

Submodule MIN-335-01 Machine Learning

Subheading	(MIN-ML)
Person in Charge	Ahlers, Volker, Prof. Dr.
Language of Instruction	by agreement
Curriculum Allocation	MIN
Course Type, Contact Hours per Week	Lecture with exercise, 4 SWS
ECTS Credits	6
Contact Hours / Independent Study Hours	68 h / 112 h
Suggestions for Independent Study	See bibliography
Recommended Prerequisites	None
Examination	Written or oral examination, experimental work
Group Size	30

Learning Outcomes

Algorithmic and mathematical skills: Understanding central algorithms of machine learning (ML); knowledge of mathematical and statistical foundations.

Analysis, design, and realization skills: Evaluating datasets; selecting or combining suitable learning approaches for a given problem; implementing ML solutions.

Technological skills: Using current ML frameworks and libraries.

Methodological skills: Knowledge of the strengths and weaknesses of different ML methods; interpreting the results of these methods.

Content

Selected topics from the following fields:

- Fundamentals and goals of machine learning (ML)
- Supervised learning, classification: decision trees, naïve Bayes, logistic regression, neural networks
- Unsupervised learning, clustering
- Evaluation of models, regularization
- Association analysis, recommender systems
- Anomaly detection
- Time series analysis, forecasting
- Implementation of ML algorithms in current software environments (e.g., Python, scikit-learn, Keras) and application to different datasets

The list can be extended by current topics.

Requirements for Contact Hours

Active participation, solving exercise problems

Requirements for Independent Study Hours

Preparation and review of the lectures

Bibliography

Frochte: Maschinelles Lernen. Hanser, 2. Aufl., 2019.

Tan et al.: Introduction to Data Mining. Pearson Education, 2nd ed., 2018.

Further current literature according to the lecture contents.