Linnæus University

Dnr: 2022/2103-3.1.2.2

Course syllabus

Faculty of Technology

Department of Computer Science and Media Technology

2DV516 Introduktion till maskininlärning, 7,5 högskolepoäng
2DV516 Introduction to Machine Learning, 7.5 credits

Main field of study
Computer Science

Subject Group
Informatics/Computer and Systems Sciences

Level of classification
First Level

Progression
G2F

Date of Ratification
Approved 2017-05-22
Revised 2022-05-16 by Faculty of Technology. Content and Credit Overlap is revised.
The course syllabus is valid from spring semester 2023

Prerequisites
60 credits including

- 7.5 credits of Linear Algebra (e.g 1MA133 or 1MA403 or equivalent)
- 15 credits of Programming (e.g 1DV501 and 1DV502 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 and make use of basic statistical concepts related to machine learning
- 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:

- basic statistical concepts
- supervised and unsupervised learning
- linear and polynomial regression
- iterativ optimization with gradient descent
- 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 written examination and assignments which are presented in written form.

The final grade is a weighted average of assessment methods.

Repeat examination is offered in accordance with Local regulations for courses and examination at the first and second-cycle level at Linnaeus University.

If the university has decided that a student is entitled to special pedagogical support due to a disability, the examiner has the right to give a customised exam or to have the student conduct the exam in an alternative way.

Course Evaluation
During the implementation of the course or in close conjunction with the course, a course evaluation is to be carried out. Results and analysis of the course evaluation are to be promptly presented as feedback to the students who have completed the course. Students who participate during the next course instance receive feedback at the start of the course. The course evaluation is to be carried out anonymously.

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: 2DT916, Machine Learning

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.