Course introduction 2019

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Why machine learning?

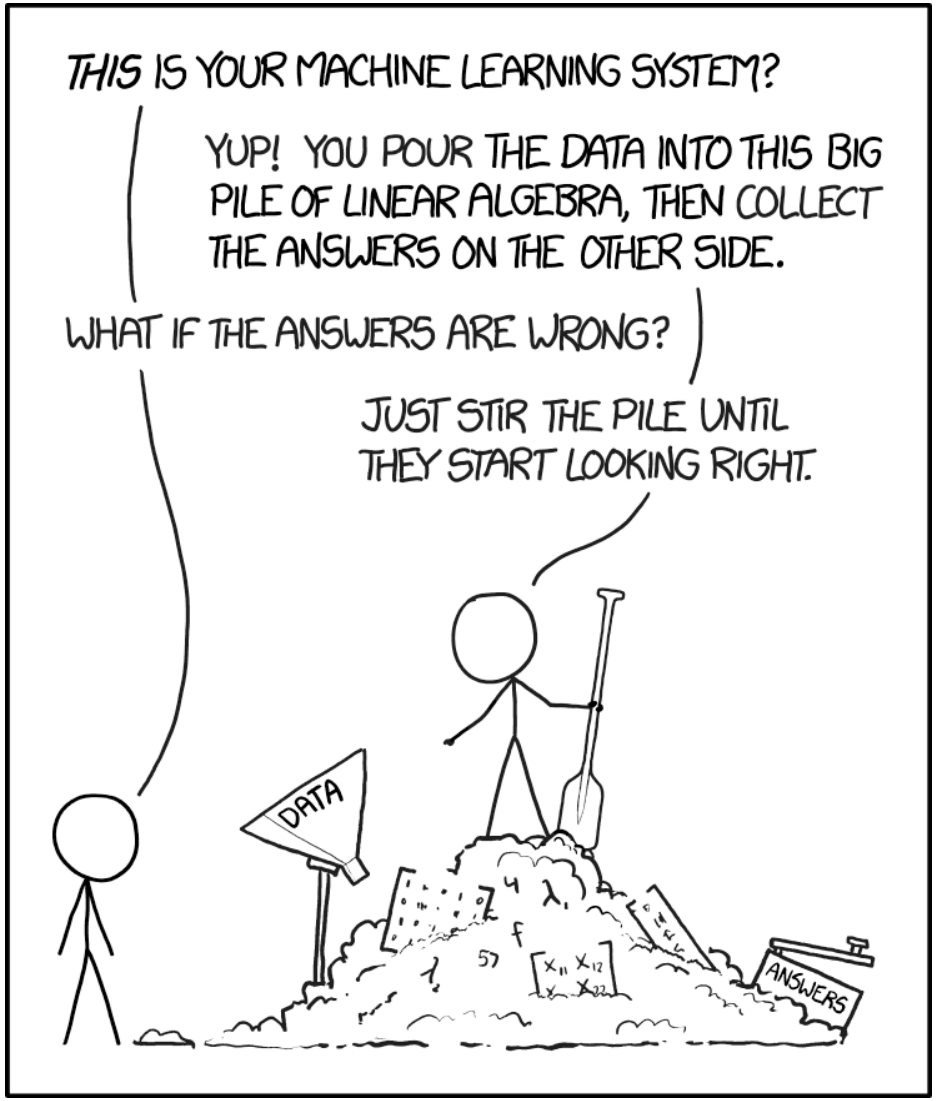
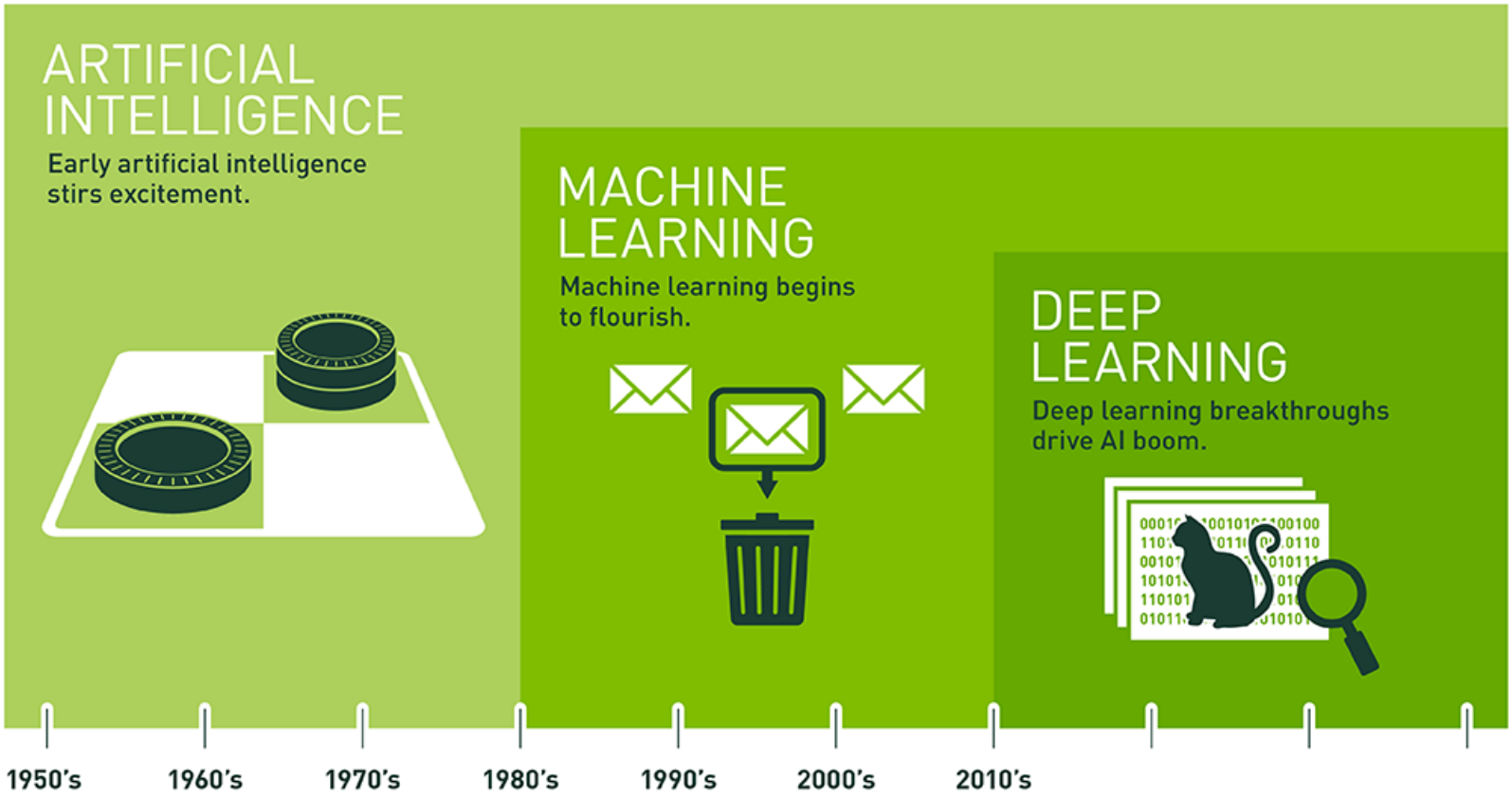


