

Introduction to the Labs

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Labs

- ▶ Mix of theoretical and practical exercises
- ▶ Not graded! Only final exam counts
- ▶ Exercises and solutions for the previous week posted on Moodle on Tuesday morning
- ▶ I will present questions for the week and solutions for the previous week on Friday
- ▶ Second part of the lab for free form discussions or we end early if there are no topics
- ▶ Lab sessions exist to discuss and ask questions, attend not to fall behind the schedule

Theory-oriented Exercises

- ▶ Apply the math you see in the lectures
 - ▶ Pen-and-paper exercises on simple cases
 - ▶ Code the solution and test on simple problems
 - ▶ Brush up your linear algebra!
- ▶ Purpose:
 1. Understand and internalize how things work
 2. Get practical experience in implementing ML algorithms
 3. Get ready for the exam

Practice-oriented Exercises

- ▶ Play with neural networks
 - ▶ github.com/jjallaire/deep-learning-with-r-notebooks
 - ▶ github.com/fchollet/deep-learning-with-python-notebooks
- ▶ Handouts both in R and Python
 - ▶ I will present the solutions in R, but you are free to use and ask questions about the Python version
- ▶ Purpose:
 1. Learn to use a popular Deep Learning Framework
 - ▶ For R we will use Keras/Tensorflow
 - ▶ For Python we will use PyTorch
 2. Get a feeling for how neural networks behave

Our software stack (R)

1. Keras for R
2. Keras for Python
3. Tensorflow (Python bindings)
4. Tensorflow (C++)
 - ▶ CPU computations: BLAS (C/Fortran)
 - ▶ GPU computations: cuDNN (C)
 - ▶ TPU computations: Private Google library