



Course syllabus

Faculty of Technology

Department of Computer Science and Media Technology

2DT916 Maskininlärning, 5 credits

Machine Learning

Main field of study

Computer Engineering

Subject Group

Computer Science

Level of classification

First Level

Progression

G2F

Date of Ratification

Approved by Faculty of Technology 2022-08-30

The course syllabus is valid from spring semester 2023

Prerequisites

60 credits including

- 7.5 credits of Linear Algebra (e.g. 1MA901 or equivalent)
- 7.5 credits of Applied probability and statistics (e.g. 1MA915 or equivalent)
- 7.5 credits of Programming (e.g. 1DT901 or equivalent)

Objectives

The purpose of the course is to give a hands-on introduction to theory and practice related to machine learning. The students should afterwards be able to understand and apply well-known machine learning methods to solve problems of different types.

Upon completion of the course the student should be able to:

- explain the basic principles and limitations of a few well-known learning algorithms
- solve machine learning problems either by implementing a solution or by using existing tools/libraries
- compare and reason about strengths and weaknesses of different approaches to solve a given problem
- decide upon a suitable data representation to facilitate learning

Content

The course covers machine learning concepts and methods. The following topics are covered in the course:

- supervised and unsupervised learning
- logistic regression
- decision trees
- ensemble methods
- Support vector machines
- basic principles of feedforward neural networks
- unsupervised learning using the k-means clustering algorithm
- algorithm evaluation using cross-validation and mean square error
- evaluation metrics such as precision and recall
- algorithm implementation using Python

Type of Instruction

Teaching consists of lectures and practical assignments. The assignments are individual or carried out in groups. Attendance at some activities is mandatory.

Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

Assessment of the student's performance is made through assignments which are presented in written form.

The final grade is a weighted average of assessment methods.

Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

Credit Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course: 2DV516 Introduction to machine learning, 5 hp

Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

Required Reading and Additional Study Material

Aurélien Géron, Hands-On Machine Learning with Scikit-Learn and TensorFlow, 2017 (or latest edition). We use 368 out of 566 pages.