

Ahmed Khaled

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Education

2015–Present **B.Sc. Computer Engineering**, *Cairo University*, Egypt.
GPA: Distinction (3.96/4.0). Expected Graduation Date: July 2020.

Research Experience

June–September 2019 **Research Intern**, *King Abdullah University of Science and Technology*, Saudi Arabia.
Worked in the group of Professor **Peter Richtárik** on Stochastic Optimization. Carried out novel mathematical analysis of optimization algorithms for federated learning, variance reduced methods and nonconvex stochastic gradient descent. Wrote experiments in Python with scikit-learn. Three papers accepted to a NeurIPS workshop, one submitted to AISTATS and several in-progress.

August–September 2018 **Undergraduate Research Assistant**, *Cairo University*, Egypt.
Worked with Professor **Amir Atiya** and Professor **Ahmed Abdel-Gawad** on speeding up the training of neural networks using fast matrix multiplication algorithms. Wrote code in CUDA C and interfaced it to the TensorFlow library. Paper submitted to the ACM SAC conference.

Papers

2019 **Ahmed Khaled**, Konstantin Mishchenko and Peter Richtárik - **Better Communication Complexity for Local SGD**. - NeurIPS 2019 Federated Learning Workshop

Ahmed Khaled and Peter Richtárik - **Gradient descent with Compressed Iterates**. - NeurIPS 2019 Federated Learning Workshop

Ahmed Khaled, Konstantin Mishchenko and Peter Richtárik - **First Analysis of Local GD on Heterogeneous Data**. - NeurIPS 2019 Federated Learning Workshop

Relevant Projects

Relevant Course Projects, these projects involved implementing research papers from scratch.

- Image Processing: Implemented Elad and Milanfar's Style-Transfer via Texture-Synthesis paper in Python using OpenCV, scikit-learn and NumPy. [Code link](#).
- Multimedia: 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 link](#).
- Probability and Statistics: Implemented word2vec using NumPy and Python.

Mathematics Self-Study, this was mainly to develop my mathematical maturity beyond class.

- Worked through a textbook on real analysis and wrote a solutions manual for it ([link](#)).
- Also worked through chapters of **Axler's Linear Algebra Done Right**, Bartle's Elements of Integration, **Hrbacek and Jech's Set Theory**, **Aluffi's Algebra Chapter 0** and others.

Work Experience

Jun–Aug/2016 **Nafham**, *Intern*.

Aug–Sep/2017 Wrote web pages in HTML, JavaScript, & CSS, and PHP with Bootstrap and Laravel. Recorded more than 40 educational videos on high school mathematics.

Awards

Sep 2019 **Mentor Achievement Award**, *Learn IT, Girl 4th Edition*.
Awarded for successfully mentoring Natalia Grzywalska over March – June 2019 in programming in Java.