Siddharth Nayak

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Education

Indraprastha Institute of Information Technology, Delhi — Aug. 2022 – May 2024 (Expected)
M.Tech in Computer Science and Engineering — *CGPA: 8.63/10 (Till 3rd Semester)*

Institute of Technical Education and Research, Bhubaneswar — Aug. 2015 – May 2019
B.Tech in Computer Science and Engineering — *CGPA: 9.3/10*

Skills

Areas of Interest: Operating Systems, Networking, Cloud Computing, Backend Engineering
Languages: C/C++, Python, Go, Java, CPython, HTML/CSS, JavaScript, JQuery, Ajax, P4
Tools: Git/GitHub, Shell Scripting, gdb, LLVM, DPDK, Docker, Kubernetes
Frameworks: Django, Flask, C++ QT
Databases: MySQL, Redis

Experience

Open Futures, New Delhi | *Software Developer* — Aug. 2019 – Sep. 2021
Responsible for adding and maintaining features to in-house low-latency trading system and implementing micro-second scale trading algorithms in C++.

- Developed and implemented trade execution algorithms for micro-second scale automated trading strategies.
- Reduced app startup time to *1/3rd* by porting sequential C++ code to *multithreaded* code.
- Built a web-based *real-time* risk monitoring system using Django, WebSocket, and Redis. Wrote *asynchronous* Python HTTP and WebSocket clients for multiple crypto exchanges (Full ownership).

Centroxy, Bhubaneswar | *Software Engineer Intern* — June 2017 – Aug. 2017

- Developed Front-end and REST API client libraries for Python (Flask) application for Open source software Gluu.

Projects

Serialization Performance Optimisation | **(Systems Programming)** — May 2023 – Present
- Developing a new serialization library to improve application's end-to-end network communication performance by leveraging advanced Linux I/O techniques such as *scatter-gather, and zero-copy* in a microservice environemnt.

Distributed Key-Value Store | **(Distributed Systems)** — Jan. 2024 – Present
- Working on implementing a distributed key-value store on top of Raft using Go. Currently, implementing the *Raft consensus protocol* from scratch.

Kanva: Lock Free Search | (**Concurrent Data Structure**) — Jan. 2023 – May 2023
- Implemented a *strong consistent(Linearizable) lock-free range search* using a memory efficient constant-time snapshot algorithm for Kanva, a *Non-blocking Linearizable learned lock-free* search data structure.

Argolib: A Parallel Runtime | **(Parallel Programming)** — Sept. 2022 – Dec. 2022
- Developed a *Fork-Join style parallel programming library and runtime* for C/C++ programs using Argobots threading library. Experimented *multicore scalability* of different *work-stealing* algorithms. Implemented *trace and replay* mechanisms for minimizing runtime performance overheads. Also, implemented *dynamic concurrency throttling* for energy efficiency.

SafeC | **(Compiler)** — Sept. 2022 – Dec. 2022
- Implemented *data flow analysis* using *LLVM* for a subset of C programs to avoid NULL pointer access. Also, implemented a *conservative garbage collection* using the *mark-and-sweep* algorithm.

Publication

Learned Lock-free Search Data Structures [preprint]
Gaurav Bhardwaj, Bapi Chatterjee, Abhinav Sharma, Sathya Peri, and **Siddharth Nayak**
Under review at 50th International Conference on Very Large Databases (VLDB) - 2024

Relevant Courses

Compilers, Parallel Runtimes for Modern Processors, Concurrent and Learned Data Structures, Programmable Networking, Decision Procedures, Distributed Systems: Concepts and Design(ongoing), Machine Learning(ongoing)