DM1590 Machine Learning for Media Technology 7.5 credits

Maskininlärning för medieteknik

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 2021-10-14, the Head of School of EECS has decided to establish this official course syllabus to apply from the spring semester 2022 (registration number J-2021-1935).

Grading scale

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

Education cycle

First cycle

Main field of study

Technology

Specific prerequisites

Knowledge and skills in programming, 6 higher education credits, equivalent to completed course DD1310-DD1318/DD100N/DD1331/DD1337/ID1018.

Knowledge in probability theory and statistics, equivalent to completed course SF1919.

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 students should be able to:

- develop and modify media technology applicationsthat use machine learning and evaluate them in an appropriate manner,
- recommend methods for machine learning for particular media technology applications,
- describe and explain the machine learning pipeline,
- explain and contrast supervised and unsupervised learning methods,
- explain and contrast parametric and non-parametric methods,
- explain training validation and testing of machine learning models,
- summarise best practice and pitfalls in applied machine learning for media technology

in order to

- being able to apply and evaluate machine learning models and methods in media technology.

Course contents

Course starts with an overview of what machine learning is and why it is important. This is illustrated with several real applications in various media, e g text summarisation, sound and music recommendation and image retrieval. The course then presents the workflow of machine learning development that serves as an overview of the remainder of the course. The course presents the two general classes of machine learning methods: supervised learning (for example closest neighbour, decision tree) and unsupervised learning (e g k-means clustering, principal component analysis). For these, the course presents different types of modelling: parametric (e.g. Bayes, least squares) and non-parametric (for example closest neighbours, decision trees). The course reviews common methods for evaluation of machine learning models (e g holdout, bootstrap). Finally, best practices are presented (e.g. partition) together with common pitfalls (e g over fitting).

Examination

- LABA - Laboratory work, 3.5 credits, grading scale: P, F
- PROA - Project, 3.0 credits, grading scale: A, B, C, D, E, FX, F
- ÖVNA - Exercises, 1.0 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.

Transitional regulations

Students who did not complete the course the first time it was given (spring semester 2020) must complete the laboratory work they did not complete, all exercises and project.

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.