Pranav Dani

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Education

SUNY – Stony Brook University Aug 2023 – May 2025
Master of Science, Computer Science *New York, USA*

- Courses: Computer Architecture, OS, Distributed Systems, System Security, Theory of Databases, Analaysis of Algorithms
- Teaching Assistant: CSE 316: Fundamentals of Software Development

University of Mumbai – Thadomal Shahani Engineering College Aug 2019 – May 2023
Bachelor of Engineering, Information Technology *Mumbai, India*

Technical Skills

Languages and Databases: C, C++, Java, Python, Go, SystemVerilog, nasm; PostgreSQL, MySQL, Firebase
Tools and CI: Unix/Linux, Docker, QEMU, bash, GTKWave, Kubernetes, Git

Work Experience

Compilers and Operating Systems Lab | Graduate Research Assistant | New York, US May 2024 – Present

- Engineered a CPU Energy Flamegraph tool using Linux perf_events, eBPF and PowerAPI to trace CPU call chains and monitor power consumption per cgroup, enhancing energy efficiency analysis for developers.
- Crafted a GPU Energy Flamegraph tool using Nsight Systems and nvidia-smi to monitor GPU power consumption per kernel, enhancing GPU power usage insights for optimization.

Suven Consultants | Software Intern | Mumbai, India Jun 2021 – Aug 2021

- Devised a Home Inventory and Loan Management tool using Java and SQLite3; gained 150+ users in the first month.
- Implemented an advanced Printable interface with Java AWT and the Graphics Library to generate professional PDF reports in under 2 seconds per report—boosting document accessibility by 75% and processing over 150 reports weekly.

Projects

Bootable x86 Kernel | *C, nasm, QEMU* Jun 2025 – Present

- Developed a bootloader that loads the kernel with round-robin scheduling, interrupt handling, and VGA support.
- Implements paging, a basic grow-only heap, and ATA-based disk I/O integrated with a simple file system.

Computer Architecture – RISC-V Processor | *SystemVerilog, GTKWave, C* Jun 2024 – Oct 2024

- Designed a synthesizable 6-stage RISC-V processor (RV64IM ISA) with branch prediction and stalls.
- Integrated 2 set-associative L1 caches, load/stores which uses AXI-4 protocol to communicate with the memory.

Kernel Programming – File Systems | *C, QEMU* Mar 2024 – May 2024

- Implemented an asynchronous journaling protocol in xv6, reducing disk write() syscall latency by up to 94%.
- Added optimization for ”small files” - allowing file data ($<$ 52B) to be stored in the inode, reducing disk I/O by 29%.

Distributed Systems – Key-Value Store with Raft Consensus | *C++* Aug 2023 – Dec 2023

- Architected a persistent key-value store using Raft for leader election, replication, and snapshotting for fast recovery.
- Executed sharding with consistent hashing for efficient data distribution and automated partition rebalancing.
- Formulated a versioned key-value store that supports cross-shard transactions using 2-Phase Locking and 2-Phase Commit with Optimistic Concurrency Control.

Unix Systems Programming Projects | C, C++, Python, Perl, Bash, QEMU Jan 2023 – Present

- **Locks:** RCU-based lock supporting concurrent readers and a single writer, ensuring atomic access to shared resources.
- **Syscall – *ftruncate()***: Implemented as Unix system call for adjusting the file size—either increasing or decreasing it.
- **KV Store**: A multithreaded key-value store with distributed transactions, supporting multiple clients and persistence.
- **GPU Flamegraph**: A tool to visualize GPU (CUDA) kernel execution and power consumption through *NVML* and *nsys*.

BackGen - GoLang Backend Generator | *ICT4SD* | *Springer* Jan 2023 – Aug 2023

- Developed a GoLang backend generator that generates server code based on REST API spec, reducing dev time by 50%.
- Validated on a Todo application, tool generates nearly 48% of the code, significantly streamlining web app development.

Extracurricular Activity

Our Tech Community (OTC) | ourtech.community | *Admin* May 2022 – Present

- Hosted 500+ hours of weekly OTC CatchUp, organized two in-person MeetUp events with 70+ attendees.