Rustem Islamov

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Education

PhD in Computer Science — Oct. 2023 – Pres.
University of Basel — Basel, Switzerland

Master of Science in Applied Mathematics — Sept. 2021 – Aug. 2023
Institut Polytechnique de Paris — Palaiseau, France
GPA: 17.65/20, transcript of records

Bachelor of Science in Applied Mathematics and Physics — Sept. 2017 – July 2021
Moscow Institute of Physics and Technology — Dolgoprudny, Russia
GPA: 4.95/5 (9.27/10), Top 3 at the department, transcript of records

Research Interests

Machine Learning, Optimization, Distributed Optimization

Recent Research Projects

Error-Feedback for SGD — Oct. 2022 – Oct. 2023
CISPA, Supervisor: Sebastian Stich — Saarbrücken, Germany
Brief description: develop a theory for SGD with biased compression which recovers optimal rates in all possible scenarios.

Analysis of Gradient-type methods over directed graphs — Apr. 2022 – Aug. 2022
EPFL, Supervisor: Hadrien Hendrikx, Links: technical report — Lausanne, Switzerland
Brief description: development of a theory for gradient-type methods over directed graphs. The goal is to create a method which supports stochastic updates, variance reduction and acceleration and whose convergence rates match optimal rates in undirected case.

Adaptive stepsize selection for PDHG algorithm — Sept. 2021 – Mar. 2021
IP Paris, Supervisor: Olivier Fercoq, Links: technical report — Palaiseau, France
Brief description: the goal is to develop a mechanism for adaptive stepsize selection for PDHG. The idea is based on checking in each iteration the Quadratic Error Bound inequality introduced in [Fercoq, 2021].

Second Order Methods for Distributed Optimization — Jul. 2020 – Dec. 2020
KAUST, Supervisor: Peter Richtárik — Thuwal, Saudi Arabia
Brief description: development of a theory for Newton-type methods for distributed optimization. The goal is to create the first communication-efficient Newton-type method that inherits its local superlinear convergence. As a part of internship, I attended the course on modern analysis of a family SGD algorithms by Prof. Richtárik.

Publications

10. R. Islamov*, Y. Gao*, S. Stich (*equal contribution). **Near Optimal Decentralized Optimization with Compression and Momentum Tracking**, arXiv preprint arXiv: 2405.20114, 2024.
9. Y. Gao*, R. Islamov*, S. Stich (*equal contribution). **EControl: Fast Distributed Optimization with Compression and Error Control**, in Proc. of the 12th International Conference on Learning Representations, 2023.
8. R. Islamov, M. Safaryan, D. Alistarh. **AsGrad: A Sharp Unified Analysis of Asynchronous-SGD Algorithms**, in Proc. of the 27th International Conference on Artificial Intelligence and Statistics, 2023.
7. K. Mishchenko, R. Islamov, E. Gorbunov, S. Horváth. **Partially Personalized Federated Learning: Breaking the Curse of Data Heterogeneity**, arXiv preprint arXiv: 2305.18285, 2023.
6. S. Khirirat, E. Gorbunov, S. Horváth, R. Islamov, F. Karray, P. Richtárik. **Clip21: Error Feedback for Gradient Clipping**, arXiv preprint arXiv: 2305.18929, 2023.
5. M. Makarenko, E. Gasanov, R. Islamov, A. Sadiev, P. Richtárik. **Adaptive Compression for Communication-Efficient Distributed Training**, Transactions on Machine Learning Research, 2022.

4. R. Islamov, X. Qian, S. Hanzely, M. Safaryan, P. Richtárik. **Distributed Newton-Type Methods with Communication Compression and Bernoulli Aggregation**, Transactions on Machine Learning Research, 2022.
3. X. Qian, R. Islamov, M. Safaryan, P. Richtárik. **Basis Matters: Better Communication-Efficient Second Order Methods for Federated Learning**, in Proc. of the 25th International Conference on Artificial Intelligence and Statistics, 2022.
2. M. Safaryan, R. Islamov, X. Qian, P. Richtárik. **FedNL: Making Newton-Type Methods Applicable to Federated Learning**, In Proc. of 39th International Conference on Machine Learning, 2022.
1. R. Islamov, X. Qian, P. Richtárik. **Distributed Second Order Methods with Fast Rates and Compressed Communication**, In Proc. of 38th International Conference on Machine Learning, 2021.

