Sergei VOLODIN

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Birth date: 3rd of October 1994 (29 years), Russian

ABSTRACT

Software engineer and young scientist with with experience in research and development in industry, academia and startups. Have a Swiss degree. Looking for a vibrant team to work on creative projects.

EPFL, Google, Berkeley

EDUCATION

Swiss Federal Institute of Technology in Lausanne (EPFL) — Master's
Lausanne, Switzerland — Sep 2017 – Apr 2021

- Master's degree in Computer Science, minor in Computational Neurosciences, GPA: 5.67/6
- Research Assistant position (2017–2019)
- Thesis "CauseOccam: Learning Interpretable Abstract Representations in Reinforcement Learning Environments via Model Sparsity"

Moscow Institute of Physics and Technology — Bachelor's
Moscow, Russia — June 2017

Bachelor's degree in Applied Mathematics, GPA: 4.84/5

SKILLS

Scientific programming: Keras, TensorFlow, PyTorch, ray/tune/rllib, tf-agents, scikit-learn, Brian 2, MATLAB, Mathematica, R

Programming languages: Python, C/C++, TypeScript, Java, Scala, nasm, C#, AVR C++

Frameworks: Qt/QML, Django, Android Studio, OpenGL/GLSL, Unity 3D, Blender, React.js

Environment: Git, LaTeX, Bash, Debian/Ubuntu Linux

Scientific skills: experimental sections of research papers, working on theoretical problems, scientific presentation, data analysis

Software development: agile software development (Scrum), CI/CD, debugging, design patterns, concurrent and distributed systems, TCP/IP networking, AVR microcontrollers, Arduino platform, team and project management in small startups

Languages: English: TOEFL iBT 113/120, French: A1, Russian: native

WORK AND RESEARCH EXPERIENCE

Fave For Fans — Software Engineer
Platform dedicated to passionate fans, Zürich, Switzerland — Sep 2021 – May 2022

- Responsible for the backend development with microservices on Cloudflare Workers with TypeScript, an ArangoDB-based database, automatic data schema validation, and CI/CD with integration tests. First full-time engineer at the company.
- Proposing and discussing ways to create more ethical and democratic social media sharing mechanisms, organizing voting in the team to discuss proposals ("mini Stakeholder Capitalism")
- Research into ways of obtaining data from third-party services with privacy guarantees
- Conducted analysis of the database to create better ranking results

Tournesol — Co-founder&ML engineer
Non-profit designing better recommender systems, Lausanne, Switzerland — May 2020 – May 2021

- Co-founded a startup working on contributor-driven collaborative recommender systems
- Responsible for back-end engineering using Django, and Machine Learning engineering with TensorFlow, the API server
- Responsible as well for system administration (Debian), (partially) front-end development with React.js and parts of algorithm design
- Co-authored the paper with our results

Center for Human-Compatible AI (CHAI), Berkeley — Summer Intern
Berkeley, CA, United States (remote due to COVID-19, from Zurich, Switzerland) — June 2020 – Sep 2020

- Designed better defenses against adversarial policies in Multi-Agent Reinforcement Learning via alternating training of opponents using Python 3, Tensorflow, ray, rllib.
- Ran hyperparameter sweeps on multiple machines with ray and rllib
- Converted legacy code using stable baselines and Tensorflow 1.0 to rllib and Tensorflow 2.0
- Results published as a blog post "Defending against Adversarial Policies in Reinforcement Learning with Alternating Training" on the Effective Altruism forum

Google Research — Software Engineering Intern
Mountain View, CA, United States — Nov 2019 – Feb 2020

- Designed an algorithm to uncover a linear Causal Model of a Reinforcement Learning environment using interventions with Python 3, Tensorflow, tf-agents, and analyzed the effect of interventions on the quality of exploration
- Used TensorFlow and tf-agents to conduct the experiments with large hyperparameter sweeps
- Results published as an ICLR CLDM workshop paper

EPFL, Computer-Human Interaction in Learning and Instruction laboratory — Research Assistant
Lausanne, Switzerland — Sep 2017 – Aug 2018

