Ahmed Khaled

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Homepage
Scholar Profile

Education

Jan 2022 - Present	**Ph.D. Electrical and Computer Engineering**, *Princeton University*, New Jersey, United States. Advisor: Professor Chi Jin. GPA: 3.96/4.0.
Oct 2015 – Aug 2020	**B.Sc. Computer Engineering**, *Cairo University*, Egypt. GPA: Distinction with Honors (91.3%). Rank: $3^{rd}/64$.

Work Experience

May 2023–Present	**Research Scientist Intern**, *Meta*, New York City, New York, United States. Research scientist intern at the Fundamental AI Research Team at Meta working with Aaron Defazio.
Jun–Oct 2020 Jun–Sep 2019	**Research Intern**, *KAUST*, Saudi Arabia. Research intern in the group of Professor Peter Richtárik. Worked on federated learning and optimization.
Aug–Sep 2018	**Undergraduate Research Assistant**, *Cairo University*, Egypt. Worked with Professor Amir Atiya and Professor Ahmed Abdel-Gawad on fast matrix multiplication algorithms. Wrote code in CUDA C.
Jun–Aug 2016 Aug–Sep 2017	**Nafham**, *Intern*. Recorded more than 40 educational videos on high school mathematics and tutored multiple students in Arabic. Also wrote web pages in HTML, JavaScript, & CSS, and PHP with Bootstrap and Laravel.

Awards

Sep 2019	**Mentor Achievement Award**, *Learn IT, Girl 4th Edition*. Awarded for successfully mentoring Natalia Grzywalska over March–June 2019 in learning IT.
Oct 2020	**INFORMS Undergraduate Operations Research Prize** **Finalist**, *Institute for Operations Research and the Management Sciences (INFORMS)*. One of ten finalists selected to give a presentation on outstanding research done as an undergraduate.
2020/2022	**Top reviewer**, *various conferences*. One of the top 10% of reviewers for ICML 2022 (awarded free registration, July 2022), AISTATS 2022 (awarded Feb. 2022) and NeurIPS 2020 (awarded free registration, Oct. 2020).
2023	**School of Engineering and Applied Sciences (SEAS) Travel Grant**, *Princeton University*. Awarded a $500 travel grant used towards going to ICLR 2023.

Papers

Conference papers

(1) **A. Khaled** and Chi Jin - Faster federated optimization under second-order similarity - ICLR 2023.

(2) Konstantin Mishchenko, **A. Khaled**, and Peter Richtárik - Proximal and Federated Random Reshuffling - ICML 2022.

(3) Elnur Gasanov, **A. Khaled**, Samuel Horváth, and Peter Richtárik - FLIX: A Simple and Communication-Efficient Alternative to Local Methods in Federated Learning - AISTATS 2022.

(4) Konstantin Mishchenko, **A. Khaled**, and Peter Richtárik - Random Reshuffling: Simple Analysis with Vast Improvements - NeurIPS 2020.

(5) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - Tighter Theory for Local SGD on Identical and Heterogeneous Data - AISTATS 2020.

(6) **A. Khaled**, Amir F. Atiya, Ahmed H. Abdelgawad - Applying Fast Matrix Multiplication to Neural Networks - ACM SAC 2020.

Journal papers

(7) **A. Khaled** and Peter Richtárik - Better Theory for SGD in the Nonconvex World - arXiv:2002.03329, Transactions of Machine Learning Research (TMLR) 2023.

Preprints

(8) **A. Khaled**, Konstantin Mishchenko, and Chi Jin - DoWG Unleashed: An Efficient Universal Parameter-Free Gradient Descent Method - arXiv:2305.16284 (2023).

(9) Abdurakhmon Sadiev, Grigory Malinovsky, Eduard Gorbunov, Igor Sokolov, **A. Khaled**, Konstantin Burlachenko and Peter Richtárik - Federated Optimization Algorithms with Random Reshuffling and Gradient Compression - arXiv:2206.07021 (2022).

(10) **A. Khaled**, Othmane Sebbouh, Nicolas Loizou, Robert M. Gower, and Peter Richtárik - Unified Analysis of Stochastic Gradient Methods for Composite Convex and Smooth Optimization - arXiv:2006.11573 (2020).

(11) Sélim Chraibi, **A. Khaled**, Dmitry Kovalev, Peter Richtárik, Adil Salim, and Matrin Takáč - Distributed Fixed Points Methods with Compressed Iterates - arXiv:1912.09925 (2019).

Workshop papers

(12) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - Better Communication Complexity for Local SGD - *Oral presentation* at the NeurIPS 2019 Federated Learning Workshop.

(13) **A. Khaled** and Peter Richtárik - Gradient descent with Compressed Iterates - Poster at the NeurIPS 2019 Federated Learning Workshop.

(14) **A. Khaled**, Konstantin Mishchenko, and Peter Richtárik - First Analysis of Local GD on Heterogeneous Data - Poster at the NeurIPS 2019 Federated Learning Workshop.

Teaching

Spring 2023 **ECE539/COS512**, *Princeton University*.
Teaching assistant for ECE539: Optimization for Machine Learning. Graduate course on optimization.

Skills

Technical Python, C/C++, LATEX, Git.
Languages English (fluent) and Arabic (native).

Programming projects

○ Style Transfer (Image Processing course project): Implemented Elad and Milanfar's Style-Transfer via Texture-Synthesis paper in Python using OpenCV, scikit-learn and NumPy. Code, Report.

○ Gated Neural Networks (Multimedia course project): Implemented a gated neural nets algorithm (PAQ7) for compression in C++. Won 1st place out of 15 teams over the department for the best compression ratio on an Arabic text dataset. Report.

○ GoSlayer (Machine Intelligence course project): Led a team of sixteen people in implementing an AI agent that plays Go based on Monte-Carlo Tree Search and various heuristics. Code, Report.

○ Arabic OCR (Pattern Recognition course project): Implemented Nashwan et al.'s A Holistic Technique for an Arabic OCR System paper in Python using OpenCV, scikit-learn, and NumPy, in addition to multiple other papers. Code, Report.

○ PacMan (Microprocessors course project): Wrote a multiplayer PacMan-like game in pure x86 assembly with search-based AI. Code.

○ SpaceVoyager (Graphics course project): Implemented a Bullet Hell game using OpenGL and C++. Code.