Shriram Raja

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RESEARCH INTERESTS

Scheduling, Real-Time Operating Systems, Resource Management

EDUCATION

Boston University, Boston, MA — Sep 2023 - Present
Ph.D. in Computer Science — *3.88/4.00*
- Advisor: Dr. Richard West
- Coursework: Introduction to Operating Systems, Computing Systems for Robotics, Advanced Algorithms

Virginia Tech, Blacksburg, VA — Aug 2021 - May 2023
Master of Engineering, Computer Engineering — *3.96/4.00*
- 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 — *9.76/10.00*

PUBLICATIONS

Published/Accepted:

[J1] Xuanliang Deng, **Shriram Raja**[1], Yecheng Zhao, and Haibo Zeng, "Priority Assignment for Global Fixed Priority Scheduling on Multiprocessor", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, 2024. **Impact Factor: 2.9** [Paper] [Code]

- Proposes a Mixed Priority Assignment algorithm for Global Fixed Priority (G-FP) scheduling that combines the advantages of heuristics and response time estimation (in place of actual response time) to outperform existing methods by 25% on average.

EXPERIENCE

Boston University — Sep 2023 - Present
Research Fellow — *Boston, MA*
- Working on resource management in Quest-V

Virginia Tech — Mar 2022 - May 2023
Research Assistant — *Blacksburg, VA*
- Developed, implemented and evaluated a novel algorithm for Global Fixed Priority scheduling on multiprocessors, 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 enable communication between the processor and the FRAM during boot-up.
- Developed skills to understand and work with a large codebase spread across different repositories.

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[1] Equal contribution as the first author

SKILLS & TECHNOLOGIES

Programming Languages	C, C++, Python, and Verilog
Microcontrollers & Boards	Arduino, 8085, 89C52, MSP430, and Raspberry Pi
Tools	MATLAB, Linux Shell, Git, and LLVM
Systems	Linux Kernel, FreeRTOS

TEACHING EXPERIENCE

ECE 5480 Cybersecurity & IoT, GTA, Virginia Tech   Spring 2022, 2023, Fall 2022

PROJECTS

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.