Figure source: xkcd.com

Historical perspective



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

Figure source: nvidia.com

The course in a nutshell

- Seven topics
  - Six lectures and practicals
  - One self-study topic
- Assessment
  - 65% written exam
  - 25% practicals
  - 10% presentations of self-study topic
  - 0% **mandatory** Python self-assessment quiz in the first week
- GitHub repository used for material dissemination
- Canvas used for communication and submissions/grading
- Lectures every week (for the first six weeks of the quartile) on Wednesdays, time slots 1 and 2
- Practicals immediately after the lectures, time slots 3 and 4

Topics covered in the course

- Machine learning fundamentals I (Mitko Veta)
- Machine learning fundamentals II (Mitko Veta)
- Linear models (Federica Eduati)
- Deep learning I (Mitko Veta)
- Deep learning II (Jelmer Wolterink, UMCU/UvA)
- Support vector machines, random forests (Federica Eduati)
- Unsupervised machine learning (self study topic)

Study materials

- Main: lecture slides and practicals
- Books
  - Goodfellow et al., *Deep Learning*
  - Friedman et al., *The Elements of Statistical Learning*
- Specific chapters and additional material (such as papers) are referenced in the lecture slides

Practicals

- Distributed as Python notebooks
- Deliverables
  - Python functions and/or classes (.py files) that implement basic functionalities (e.g. a k-NN classifier)
  - A **single** Python notebook that contains the experiments, visualization and answer to the questions and math problems.
- The assessment rubric for the practicals can be found in the handouts for week 1
- Use of GitHub is highly recommended
- The essential skills tutorial covers Python and git basics