

VU Machine Learning

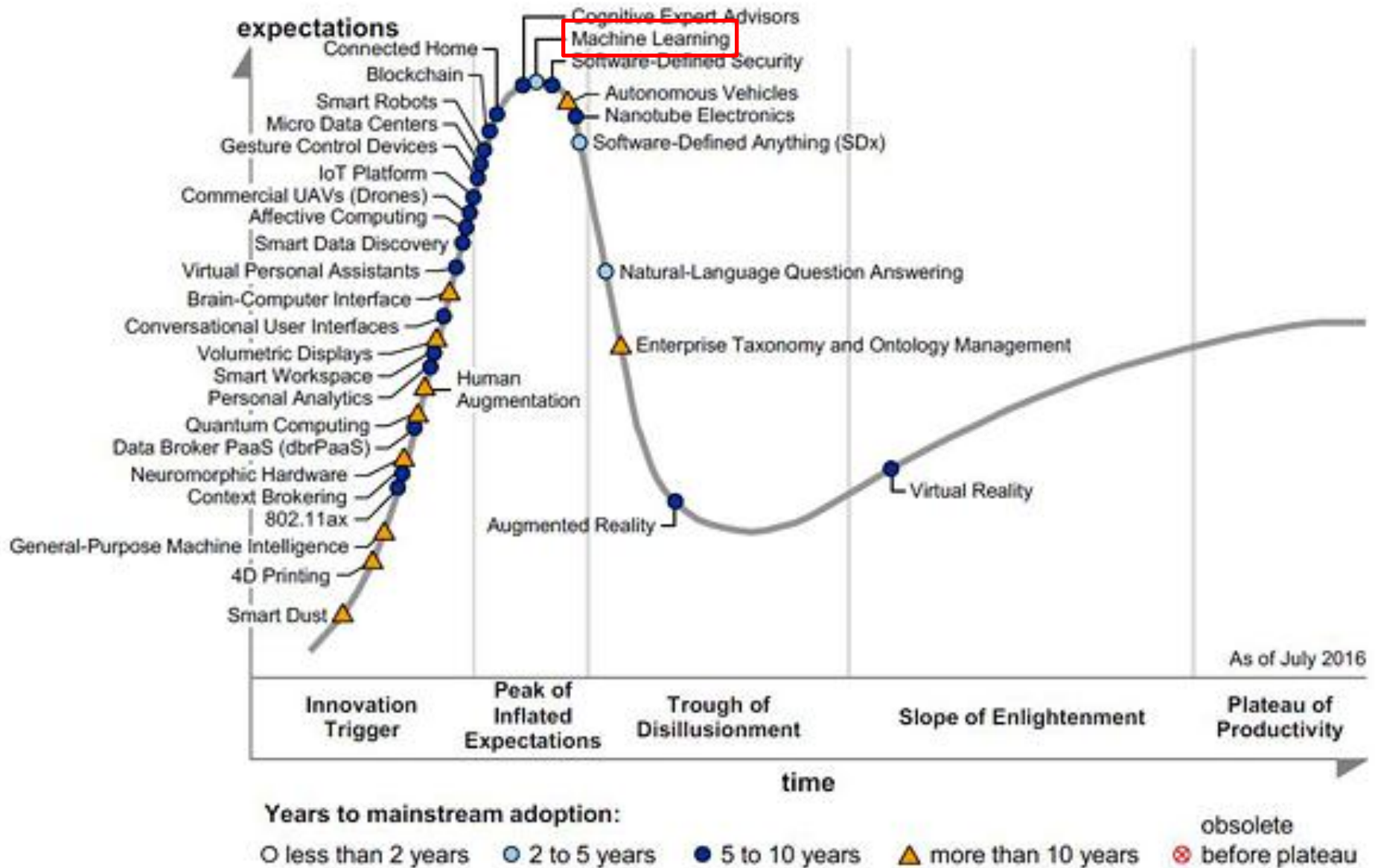
Winter 2017/18

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- Lecture deals with *supervised* machine learning
- Unsupervised learning: e.g. cluster analysis (is not part of this lecture)
- Supervised prediction of a nominal class label: *classification*
- Supervised learning to predict continuous output variables: *regression*

- Data types & data preparation
- Supervised machine learning algorithms
 - Decision Trees
 - Random Forests
 - Support Vector Machines
 - Bayesian Networks
 - Regression Techniques
 - Logistic Regression
 - Hidden Markov Models
 - Deep Learning
- Model selection
- Metalearning
- Ensemble learning
- Significance testing

Machine learning – why?



- Lectures on Wednesday, 16:00-18:00 (except on 29.11., 13:00-15:00), EI 8 lecture room

- 11.10. Preliminary talk, Introduction
- 18.10. Lecture
- 25.10. Lecture
- 08.11. Lecture
- 22.11. Lecture
- 29.11. Lecture
- 06.12. Lecture
- 20.12. Lecture
- 17.01. Lecture

- TUWEL e-learning course
 - <https://tuwel.tuwien.ac.at/course/view.php?idnumber=184702-2017W>
 - linked from TISS (automatic access when applied to lecture in TISS)
- Course materials (lecture slides, further readings)
- Lab assignments
- Forum

- TISS will **NOT** be used !!

- Required: Basic mathematics & statistics knowledge

- Written exam
 - 26.01.2018
 - 3 other exams in SS 2018

- Exercises/assignments
 - Three different tasks
 - Group work of 3 students

- Each part (exam, each assignment) individually has to be passed with a positive grade !

- First/second assignment: machine learning experiments
 - With a machine learning toolkit (e.g. R, Matlab, WEKA, Python).
 - Experiments with data pre-processing, different data sets & regression techniques, and classifiers
 - Written report (7-10 pages)
 - Discuss pre-processing, findings, differences in results per technique and datasets, patterns found, ...
 - Interpret and analyse result
 - More details in the end of the third lecture

- Third assignment: programming and experiments
 - Implementation of machine learning algorithm / techniques
 - E.g., Java (WEKA), Python, Matlab, R or in other languages on request
 - Group work (can be the same as for the first assignment)
 - Presentation at the end of January
 - attendance at presentation compulsory
 - More details after the first assignment

- 1st assignment
 - Handing in on: 25.11.
 - Discussion of reports: TBA
- 2nd assignment
 - Handing in on: TBA
 - Presentations: TBA
- 3rd assignment
 - Handing in on: TBA
 - Presentations: TBA

- Self-Organising Systems (188.413)
 - Unsupervised learning
 - Self-Organising Maps, Genetic Algorithms, Agents, ...
 - Winter semester

- Information Retrieval (188.412)
 - Feature extraction from text & music, (genre) classification
 - Summer semester

- Problem Solving and Search in Artificial Intelligence (181.190)
 - Meta-heuristics, learning in search
 - Summer semester

Questions ?