Polina Kirichenko

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Google Scholar, Semantic Scholar

Education

Ph.D. student in Data Science, New York University — New York, USA
Center for Data Science; supervisor: Professor Andrew Gordon Wilson — 2019 – current
Research interests: uncertainty estimation, probabilistic deep learning, generative models

Ph.D. student in Operations Research, Cornell University — Ithaca, USA
Operations Research and Information Engineering department; transferred to NYU — 2018 – 2019

B.Sc. in Computer Science, Higher School of Economics — Moscow, Russia
Computer Science department; supervisor: Professor Dmitry Vetrov — 2014 – 2018
Cumulative GPA: 9.1 (10.0 scale), class rank: top 3%

Work Experience

Cold Spring Harbor Laboratory — Cold Spring Harbor, USA
Research Intern; supervisor: Prof. Anthony Zador — June 2021 – Aug 2021
Research topics: meta-learning with compressed neural networks; data analysis of brain transcriptome and connectome data

Google DeepMind — (remotely) Mountain View, USA
Research Intern; supervisors: Mehrdad Farajtabar, Balaji Lakshminarayanan, Razvan Pascanu — June 2020 – Oct 2020
Research topic: continual learning with deep generative models

École Polytechnique Fédérale de Lausanne (EPFL) — mlo.epfl.ch, Lausanne, Switzerland
Machine Learning and Optimization Lab — June 2018 – Aug 2018
Research Intern; supervisors: Prof. Martin Jaggi, Prof. Dan Alistarh
Research topic: evolution strategies for low precision training of neural networks

Bayesian Methods Research Group — bayesgroup.ru, Moscow, Russia
Research Assistant; supervisor: Prof. Dmitry Vetrov — Sep 2016 – Aug 2018
Research topic: structured sparsification of Bayesian neural networks

Google — Seattle, USA
Software Engineering Intern, Google Cloud Platform Team — July 2017 – Sep 2017

Google — Munich, Germany
STEP Software Engineering Intern, Piper Team (Google's version control system) — July 2016 – Sep 2016

Publications

* Equal Contribution

Does Knowledge Distillation Really Work? [arXiv]
Samuel Stanton, Pavel Izmailov, **Polina Kirichenko**, Alexander A. Alemi, Andrew G. Wilson
Neural Information Processing Systems (NeurIPS) 2021

Task-agnostic Continual Learning with Hybrid Probabilistic Models [arXiv, poster]
Polina Kirichenko, Mehrdad Farajtabar, Dushyant Rao, Balaji Lakshminarayanan, Nir Levine, Ang Li, Huiyi Hu, Andrew Gordon Wilson, Razvan Pascanu
ICML Workshop on Invertible Neural Networks and Normalizing Flows (spotlight talk) 2021

Why Normalizing Flows Fail to Detect Out-of-Distribution Data [arXiv, code]
Polina Kirichenko*, Pavel Izmailov*, Andrew G. Wilson
First presented at *Workshop on Invertible Neural Networks and Normalizing Flows at ICML 2020*
Neural Information Processing Systems (NeurIPS) 2020

Semi-Supervised Learning with Normalizing Flows [arXiv, poster, code]
Pavel Izmailov*, **Polina Kirichenko***, Marc Finzi*, Andrew G. Wilson
First presented at *Workshop on Invertible Neural Networks and Normalizing Flows at ICML 2019*
International Conference on Machine Learning (ICML) 2020

Subspace Inference for Bayesian Deep Learning [arXiv, poster, slides, code]
Pavel Izmailov*, Wesley Maddox*, **Polina Kirichenko***, Timur Garipov*, Dmitry Vetrov, Andrew G. Wilson
First presented at *Workshop on Uncertainty & Robustness in Deep Learning at ICML 2019* (contributed talk)
Uncertainty in Artificial Intelligence (UAI) 2019

SWALP: Stochastic Weight Averaging in Low Precision Training [PMLR, code]
Guandao Yang, Tianyi Zhang, **Polina Kirichenko**, Junwen Bai, Andrew G. Wilson, Christopher De Sa
International Conference on Machine Learning (ICML) 2019

Workshop Papers

Effective Surrogate Models for Protein Design with Bayesian Optimization [workshop pdf]
Nate Gruver, Samuel Stanton, **Polina Kirichenko**, Marc Finzi, Phillip Maffettone, Vivek Myers, Emily Delaney, Peyton Greenside, Andrew Gordon Wilson
ICML Workshop on Computational Biology 2021

Invertible Convolutional Networks [workshop pdf, poster]
Marc Finzi*, Pavel Izmailov*, Wesley Maddox*, **Polina Kirichenko***, Andrew G. Wilson
Workshop on Invertible Neural Nets and Normalizing Flows at ICML 2019 (spotlight talk)

Research Projects

Evolution strategies for training low precision neural networks 2018
Polina Kirichenko, Sebastian Stich, Martin Jaggi, Dan Alistarh
Leveraged lower memory consumption of low-precision networks to increase population sizes in evolution strategies which leads to more efficient gradient-free training.

