

Aqib Mahfuz

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I'm a software engineer with strong foundations in theoretical and applicative AI/ML in addition to plenty of web development experience. I've acquired a variety of skills over 6+ years from working in several fast-paced environments, both in industry and research settings. I look forward to driving innovation on the cutting-edge.

EXPERIENCE

Epic Systems

May 2023 – Sep. 2023

Full-Stack Software Developer

Brainbow

- Developed invaluable training site designed for both employees and users of world's largest healthcare software firm
- Spearheaded team-wide transition to modern version control system, resulting in 300%+ productivity boost
- Tied record for fastest completion of onboarding assessments (technical, behavioral, legal) in company history

Meta

May 2022 – Aug. 2022

Research Intern

Fundamental AI Research (FAIR) Labs

- Collaborated on Droidlet, a research project to build “a one-stop shop for modular, intelligent agents” (i.e. robots)
- Created real-time AI interaction tool to visualize agent memory state and provide ability to edit tags on the fly
- Worked with cross-functional AR/XR teams to ensure compatibility of Droidlet agents on other platforms
- Optimized agent-to-dashboard pipeline communication for enhanced human interactability and live metric analysis

Facebook

May 2021 – Aug. 2021

Software Engineering Intern

Facebook Financial (Payments Risk Engineering)

- Designed new fraud detection immunity framework, reducing weekly losses by \$1+ million across millions of users
- Utilized GraphQL, Thrift, and proprietary programming languages (Haskell/PHP dialects) for immediate impact
- Refactored swaths of old code for greatly improved efficiency and mitigated security risks to meet rising standards

Duke University

Jan. 2021 – May 2023

Teaching Assistant

Department of Computer Science, Department of Mathematics

- **Courses:** Computer Vision (Graduate Level), Algorithm Design, Discrete Mathematics, Laboratory Calculus
- Led recitation sections and held weekly office hours
- Graded 200+ assignments each week for three of the largest on-campus classes (CV, Algs, Disc)
- Worked with small groups of students each semester, teaching key principles in a creative, visual manner (LC)

TECHNICAL SKILLS

Languages: *Python, Java, JavaScript, Ruby, C/C++, C#, Haskell, SQL, Rust, PHP, R, M, MIPS Assembly*

Frameworks: *Pytorch, React, Node.js, Material-UI, GraphQL, TensorFlow, Keras, JUnit*

Developer Tools: *Git, Docker, Jupyter, VS Code, CircleCI, IntelliJ, PyCharm, Colab*

EDUCATION

University of Oxford

Oct. 2023 – Sep. 2024

Master of Science in Advanced Computer Science

Mark: Distinction (GPA Equivalent: 4.00)

- **Relevant Coursework:** Geometric Deep Learning, Graph Representation Learning, Uncertainty in Deep Learning, Probability in Computing, Quantum Software, Quantum Information, Categories, Proofs and Processes
- **Research Projects:**
 - * *Extending Perfectly Secure Steganography to Generative Diffusion Models* (Dissertation, exp. ICLR publication)
 - * Analysis and Optimization of Readouts for Learning Classifiers on Multi-Relational Graphs ([report](#)) ([code](#))
 - * Variational Continual Learning with Laplacian Approximation Families ([report](#)) ([code](#))
 - * Improving Temporal Graph Networks via Learnable Aggregation ([report](#)) ([code](#))
 - * Enhancing Classical Quantum Circuit Simulation via Partial Stabilizer Decomposition ([report](#)) ([code](#))
 - * Diagrammatic Quantum Solution for Linear Systems ([report](#))

Duke University

Aug. 2019 – May 2023

Bachelor of Science in Computer Science and Mathematics (Double Major)

GPA (in majors): 3.98/4.00

- **Relevant Coursework:** Computer Vision, High Dimensional Data Analysis, Artificial Intelligence, Design and Analysis of Algorithms, Computer Architecture, Data Structures and Algorithms, Database Systems

PROJECTS

R-FR-GNN | *Python, PyTorch, Linux*

- Devised new class of ML models for graph learning that trains and deploys up to 3x faster than previous standard
- Demonstrated both empirically and theoretically that R-FR-GNNs (and R^{1+d} -GNNs by extension) are equally as expressive as state-of-the-art R^2 -GNNs on classification tasks over transformed multi-relational graphs

Laplacian Variational Continual Learning | *Python, PyTorch + TensorFlow*,

- Identified fundamental flaw in the underlying assumptions of the seminal “Variational Continual Learning” paper
- Devised superior approximation (Laplacian variation as opposed to Gaussian) without sacrificing any efficiency
- Reduced error rates by up to 2.5x, mitigating catastrophic forgetting by earlier continual learning models

GryZX | *C++, CUDA, Python, Rust, Linux*

- Developer on novel quantum simulation software utilizing GPUs for accelerated ZX-diagram simplification
- Designed to implement most features of PyZX and QuiZX libraries, with optimizations for especially large circuits

Food Devil | *Python, TypeScript, React, Node.js, MongoDB, Git*

- Created crowd-sourced review website designed for students dining at various eateries across Duke’s campus
- Implemented several requested features, including diet tracking, meal recommendations, and a campus-wide feed
- Incorporated a complete nutritional database of all offered options at each venue

Pokémon Reborn | *Ruby, Git*

- Community developer on scripts (i.e. AI tweaking, feature testing, general bugfixing) for popular fan-made game
- Author of several mods, including “Story Select”, “Enhanced AI”, and others improving quality-of-life

AWARDS

Academic Competitions

Highest Placements

Aug. 2012 – Present

Mu Alpha Theta, AGLOA, etc.

- Calculus - State/Regional, 1st place (team), 8th place (individual), 2018-19
 - Statistics - State/Regional, 1st place (team), 3rd place (individual), 2017
 - Pre-Calculus – National, 6th place (team), 16th place (individual), 2016
 - Florida Math League, 1st place (individual), 2015-19
 - Palm Beach County Math Tournament, 1st place (individual), 1st place (overall), 2015
- } Nationals eschewed due to costs

Other Recognitions

- National Merit Finalist, 2018
- National AP Scholar, 2018
- National Honor Society, 2017-19