Aditya Ajith Krishnan

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Summary

Doctoral student working at Knowledgeable Interactive Machines lab, with research primarily focused on cyber-physical systems and embodied AI. The aim of the work is to find mechanisms and tools to make such complex systems deterministic, safe and testable.

Education

PhD, Computer Engineering — Jan 2026 – Ongoing
Arizona State University — Tempe, AZ

- Advised by Prof. Hokeun Kim

MS, Computer Engineering — Aug 2023 – May 2025
Arizona State University — Tempe, AZ

- Computer Architecture II, Advanced Operating Systems, Real-Time Embedded Systems, Machine Learning Accelerators
- GPA: 3.3/4.0

Research Experience

Research Assistant - Knowledgeable Interactive Machines Lab, ASU – Tempe, AZ | Dec 2023- Present

- Developing a framework towards safety in Distributed Vision-Language-Action (VLA) based systems using Maxwait.
- Developing an automated cyber-physical systems testbed for 5 components using python and integration into the CI/CD pipeline of Lingua Franca open source platform.
- Developing a system with federated learning with homomorphic encryption and dynamic partial reconfiguration.
- Enhanced RTI test coverage by developing of 5 Rust RTI unit test cases for the open source project.
- Zephyr RTOS development on the nrf52dk microcontroller using the Lingua Franca framework.
- Developed a new lab experiment for Lingua Franca embedded systems lab for the real-time embedded systems course.

Graduate Services Assistant - Grader, ASU – Tempe, AZ | Aug 2024 – May 2025

- Assisted in academic evaluation for CSE 522 (Real-Time Embedded Systems) and CSE 520 (Computer Architecture) for 50+ graduate students

Publications

- **ACT: Automated CPS Testing for Open-Source Robotic Platforms** (2026): Proceedings of the 7th ACM/IEEE International Conference on Automation of Software Test (AST 2026), April 13 - 14, 2026.
- **Towards Efficient Privacy-Preserving Federated Learning on Edge with Reconfigurable FPGA** (2025): in Proceedings of the 28th Forum on specification and Design Languages (FDL 2025), September 10 - 12, 2025.

Industry Experience

Embedded Software Engineer, VVDN Technologies – Kochi, India | Aug 2020 – Jul 2022
Project: Hardware acceleration of the AMD U25N SmartNIC

- Ported and optimized driver modules for U25N SmartNIC, improving platform stability and **L2/L3 throughput by 22% using OVS** in high-performance workloads **(VxLAN, L2GRE, and VM-to-VM switching)**
- Engineered and validated the SmartNIC's 3 most critical features — **Switching, ConnTrack, and DPR** modules.
- Architected a Dynamic Partial Reconfiguration (DPR) driver and application module from scratch; **reduced FPGA reconfig time by 66%** enabling faster deployment and function exchange.
- Delivered driver support for **5 critical firmware components** (reset, mode control, flash select, statistics, card ID).
- Led the driver release and validation phase; **coordinated with the FPGA and QA teams** to resolve integration issues.

Academic Projects

- **Deep Learning Performance Profiling** (2025): **Profiled MLP, CNN, and BERT** models on NVIDIA 3060 using Nsight Systems and Compute, measuring GPU utilization, DRAM bandwidth, and power draw.
- **Features on xv6 Operating System** (2024): Implemented 4 features on the xv6 operating system: Scheduling algorithms, bootloader, trap and emulate of VM, fork functionality, and process creation.
- **Bringup of Agilex 7 SoC FPGA Dev Kit** (2024): Bootstrapped HPS-first mode on Arm Cortex-A53 with Yocto images and benchmarked ResNet across 7 architectures using Intel FPGA AI Suite.