Stephan Rabanser

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Education

M.Sc. in Computer Science (w/ Prof. Stephan Günnemann) — October 2015 – July 2019
Technical University of Munich (TUM) — *Munich, Germany*

Visiting Research Scholar (w/ Prof. Zachary C. Lipton) — August 2018 – January 2019
Carnegie Mellon University (CMU) — *Pittsburgh, PA*

Honours Degree in Technology Management — August 2015 – July 2019
Technical University of Munich (TUM) — *Munich, Germany*
Ludwig Maximilian University of Munich (LMU)
Center for Digital Technology and Management (CDTM)

Visiting Research Student (w/ Prof. Thomas W. Malone) — February 2016 – June 2016
Massachusetts Institute of Technology (MIT) — *Cambridge, MA*
Center for Collective Intelligence (CCI)

B.Sc. in Computer Science, Minor in Economic Sciences — October 2012 – October 2015
Technical University of Munich (TUM) — *Munich, Germany*

Higher Education Entrance Qualification (A-levels) — September 2007 – July 2012
Technologische Fachoberschule "Max Valier" — *Bolzano, Italy*

Work Experience

Intern Applied Scientist (Machine Learning) — September 2019 – December 2019 (exp.)
Amazon AI Labs — *Munich, Germany*

- Working on systematically assessing the impact of input/output representations for deep-learning-based time-series forecasting.

Intern Applied Scientist (Machine Learning) — May 2018 – August 2018
Amazon AI Labs — *Munich, Germany*

- Evaluated existing and developed new ML-based algorithms for large-scale lossless data compression.
- Implemented autoencoder-based probability distribution estimation for arithmetic coding on tabular data.

Intern Software Development Engineer — August 2017 – October 2017
Amazon – Core Machine Learning — *Berlin, Germany*

- Received an overview of standard time series analysis / forecasting techniques.
- Implemented Bayes by Backprop (weight uncertainty quantification) for plain MLPs and RNNs in MXNet.
- Contributed two chapters to upcoming MXNet book.

Intern Software Development Engineer — July 2016 – October 2016
Amazon Web Services (AWS) – OpsWorks — *Berlin, Germany*

- Developed internal business intelligence tool (business metrics reporting and automated dashboard generation) for new OpsWorks service offering (OpsWorks for Chef Automate).
- Gained deep insights into a broad range of AWS products and large-scale software development at Amazon.

Publications

- Stephan Rabanser, Stephan Günnemann, Zachary C. Lipton. **Failing Loudly: An Empirical Study of Methods for Detecting Dataset Shift**. *Accepted to Neural Information Processing Systems (NeurIPS) 2019*. Previously presented at the DebugML Workshop at ICLR 2019.
- Stephan Rabanser, Oleksandr Shchur, Stephan Günnemann. **Introduction to Tensor Decompositions and Their Applications in Machine Learning**. *ArXiv e-prints (November 2017)*. arXiv:stat.ML/1711.10781.
- CDTM Class of Fall 2015. **Entrepreneurship in Bavaria**. *Center for Digital Technology and Management (CDTM)*. ISBN: 978-3-9815538-9-5. 2015.

Technical Strengths

Programming Languages	Python, Java, Swift, Ruby, C, HTML5/CSS3/JS
ML Frameworks	Keras, TensorFlow, MXNet, sklearn
Tools	Git, IDEA Suite, Jupyter, Xcode, Sketch

Awards & Honors

ICLR 2019 Student Volunteer May 2019

NeurIPS 2018 Student Volunteer December 2018

Member of the Elite Network of Bavaria Since April 2016

Apple Worldwide Developers Conference (WWDC) June 2013
Student Scholarship Recipient *San Francisco, CA*

- Developed résumé iOS app to highlight academic and professional experience as well as hobbies.
- Got awarded a free WWDC ticket.

Selected Coursework & Prior Research Experience

Data Shifts and Distribution Change Point Detection August 2018 – July 2019
Master's Thesis Project – CMU & TUM *Pittsburgh, PA & Munich, Germany*

- Conducted research on dataset shift detection, characterization, and malignancy quantification between training and testing environments.
- Set up a large-scale empirical study to evaluate shift detection potential using statistical two-sample testing on various latent representations.
- Accepted to Neural Information Processing Systems (NeurIPS) 2019.

Denoising Spectral Clustering Through Latent Data Decomposition October 2017 – March 2018
Guided Research – Professorship of Data Mining and Analytics, TUM *Munich, Germany*

- Developed two new methods to make spectral clustering more robust (reduced sensitivity to noise).
- Modeled problem as latent data decomposition instead of similarity graph decomposition.
- Initial results outperform similar techniques on many datasets, but extensive hyper-parameter tuning is needed.

Data Science in Astrophysics and Industry March 2017 – July 2017
Interdisciplinary Project – Max Planck Institute for Astrophysics (MPA) *Munich, Germany*

- Transformed an existing Gaussian mixture model (GMM) into Google TensorFlow.
- Optimized the algorithmic implementation of the model (e.g. number of mixture components, hyper-parameters).
- Explored different training methods (stochastic vs. deterministic and expectation maximization (EM) vs. gradient descent vs. Newton).
- Determined parallelizable operations and to which extend sync points are needed.
- Researched, implemented, and improved online learning techniques for GMMs and compared them to standard EM and tensor decomposition approaches.

Teaching Assistant August 2014 – November 2014
Swift Introduction Course – Chair for Applied Software Engineering, TUM *Munich, Germany*

- Held a 2h talk and prepared the corresponding tutorial about RESTful interaction with web services within iOS and OS X apps.
- Developed a course-matching sample API by using Java technologies (Maven, Glassfish, Jersey, JPA).
- Supported course administration by writing and reviewing course assignments.
- Highlighted by Apple as one of the first Swift courses at major universities.

Languages

German	Native
English	Fluent, TOEFL iBT 112 (November 2018)
Italian	Proficient