Machine Learning

PhD programme in Economics, Statistics and Data Science (ECOSTATDATA)
Curriculum in curriculum Big Data & Analytics for Business
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Lecture 1
- Introduction to Machine Learning
- Taxonomy of Machine Learning methods:
  - Supervised vs Unsupervised
  - Classification vs Regression
- Unsupervised Machine Learning Methods
  - Clustering
  - Association Rules
- Hands-on with Pyhton Jupyter Notebook

Lecture 2
- Unsupervised Machine Learning Methods
  - K-Nearest Neighbour
  - Decision trees
  - Bayesian Classifiers
  - Logistic Regression
  - Support Vector Machines
- Evaluation methods for Classificationm
  - Confusion Matrices
  - ROC and AUC curves
- Validation methods for Classificationm
  - Hold-out method
  - K-fold Cross Validation
- Hyper-parameter tuning for Machine Learning
- Hands-on with Pyhton Jupyter Notebook

Lecture 3
- Introduction to Deep Learning
- Deep Feedworward Neural Networks (NNs)
  - Architecture of Deep NNs
  - Backproagation in Neural Networks
- Different activation functions and optimization algorithms for NNs
- The vanishing/exploding gradient problem of Deep NNs
- Hands-on with Pyhton Jupyter Notebook

Lecture 4
- Recurrent neural Networks
- Sequence to sequence modelling
- Attention models
- Transformers
- Hands-on with Pyhton Jupyter Notebook