- Created a library QML-AR for seamless augmented reality using OpenCV, Qt/C++ and Qt/QML with competitive performance on Android and small visual negative impact
- Designed an activity for kids for learning math using AR, tested the application in a classroom setting, analyzed the obtained data

EscapeControl — Founder&Backend engineer
Own b2b startup for escape rooms, Moscow, Russia — Jul 2015 – Feb 2016

- Created a startup selling software and hardware for real-world escape room games which allows to speed up the construction and reduce maintenance costs
- Responsible for back-end software engineering with C++/Python, servers administration, sales and customer support
- Managed a team of two web developers until a successful launch of the web interface
- Sold more than forty solutions which are currently running in different countries across the globe and provided remote support

PUBLICATIONS

Lê-Nguyên Hoang, Louis Faucon, Aidan Jungo, Sergei Volodin, Dalia Papuc, Orfeas Liossatos, Ben Crulis, Mariame Tighanimine, Isabela Constantin, Anastasiia Kucherenko, Alexandre Maurer, Felix Grimberg, Vlad Nitu, Chris Vossen, Sébastien Rouault, El-Mahdi El-Mhamdi. Tournesol: A quest for a large, secure and trustworthy database of reliable human judgments, 2021. Code for the platform (backend, ML, frontend), experiments, part of data analysis, writing

ICLR Sergei Volodin, Nevan Wichers, Jeremy Nixon. Resolving Spurious Correlations in Causal Models of Environments via Interventions, 2020. Topic choice, experiments, theory, writing. ICLR CLDM workshop 2020.

El-M. El-Mhamdi, R. Guerraoui, A. Kucharavy, S. Volodin. The Probabilistic Fault Tolerance of Neural Networks in the Continuous Limit, 2019. Experiments, theory, writing.

A. Dymarsky, E. Gryazina, S. Volodin, B. Polyak. Geometry of quadratic maps via convex relaxation, 2018. Exp-s, theory, writing.

A. Petrov, S. Volodin Janibekov's effect and the laws of mechanics. Doklady Akademii Nauk, 2013. Graphics for the article, experiments, first year of my BSc

MASTER'S THESIS

EPFL, Laboratory for Computational Neuroscience — Master's Thesis student
Lausanne, Switzerland — Oct 2020 – Apr 2021

- Designed an algorithm with Python 3, Pytorch and ray based on the "Consciousness Prior" proposal that finds a simple causal model of an RL environment in the general case from pixels. The project is a continuation of my Google Research internship (see below)
- The algorithm works on benchmarks, see my thesis for more details
- The work includes theoretical results on abstraction learning as well as a code base with tests and documentation
- The thesis defended on the 21st of April 2021 with Adam Gleave (Berkeley/DeepMind) as an external expert

EXTRAS

EXTRA EXPERIENCE

Swisscom Digital Lab — Thesis student
Lausanne, Switzerland — Sep 2020 – Nov 2020
- Developed a prediction model of customer churn based on time series data with neural networks implemented in PyTorch
- Responsible for obtaining the data into Apache Spark and presenting the results

EPFL, Distributed Computing Laboratory — Research Assistant
Lausanne, Switzerland — Sep 2018 – Oct 2019
- Investigated fault tolerance of a neural network using Taylor approximation
- Introduced the *continuous limit* to bound the error, and compared to the Neural Tangent Kernel limit case
- Conducted experiments to test the theory using Keras including the implementation of custom layers and regularizers

Skolkovo Institute of Science and Technology, Center for Energy Systems — Research Intern
Moscow, Russia — Sep 2016 – Jul 2017
- Characterized using numerical optimization and theoretically the structure of the set of boundary non-convexities of an image of a quadratic map in case the number of non-convexities is infinite
- Designed and implemented the Convexity Analysis of Quadratic Maps library using MATLAB which gives approximate solutions to a number of problems involving quadratic maps

