Ahmed Khaled

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Homepage

Education

2015–Present **B.Sc. Computer Engineering**, *Cairo University*, Egypt.
GPA: Distinction (93/100). 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 Distributed and 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.

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. Implemented Strassen's Algorithm using C++ with CUDA and interfaced it into the TensorFlow library.

Papers

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

Ahmed Khaled and Peter Richtárik - Gradient descent with Compressed Iterates. (Accepted to the NeurIPS 2019 FL Workshop).

Ahmed Khaled, Konstantin Mishchenko and Peter Richtárik - First Analysis of Local GD on Heterogeneous Data. (Accepted to the NeurIPS 2019 FL 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.
- 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, and others.

Work Experience

Jun–Aug/2016 Aug–Sep/2017 **Nafham**, *Intern*.
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.

Skills

Programming C/C++, Python, Java, Matlab.

Toolkits	scikit-learn, PyTorch, TensorFlow.
Languages	English (fluent) and Arabic (native).
Other	Linux, Git, LaTeX.
Personal	Independent, self-motivated, can work under pressure.