Ari Fiorino

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arifiorino.github.io

Education

University of Illinois Urbana-Champaign

- PhD in Computer Science, August 2023 - Present
    - Focus in Cryptography and Machine Learning, GPA: 4.0

Carnegie Mellon University

- Master of Science in Computer Science, August 2021 - May 2022
    - Focus in Machine Learning, QPA: 3.95
- Bachelor of Science in Computer Science, August 2018 - May 2021
    - Minor in Discrete Mathematics and Logic, QPA: 3.87

Work Experience

Research Assistant, Professor Daniel Kang at UIUC Computer Science, December 2023 - Present

- Designed and implemented novel methods for zero knowledge proofs of machine learning inference.
- This is a method that allows for the owner of a machine learning model to give cryptographic proof that their model generated some output, without revealing the model weights.
- Created novel methods to quantize LLaMA 2-7B and GPT-j to run on ints without affecting perplexity.
- Implemented the PLONK and GKR zk-SNARKS from scratch, utilizing Rust and custom CUDA kernels.

Backend Developer, YinzCam Inc., March 2022 - July 2023

- Designed a live analytics portal to view what users are doing in 200+ sports apps in real time. Implemented a parallel data ingestion system able to handle 500,000 events/second.

Research Assistant, Professor Aarti Singh at CMU Computer Science, Jan. 2021 - May 2023

- Extensively researched Gaussian Process ML optimization techniques. Implemented the GP-UCB algorithm in python from scratch and optimized it for speed and parallel computation.
- Developed a robot to iteratively perform chemical reactions and optimize for a target result using GP-UCB. This was used to find the optimal combination of dyes to achieve a target color.

Teaching Assistant, Carnegie Mellon University, January 2021 - December 2021

- Teaching Assistant for Matrices and Linear Transformations in Spring 2021, and Graduate Introduction to Machine Learning in Fall 2021. Helped lead recitation and explain concepts in office hours.

Publications

- Fiorino, A., Tang, L., Chen, B., & Kang, D. (2025). ZK-Torch: Compiling Machine Learning Models to Zero-Knowledge Proofs. Submitted for publication to Crypto 2025.
    - Designed and implemented an efficient and extensible zero knowledge proof framework that is able to prove ML inference for any Pytorch ML model. Wrote cryptographic proofs to show the security of each component.
    - https://arifiorino.github.io/zk_torch.pdf
- Fiorino, A., Neopane, O., & Singh, A. (2022). Gaussian Processes for Episodic Experimental Design. International Conference on Machine Learning.

    - Designed a novel GP algorithm to optimize a time dependent sequence of actions called an “episode”. This algorithm out performed existing algorithms on both synthetic data and a COVID-19 dataset.
    - https://realworldml.github.io/files/cr/paper26.pdf
- Van Aken, D., Yang, D., Brillard, S., Fiorino, A., Zhang, B., Bilien, C., & Pavlo, A. (2021). An Inquiry into Machine Learning-Based Automatic Configuration Tuning Services on Real-World Database Management Systems. Proc. VLDB Endow., 14(7), 1241–1253.
    - Collaborated on a system to find the optimal configuration of a database using various ML algorithms.
    - https://db.cs.cmu.edu/papers/2021/p1241-aken.pdf

Programming Projects

Water Simulation, May 2021 - August 2021

- Implemented a water simulation from scratch in Python and C. Extensively researched academic papers on eulerian fluid simulations. The algorithm solves the Navier-Stokes partial differential equations to update the field of velocities and uses the Marching Squares algorithm to render the water.
    - https://github.com/arifiorino/water-simulation

Edline Helper, March 2015 - May 2018

- Identified a feature gap in the Edline public school grades platform. Implemented an iOS and Android client to web scrape the platform and provide additional features and ease of use. > 80,000 downloads.

Programming Skills

Languages: C, C++, Python, Rust, Java, Objective-C, Swift, C Sharp, HTML, Javascript, CUDA, SQL
Tools: PyTorch, Tensorflow, AWS (EC2, RDS, S3, DynamoDB, EMR Hadoop), Django, Bootstrap
Software: Vim, Xcode, Android Studio, Unity, Git and Github, LaTeX
Fluent in English and Spanish. Advanced piano player.