ITBrat — Software Engineer
Algorithmic trading startup, Moscow, Russia — Jul 2015 – Feb 2016
- Developed algorithmic trading application from initial discussion with the team to deployment and supporting in C++
- Added low-level user-space networking to the project which allowed to decrease latency and increase profit
- Responsible for the performance of the code

PROJECTS

Safe Proximal Policy Optimization
EPFL EE-618 course project, advised by Dr. Kamalaruban Parameswaran and Prof. Volkan Cevher, Lausanne, Switzerland — 2019
- Added a projection step to the Proximal Policy Optimization algorithm to comply with requirements of Constrained Markov Decision Processes
- Implemented code in Tensorflow and tested it in simple environments
- Presented the project at the RLSS 2019 summer school (Lille, France)

Quadcopter drone from scratch project
Russia — 2012 – 2014
- Developed an algorithm in C++ for stabilization of a quadcopter drone from scratch using AVR microcontrollers, IMU sensors and PID regulators
- Co-managed the project consisting of 2-5 developers
- Conducted the analysis of launches to improve flying quality
- Results were published as a popular science article *(in Russian)*

RELEVANT COURSES

Machine Learning, Software Engineering, Unsupervised and Reinforcement Learning, Convex Optimization, Distributed Algorithms, Algorithms, Random graph theory, Functional Programming, Set Theory, Random Processes, Functional Analysis, Biological modeling of neural networks, Complexity theory, Learning theory, Neuroscience: behavior and cognition, Neuroprosthetics, Theory and methods for Reinforcement Learning, Optimization for Machine Learning, Computer Vision

CONFERENCES AND SUMMER SCHOOLS

- Machine Learning Summer School, 2020 (virtual due to COVID-19), *poster presenter*
- Reinforcement Learning Summer School, 2019 (Lille, France), *poster presenter, selected to receive financial help*
- Data science summer school, 2019 (Paris, France), *poster presenter*
- QtDay 2019 (Firenze, Italy), *speaker, one hour session on qml-ar*
- P.A.I.S.S. AI Summer School, INRIA Grenoble, 2018, *participant in tutorials given by top experts; selected to receive financial aid*
- Information Technologies and Systems (Saint-Petersburg, Repino, 2016), *speaker, poster presenter*

COMPETITIONS

- Google HashCode Qualification round coding contest, top 6% (team EPFL_Noobs), managed the team, developed algorithms and did the coding, 2019
- DeepHack.RL hackathon on Deep Reinforcement Learning for Atari games, managed the team and developed an evolutionary algorithm with an autoencoder, MIPT, Moscow, Russia, 2017

VOLUNTEERING

Better Russia
Community of pro-democracy Russians, Zurich, Switzerland — 2022
Making posters for the demonstrations, organizing voting on important decisions among members, brainstorming on the situation to find a way forward

Artificial Intelligence Governance Forum
AI governance conference, Geneva, Switzerland (2019), virtual due to COVID-19 (2020) — 2019, 2020
Time-keeping, technical support, small tutorial on neural networks

Effective Altruism Lausanne
Local EA community, Lausanne, Switzerland — 2019
Co-founding the group, introduction workshop speaker, running a discussion group on AI safety and theory, newsletter management and writing, Facebook events announcements, managing open discussions

Applied Machine Learning Days
Machine learning conference, Lausanne, Switzerland — 2019
Technical help for presenters, badge check

Anti-corruption foundation (A. Navalny)
A non-profit aimed at investigating corruption, Moscow, Russia — 2017
Conveyed the results of the investigations by talking to people on the streets as a volunteer

INTERESTS

Music, Dancing, Running ($1/2$ marathon 2018), Snowboarding, Swimming, Philosophy, DIY, Activism

RESEARCH INTERESTS

Artificial Intelligence Safety/Ethics, Artificial Intelligence, Machine Learning, Causal Reasoning, Neuroscience, Adversarial policies, Mathematical Optimization, Robotics, Consciousness research

SCHOLARSHIPS

- Research Scholars, a paid Research Assistant position, Swiss Federal Institute of Technology in Lausanne (EPFL), 2017 – 2019
- Abramov Fund's scholarship for excellent grades, 2014