Andrii Semenov

2k2, Likhachevsky Drive, Dolgoprudny, Russia
Profile GitHub Website Scholar

Education

École polytechnique fédérale de Lausanne
MSc in Data Science Sep 2024 -

- School of Computer and Communication Sciences

Moscow Institute of Physics and Technology
MSc in Computer Science and Informatics Sep 2024 -

- Phystech School of Applied Mathematics and Informatics
- Department of Intelligent Systems

Moscow Institute of Physics and Technology
BSc in Applied Mathematics and Physics Sep 2020 - Aug 2024

- Landau Phystech School of Physics and Research
- Chair of Problems of Physics and Astrophysics
- Affiliated with Yandex chair of Data Analysis
- Advisor: Aleksandr Beznosikov
- Thesis: "Contrastive Learning for Enhancement of Model Interpretability in Computer Vision"

Work Experience

Teaching Assistant | Department of Mathematical Fundamentals of Control, MIPT Jan 2024 - Aug 2024

- Reinforcement Learning course. Lecturer: Yudin Nikita

Deep Learning Engineer | Huawei-MIPT research group Nov 2023 -

- Deep Learning and Reinforcement Learning
- Head : Professor Roland Hildebrand

Research Student | MIPT-Yandex Fundamental Research Lab Jul 2023 -

- Machine Learning and Optimization
- Head: PhD Aleksandr Beznosikov

Research Student | Laboratory of Mathematical Methods of Optimization, MIPT Jul 2023 -

- Optimization
- Head : Professor Alexander Gasnikov

Research Student | Lab of Fundamental and Applied Research of Relativistic Objects Nov 2022 - Apr 2024

- Theoretical Physics, Astrophysics
- Head : DSc Elena Nokhrina

Research Physicist | P.N.Lebedev Physical Institute Nov 2022 - Jul 2023

- Theoretical Physics, Astrophysics

Skills

Stack	Python, C++, C#, LaTeX, PostgreSQL, MySQL, Git, Linux, macOS
Language	English – C1, Russian – native, Ukrainian – native
Hobbies	Swimming, Football

Research Interests

Federated Learning, Natural Language Processing, Computer Vision and applications of Stochastic Optimization in Deep Learning

Publications

Mixed Newton Method for Optimization in Complex Spaces
Jul 2024

Preprint

Nikita Yudin, Roland Hildebrand, Sergey Bakhurin, Alexander Degtyarev, Anna Lisachenko, Ilya Kuruzov, Andrei Semenov, Mohammad Alkousa

- arXiv
- PDF

Gradient Clipping Improves AdaGrad when the Noise Is Heavy-Tailed
Jun 2024

Under review as a conference paper at NeurIPS 2024

Savelii Chezhegov, Yaroslav Klyukin, Andrei Semenov, Aleksandr Beznosikov, Alexander Gasnikov, Samuel Horváth, Martin Takáč, Eduard Gorbunov

- arXiv
- Code

Sparse Concept Bottleneck Models: Gumbel tricks in Contrastive Learning
Feb 2024

Under review as a conference paper at NeurIPS 2024

Andrei Semenov, Vladimir Ivanov, Aleksandr Beznosikov, Alexander Gasnikov

- arXiv
- Code

Bregman Proximal Method for Efficient Communications under Similarity
Nov 2023

International Conference on Computational Optimization, 2024

Aleksandr Beznosikov, Darina Dvinskikh, Andrei Semenov, Alexander Gasnikov

- arXiv
- PDF

Honors and Awards

University

- **Autumn 2023:** Increased State Academic Scholarship for 4 year bachelor and master students at MIPT
- **Summer 2023:** Participated in the Terra Quantum AG Summer School. Studied Neural Networks and received an award for the best project in Parameter-Efficient Fine-Tuning
- **Spring 2023:** Participated in MIPT "Match of the Century" football tournament
- **Autumn 2022:** MIPT football tournament contestant. Currently team captain
- **Spring 2022:** Honorable Award in MIPT Swimming championship
- **Spring 2022:** Participated in MIPT "Match of the Century" football tournament
- **Spring 2022:** Organized students Olympiad in Physics
- **Winter 2021–2022:** Organized film screenings at the MIPT
- **Winter 2021:** Passed Landau Theoretical Minimum exam
- **Autumn 2021:** Third prize at the MIPT football tournament
- **2021 – 2023:** Abramov scholarship for 1-3 year bachelor students with the best grades at MIPT
- **2020:** Increased Scholarship for students with Olympiad awards

School

- **Autumn 2020:** Silver medal in GeCAA (International Olympiad in Astronomy and Astrophysics), was held online during the first semester at University because of pandemic risk
- **Winter 2019–2020:** Prize-Winner, ExPhO.
- **Autumn 2018:** Honorable Mention in IAO, Colombo, Sri-Lanka

PROJECTS

PAUS | Optimization, Machine Learning — Ongoing
MIPT, Laboratory of Mathematical Methods of Optimization — (Expected by Aug '24)

- Numerical simulations for paper
- Developed a new distributed algorithm for convex-concave saddle-point problems in non-euclidean setup
- Derived the optimal parameters and stepsizes for the algorithms
- I will be able to push it on my GitHub after the review process is completed

Llama-LoRA project | Natural Language Processing, Transformers — Jul 2023
Terra Quantum AG — Project Link

- Best project award at Terra Quantum Summer School in Neural Networks
- Studied a novel methods of Parameter-Efficient Tuning of LLMs
- Tuned a 13B and 7B models on custom dataset containing my Telegram chats
- Pushed my models to HuggingFace hub. Where they got 10000+ downloads! HuggingFace Link

Solar System Model in Python | Python, Computational Physics — Nov 2020 – Dec 2020
Moscow Institute of Physics and Technology — Project Link

- We have developed a simple model approximating the Solar System and implemented it on Python

TALKS

- 26 March 2024, MIPT-Yandex Optimization Seminar. Talk on "Model Reconstruction Attacks" [video]
- 12 March 2024, MIPT-Yandex Optimization Seminar. Talk on "Concept Bottleneck Models" [video]

TEACHING

Moscow Institute of Physics and Technology
Teaching Assistant — Jan 2024 -

- Autumn 2024: Machine Learning. Part of the MSAI team, course repository
- Spring 2024: Reinforcement Learning. Owner of the course repository