Pranav Dani

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Education

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

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

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*

- Built a CPU Energy Flamegraph tool using Linux perf_events and PowerAPI to monitor power consumption per function call.
- Developed a GPU Energy Flamegraph tool using CUPTI and NVML to monitor GPU power consumption per kernel.

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

- Developed 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.

Skills

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

Projects and Research

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

- Designed a five + stage in-order pipeline for RV64IM spec extension which talks to the physical memory over **AXI4 protocol**.
- Implemented an ALU to execute instructions, and interact with reg file, supporting pipeline stalls on RAW data hazards.
- Added branch prediction, Set-Associative cache, and support for load/stores and ECALL instructions with pipeline flush.

Improved xv6 File System | *C, QEMU* Mar 2024 – May 2024

- Built a disk logging protocol targetting 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 significantly.
- Implemented *ftruncate()* syscall for file truncation and transition between "small" and regular files.

Raft Implementation - Consensus Algorithm | *C++* Aug 2023 – Dec 2023

- Built a persistent key-value store using Raft for leader election and data replication. Implemented snapshotting.
- Implemented sharding with consistent hashing for efficient data distribution and automated partition rebalancing.
- Implemented 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 helps with the process of writing repetitive backend code for web applications.
- Creates data models and RESTful API endpoints, and generates executable code for the same in Golang.
- 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

- Designed and built a web app for recording and managing personal expenses with support for creating bulk expenses and exporting user data in CSV and Excel formats using Flask and PostgreSQL and hosted on Heroku.
- Provides the functionality to create personalized budgets based on multiple categories.

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.