Jan Sobotka

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EDUCATION

Swiss Federal Institute of Technology in Lausanne (EPFL)   Sep. 2024 – ongoing
M.S. in Computer Science   *Lausanne, CH*
- Anticipated graduation date: 07/26

Czech Technical University, Faculty of Information Technology   July 2021 – July 2024
B.S. in Informatics, Specialization in Artificial Intelligence   *Prague, CZ*
- Weighted grade average: **1.05** (scale of 1.0 to 4.0, 1.0 is the best)
- Ranked among the **top 5%** of students in the majority of courses.

INDUSTRY EXPERIENCE

AI/ML Engineer Junior   June 2021 – June 2023
Generali Česká pojišťovna   *Prague, CZ*
- Prepared a machine learning pipeline that improved the accuracy of product recommendations by ∼**35%**.
- Built computing infrastructure for the company's internal data science community with over 90 members.
- Applied deep learning approaches to various projects, including product and text recommendation, client departure prediction, email classification, and unsupervised customer segmentation.

IT Generalist   Feb. 2020 – June 2021
Startup Disrupt   *Prague, CZ*
- Deployed several websites and cloud services on AWS.
- Led the development of a web application for ticket sales.
- Prepared IT setup for over 30 offline/online events.

Junior DevOps Intern   July 2020 – Sep. 2020
Cloudinfrastack   *Prague, CZ*
- Built server-side applications in Golang.
- Deployed custom automation services.

RESEARCH EXPERIENCE

Research Scholar at the MLBio Lab   Aug. 2024 – ongoing
Swiss Federal Institute of Technology in Lausanne (EPFL)   *Lausanne, CH*
- Analyzing and developing algorithms for robust generalization of vision models.
- Using reinforcement learning for discovery of gene markers and fine-grained classes in single-cell data.
- Supervised by Prof. Maria Brbić.

Research Intern at the Computational Systems Neuroscience Group   Sep. 2023 – Aug. 2024
Faculty of Mathematics and Physics, Charles University   *Prague, CZ*
- Worked on deep learning-based decoding of neural activity for use in brain-machine interfaces.
- Bachelor thesis titled *Decoding visual stimuli from cortical activity using neural networks* under the supervision of Mgr. Ján Antolík, Ph.D.

Research Assistant at the Data Science Lab   Apr. 2023 – Feb. 2024
Faculty of Information Technology, Czech Technical University   *Prague, CZ*
- Investigated the inner workings and applicability of optimization methods known as *Learning-to-Optimize* (meta-learning) and *fractional gradient descent* in the context of deep learning.

Computational Neuroscience Research Intern   July 2023 – Sep. 2023
Biozentrum, University of Basel   *Basel, CH*
- Worked on the research project *Bistable Dendrites Matter: Auto-Associative Memory in Networks of Neurons* under the supervision of Dr. Everton Agnes.
- Designed computational models of spiking neural networks and analyzed the role of bistable dendrites in memory.

Publications

Jan Sobotka, Petr Šimánek, Pavel Kordík (2024). Submitted
Enhancing Fractional Gradient Descent with Learned Optimizers.
Optimization Letters.

Jan Sobotka, Petr Šimánek, Daniel Vašata (2024). DOI 🔗 | Preprint 🔗
Investigation into the Training Dynamics of Learned Optimizers.
*The 16th International Conference on Agents and Artificial Intelligence (**ICAART 2024**).*

Jan Sobotka, Petr Šimánek (2024). DOI 🔗
Investigation into the Training Dynamics of Learned Optimizers (Student Abstract).
*The 38th Annual AAAI Conference on Artificial Intelligence (**AAAI-24**).*

Selected Projects

Internal World Models in Recurrent Model-Free Reinforcement Learning Sep. 2024 – ongoing
- Ongoing semester research project at the intersection of ML interpretability and RL.
- Using methods from ML interpretability and neuroscience to understand the impact of auxiliary objectives in RL.

Deep Reinforcement Learning for Optimal Experimental Design in Biology Jan. 2023 – June 2023
- Open research project focused on the efficient estimation of biological system parameters (OpenBioML 🔗).
- Implemented the TD3 RL algorithm and designed a pipeline for experiments on an HPC cluster.

Generative Models of Regulatory DNA Sequences Based on Diffusion Models July 2022 – Dec. 2022
- Open research project investigating the application of diffusion models to genomics data (OpenBioML 🔗).
- Prepared data preprocessing and unit testing for the pipeline.
- Initiated experimental research focused on exploring the synergy between diffusion models and hypernetworks.

Extracurricular Activities

Participant of the ROBOT ICT Summer Academy Aug. 2021 – Aug. 2021
- Acquired hands-on experience with Robotic Process Automation (RPA) development using UiPath.

Organizer of the Traion Community of Student Entrepreneurs June 2020 – Feb. 2021
- Organized offline meetings, educational seminars, and workshops targeted at startups and entrepreneurship.

Volunteer for an Entrepreneurship Education Program for Students Dec. 2019 – Aug. 2020
- Organized events and wrote a technology/entrepreneurship blog for the Soutěž and Podnikej organization.

Pitcher at the Czech Republic National Baseball Team U-15 Jan. 2017 – July 2017
- Secured third place at the U-15 European Baseball Championship 2017.

Honors and Awards

The Bakala Foundation Scholarship: Awarded to 12 out of 165 applicants | The Bakala Foundation 🔗 | 2024
Merit-Based Scholarship for Academic Achievements: Czech Technical University | 2021, 2022, 2023
National Benchmark Exam in Mathematics: Scored higher than 97% of the 875 test takers | SCIO 🔗 | 2021
Algorithms & Programming Competition FIKS: 4th out of 107 contestants | Czech Technical University | 2020
TOP25 Czech High School Students of the Year 2020: Selection based on extracurricular activities | 2020

Skills

Programming languages: Python, C, C++, Julia, JavaScript, Go
Other selected technologies: PyTorch, Scikit-learn, NumPy, Pandas, Matplotlib, Azure, AWS, Git, Docker, Bash
Languages: Czech (native speaker), English (C1, TOEFL iBT 107), German (A2)