Hot Topics in Machine Learning

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Universität Mannheim

HWS 2017
Lecture (1)

- **Website**

- **Lecture material / sheets / news / hand-ins / forum in ILIAS**

- **When?**
  - Lecture: Wednesday, 08:30-10:00, B6 A101
  - Tutorium: Tuesday, 10:15-11:45, B6 A101 (starts next week)
  - No strict separation between lecture and tutorium
  - Exercises & assignments: mostly at home

- **Who?**
  - Lecturer: Prof. Dr. Rainer Gemulla
  - Tutor: Yanjie Wang
Lecture (2)

- For whom?
  - Master students, Ph.D. students
  - Business informatics / MMDS / business mathematics / ...
  - 6 ECTS

- Prerequisites
  - IE 500 Data Mining I (highly recommended)
  - Basic knowledge of linear algebra (refreshed in lecture)
  - Basic knowledge of probability
Exercises

- Smaller tasks to deepen topics covered in lecture
- No hand-in, no grading
- Discussion in tutorium
  - Let’s keep this interactive
  - Students first, instructors later
  - Solutions provided afterwards
- Tasks marked with (*) are more difficult
  - Try to solve them
  - Don’t be too frustrated if you get stuck
Assignments

- Larger tasks to gather practical experience or explore additional topics
- \( \geq 4 \) assignments in total, e.g.
  - Analyze a dataset
  - Write a short essay
  - Implement an algorithm
  - Experiment with a toolbox
- Graded: solve individually at home & hand in
  - Fail
  - Pass (you need at least 3 passes)
  - Excellent (you get 1 bonus point)
- General feedback on solutions in tutorium
- Timeframe
  - \( \geq 2 \) weeks time per assignment
  - Assignments + hand-ins via ILIAS
Software

• We explore a number of different software packages in the assignments
  ▶ Python + NumPy (via Anaconda)
  ▶ scikit-learn
  ▶ Keras (with TensorFlow)
  ▶ PyStan

• To work with those, either
  1. Follow the installation instructions given in ILIAS (Windows/Linux)
  2. Use our virtual machine

• Frontends
  ▶ Jupyter notebook
  ▶ IPython notebook
  ▶ Emacs + elpy (+ ein)

• More in tutorial next week
Certificate

- Pass $\geq 3$ assignments
  - Must!

- Take the exam
  - Must!
  - At end of semester (tentative: on or around Jun 7)
  - Oral, 25 minutes, in English
  - Bonus points can be used to improve grade (-0.15 per bonus point)
  - We test *understanding*, not learning by heart
What to expect?

- **From us**
  - Lecture notes online day before lecture (hopefully!)
  - Timely grading of your assignments (but no individual feedback)
  - Discussion of issues and questions around the course
    - Primarily in tutorials and forum
    - Also: per email, individual appointments if needed
  - Anything you’d like to add?

- **From you**
  - Be here (physically and mentally)
  - Be active (ask questions, answer questions)
  - Take notes, follow reading suggestions
  - Laptops for note-taking only
  - Talk to us early in case of problems / suggestions / ...
Literature

- K.P. Murphy  
  *Machine Learning: A Probabilistic Perspective*  
  The MIT Press, 2012 (4th printing)

- D. Koller, N. Friedman  
  *Probabilistic graphical models*  
  The MIT Press, 2009

- I. Goodfellow, Y. Bengio, A. Courville  
  *Deep Learning*  
  The MIT Press, 2017  

- More in lecture notes
Next steps

- Sign up at ILIAS
- Install software / virtual machine
  - URL: [http://web.informatik.uni-mannheim.de/pi1/vm/Ubuntu.ova](http://web.informatik.uni-mannheim.de/pi1/vm/Ubuntu.ova)
  - Website credentials: pi1 / hws2017
  - VM credentials: html / html and root / student
- Go to the tutorial next week
  - Covers how we use VirtualBox
  - Reviews basic concepts
  - Discusses first exercise sheet