DD2432 Artificial Neural Networks and Other Learning Systems 6.0 credits

Artificiella neuronnät och andra lärande system

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

Establishment

Course syllabus for DD2432 valid from Autumn 2016

Grading scale

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

Education cycle

Second cycle

Main field of study

Information Technology, Information and Communication Technology, Computer Science and Engineering

Specific prerequisites

Single course students:

SF1604 Linear algebra, SF1625 Calculus in one variable, SF1626 Calculus in several variables, SF1901 Probability theory and statistics, DD1337 Programming, DD1338 Algorithms and Data Structures, or corresponding courses.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After the course the student should be able to

- explain the function of artificial neural networks of the Back-prop, Hopfield, RBF and SOM type
- explain the difference between supervised and unsupervised learning
- describe the assumptions behind, and the derivations of the ANN algorithms dealt with in the course
- give example of design and implementation for small problems
- implement ANN algorithms to achieve signal processing, optimization, classification and process modeling

so that the student

- achieves an understanding of the technical potential and the advantages and limitations of the learning and self organizing systems of today
- can apply the methods and produce applications in their working life

Course contents

The course covers algorithms which gets its computational capabilities by training from examples. There is thus no need to explicitly provide rules and instead training using measured data is performed. Learning can be done either by providing the correct answer, or be totally autonomous.

The courser also covers principles of representation of data in neural networks. The course also includes principles of hardware architectures (euro chips and neuro computers) and shows how ANN can be used in robotics. We also show applications of learning systems in areas like pattern recognition, combinatorial optimization, and diagnosis.

Course literature

Stephen Marsland: Machine Learning, an Algorithmic Perspective, 2009, CSC-Press, ISBN 1420067184

Examination

- TEN2 - Examination, 3.0 credits, grading scale: A, B, C, D, E, FX, F

- LAB2 - Laboratory Assignments, 3.0 credits, grading scale: P, 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.

In this course all the regulations of the code of honor at the School of Computer science and Communication apply, see: http://www.kth.se/csc/student/hederskodex/1.17237?l=en_UK.

Other requirements for final grade

Examination (TEN2; 3 university credits).
Laboratory assignments (LAB2; 3 university credits).

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.