Albert Cao

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Education

University of Michigan, *MSE in Computer Science* – GPA: 4/4   Aug 2025 – May 2026
- **Coursework:** Computer Networks, Compilers, Artificial Intelligence

University of Michigan, *BSE in Computer Science* – GPA: 3.66/4   Aug 2022 – May 2025
- **Coursework:** Operating Systems, Distributed Systems, Machine Learning, Web Systems, Computer Security, Computer Systems Architecture, Software Engineering, Data Structures and Algorithms, Theory of Computer Science, Linear Algebra

Experience

Software Engineer Intern, *Amazon AWS* – Redmond, WA   May 2025 – Aug 2025
- Created a Java-based FGAC Spark profiler for various EMR platforms, enabling data-driven performance tuning
- Utilized AWS CloudWatch with EMF logs for metrics collection and custom dashboards to identify performance bottlenecks

Research Assistant, *Aura AI* – Bellevue, WA   Mar 2025 – Present
- Mentored high school students on AI research projects focused on music visualization, guiding model design and development

Projects

Sharded Paxos Key/Value Service   Mar 2025
- Built distributed and sharded key-value stores in Go utilizing Paxos and primary-backup replication for robust fault tolerance
- Implemented dynamic shard reallocation and view-change protocols to ensure consistency during reconfig and server failures

Network File Server   Dec 2024
- Designed a hierarchical network file system that supports create, delete, read, and write requests, using upgradeable reader locks from Boost C++ library to provide optimal concurrency and ensure data consistency across multiple clients
- Implemented error handling techniques to ensure server resilience to malformed requests and unauthorized accesses

Virtual Memory Manager   Nov 2024
- Designed pager to provide virtual address space abstraction across multiple processes enabling efficient memory management
- Implemented fork()-like system call for address space creation and LRU-based clock algorithms for handling page evictions

Thread Library   Oct 2024
- Designed CPU, thread, mutex, and condition variable libraries for concurrent programming in multiprocessor environments
- Used RAII-programming techniques to enable/disable interrupts and acquire/release guard variable to ensure thread safety

Search Engine   Apr 2024
- Built scalable search engine in Python/React, using TF-IDF and PageRank to enhance the rankings/relevance of search results
- Wrote MapReduce programs to construct inverted index of web-crawled Wikipedia data for use in TF-IDF calculations

MapReduce Framework   Mar 2024
- Implemented MapReduce framework in Python with job scheduling, data partitioning, and fault tolerance mechanisms
- Used TCP to ensure reliable communication between manager and worker threads and UDP for heartbeat messages

Activities

Software Engineer, *Traders at Michigan* – Ann Arbor, MI   Nov 2023 – Present
- Taught new members core software concepts, mentoring them in algorithmic problem solving & interview preparation
- Designed and tested software in Python for quantitative trading games played in club-hosted competitions
- Learned quantitative trading problem solving techniques such as Markov's Chain, Kelly Criterion, and Bayes' Theorem

Technologies

Languages: C++, C, Java, Python, GoLang, Scala, SQL, JavaScript, HTML, CSS, MatLab, R
Libraries: React, JUnit, Flask, MatPlotLib, NumPy, PyTorch, Django
Developer Tools: Git, Docker, AWS, VSCode, IntelliJ, LLDB, Valgrind, NPM