ALEXANDER CHEBYKIN

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Education

National Research Institute for Mathematics & Computer Science (CWI)   01/2021 – 01/2025
Ph.D. candidate — Automated Machine Learning via Evolutionary Algorithms   *Amsterdam, NL*

Technical University of Berlin   10/2018 – 12/2020
M.Sc. Computer Science — DAAD scholarship — GPA 1.0 (100%)   *Berlin, DE*

THESIS: Learning Neural Network Structure that Aids the Interpretability of the Underlying Processes
- Created an algorithm for learning sparse connectivity without drastic performance loss.
- Discovered circuits in sparse networks, noticed that minimally-activating feature for a neuron can be meaningful and not simply opposite to the maximally-activating feature.
- Confirmed (visually and quantitatively) that the finding holds in dense networks.

Saint Petersburg State University   09/2014 – 07/2018
B.Sc. Software Engineering — Minor in Mathematics — GPA 5.0 (100%)   *Saint Petersburg, RU*

THESIS: Source Code Generation using Machine Learning Techniques
- Started from a paper that used an RNN to translate a natural-language request into an API call sequence.
- Collected data, reproduced the experiment, improved data preprocessing & model architecture.
- Combined with an algorithm that translates an API call sequence into code, developed an IDE plugin.
- Published the results in SEIM-2017 and SYRCoSE-2018. Research supported by a JetBrains Research stipend.

Publications

Shrink-Perturb Improves Architecture Mixing during Population Based Training for Neural Architecture Search   *European Conference on Artificial Intelligence (ECAI) 2023*
A. Chebykin, A. Dushatskiy, T. Alderliesten, P. A. N. Bosman
- Optimize architectures during training by mixing good architectures and inheriting the weights.
- Mixing works best if shrink-perturb is applied to the inherited weights.
- The proposed algorithm, PBT-NAS, outperformed baselines in challenging settings (GANs, RL).

Multi-Objective Population Based Training   *International Conference on Machine Learning (ICML) 2023*
A. Dushatskiy, A. Chebykin, T. Alderliesten, P. A. N. Bosman
- Extend Population Based Training (PBT) to multi-objective (MO) hyperparameter optimization.
- MO-PBT is parallel and scalable, it achieved state-of-the-art results on varied MO machine learning problems.

Evolutionary Neural Cascade Search Across Supernetworks   *Genetic and Evolutionary Computation Conference (GECCO) 2022*
A. Chebykin, T. Alderliesten, P. A. N. Bosman
- Efficiently search for cascades of neural nets in model pools of hundreds of models (pretrained or found by NAS).
- Using multiple supernetworks leads to higher architecture diversity and performance.
- Best Paper award in the Neuroevolution track.

Experience

Student Research Assistant | TU Berlin | *Python, PyTorch*   09/2019 – 12/2020
- Was free to set own research agenda (within supervisors' interests), work resulted in the M.Sc. thesis (see above).

Data Scientist, Intern | JetBrains | *Java, Python, PostgreSQL, Spring Boot*   07/2017 – 08/2017
- Developed and integrated into production code a framework for data collection via Twitter API.
- Analyzed structure of subscribers of JetBrains products' accounts, performed tasks for the marketing team.

Software Engineer, Intern | Lanit-Terkom | *C#, SQLite*   07/2016
- Developed offline mode for an app for accessing Microsoft Team Foundation Server.

Software Engineer, Intern | Lanit-Terkom | *CUDA C, C#, GP GPU*   07/2015
- Implemented image enhancement algorithms in C#, improved speed by developing parallel versions in CUDA C.

Skills

- Python
- PyTorch
- NumPy
- Ray
- Data visualization
- Problem solving
- Fluent English
- Communication