Tetiana Parshakova

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Objective

To develop efficient algorithms for computational problems using techniques from optimization, discrete mathematics and statistics, to analyze and to bring theoretical guarantees about these methods.

Education

Stanford University	USA
Ph.D.	Computational Mathematics. Advisor Prof. Stephen Boyd	2019 – 2024
M.Sc.	Computational Mathematics	2022
Korea Advanced Institute of Science and Technology	South Korea
M.Sc.	Electrical Engineering	2019
B.Sc.	Industrial Design	2017

Work Experience

Google Research — 2022
Student Researcher | Google Brain Robotics — USA

- Message passing and tree-based algorithms for fast graph field integration, generalization of Fast Multipole Method to discretized manifolds.

Apple Inc. — 2020, 2021
Machine Learning Research Intern | Exploratory Design Group — USA

- Accelerating the training of Neural Networks using Hessian-vector products.
- Constructive methods for Neural Networks on elementary functions.

Naver Labs Europe — 2019
Machine Learning Researcher | Natural Language Processing Group — France

- Global Autoregressive Models (GAMs) combine an autoregressive component with a log-linear component, allowing the use of global a priori features to compensate for lack of data.
- Different approaches for approximating the normalized distribution given by GAMs for fast inference.

Patents

Interpolation Method and Apparatus for Arithmetic Functions — Apple Inc, 2022
William C. Athas, Zaid M. Nadeem, Tetiana Parshakova — US 17/085,971

Methods and Systems for Producing Neural Sequential Models — Naver Corp, 2022
Tetiana Parshakova, Marc Dymetman, Jean-marc Andréoli — US 17/018,754

Publications

Tetiana Parshakova, Trevor Hastie, Eric Darve and Stephen Boyd. *Factor Fitting, Rank Allocation, and Partitioning in Multilevel Low Rank Matrices.* ArXiv preprint arXiv:2310.19214. 2023

Krzysztof Choromanski, Arijit Sehanobish, Han Lin, Yunfan Zhao, Eli Berger, Tetiana Parshakova, et al. *Efficient Graph Field Integrators Meet Point Clouds.* International Conference on Machine Learning. 2023

Tetiana Parshakova, Fangzhao Zhang and Stephen Boyd. *Implementation of an Oracle-Structured Bundle Method for Distributed Optimization.* To appear, Optimization and Engineering. 2023.

Tetiana Parshakova, Marc Dymetman and Jean-Marc Andreoli. *Distributional Policies for Energy-Based Sequential Models.* NeurIPS Optimization Foundations of Reinforcement Learning Workshop. 2019

Tetiana Parshakova, Jean-Marc Andreoli and Marc Dymetman . *Global Autoregressive Models for Data-Efficient Sequence Learning*. In Proceedings of the SIGNLL Conference on Computational Natural Language Learning, ACL. 2019

Tetiana Parshakova, Francois Rameau, Andriy Serdega, Inso Kweon, and Dae-Shik Kim. *Latent Question Interpretation Through Variational Adaptation*. Accepted in IEEE/ACM Transactions on Audio, Speech, and Language Processing. 2019

Tetiana Parshakova and Dae-Shik Kim. *Latent Question Interpretation Through Parameter Adaptation Using Stochastic Neuron*. In Proceedings of ICML Workshop, MRC-2018, http://ceur-ws.org/Vol-2134/#paper07. 2018

Tetiana Parshakova and Daniel Saakes. *UMorph: Self-Change Tracker to Reflect Yourself to the Future and Past*. In Proceedings of the 2018 ACM Conference Companion Publication on Designing Interactive Systems, ACM. 2018

Tetiana Parshakova, Minjoo Cho, Alvaro Cassinelli, and Daniel Saakes. *Furniture that Learns to Move Itself*. In Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems, ACM. 2017

Tetiana Parshakova, Minjoo Cho, Alvaro Cassinelli, and Daniel Saakes. *Ratchair: Furniture learns to move itself with vibration*. In ACM SIGGRAPH 2016 Emerging Technologies, ACM. 2016

PROJECTS AND RESEARCH

Research Rotations
2019 – 2021

Stanford University
USA

- with Prof. Aaron Sidford on hop constrained graph embedding onto a distribution of a dominating trees: minimax principle between probabilistic and distributional distance stretch, randomized algorithms for obtaining embeddings.
- with Prof. Amin Saberi on finding optimal strategy for the card guessing game using partially observable Markov decision process.
- with Prof. Eric Darve on deriving bounds for the number of neurons and layers of Relu NNs necessary for approximating any analytic function arbitrarily close.