Research Visits and Internships

Internship at Distributed Algorithms and Systems Lab — Apr. 2023 – Oct. 2023
IST Austria, Supervisors: Mher Safaryan, Dan Alistarh — Klosterneuburg, Austria

Internship at Machine Learning and Optimization Lab — Apr. 2022 – Aug. 2022
EPFL, Supervisors: Hadrien Hendrikx, Martin Jaggi — Lausanne, Switzerland

Internship at Optimization and Machine Learning Lab — Mar. 2021 – Aug. 2021
KAUST, Supervisor: Peter Richtárik — Jul. 2020 – Dec. 2020
Thuwal, Saudi Arabia

Scholarships, Honors and Awards

French Embassy Scholarship — Sept. 2022 – May. 2023
Given to students enrolled to French universities with high academic achievements; 700 Euro per month

PhD Track Excellence Scholarship — Sept. 2021 – Mar. 2022, Sept. 2022 – Mar. 2023
IP Paris awards merit-based excellence scholarships for students enrolled in PhD tracks; 1000 Euro per month

Increased State Academic Scholarship — Feb. 2021 – June 2021, Sept. 2020 – Jan. 2021
Given to 4 year Bachelor and Master students at MIPT with scientific achievements; 16,000 Russian roubles per month

Prizewinner of Student Olympiad in Maths — Apr. 2020
"I am professional" Student Olympiad organized by Yandex and MIPT

Abramov scholarship — Sept. 2017 – June 2020
Given to 1-3 year Bachelor students with the best grades at MIPT; 12,000 Russian rubles per month

Prizewinner of Final Round of All-Russian Physics Olympiad — Apr. 2016

Participant of Final Round of All-Russian Physics Olympiad — 2015, 2017

Talks and Posters

Poster at ICLR 2024 conference, Links: paper, poster — 9 May, 2024

Poster at AISTATS 2024 conference, Links: paper, poster — 3 May, 2024

Invited Talk at Rising Stars in AI Symposium at KAUST workshop, Links: paper, slides — 21 February, 2024

Talk at NTDS workshop, Links: paper — 24 October, 2023

Talk at CISPA for the group of Prof. Sebastian Stich, Links: paper — 16 March, 2023

Talk at ETH AI Center Symposium for PhD fellows, Links: paper — 9-10 February, 2023

Poster at NeurIPS workshop: Order up! The Benefits of Higher-Order Optimization in Machine Learning, Links: poster, paper — 2 December, 2022

Poster at AISTATS 2022, Links: poster, paper — 29 March, 2022

Prerecorded Talk at Beyond first-order methods in ML systems workshop, Links: video, paper — 24 July, 2021

Poster at International Workshop on Federated Learning for User Privacy and Data Confidentiality, Links: poster, paper — 24 July, 2021

Poster and Prerecorded Talk at ICML 2021, 22 July, 2021
Links: video, poster, paper
Poster at PRAIRIE/MIAI AI Summer School, Links: poster, paper 6 July, 2021
Talk at Maths & AI: MIPT-UGA young researchers workshop, Links: video, slides, paper 1 July, 2021
Prerecorded Talk at KAUST Conference on Artificial Intelligence, Links: video, paper 28 April, 2021
Poster at NSF-TRIPODS Workshop on Communication Efficient Distributed Optimization, Links: poster, paper 9 April, 2021

Reviewing and Teaching

Teaching Assistant for Continuous Optimization course Spring Semester 2024
Reviewer for International Conference on Machine Learning (ICML 2024) 2024
Reviewer for Journal on Machine Learning Research (JMLR) 2024
Reviewer for Journal of Parallel and Distributed Computing (JPDC) 2024
Reviewer for Journal of Optimization Theory and Applications (JOTA) 2023
Reviewer for Artificial Intelligence and Statistics Conference (AISTATS 2024) 2023

Summer Schools

PRAIRIE/MIAI AI Summer School, Links: certificate 5-9 July, 2021

Technical skills

Programming Languages: Python (NumPy, Matplotlib, PyTorch, Pandas), C++, LaTeX
Mathematics: Calculus, Linear Algebra, Probability Theory, Convex Analysis

Languages

Russian: Native
English: Advanced (C1)
French: Elementary (A1)

Hobbies and Interests

Football, former member of student football team
Travelling, hiking, photo shooting

Last updated on June 12th 2024