



**Karolinska
Institutet**

Course syllabus for

Machine Learning for Extraction of Medical Knowledge, 7.5 credits

Maskinlärning för extraktion av medicinsk kunskap, 7.5 hp

This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

Course code	4HI017
Course name	Machine Learning for Extraction of Medical Knowledge
Credits	7.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Health Informatics
Level	AV - Second cycle
Grading scale	Excellent, Very good, Good, Satisfactory, Sufficient, Fail, Fail
Department	Department of Learning, Informatics, Management and Ethics
Decided by	Programnämnd 5
Decision date	2011-04-27
Revised by	Education committee LIME
Last revision	2019-11-22
Course syllabus valid from	Autumn 2011

Specific entry requirements

All courses from term 1 and at least 10 credits from courses in term 2 at the Master's programme in health informatics.

Objectives

On completion of the course students should be able to:

- * Explain the purpose of the field of machine learning, the characteristic of its methods, its benefits and limitations
- * Explain and describe different learning algorithms ("machine learning methods")
- * Apply machine learning methods on patient-related data in health care
- * Contrast, assess and justify the appropriateness of different machine learning methods based on the application within health care
- * Adapt machine learning methods to medical requirements, and evaluate its applicability
- * Apply computer software that implements machine learning methods

Content

- * Machine learning and its application to medical problems
- * Preprocessing
- * The development process. How to apply the software, from problems to evaluation
- * Decision Trees
- * Rules and association rules
- * Ensembles
- * Artificial Neural Networks
- * Linear models
- * Naive Bayes
- * "Nearest Neighbor" models
- * Clustering

Teaching methods

- * Lectures
- * Case studies
- * Laboratory work where students apply machine learning methods on real medical data in order to create medical knowledge.
- * Written assignment reporting results from laboratory work in the form of a scientific article
- * Seminar

Examination

Assignment and active participation in the seminar is the basis for examination. Active participation is expected, and graded with one of the expressions "Pass" or "Fail". The assignment is assessed according to the scale A-F, which also will become the grade for the course, provided that a passing grade was obtained in the seminar task.

Compulsory participation

Laboratory work, written assignment and seminar are mandatory. The course director assesses if, and in that case how, absence can be compensated. Before the student has participated in all compulsory parts or compensated absence in accordance with the course director's instructions, the student's results for the course/respective part will not be registered in LADOK.

Limitation of number of occasions to write the exam

The student has the right to write the exam six times. If the student has not passed the exam after four participations he/she is encouraged to visit the study advisor.

The number of times that the student has participated in one and the same examination is regarded as an examination session. Submission of a blank examination is regarded as an examination. An examination for which the student registered but not participated in will not be counted as an examination.

Transitional provisions

The course is closed.

Other directives

Course evaluation will be carried out in accordance with the guidelines established by the Board of Education.

The course is given in English.

Literature and other teaching aids

Witten, I. H.; Frank, Eibe.; Hall, Mark A.

Data mining : practical machine learning tools and techniques.

3rd ed. : Burlington, MA : Morgan Kaufmann, cop. 2011. - xxxiii, 629 p.

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