Technology
Arts Sciences
TH Köln

Course
MLWR - Machine Learning and Scientific Computing

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General information

Long name	Machine Learning and Scientific Computing
Approving CModule	MLWR_MaCSN, MLWR_MaET, MLWR_MaTIN
Responsible	Prof. Dr. Beate Rhein Professor Fakultät IME
Level	Master
Semester in the year	summer semester
Duration	Semester
Hours in self-study	60
ECTS	5
Professors	Prof. Dr. Beate Rhein Professor Fakultät IME
Requirements	Basic knowledge of probability theory and machine learning
Language	German
Separate final exam	Yes

Final exam

Details

Questions of different degrees of difficulty and different aspects of the course (course of a project, performance measures, data protection, etc.)

some in-depth questions

It is possible to write down sketches and formulas.

Minimum standard

be able to describe the rough sequence of a machine learning or scientific computing project

Being able to explain discussed procedures roughly

Exam Type

Questions of different degrees of difficulty and different aspects of the course (course of a project, performance measures, data protection, etc.)
some in-depth questions
It is possible to write down sketches and formulas.

Lecture / Exercises

Learning goals

Knowledge

Approximation methods
metamodeling
regression

Multi-criteria optimization
formulation
Pareto front
algorithms
visualization

Advanced Cluster Analysis

Association Pattern Mining

Outlier Detection

Advanced classification procedures

possibly text recognition, web mining, time series analysis

Skills

Be familiar with mathematical methods, which are suitable for application tasks,
convert them into run-time and memory optimized programs using numerical methods and skilful implementation
Know approximation methods and select and apply the appropriate method for a task
Formulate an application task as a multi-criteria optimization task and solve it in a program
Know methods of machine learning, select and apply appropriate procedures

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2

Exercises (whole course)	2
Exercises (shared course)	0
Tutorial (voluntary)	0

Separate exam

none

Practical training

Learning goals

Skills

Apply and program methods of approximation, multicriteria optimization or machine learning
efficiently implement numerical methods
Evaluate the complexity of algorithms

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	1
Tutorial (voluntary)	0

Separate exam

none