H. Umut Suluhan

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EDUCATION

Electrical and Computer Engineering *PhD* — Expected May 2027
University of Arizona, Tucson, AZ — GPA: 4.0/4.0
Computer Science *BS* — February 2023
Ozyegin University, Istanbul, Turkey — GPA: 3.72/4.0

WORK EXPERIENCE

University of Arizona | *Graduate Research Assistant* — Jan 2023 - Present
Scientific and Technological Research Council of Türkiye | *Undergraduate Research Assistant* — Sep 2021 - Dec 2022

RESEARCH FOCUS

Runtime System Design and Placement Algorithms for Coarse-Scale Programmable Heterogeneous SoCs

- Productive architecture exploration along with application development and deployment for seamless dynamic workload execution on a wide range of heterogeneous SoCs
- Design and development of a reinforcement learning environment targeting placement of heterogeneous kernels on a coarse-grained 2D systolic array architectures, in which users can integrate and evaluate new placement heuristics

RELEVANT PROJECTS

Deployment of PyTorch Models on Heterogeneous SoCs

- Designed and developed a framework that transforms PyTorch models into C++ representation to be able to deploy on systems composed of a pool of accelerators and CPU cores
- Demonstrated ability to execute range of machine learning models concurrently on a single heterogeneous system composed of Convolution, FFT accelerators and ARM CPU Cores emulated on the Xilinx ZCU102 platform

RISC-V Based Heterogeneous SoC Design

- Built an FPGA image comprising heterogeneous set of RISC-V cores and FFT accelerators including their peripherals, DMA engine, and interconnect along with a bootable Linux
- Design space exploration based on FPGA emulation of heterogeneous SoC on Xilinx Virtex 7 VC707
- Deployed signal processing applications with dynamic workload scenarios and exposed the trade-off between scheduler complexity, degree of heterogeneity, and workload complexity

PUBLICATIONS

- H. U. Suluhan, S. Gener, A. Fusco, H. F. Ugurdag, and A. Akoglu, *"PyTorch and CEDR: Enabling deployment of machine learning models on heterogeneous computing systems"* in ACS/IEEE International Conference on Computer Systems and Applications. IEEE, 2023. (Accepted)
- J. Mack, S. Gener, S. Hassan, H. U. Suluhan, and A. Akoglu, *"CEDR-API: Productive, performant programming of domain-specific embedded systems"* in 2023 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW), 2023, pp. 16 25.
- H. U. Suluhan, H. F. Ates, and B. K. Gunturk, *"Dual camera based high spatio-temporal resolution video generation for wide area surveillance"* in 2022 18th IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS). IEEE, 2022, pp. 1–8.

SKILLS

- **Programming Languages:** C, C++, Python, Verilog, CUDA, Java
- **Hardware and Embedded Design:** Heterogeneous SoC, RTL Design, Rocket Chip Generator, FPGA Design Tools, FPGA Emulation
- **Software Experience:** Synopsys VCS, Vivado, Linux, Git

COURSE WORK

- High-Performance Computing: Technology, Architecture, and Algorithms, Computer Architecture and Design, Fundamentals of Computer Networks, Cyber Security - Concept, Theory, Practice