Shriram Raja

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RESEARCH INTERESTS

Scheduling, Resource Management, Synchronization, Virtualization

EDUCATION

Boston University, Boston, MA — Sep 2023 - Present
Ph.D. in Computer Science

- Advisor: Dr. Richard West
- Coursework: Introduction to Operating Systems, Computing Systems for Robotics, Advanced Algorithms, Artificial Intelligence

Virginia Tech, Blacksburg, VA — Aug 2021 - May 2023
Master of Engineering, Computer Engineering

- Advisor: Dr. Haibo Zeng
- Project Title: Hybrid Priority Assignment for Global Fixed Priority Scheduling

PSG College of Technology, Coimbatore, India — Aug 2017 - May 2021
Bachelor of Engineering, Electrical & Electronics Engineering

PUBLICATIONS

[J1] Xuanliang Deng*, **Shriram Raja***, Yecheng Zhao, and Haibo Zeng, "Priority Assignment for Global Fixed Priority Scheduling on Multiprocessors", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, 2024 [Paper] [Code] [DOI]

- Proposed a priority assignment algorithm for Global Fixed Priority (G-FP) scheduling that combines the advantages of heuristics and response time estimation (instead of actual response time) to outperform existing methods by 25 percentage points on average.
- * - contributed equally

EXPERIENCE

Boston University — Sep 2023 - Present
Research Fellow — *Boston, MA*

- Developed bounded priority-aware kernel locks for Quest RTOS
- Implemented compartmentalization using hardware virtualization features on x86 processors
- Contributed to the Quest-V Software Development Kit which supports Quest and Yocto Linux guests.

Virginia Tech — Mar 2022 - May 2023
Research Assistant — *Blacksburg, VA*

- Developed, implemented and evaluated a novel Global Fixed Priority scheduling algorithm for multicore real-time systems, advised by Dr. Haibo Zeng

Security Solutions, Marvell Semiconductor — May - Aug 2022
Firmware Engineer Intern — *Santa Clara, CA*

- Implemented FRAM Logging feature in LiquidSecurity Cloud Hardware Security Module to collect debug information during boot-up.

TEACHING EXPERIENCE

CS 410 Advanced Software Systems, Teaching Fellow, Boston University — Spring 2025
CS 552 Operating Systems, Teaching Fellow, Boston University — Fall 2024
ECE 5480 Cybersecurity & IoT, Grad Teaching Assistant, Virginia Tech — Spring 2022, 2023, Fall 2022

SERVICE AND PRESENTATIONS

Shadow Technical Program Committee
Euromicro Conference on Real-Time Systems (ECRTS) — 2025

Tutorial/Education Class
Getting Started with the Quest RTOS & Quest-V Partitioning Hypervisor — RTSS 2024, ESWEEK 2025

Secondary Reviewer
- Software: Practice and Experience — 2025
- IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS) — 2025
- IEEE Real-Time Systems Symposium (RTSS) — 2024

PROJECTS

i386 Custom Bare-metal Operating System — Fall 2023
Developed a bare-metal operating system for 32-bit x86 systems that uses preemptive FIFO scheduling and supports a simple file system.

Scheduler for Real-Time Operating Systems — Apr 2022
Programmed different periodic scheduling algorithms, resource management protocols, and a polling server for FreeRTOS. Determined the best priority that can be assigned to the polling server by analyzing the response time of aperiodic tasks by varying periodic load for different test cases when executed on an Arduino Mega 2560.

LLVM Optimization Pass — Apr 2022
Implemented the Lazy Code Motion (LCM) algorithm to eliminate redundant statements and move arithmetic expressions to the latest point in the program without modifying the functionality of the code. Evaluated the performance of the optimization pass using open-source benchmarks.

CPU Profiling Tool for Linux — Nov 2021
Used Kprobe to track the cumulative run time and the number of times each task is scheduled by the Linux scheduler. Created and maintained a red-black tree that stores the run time of the tasks. The 20 most scheduled tasks are identified, and their stack trace is displayed using the /proc file system.