Pranav Dani

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Education

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

- Courses: Distributed Systems, Operating Systems, Computer Architecture, Theory of Databases, System Security
- 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*

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

Experience

GPU Profiling - Energy Flamegraphs **May 2024 – Present**
Graduate Research Assistant - Advisor: Prof. Dongyoon Lee *New York, US*

- Developing a software solution to capture CPU and GPU execution call stacks, enabling the generation of energy flamegraphs to provide assistance for energy-efficient data centers.

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

- Collaborated on two Open Source Java projects: Home Inventory and Loan Management tool.
- Used **Printable interface** to generate printable reports in PDF format using Java AWT and Graphics Library.
- Used SQLite3, JavaFX, and Java Swing components.

Skills

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

Projects and Research

Computer Architecture - RV64IM - RISCV - Five Stage In-Order Pipeline | *Verilog, GTKWave* **Jun 2024 – Present**

- Designed a five-stage in-order pipeline for RV64IM specs which talks to physical memory over AXI4 protocol.
- Implemented an ALU to execute instructions, and interact with reg file, supporting pipeline stalls on RAW data hazards.
- Created a functional RISCV processor with a direct-mapped cache and support for load/stores and ECALL instruction with pipeline flush.

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

- Designed an asynchronous disk logging protocol for xv6, enhancing the write efficiency, resulting in a 94% latency reduction.
- Introduced small file support with file type conversion handling, reducing disk IO requests with unchanged logging protocol by 29% and reducing disk IO requests with the new logging protocol by 91%.
- Implemented ftruncate() syscall for file truncation and seamless transition between ”small” and regular files.

Distributed Systems - Raft Implementation | *C++* **Aug 2023 – Dec 2023**

- Created a persistent linearizable key-value store utilizing the Raft consensus algorithm for leader election and data replication in an asynchronous environment. Implemented log compaction with Snapshots.
- Engineered sharding using consistent hashing, ensuring efficient data distribution across nodes. Automated partition rebalancing during node joins and departures.
- Implemented a versioned key-value store that supports cross-shard Transactions using 2-Phase Locking and 2-Phase Commit with Optimistic Concurrency Control.

BackGen - Backend Generator | *ICT4SD* | *Springer* **Aug 2023**

- Developed a software tool that automates the process of writing backend code for web applications.
- Creates a structure for 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 200+ hours of weekly OTC CatchUp sessions, organized two in-person OTC MeetUp events with 60+ attendees.