

MLDM-L1: Introduction to Machine Learning and Data Mining

Person in charge and Representative	Großhennig, Kacprowski, Jung, Deserno
Contact person	BIOMEDAS Office
Semester	This lecture should be taken in semester 1
Topic cluster	Machine Learning and Data Mining
Duration/Credit	14 lectures of 1.5 hours
Time	Winter Semester (First Semester) first four lectures mondays 1-2:30, rest 3-4:30
Place	The lectures can be given using online platforms as WebEx or BBB
Prerequisite for the lecture	Basic knowledge of Statistics
Aim of the lecture	<p>Upon completion of the lecture, participants will be able to understand and conduct statistical hypothesis tests appropriately. They will have a sound knowledge of basic machine learning approaches and will be able to assess machine learning workflows and applications. Furthermore, the lecture will demonstrate state-of-the-art applications of machine learning for analysis of molecular data and imaging data.</p> <p>Specifically, the lecture will cover:</p> <ul style="list-style-type: none"> • Essential statistical concepts on the basis of randomized clinical trials • Analysis and interpretation of observational studies • Statistical methods for the validation of biomarkers • Do's and don'ts for statistical testing • Robustness of machine learning approaches (cross validation, etc) • Appropriate assessment of machine learning approaches • Random forests • Neural Networks • Structure and distributions of molecular high-dimensional data • Application of discriminant analysis in high-dimensional settings • State-of-the-art software and examples • translational aspects and limitations • Neural Networks for images analysis.