Graduate Researcher
2017 – 2018

Brain Reverse Engineering and Imaging Lab, KAIST
South Korea

- Latent question interpretation through variational adaptation; visual question answering via bottom-up and top-down attention; abstractive text summarizer using Pointer generator with Seq2seq attention that constructs hybrid vocabulary distribution; sequential decision making agent for solving "Angry Birds" using deep deterministic policy gradient with attention-based LSTM.

Undergraduate Researcher
2016

Brain Reverse Engineering and Imaging Lab, KAIST
South Korea

- Machine Learning and Reinforcement Learning basics; comic style generation using NNs.

Undergraduate Researcher
2015 – 2016

My Design Lab, KAIST
South Korea

- "Ratchair", a strategy for displacing objects utilizing vibrations. Used: Python, Java, Android, OpenCV, Arduino, Inventor, Processing-Android, Myo Armband, hardware.
- "UMorph", an unobtrusive self-image capturing system for tracking self changes over time. Used: PyQt, Dragon Board 410c, OpenCV, Dlib, hardware.

Honors and Awards

The Oliger Memorial Fellowship   2019 – 2022
A stipend during the Ph.D. at Stanford

Qualcomm-KAIST Innovation Awards 2018   2018
Paper Competition Awards for Graduate Students

Featured at Discovery Daily Planet Canada   2017
"Ratchair: Furniture That Learns to Move Itself" demonstration for Discovery Daily Planet Canada

KAIST Breakthroughs Newsletter   2017
"Furniture That Learns to Move Itself" featured in KAIST Breakthroughs Newsletter

Excellence Award for Bachelor's thesis   2017
Thesis "UMorph: Self-Change Tracker to Reflect Yourself to the Past and to the Future"

First prize in Qualcomm-KAIST Innovation Awards   2016
Embedded Systems Awards

SIGGRAPH 2016 Emerging Technologies DC EXPO Special Prize   2016
For "Ratchair: Furniture That Learns to Move Itself With Vibration"

Undergraduate Research Program Excellence Award   2016
For Extraordinary Efforts and Research Outcomes

KAIST International Student Scholarship   2012 – 2016, 2017 – 2019
A stipend during the B.Sc. and M.Sc. at KAIST

Kyiv Capital Olympiads in Mathematics   2009, 2012
Bronze medal

Regional Mathematics Olympiad   2009
Silver medal

Volyn Regional Mathematics Olympiad   2008
Gold medal

Skills

Languages: Ukrainian (native), Russian (fluent), English (fluent), Korean (elementary)
Programming: Python, Matlab, Java, Torch, Tensorflow, PyTorch, Git, LaTeX, OpenCV, Unix
Prototyping: Raspberry Pi, Arduino, Processing-Android, Autodesk Inventor, Rhino 5, Adobe Photoshop, Adobe Illustrator, Adobe After Effects, Adobe Premiere Pro

Service & Extra-curricular

Teaching Assistant at Stanford   2023
EE364a Convex Optimization I

Reviewer   2021
Energy Based Models Workshop @ ICLR2021

Tutor at KAIST EE Co-op Program   2018
Taught undergraduate students basics of ML, NLP and Tensorflow   South Korea

Tutor in Science Camp and English Camp   2017, 2018
Prepared schoolchildren for a science competition, taught schoolchildren English   South Korea

Organizer of KAIST EE Promotion in Ukraine   2017
Helped to organize EE Visit Camp, recruited students   South Korea, Ukraine

Teaching Assistant at KAIST   2015 – 2016
Intro to Philosophy, English Short Stories, Philosophy of Mathematics, Logic and AI   South Korea

Volunteer at UEFA Euro 2012   2012
Participated in closing ceremony dance performance in Kyiv   Ukraine

Candidate Master of Sports   2001 – 2007
Acrobatic gymnastics   Ukraine