Bayesian regularization of deep neural networks with weight normalization 2018
Polina Kirichenko, Alexander Fritsler, Ekaterina Lobacheva, Dmitry Vetrov [report]
Studied the effect of applying noise to direction and magnitude of weight vectors of neurons in deep networks to achieve regularization and structural sparsity.

Vanishing and exploding gradients in recurrent neural networks 2017
Polina Kirichenko, Ekaterina Lobacheva, Dmitry Vetrov [report]
Studied constraints on weight matrices of recurrent layers that improve training stability and alleviate vanishing and exploding gradients in RNNs.

Awards

DeepMind Fellowship 2019
New York University Center for Data Science Graduate Fellowship 2019
Golden HSE Award (Alumni Success category) [link], 2019
HSE Alumni Academic Fellowship [link], 2019
NeurIPS Travel Award 2019
ICML Travel Award 2019
Cornell Operations Research and Information Engineering Graduate Fellowhship 2018
Travel Grant for Women in Data Science Conference [link], 2018, 2019
Ilya Segalovich Scholarship (Yandex) [link], 2016, 2017
Google Anita Borg Memorial Scholarship (Women Techmakers Scholarship) [link], 2015
Google Travel Grant for the Grace Hopper Celebration of Women in Computing 2015

Talks

"Applications of normalizing flow", **keynote talk** at ICML Workshop on Finance Applications [video], 2021
"Task-agnostic Continual Learning with Hybrid Probabilistic Models", ICML INNF+ 2021 [video], 2021
"Normalizing flows for anomaly detection", Facebook AI Research, Uncertainty team 2021
"Continual Learning in Neural Networks" [in Russian], Bayesian Methods Research Group seminar [video], 2021
"Understanding Semantic Anomaly Detection with Generative Networks", ML Collective 2021 [slides], 2021
"Anomaly detection via Generative Models", ODS DafaFest 2020, Uncertainty in ML Workshop [video], 2020
"Normalizing flows for anomaly detection", CogSys Talks, Technical University of Denmark [video], 2020
"Normalizing flows for anomaly detection", Capital One, Machine Learning seminar 2020
"Why Normalizing Flows Fail to Detect Out-of-Distribution Data", NeurIPS 2020 [video], 2020
"Why Normalizing Flows Fail to Detect Out-of-Distribution Data", INNF+ workshop at ICML [video], 2020
"Uncertainty Estimation in Bayesian Deep Learning", WiML Un-Workshop at ICML 2020
"Scalable Bayesian Inference in Low-Dimensional Subspaces", Higher School of Economics [video], 2019
"How do we build neural networks we can trust?", Broad Institute of MIT and Harvard [video], 2019
"Subspace Inference", Uncertainty & Robustness in Deep Learning workshop at ICML [video], 2019

Reviewing

Conferences: NeurIPS 2019 (top 400 highest-scoring reviewers), ICLR 2020, ICML 2020 (top 33% reviewer), UAI 2020, NeurIPS 2020, AISTATS 2021

Workshops: NeurIPS 2019 WiML, NeurIPS 2019 BDL, ICML 2020 UDL, NeurIPS 2020 HAMLETS, ICML 2021 INNF+, ICML 2021 UDL

Technical Skills

Languages: Python, C++
Neural network libraries: PyTorch, TensorFlow, Keras, Theano, Lasagne

Teaching

Cornell University Ithaca, USA
Teaching Assistant for "Data Science for All" course Jan 2019 – May 2019

Bayesian Methods for Machine Learning on Cousera [course link], Moscow, Russia
Teaching Assistant; helped prepare assignments and quizzes Sep 2017 – Aug 2018
The specialization of the course received Coursera Outstanding Educator Award

National Research University Higher School of Economics Moscow, Russia
Teaching Assistant for "Probability Theory and Statistics" (Sep 2016 – June 2017),
"Introduction to Data Analysis" (Jan 2016 – June 2016), "Introduction to Programming" (Sep 2015 – Dec 2015)

Summer Schools

Machine Learning Summer School (London, UK) 2019
Deep Learning & Reinforcement Learning Summer School (Edmonton, Canada) 2019