



Learning Systems, 7.5 credits

Läraktiga system, 7.5 hp

Second level

Main field: Computer Science and Engineering AIF (Information inför fastställande: Main field technology (100%)) Syllabus is not adopted, but refers to spring 2012.

Placement in the Academic System

The course is included as an elective course in the Master's Programme (120 credits) in Embedded and Intelligent Systems and the Master's Programme (120 credits) in Information Technology.

Prerequisites and Conditions of Admission

- Bachelor of Science degree (or equivalent) in an engineering subject or in computer science.
- Courses in computer science, computer engineering or electrical engineering of at least 90 credits, including thesis.
- Courses in mathematics of at least 30 credits or courses including calculus, linear algebra and transform methods.
- The course Signal analysis and representation 7.5 credits

Course Objectives

The course aims at providing an overview of the machine learning field; learning and self-organizing systems for classification and prediction.

Following successful completion of the course the student should be able to:

Knowledge and understanding

- describe basic linear machine learning algorithms
- describe basic nonlinear machine learning algorithms
- describe main application areas of machine learning algorithms

Skills and abilities

- apply machine learning methods on real world problems
- present scientific results in the learning systems area

Judgement and approach

- assess when and which machine learning methods are applicable
- analyze and explain scientific results from the machine learning area

Primary Contents

Overview of learning systems. Overview of classification and regression. Overview of products on the market and common application areas for learning systems. Important aspects and standard methods in learning systems. The most common techniques and models for learning systems will be introduced e.g., artificial neural networks and self-organizing maps.

Teaching Formats

Instruction consists of lectures, seminars and practical projects. In seminars, scientific literature/articles are addressed and presented by the student. In the project the student solves a practical problem using machine learning methods. This project is concluded with a written report and oral presentation at a seminar.

Attendance at seminars is compulsory.

Teaching is in English.

Examination

The overall grades of Fail, 3, 4 or 5.

Examination is by approved projects, attendance at seminars, evaluation of presentations and activity at seminars, and an oral or written exam.

Course Evaluation

Course evaluation is part of the course. This evaluation should offer guidance in the future development and planning of the course. Course evaluations should be documented and made available to the students.

Course Literature

Hastie, T., Tibshirani, R. & Friedman, J. *The Elements of Statistical Learning: Data Mining, Inference, and Prediction*. Second edition Springer Series in Statistics, 2nd edition, 2009

Duda, R. O., Hart, P. E., & Stork, D. G. *Pattern Classification*. 2nd Edition, John Wiley & Sons, New York, 2001