

CS 6170: Computational Topology, Spring 2019

Lecture 11

Topological Data Analysis for Data Scientists

Dr. Bei Wang

School of Computing
Scientific Computing and Imaging Institute (SCI)
University of Utah

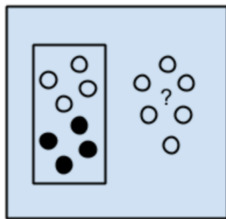
www.sci.utah.edu/~beiwang

beiwang@sci.utah.edu

Feb 12, 2019

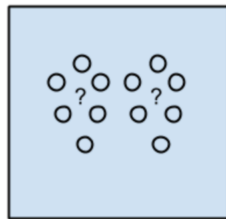
Machine Learning at a Glance

ML algorithms by learning styles



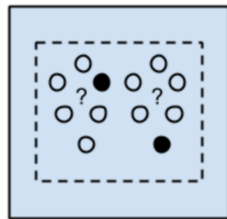
Supervised Learning

*Problems: Classification
Regression*



Unsupervised Learning

*Problems: Clustering
Dimensionality Reduction*

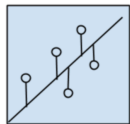


Semi-supervised Learning

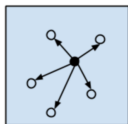
*Problems: Classification
Regression*

<https://machinelearningmastery.com/a-tour-of-machine-learning-algorithms/>

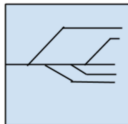
ML algorithms by similarity (how they work)



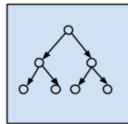
Regression Algorithms



Instance-based Algorithms



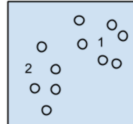
Regularization Algorithms



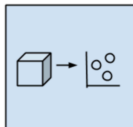
Decision Tree Algorithms



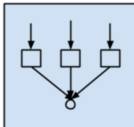
Bayesian Algorithms



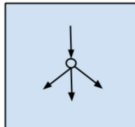
Clustering Algorithms



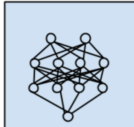
Dimensional Reduction Algorithms



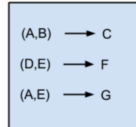
Ensemble Algorithms



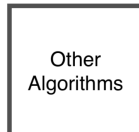
Artificial Neural Network Algorithms



Deep Learning Algorithms



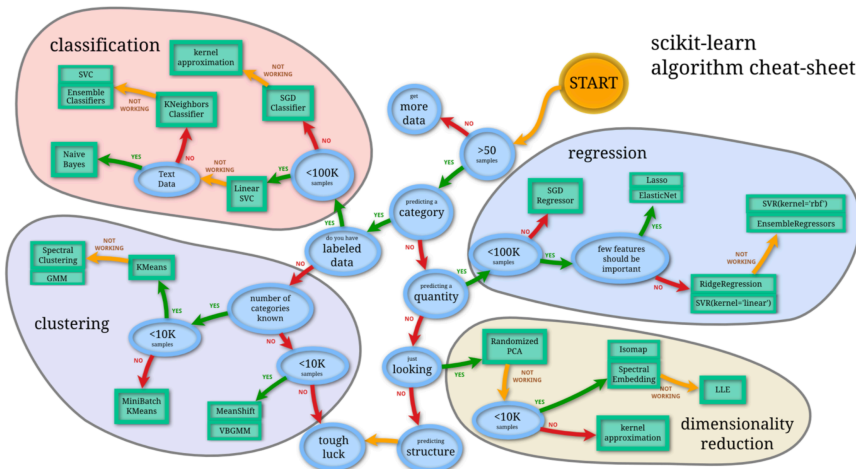
Association Rule Learning Algorithms



<https://machinelearningmastery.com/a-tour-of-machine-learning-algorithms/>

Scikit-learn algorithm cheat-sheet

scikit-learn algorithm cheat-sheet



<https://scikit-learn.org/stable/>

Unsupervised Learning: Clustering: Mapper
High-Dimensional Data Analysis
See the whiteboard for the mapper algorithm
Singh et al. (2007)

Singh, G., Mémoli, F., and Carlsson, G. (2007). Topological methods for the analysis of high dimensional data sets and 3D object recognition. In *Eurographics Symposium on Point-Based Graphics*.