Joe Tsai

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EDUCATION

Stanford University *Sep. 2023 - Jun. 2025 (Expected)*

M.S. in Computer Science *Stanford, CA*

- **GPA:** 4.30/4.30

National Taiwan University (NTU) *Sep. 2018 - Jun. 2022*

B.S. in Computer Science *Taipei, Taiwan*

- **GPA:** 4.28/4.30; **Rank:** 1/181; **Honors:** Phi Tau Phi (Honor for **top 1%** students)

WORK EXPERIENCE

Academia Sinica *Jun. 2022 - Dec. 2022*

Research Assistant *Taipei, Taiwan*

- Implemented an intermittent system operating with scarce energy supply on STM32 devices in C, overcoming low-level programming challenges such as interrupt handling, race conditions, and memory I/O.
- Established Bluetooth Low Energy communication and optimized parameters to support data exchange between multiple devices.
- Developed algorithms for optimal intermittent computation and data exchange, achieving 30% less latency than existing methods.
- Published and presented the research result at *IEEE ICC 2023 Workshop: Workshop on Green and Sustainable Networking.*

Synology *Jul. 2021 - Dec. 2021*

Software Engineer Intern, Development Infrastructure Team *New Taipei, Taiwan*

- Designed and implemented a mobile app CI/CD pipeline using GitLab CI, streamlining builds for 10+ iOS and Android apps.
- Defined a YAML-based configuration approach, eliminating manual script-writing and minimizing developer effort.
- Configured and set up LVM, Postfix, Samba, Docker images and containers for the build service on bare-metal servers.
- Rewrote legacy build scripts in PHP, Ruby, and Bash into reusable Python scripts to improve script maintainability.

Microsoft *Jul. 2020 - Jun. 2021*

Software Engineer Intern, Geocoding Team, AI Bing Department *Taipei, Taiwan*

- Increased the QPS (queries per second) of a query analysis tool for Bing Maps by ∼20% by adapting the asynchronous model in I/O intensive sections.
- Led the integration of a query parsing model and the query analysis tool to replace heuristic parsing rules, allowing the tool to analyze location queries of different countries.
- Designed a pipeline to collect geographical information from 500+ TB of logs in C# and SQL, and perform data cleaning and processing with Python to create machine learning datasets for geocoding models.

SELECTED PROJECTS

Byzantine Fault-tolerant RAID-like Filesystem — *C++, gRPC, FUSE*

- Designed and Implemented a distributed, RAID-like filesystem capable of tolerating up to $\lfloor \frac{n-1}{2} \rfloor$ Byzantine faults.
- Implemented integration with FUSE, allowing existing applications using ordinary I/O operations to work with the filesystem.

Pintos — *C*

- Implemented core operating system functionalities, including thread scheduling, synchronization mechanisms, virtual memory, and file system.
- Deepened understanding of the interaction between the kernel and user processes through the implementation of process management and system calls.

NetCut — *C++*

- Developed an ARP spoofing tool capable of scanning users and disrupting the Internet connection of targeted devices.
- Utilized socket programming and multi-threading to manipulate the Internet connections of multiple targets concurrently.

TECHNICAL SKILLS

- **Programming Languages:** (Proficient) C, C++, Python; (Fluent) Go, JavaScript
- **Tools and frameworks:** Linux, Docker, Git, CI/CD (GitHub, GitLab), PySpark, Pytorch