Youssef Ait Alama

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Education

University of North Carolina at Charlotte *Ph.D. in Computer Science* *Expected Aug. 2028*

- Advisor: Dr. Razvan Bunescu GPA: 4.0
- Focus: Algorithm Discovery and Machine Learning

University of North Carolina at Charlotte *B.S. in Computer Science* *Aug. 2024*

- GPA: 3.53 Concentration: Machine Learning

Research Interests

Algorithm Discovery, Fault-Tolerant Machine Learning, Reinforcement Learning, Neural Network Systems

Publications

Algorithmic Strategies for Sustainable Reuse of Neural Network Accelerators with Permanent Faults 2024

Youssef A. Ait Alama, Sampada Sakpal, Ke Wang, Razvan Bunescu, Avinash Karanth, Ahmed Louri

38th IEEE International Symposium on Defect and Fault Tolerance in Integrated Circuits and Systems (DFTS), 2024 **Best Student Paper Award** arXiv:2412.16208

Research Experience

Research Assistant *UNC Charlotte* *May 2024 – Aug. 2024*

- Co-authored a publication on fault-tolerant neural network accelerators, accepted to IEEE DFTS 2024 and recognized with the Best Student Paper Award.
- Designed and implemented a CUDA-accelerated systolic array simulator in PyTorch to model the impact of permanent hardware faults in machine learning accelerators.
- Investigated stuck-at faults in interconnects and weight registers across float32, float16, and bfloat16 formats.
- Developed fault mitigation techniques (Invertible Scaling and Shifting, fine-tuning with fault injection) requiring no hardware modifications, preserving near-original accuracy on MNIST, CIFAR-10, and ImageNet.

Undergraduate Research *UNC Charlotte* *Aug. 2023 – Dec. 2023*

- Conducted a comparative study of reinforcement learning algorithms (A2C, SAC, PPO, DQN) in dynamic environments with uncontrollable data, training 10 instances of each using Stable-Baselines3.
- Analyzed algorithm performance across diverse simulated environments, identifying strengths and failure modes in non-stationary settings.

Teaching Experience

Teaching Assistant *UNC Charlotte* *Aug. 2022 – Present*

- Supported instruction for courses in machine learning, computer vision, and NLP for classes of up to 50 students.
- Collaborated with faculty on course materials and grading; mentored students on academic progress and research development.

Technical Skills

Languages: Python, CUDA/C++

Frameworks & Libraries: PyTorch, Stable-Baselines3, NumPy

Tools: Git, LaTeX

Other Experience

Lead Developer, CEEC Project *CIVRA* *Sep. 2021 – Apr. 2022*

- Led a team of 5 to design and ship a VR application for teaching chemistry concepts, competing at the CEEC Senior Expo 2022.
- Coordinated with professors, high school teachers, and students to build an accessible product for classroom use.