⌨ MASc Electrical and Computer Engineering
🏛 UWaterloo (Expected Jun. 2024, 93% GPA)
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Ben Zhang

(Some also call me "Chuan Tian")

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TL;DR

- Hands-on experience with autonomous vehicle compiler and runtime @ Tesla and MIT-PITT-RW
- Built a server cluster from bare-metal hardware @ WATonomous
- Previously Bachelor of Computer Science, AI Option @ UWaterloo (class of 2020).
- Received an "Outstanding" (highest) evaluation on the University of Waterloo's coop system during all work terms.
- Practical understanding of embedded systems and real-time programming obtained through building a real-time microkernel from scratch in CS 452 (Real-Time Programming, aka "Trains").

Serious Stuff

Autopilot Engineer (Intern) @ Tesla Inc.   May. 2022 - Aug. 2022
"Ben performed at a level commensurate with our best engineers."   Palo Alto, California

- Designed and implemented a directed acyclic graph (DAG) scheduling algorithm that generates solutions within 3% of optimal and runs 120x faster than the existing SAT-based implementation. This helped speed up the neural network (NN) deployment workflows from hours to 15 minutes.
- Sped up the trace extraction pipeline by 8x by optimizing data structure queries.
- Accelerated next-gen hardware bring-up by tightening the neural network deployment cycle.

Team Captain @ Waterloo Autonomous Racing, Controls Lead @ MIT-PITT-RW   Jul. 2020 - Dec. 2021
Autonomous vehicles for racing, with a focus on planning and control.   Waterloo, Ontario, Canada

- Integrated and improved upon a Nonlinear Model Predictive Path Following Controller.
- Set up the infrastructure for communicating with the simulator, racing line optimization, docker-based development environment, website, data pipeline, and the data visualization platform.
- The team placed 4th (out of 18 teams) in the 3rd mini-competition in Jan. 2021.

Compute Cluster and Path Planning @ WATonomous   Jan. 2020 - present
Member/Manager: Jan.-Aug. 2020, Advisor: Sep. 2020-present   Waterloo, Ontario, Canada

- Implemented efficient obstacle avoidance algorithms by generating trajectories in the Frenet frame.
- Implemented yaw-rate PID and Model Predictive Control algorithms.
- Built a server cluster from bare-metal hardware. Implemented provisioning pipelines using Ansible, Terraform, and custom scripts. Also deployed observability tools like Prometheus, Elastic and Sentry. Documentation website is available at https://cloud.watonomous.ca/.

Software Engineer (Intern) @ Apple Inc.   May 2019 - Aug. 2019
"He is a self-motivated, focused engineer who strives to look at problems in depth..."   Cupertino, California

- Implemented network bandwidth prediction infrastructure and bandwidth recording optimizations that improved the time to reach HD and UHD tiers by over 30% in Apple's HTTP Live Streaming video player.
- Created a Media Source Extensions conformance suite to streamline the certification process for external hardware.

Also previously interned at Hive.AI, Yahoo, Kik, and 500px   **May 2016 - Apr. 2019**

Languages & Frameworks

🏛 Experienced   ⚙ So-so   ⚗ Novice

🏛 C	🏛 C++
🏛 Docker	🏛 Python
🏛 Javascript	🏛 React
🏛 Node.js	⚙ ARM asm
⚙ OCaml	⚙ PHP
⚙ SQL	⚙ Java
⚙ Bash	⚗ Go
⚗ Nix	⚗ Swift

Not-So-Serious Stuff

Free Sidecar

- Enables Sidecar on Unsupported iPads and Macs running iPadOS 13 and macOS Catalina.
- Received 1.5k stars and 90K downloads on GitHub.

GitHub Action Mutex

- Brings mutual exclusion to GitHub Actions.
- Used by projects from Kong, RabbitMQ, Orchest, and Gruntwork

Waterloo Warriors Band

- Lead trumpeter
- Deputy Chief Centurion (Vice-president) and Technomancer (Webmaster)