

# Pranav Dani

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## EDUCATION

### SUNY – Stony Brook University

Master of Science, Computer Science

Aug 2023 - May 2025

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

Bachelor of Engineering, Information Technology

Aug 2019 - May 2023

Mumbai, India

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

## EXPERIENCE

### GPU Profiling

Graduate Research Assistant

May 2024 – Present

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

Software Intern

Jun 2021 – Aug 2021

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

### 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

- Designed an asynchronous **disk logging protocol**, enhancing the write efficiency, resulting in a **94% latency reduction**.
- Introduced small file support with file type conversion handling. This resulted in a **reduction of 29% disk IO** requests with unchanged logging and a **reduction of 91% disk IO** requests with a new logging protocol.
- 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](https://ourtech.community) | Admin

May 2022 - present

- Hosted 200+ hours of weekly **OTC CatchUp** sessions, organized two in-person **OTC MeetUp** events with 60+ attendees.