has decided to establish this official course syllabus to apply from the spring semester 2021 (registration number J-2020-2220).

Grading scale

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

Education cycle

Second cycle

Main field of study

Computer Science and Engineering

Specific prerequisites

Completed courses in all following subjects:

- the equivalent SF1626 of multivariable analysis
- probability theory and statistics e quivalent SF1912/SF1914/SF1915/SF1916/SF1920/SF1921/SF1922/SF1923/SF1924

- programming equivalent DD1337/DD1310/DD1312
- algorithms and data structures equivalent DD1338/DD1320/DD1321/DD1325.

The above requirements are the specific entry requirements to the Master's programme (two-year) in machine learning.

Active participation in a course offering where the final examination is not yet reported in LADOK is considered equivalent to completion of the course.

Registering for a course is counted as active participation.

The term 'final examination' encompasses both the regular examination and the first re-examination.

Language of instruction

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

Intended learning outcomes

After passing the course, the student should be able to

- describe the most important algorithms and the theory that constitutes the basis for machine learning and artificial intelligence
- explain the principle for machine learning and how the algorithms and the methods can be used
- discuss advantages with and limitations of machine learning for different applications

in order to be able to identify and apply appropriate machine learning technique for classification, pattern recognition, regression 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 in so far 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.

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.

The exam is written.

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.