Neural Networks and Learning System

Single subject and programme course

6 credits

Neuronnät och lärande system

732A55

Valid from: 2017 Spring semester

Determined by
Course and Programme Syllabus Board
at the Faculty of Arts and Sciences

Date determined
2017-06-13

Main field of study
Computer Science

Course level
Second cycle

Advancement level
A1X

Course offered for
- Masters Programme in Statistics and Machine Learning

Entry requirements
A bachelor's degree in one of the following subjects: statistics, mathematics, applied mathematics, computer science, engineering, or equivalent. Completed courses in calculus, linear algebra, statistics and programming are required. Documented knowledge of English equivalent to Engelska B/Engelska 6

Intended learning outcomes
After completion of the course the student should on an advanced level be able to:
- design and apply artificial neural networks and similar methods for signal, image and data analysis that learn from previous experience and data
- apply methods to find meaningful relations in multidimensional signals where the degree of complexity makes traditional model-based methods unsuitable or impossible to use
- explain the difference between particular learning paradigms,
implement and use common methods in those paradigms
and select an appropriate method for solving a given problem

Course content
Machine learning, classification, pattern recognition and high-dimensional data analysis. Supervised learning: neural networks, linear discriminants, support vector machines, ensemble learning, boosting. Unsupervised learning: patterns in high-dimensional data, dimensionality reduction, clustering, principal component analysis, independent component analysis. Reinforcement learning: Markov models, Q-learning.

Teaching and working methods

Lectures, lessons, laboratory works. Homework and independent study are a necessary complement to the course.

Examination

Written examination and written reports on laboratory exercises.
Detailed information about the examination can be found in the course's study guide.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

Grades

ECTS, EC

Department

Institutionen för medicinsk teknik