

Machine Learning Lab Course
Organizational Meeting (IN2106, IN4192)

Lecturer: Prof. Dr. Stephan Günnemann

Winter Term 21/22

- Prof. Dr. Stephan Günnemann
- Anna Kopetzki, Bertrand Charpentier, Marten Lienen, Tom Wollschläger

This is a practical course (Praktikum) for **Master** students!
Name of module: Large-Scale Machine Learning (IN2106, IN4192)

Website: www.daml.in.tum.de/lehre/wintersemester-202122/large-scale-machine-learning

Why attend our ML lab course?

1. Opportunity to **implement and apply** state-of-the-art ML algorithms
2. Gain **hands-on experience** working on **real-world data**, solving **real-world tasks** by working on projects offered by our **industry partners** as well as academic projects
→ Successful projects might even qualify for a subsequent master thesis
3. Work on **large-scale problems** with the support of our **GPU computing resources**



Requirements

- Requirements for the lab course
 - **Strong programming skills:** Python, deep learning frameworks Pytorch/Tensorflow, etc.
 - Strong knowledge in data mining/machine learning
 - You should have passed relevant courses (the more, the better)
 - Machine Learning for Graphs and Sequential Data, Machine Learning, ...
 - see the application form
 - Motivation
- Additional selection criteria
 - Other **relevant** experience (projects in companies, experience as a HiWi)
 - You can send an overview of your experience to us (see end of slides)

- Groups of 3 students
- This term we offer 4 different projects
- Students get access to our GPU servers, each with
 - 4x NVIDIA GPU with 11GB RAM
 - 10-core CPU
 - 256 GB RAM→ Scale up your models and data!

- Bi-weekly meetings (around 2 hours)
 - Groups present every second week
 - Each group should briefly report their progress and next steps
- Regular documentation of your work on wiki
- Code on git (LRZ)

BMW

Reliability for ML Methods

Implement, test and develop approaches to increase reliability and robustness in image classification applications for state-of-the-art architectures (CNN-GRUs-Attention, yolov4, efficientdet, retinanet, unets).

SIEMENS

Classification in Quality Control

To supervise the manufacturing process an image classification model has to be trained on the real world data. This step is currently a part of a quality control pipeline and is used in the inspection processes.

TUM-DAML

ML for Traffic Models

Modeling traffic flow is a central part of navigation systems, fleet management and urban planning. You evaluate and improve recent approaches that combine sequence models and graph neural networks.

TUM-DAML

Green & Cheap ML Models

Evaluate machine learning models (layer types, training, inference) with respect to power consumption, ecological footprint and price instead of (only) standard metrics such as accuracy.

Registration via the matching system!

Module name: Large-Scale Machine Learning (IN2106, IN4192)
(IN2107, IN4872)

+ Fill out the application form (link on the webpage)!

Website: [www.daml.in.tum.de/lehre/wintersemester-202122/
large-scale-machine-learning](http://www.daml.in.tum.de/lehre/wintersemester-202122/large-scale-machine-learning)

- Provide us with your list of experience in ML (courses, projects, etc.)
- Please send us a **concise** overview (bullet list, not a complete CV)