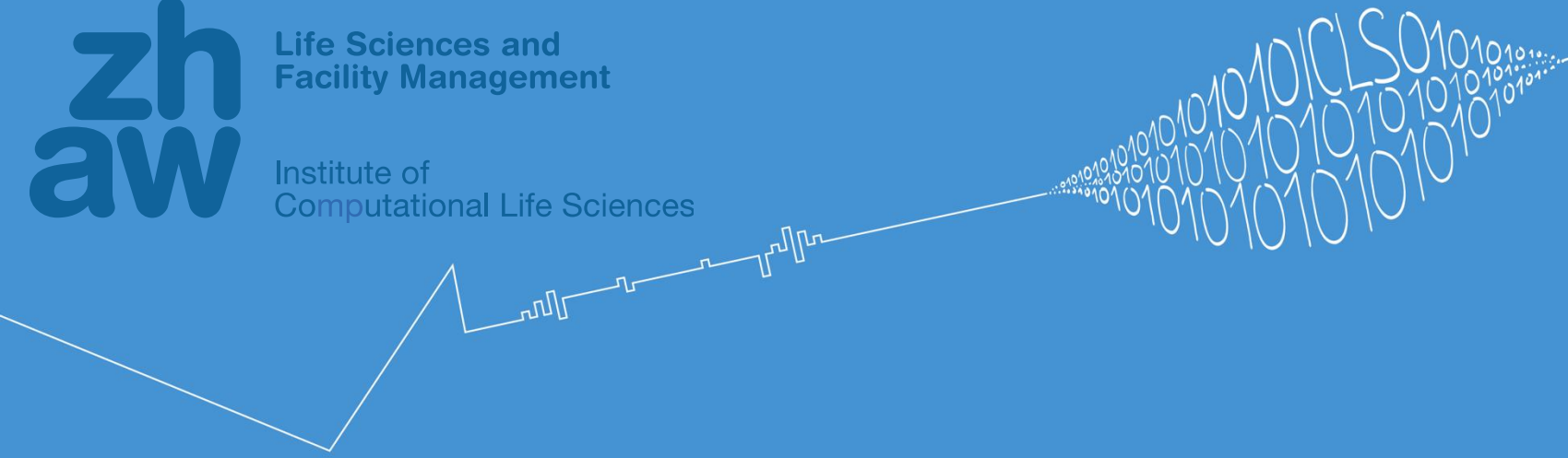
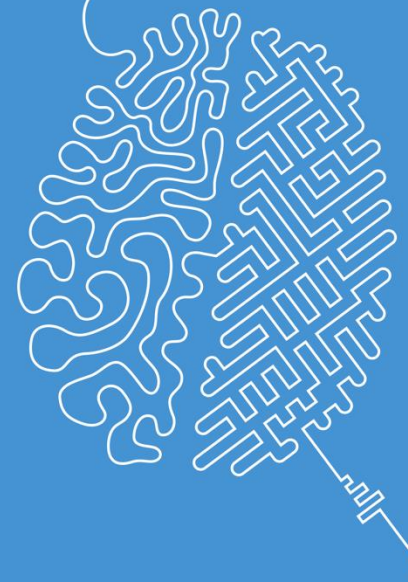
Life Sciences and
Facility Management

