

SYLLABUS

Introduction to AI and Pattern Recognition 7.5 credits D0038E

Introduktion till AI och mönsterigenkänning

Course syllabus admitted: Autumn 2023 Sp 1 - Present

**DECISION DATE
2023-02-15**

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Introduktion till AI och mönsterigenkänning

First cycle, D0038E

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Datateknik	Computer Technology

Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language

Selection

The selection is based on final school grades or Swedish Scholastic Aptitude Test.

Course Aim

Upon course completion, the student should have the ability to:

- Understanding of the basic methods and theories in artificial intelligence and pattern recognition
- Select appropriate methods for given problems in this field
- Apply the learned methods to new use cases
- Demonstrate the ability to critically evaluate and compare different AI models and learning algorithms for different problem setups and quality characteristics

Contents

This course goes deeper into the theory and mathematical methodology of sub-symbolic AI methods for both machine learning and pattern recognition. The following are the topics that will be covered in this course

- What is AI in general, its history, and the main fields covered by AI.
- Basics of standard machine learning and pattern recognition techniques.
 - Supervised
 - Instance-based learning: KNN and SVM
 - Training-based Learning: NN
 - Decision-based learning: Decision tree
 - Ensemble learning: bagging and boosting
 - Unsupervised (K-means, DBScan, and Hierarchical).
 - AI and Robotics
- Ethics and AI

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

Lectures will be given in the form of short videos 6-10 minutes covering a specific concept related to the module, short reflection questions will be asked after each video.

Weekly live sessions will be conducted where students can ask the instructors and sort out their concerns if they exist.

Project related to the covered topics should be delivered at the end of the module as the major contribution from the student.

Project will be split into different tasks, and each task will be assigned to the students at the end of the relevant module.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. The examination consists of two parts:

Project work and reflective quizzes (3.0 credits).

Oral examination (4.5 credits)

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Remarks

Participants are recommended to:

Have internet connection (minimum 0,5 Mbps), microphone, Webcam

Use their personal computers during the course.

The participants need to guarantee they have all administration rights on their machines to install and use the necessary tools during the course

The course can not be included in a degree together with the course D0032E Introduction to AI, 7.5 credits or D0033E Machine Learning and Pattern recognition, 7.5 credits.

Overlap

The course D0038E is equal to D0033E, D0032E

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0001	Oral exam	G U 3 4 5	4.5	Mandatory	A23	
0002	Project work, Reflective quizzes	U G#	3	Mandatory	A23	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via My LTU.

Syllabus established

by Robert Brännström 2023-02-15