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

Experience

GRA: GPU and CPU Profiling - Advisor: Prof. Dongyoon Lee May 2024 – Present
Energy Flamegraphs *New York, US*

- Engineered a CPU Energy Flamegraph tool using Linux perf_events 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.
- Integrated Printable interface to generate PDF reports using Java AWT and Graphics Library, enhancing document accessibility.

Projects and Research

RISC-V CPU - RV64IM Implementation | ***Verilog, GTKWave, C*** Jun 2024 – Oct 2024

- Designed a synthesizable multi-cycle in-order pipeline RISC-V processor which communicates with memory over **AXI4 protocol**.
- Implemented an ALU to execute instructions, and interact with reg file, supporting pipeline stalls on RAW data hazards.
- Simulated branch prediction, set-associative cache, load/stores and ECALL instructions with pipeline flush.

Enhanced xv6 File System: Optimized Logging and Small File Support | ***C, QEMU*** Mar 2024 – May 2024

- Constructed a disk logging protocol targeting in-memory buffers and disk writes, reducing disk write latency by 94%.
- Added small file support with file type conversion, optimizing disk space utilization and reducing disk I/O by 95% for files < 52B.
- Incorporated *ftruncate()* syscall for file truncation and automatic transition between "small" and regular files.

Distributed 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.

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.)

Expense Tracker | ***Flask, PostgreSQL, Heroku, HTML, CSS, JS*** | GitHub Apr 2021 – Jun 2021

- Built an expense tracker web app with bulk expense creation and CSV/Excel export, attracting 100+ users within first month.
- Enabled personalized budget creation across multiple categories, enhancing flexibility in expense tracking.

Technical Skills

Languages and Databases: C, C++, Java, Python, Verilog, PostgreSQL, MySQL, MongoDB
Tools and Platforms: Unix, Linux, Docker, Perl, Bash, QEMU, GTKWave, Git, GitHub, Firebase, Heroku
Web and CI/CD: React.js, Node.js, Flask, HTML, CSS, JS, GitHub Actions,

Extracurricular Activity

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

- Hosted 300+ hours of weekly OTC CatchUp technical discussions, organized two in-person MeetUp events with 60+ attendees.