Machine Learning: Supervised Methods

Module-No./Abbreviation	Credits	Workload	Term	Frequency	Duration
CE-WP28/ ML:SM	6 CP	180 h	2nd Sem.	Summer term	1 Semester

Courses	Contact hours	Self-Study	Group Size:
Machine Learning: Supervised Methods	4 SWS (60 h)	120 h	No Restrictions

Prerequisites

The course requires basic mathematical tools from linear algebra, calculus, and probability theory. More advanced mathematical material will be introduced as needed. The practical sessions involve programming exercises in Python. Participants need basic programming experience. They are expected to bring their own devices (laptops).

Learning goals / Competences

The participants understand statistical learning theory. They have basic experience with machine learning software, and they know how to work with data for supervised learning. They are able to apply this knowledge to new problems and data sets.

After successfully completing the module, the students

- understand the basics of statistical learning theory,
- know the most relevant algorithms of supervised machine learning, and are able to apply them to learning problems,
- know and understand the strengths and limitations of various learning models and algorithms,
- can apply standard machine learning software for solving learning problems.

Content

The field of machine learning constitutes a modern approach to artificial intelligence. It is situated in between computer science, neuroscience, statistics, and robotics, with applications ranging all over science and engineering, medicine, economics, etc. Machine learning algorithms automate the process of learning, thus allowing prediction and decision-making machines to improve with experience. This lecture will cover a contemporary spectrum of supervised learning methods. The course will use the flipped classroom concept. Students work through the relevant lecture material at home. The material is then consolidated in a 4 hours/week practical session.

Teaching methods / Language

Lecture (2h / week), Exercises (2h / week) / English

The course applies a flipped classroom format. The sessions plan is largely based on the following caltech lectures: http://work.caltech.edu/telecourse.html

Mode of assessment

Written examination (90 min, 100%)

Requirement for the award of credit points

Passed final module examination

Module applicability

MSc. Computational Engineering

Weight of the mark for the final score

6 %

Module coordinator and lecturer(s)

Prof. Dr. T. Glasmachers, Assistants

Further information