AKSHAT SHARMA

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EDUCATION

Stony Brook University — **Stony Brook, NY, USA**

Master of Science in Computer Science | GPA: 3.96/4 — Aug 2023 – May 2025

***Relevant Courses**: Distributed Systems, Network Security, Operating Systems, Analysis of Algorithms, Computer Graphics, Storage Systems, Formal Verification in Rust*

Pune Institute of Computer Technology — **Pune, India**

Bachelor of Engineering in Computer Engineering | GPA: 9.15/10 — Aug 2019 – Jul 2023

SKILLS

- **Programming Languages**: Python, TypeScript, JavaScript, Go, C++, Rust
- **Databases**: PostgreSQL, Redis, DynamoDB
- **Frameworks/Libraries**: Django, django-rest-framework, ReactJS, NextJS, Celery, fastAPI, NodeJS
- **Deployment**: Docker, Nginx, Caddy, Git, AWS, RabbitMQ, Kubernetes

WORK EXPERIENCE

File Systems and Storage Lab — **New York**

Graduate Research Assistant — Feb 2024 – Present

- Developed a naive distributed systems orchestrator(complete with heartbeats and fault detection) in Rust. Orchestrator can be used to run decentralized encryption schemes like Shamir's Secret Sharing.
- Surveyed the current literature on broadcast schemes in relation to byzantine faults and developed a evaluating scheme to evaluate systems that can be used to broadcast reliably.

StonySystems Lab — **New York**

Graduate Research Assistant — Aug 2023 – Feb 2024

- Worked on optimizing the replication setup of an in-memory database (built in C++) by developing a novel chained RPC communication model, resulting in a 60% decrease in bandwidth utilization.
- Developed a novel fail-slow detection algorithm to predict slow nodes and reroute RPCs, increasing throughput by 25% and reducing latency by 50% in fail-slow scenarios.
- Improved network round-trip-time (RTT) while maintaining the durability of consensus algorithms like RAFT. Techstack - C++.

Supermind Inc — **Wilmington, Delaware**

Founding Engineer — Aug 2022 – Jan 2023

- Led the design and engineering process of a social search engine with complexities like multi-modal data and elaborate data pipelines built in Python.
- Optimized the search engine to reduce search latency by 90% (1000ms to 100ms).
- Streamlined the data pipeline by profiling key blockers, moving from a monolith indexer to a microservice-based architecture, improving performance by 175x (from 700 seconds to 4 seconds).
- Spearheaded the implementation of a robust deployment process and monitoring systems using Grafana Stack for efficient observability. Techstack - PostgreSQL, Redis, Python, fastAPI, Go.

Bitglaze Technologies — **Remote**

Backend Developer — Feb 2022 – May 2022

- Utilized Golang and the Chi Router to develop robust backend APIs for the Permission Management module.

- Proficiently wrote SQL queries to fetch and modify data from the underlying database, providing necessary data for the system's functionalities.
- Employed Skaffold to configure a local Kubernetes cluster on a Minikube node, enabling efficient development and seamless testing of new features.
- Developed comprehensive unit tests for the API endpoints, ensuring the reliability and stability of the system. Techstack - Go, PostgreSQL, Kubernetes, Skaffold.

Indian Institute of Technology Bombay **Remote**
Summer Fellow Apr 2021 – Aug 2021

- Worked on adding support for automated electric circuit assessments in a browser, improving accessibility for educators.
- Implemented automated visualizations and introduced results Excel sheet generation for improved data analysis.
- Led the development team in creating a user-friendly circuit simulation comparison feature on the browser, enhancing learning outcomes and decision-making.
- Techstack - Python, Django, Celery, Typescript, React.JS, Redux.

PROJECTS

Benchmarking Locking Methods in Rust Xv6 Apr 2024 – Apr 2024

- Implemented various locking mechanisms including spinlocks and ticket locks with different atomics, in a Rust-based port of the Xv6 operating system.
- Developed a concurrent hashmap for benchmarking lock implementations under different contention scenarios and conducted extensive benchmarking to measure throughput, latency, and scalability across different lock types.
- Demonstrated that ticket locks performed better in high contention scenarios compared to spinlocks.
- Techstack - Rust, QEMU, RISC-V, Git.

Sentinel Apr 2024 – Apr 2024

- Developed a secure TCP-layer jump proxy in Golang, providing additional protection for publicly accessible TCP services like SSH.
- Implemented AES-256 encryption in GCM mode with key derivation via PBKDF2, ensuring data confidentiality and integrity.
- Incorporated both forward and reverse proxy functionality, with support for handling multiple concurrent sessions and password-based authentication while maintaining data isolation at the TCP layer.
- Techstack - Go.

ACID on Shards-A Distributed Transactional KV Store Aug 2023 – Jan 2024

- Developed a C++ based Redis-like, key-value store with sharding and replication support using the RAFT consensus protocol, ensuring data consistency and fault tolerance across distributed servers.
- Implemented support for Optimistic Concurrency Control ensuring strict serializability, maintaining transaction order and preserving data integrity. Also implemented snapshotting for log compaction.
- Built-in support for distributed transactions and coordinated execution of operations across shards along with Multi-Key Version Control, making a reliable and scalable solution with ACID database properties.
- Techstack - C++.

Code Judge Aug 2021 – Oct 2021

- Developed a hackerrank-like remote coding platform for competitive programming competitions.
- Added code sandboxing and isolation using Docker for running test cases and judging code submissions.
- Integrated rate-limiting and throttling to prevent Denial-of-Service using compilation spamming.
- Techstack - Python, Django, ReactJS, djangorestframework, PostgreSQL, Redis, Docker, Sentry.

*This document was last updated on 2025-03-23.