Institute of
Computational Life Sciences



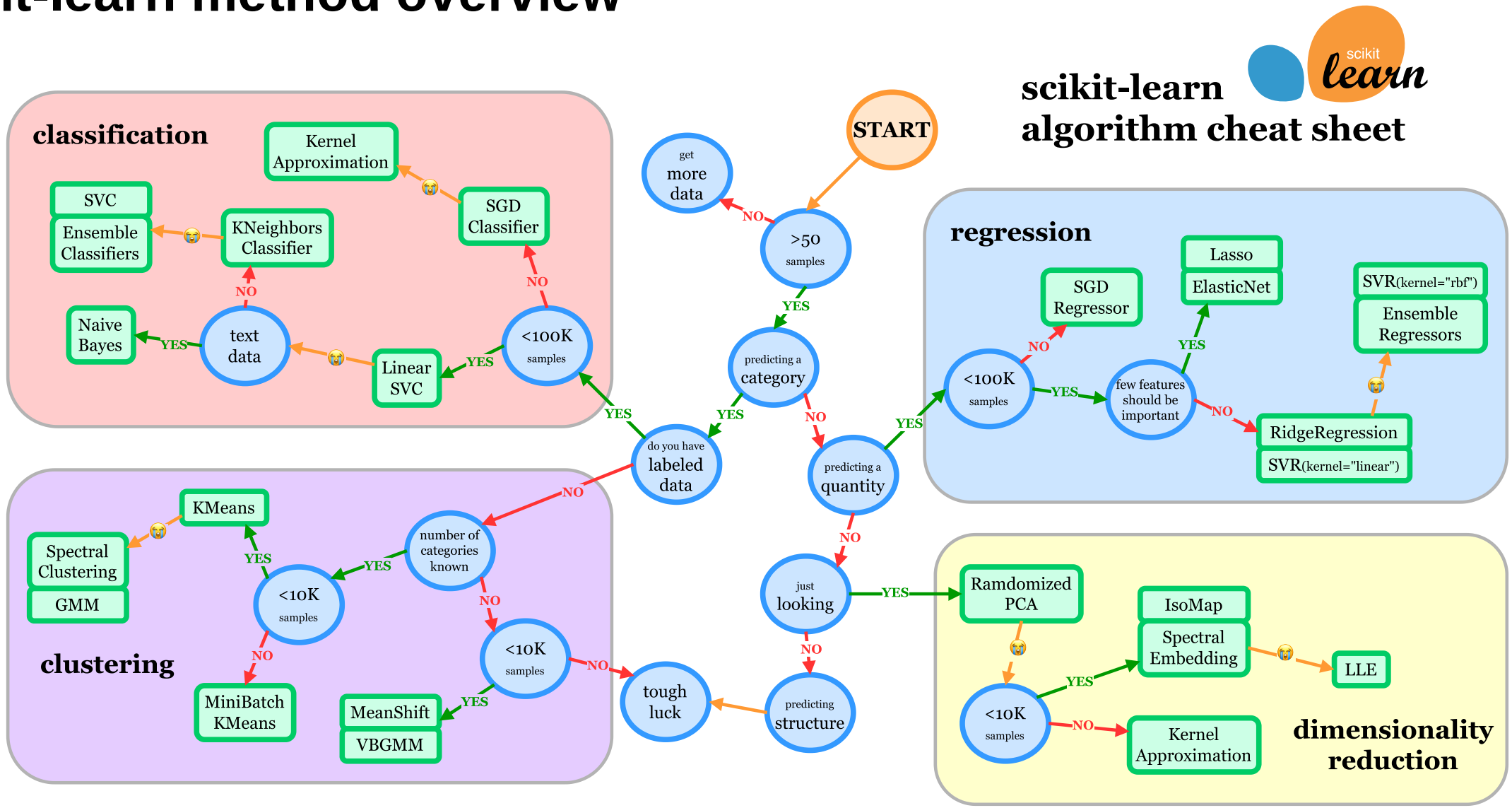


Overview of methods

Machine Learning

Norman Juchler

scikit-learn method overview



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Overview of methods

Machine Learning

- StatQuest: gentle intro to machine learning (13 min)
- Arten des maschinellen Lernens (6 min)

Unsupervised Learning

Clustering

- StatQuest: K-means clustering (8 min)
- StatQuest: hierarchical clustering (11 min)
- (StatQuest: clustering with DBSCAN (9 min))

Principle Component Analysis

- StatQuest: PCA main ideas in 5 minutes
- StatQuest: Principal component analysis (22 min)
- StatQuest: PCA - practical tips (8 min)
- Mathematische Grundlagen von D. Jung erklärt: Eigenraum einer Matrix, Lineare Algebra, Matrixalgebra, Unimathematik

Model evaluation

- StatQuest: main ideas of fitting a line to data (least-squares) (9 min)
- StatQuest: R2 score (11 min)
- StatQuest: entropy (16 min)
- StatQuest: cross validation (5 min)
- StatQuest: confusion matrix (7 min)
- StatQuest: sensitivity and specificity (11 min)
- StatQuest: ROC and AUC (16 min)

Supervised Learning

Data Preprocessing

Explorative data analysis, e.g., Pandas, Seaborn Plots
Data cleaning, e.g., missing values
StatQuest: Pearson correlation (19 min)

Linear Regression

- StatQuest: main ideas of fitting a line to data (9 min)
- StatQuest: linear regression (27 min)
- StatQuest: multiple lineare regression (11 min)

Logistic Regression

- StatQuest: odds and log(odds) (12 min)
- StatQuest: logistic regression (8 min)
- StatQuest: maximum likelihood (6 min)
- StatQuest: logistic regression …: coefficients (16 min)
- StatQuest: logistic regression „.: max. likelihood (10 min)
- StatQuest: confusion matrix (7 min)
- StatQuest: specificity and sensitivity (12 min)

Decision Trees

- StatQuest: decision and classification trees (18 min)
- StatQuest. decision trees part 2 (5 min)
- StatQuest: regression trees (22 min)
- StatQuest: random forests part 1 (9 min)
- StatQuest: gradient-boosted trees part 1 (15 min)
- (StatQuest: XGBoost part 1 (25 min), follow with parts 2-4)

Deep Learning

- MIT: introduction to deep learning (56 min)
- MIT: deep computer vision (CNNs) (55 min)

Explainable AI (XAI)

- DeepFindr: SHAP – model agnostic (15 min)
- Grad-CAM – for deep learning