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 · **May 2024 – Present**
Graduate Research Assistant · *New York, US*

- Developing a software solution to capture CPU and GPU execution contexts, enabling the generation of flamegraphs and providing programming 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
Web: React.js, Node.js, Flask, HTML, CSS, JS
Databases: PostgreSQL, MySQL, MongoDB
Platforms: GitHub, Firebase, Heroku
Tools: Git, qemu, GTKWave
CI/CD: GitHub Actions

PROJECTS AND RESEARCH

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

- Implemented an instruction fetcher and a decoder for **RV64IM specs** which talks to physical memory over AXI4 protocol.
- Developed 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.

Improving File System syscall performance on XV6 | *C, qemu* · **Mar 2024 – May 2024**

- Engineered **asynchronous disk logging protocol**, enhancing the write efficiency, resulting in a **94% latency reduction**.
- Introduced small file support with file type conversion handling. Resulted in a **reduction of 29% and 91% disk IO** requests with unchanged logging and new logging protocol respectively.
- Implemented **ftruncate() syscall** for file truncation and seamless transition between "small" and regular files.

Fault Tolerant Sharded Key-Value Store With Transactions using Raft | *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.