CM2011 Applied Machine Learning and Artificial Intelligence 7.5 credits

Tillämpad maskininlärning och artificiell intelligens

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

Establishment

On 2020-10-09, the Head of School of CBH has decided to establish this official course syllabus to apply from the spring semester 2022 (registration number C-2020-1786).

Grading scale

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

Education cycle

Second cycle

Main field of study

Medical Engineering, Technology and Health

Specific prerequisites

B.Sc. degree in engineering, social sciences or medical science (e.g. medical science or technology, engineering, statistics, applied physics, industrial management,) or similar.

Relevant documented engineering science or industrial experience that corresponds to at least a bachelor's degree.

Basic Programming Course/knowledge, in either Python or R

Swedish 3 and English 6.

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 have knowledge of:

- apply methods to import, combine and convert data into the appropriate format for data analysis,
- explain the benefits of data mining and be able to choose and implement appropriate methods in typical data mining use cases,
- choose, motivate, and apply standard machine learning methods and algorithms to typical use cases and present the results in appropriate ways
- design and perform performance validation of a machine learning system
- give an account on technology design, ethics and regulations when using and processing data

Course contents

In this course, the students will learn about the relationship between data, models and algorithms, to understand how to process and draw conclusions of data through data mining and machine learning. The course introduces some theory on machine learning, but focuses mainly on current applied methods. Successful machine learning applications need to be designed through a critical engagement and understanding of data, the algorithms that can be applied based on the kind of features the data exhibits and choosing the right paradigm of machine learning. This course provides a fundamental basis for using machine learning in an ethical and responsible manner. What are the predominant paradigms in machine learning and in what situations are they best used? What perspectives should we consider when we design machine learning applications? Why is a critical perspective important for developing machine learning?

Examination

- PRO1 - Project work, 7.5 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.

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

The examination is split into two parts: the first part consisting of 60 percent, 4.5 ECTS of the grade and the second 40 percent, 3 ECTS.

Part 1 consists of one reaction paper, and two programmatic assignments. The programmatic assignments require working code sample and a small report explaining the code. All three are graded for 1.5 ECTS.

The second part is a project, which is again programmatic and requires a working code and a small report. This is graded for 3 ECTS.

Attendance is required for 80 percent of the lectures and seminars.

Other requirements for final grade

Approved project, assignments and participation in 80percent of the lectures.

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.