Machine Learning for Time Series Data (Seminar)
Preliminary Meeting (IN2107, IN4874).

Dr. Tim Januschowski (Zalando)
Dr. Jan Gasthaus (AWS AI Labs)

Summer Term 2022

Team

- ▶ Dr. Tim Januschowski (Zalando)

- ▶ Dr. Jan Gasthaus (AWS AI Labs)

This is a seminar for **Master** students!
Main prerequisite: Machine Learning (IN2064)

Website

https://www.in.tum.de/daml/lehre/sommersemester-2022/seminar-time-series/

Why attend this Seminar?

1. Learn about and explore **state-of-the-art** research in ML for time series

2. **Analyze and criticize** recent publications or **dive deep** into a method and explore extensions/improvements

3. Improve your **scientific writing**

4. Participate in a **review process** akin to international conferences

5. Improve your **presentation skills**

Topics I: Forecasting

- ▶ Classical vs. deep-learning-based methods
- ▶ Neural network architectures for sequence data
- ▶ Modeling and measuring predictive uncertainty
- ▶ Multivariate methods
- ▶ Hierarchical methods
- ▶ Graph-based methods

Topics II: Other topics
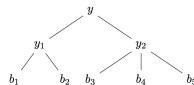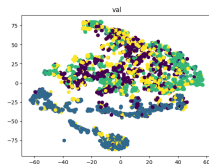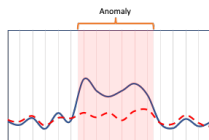
- ▶ Anomaly detection in time series data
- ▶ Time series representation learning
- ▶ Time series classification
- ▶ Interpretable machine learning methods for time series
- ▶ Event data and temporal point processes
- ▶ Causality for time series analysis

Requirements

- Strong knowledge of machine learning and mathematics

- Passed relevant courses (the more, the better)
  - Machine Learning (hard requirement)
  - Machine Learning for Graphs and Sequential Data (formerly Mining Massive Datasets)
  - Machine Learning Lab

- Motivation

- Additional selection criteria
  - relevant experience (projects in companies, experience as a HiWi) $\Rightarrow$ you can send an overview of your experience to us (see end of slides)

Tasks

1. Read **seed research papers** (provided by us)

2. **Choose** either
   2.1 **Snowball research:** identify and read additional papers related to the seed papers (via references to/from the paper, relevant keywords)
   2.2 **Deep dive:** Experiment with the code released with the paper; extend/improve the method/code, run experiments, and analyze the results

3. Summarize your findings, criticism, and research ideas in a **short paper** (4 pages, double column)

4. Write **reviews** of other students work

5. **Present** your work in 25-minute talks

Grade will be based on **all** parts: Paper, reviews, talk and overall participation

Schedule
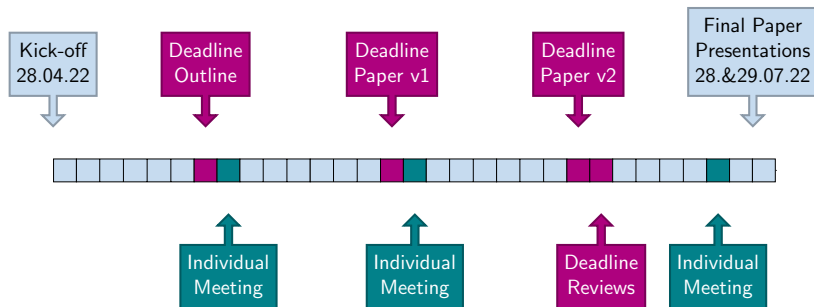
▶ Individual meetings via biweekly (virtual) office hours (time TBD).

Registration

Registration via the matching system!
(Note the different title!)
Seminar - Efficient Inference and Large-Scale Machine Learning
(IN2107, IN4874)

+ Fill out the application form!
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https://docs.google.com/forms/d/e/
1FAIpQLSepOrhnwyTKf3Z5AS4V1l5elNDUrJUlCqCGoBS3pq4vUz8nMg/
viewform
```

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