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 *(Course Instructor: Prof. Christopher Kane)*

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

- Courses: Computer Architecture, OS, DBMS, DSA, Computer Networks, Network Security, Data Mining

Work Experience

Graduate Research Assistant: GPU and CPU Profiling May 2024 – Present
Stony Brook University *New York, US*

- 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 CUPTI and NVML to monitor GPU power consumption per kernel, enhancing GPU power usage insights for optimization.

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

- Devised a Home Inventory and Loan Management tool using Java and SQLite3; gained 150+ active 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

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

- Designed a synthesizable multi-cycle in-order RISC-V processor which communicates with memory over **AXI4 protocol**.
- Implemented an ALU to execute instructions, and interact with reg file, supporting pipeline stalls syscalls.
- Integrated branch prediction, 2 set-associative L1 caches, load/stores and ECALL instructions with pipeline flush.

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

- Constructed an asynchronous journaling protocol in xv6, reducing disk write() latency by up to 94%.
- Added small file support with file type conversion, optimizing disk space utilization and reducing disk I/O by 95% for files < 52B.

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

- Architected a persistent k-v store using Raft for leader election and data replication. Added snapshotting for quick 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

- **KV Store**: A multithreaded key-value store with distributed transactions, supporting multiple clients and persistence.
- ***ftruncate()***: A Unix system call for adjusting the file size—either increasing or decreasing it.
- **Locks:** Wrote an RCU-based lock supporting concurrent readers and a single writer, ensuring atomic access to shared resources.
- **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 software tool that facilitates the process of writing repetitive backend code for web applications.
- Creates data models and RESTful APIs in GoLang, reducing development time by 50%.
- Generates approximately 48% of the code. (Result evaluated for creating a backend for a simple Todo application.)

Web Projects | *React.js, Node.js, Flask, PostgreSQL, Heroku, HTML, CSS, JS, AWS-EC2, S3, SQL* Apr 2020 – Present

- **Expense Tracker** – Web app for tracking expenses with bulk expense creation and file export, attracting 100+ users in a month.
- **NYC Housing** – A d3 based web app for visualizing NYC housing data, enabling users to filter and analyze various parameters.
- **Short-Terms** – Chrome extension for summarizing web pages using NLP and Spcay (before GPT).

Extracurricular Activity

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

- Hosted 400+ hours of weekly OTC CatchUp technical discussions, organized two in-person MeetUp events with 70+ attendees.