Robin M. Schmidt

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Education

University of Tübingen *Mar 2021*
Master of Science in Computer Science *Tübingen, Germany*

- Cumulative GPA: 1.38/1.0 on a grading scale from 1.0 (best) to 5.0 (fail)
- Relevant Coursework: Data Mining & Probabilistic Reasoning, Advanced Computer Vision & Machine Learning, Advanced Deep Neural Networks, Advanced Perception Engineering

Cooperative State University Stuttgart *Oct 2018*
Bachelor of Science in Computer Science *Horb, Germany*

- Cumulative GPA: 2.0/1.0 on a grading scale from 1.0 (best) to 5.0 (fail)

Work Experience

IBM Research & Development *Aug 2019 – Nov 2019*
Software Engineer Intern (Backend) *Böblingen, Germany*

- Incorporated Internet of Things requirements into IBM's Master Data Management.
- Led project team and conceptualized more effective instance-level master data graph representations that opened up new use-case sectors and marketing opportunities.
- Developed a prototype with React.js, a Python RESTful API, and Cassandra & JanusGraph databases which allowed users to connect and visualize sensor data in real-time.

➥ Presented the results to the team's global head and wrote requested summary detailing value proposition and implementation details for senior leadership and offering management.

Eisenmann SE *Oct 2015 – Oct 2018*
Software Engineer (Backend) *Böblingen, Germany*

- Improved the configurable data analysis pipeline for the Manufacturing Execution System "E-MES" by analyzing different reporting-frameworks (e.g. JasperReports, BIRT, Pentaho, Tableau) and implementing them for convenient customer usage.
- Implemented better KPIs for improved performance insights of many customers by collecting customer requirements and providing reporting solutions via JasperReports.
- Conceptualized an uncertainty-based single product tracking system for a press-hardening production line with limited sensor data for an US customer.

➥ Took the initiative to solve under-specified sensor data collection problems on-premise in the USA, which was essential for the team to successfully complete the project on-time.

Research Experience

Max Planck Institute for Informatics & University of Tübingen *Aug 2020 – Present*
Research Scientist in the Explainable Machine Learning Group *Tübingen, Germany*

- Research on Explainability-aided Domain Generalization for Image Classification that led to state-of-the-art advancements on multiple generalization datasets.
- Developed two novel algorithms for domain generalization called Diversified Class Activation Maps (DivCAM) and Self-Challenging Attribute Prototype Networks (ProDrop).

Max Planck Institute for Intelligent Systems & University of Tübingen *Oct 2019 – May 2020*
Research Scientist Intern in the Methods of Machine Learning Group *Tübingen, Germany*

- Research on Stochastic Non-Convex Optimization that enabled the optimization benchmarking suite "DeepOBS" via open-sourced baselines of 50,000 individual training runs.
- Advanced development of "DeepOBS" by fixing and developing key features that included batch comparison scripts, analysis code, and multiple framework endpoints.

➥ Publication: "Descending through a Crowded Valley – Benchmarking Deep Learning Optimizers" under review at *International Conference on Machine Learning, ICML* 2021.

➥ Work featured twice in Andrew Ng's weekly machine learning newsletter "The Batch".

Skills

Concepts: Machine Learning, Deep Learning, Optimization, Domain Generalization

Programming: Python, Java, C++, Prolog, Matlab, R, JavaScript

Frameworks & Tools: PyTorch, TensorFlow, Flask, Pandas, Docker, Git, Linux, SQL, Gremlin, LaTeX

Databases: MySQL, Oracle, JanusGraph, Cassandra, MongoDB, VoltDB, NuoDB, CockroachDB

Languages: German (native), English (fluent), Japanese (beginner)

Selected Projects & Contributions

DeepOBS: Optimization Benchmarking Suite – Contributed baselines, scripts and improved software quality.

DomainBed: Domain Generalization Benchmarking Suite – Contributed algorithms and other features.

Recommender Systems: Analyzed *recourse* and *availability* under model uncertainty and discrepancy.

App2Night: Cross-platform mobile app to create, attend, and rate user-generated events in real time.

SiteScrawler: Web-App to provide users via email and online with relevant news articles based on their interests.

Invited Talks

KTH Royal Institute of Technology: *Stockholm, Sweden* — *September 25th, 2020*

IBM Extreme Blue Conference: *Cluj-Napoca, Romania* — *September 3rd, 2019*

Publications

[SSH21] **Robin M. Schmidt**, Frank Schneider, and Philipp Hennig. "Descending through a Crowded Valley – Benchmarking Deep Learning Optimizers". In: *International Conference on Machine Learning, ICML*. (under review). 2021.

Preprints

[SH20] **Robin M. Schmidt** and Moritz Hahn. *Collaborative Filtering under Model Uncertainty*. 2020. arXiv: 2008.10117 [cs.LG].

[Sch19] **Robin M. Schmidt**. *Recurrent Neural Networks (RNNs): A gentle Introduction and Overview*. 2019. arXiv: 1912.05911 [cs.LG].

Theses

[Sch21] **Robin M. Schmidt**. *Explainability-aided Domain Generalization for Image Classification*. M.Sc. Thesis. (in progress). 2021.

[Sch18a] **Robin M. Schmidt**. *Conception and Implementation of a Single Product Tracking System within a press hardening production line*. B.Sc. Thesis. (subject to a NDA). 2018.

Unpublished & Industry Research

[Sch18b] **Robin M. Schmidt**. *Improvements for the configurable Data Analysis Pipeline within a Manufacturing Execution System*. (subject to a NDA). 2018.

[Sch18c] **Robin M. Schmidt**. *New SQL Databases: An empirical evaluation of Open Source NewSQL databases regarding modern application scenarios*. (title translated from german). 2018.

[Sch17] **Robin M. Schmidt**. *Calculation and Evaluation of Key Performance Indicators for production within a Manufacturing Execution System*. (subject to a NDA). 2017.

Other Interests

Street Photography: Samples of my side work – Selling metal, paper, or canvas prints of my street photography art.