MASc Electrical and Computer Engineering
University of Waterloo (Class of 2022)
(317) 820-4214

Ben Zhang

(Some also call me "Chuan Tian")

ben.zhang@uwaterloo.ca
benzhang.xyz
/ben-z

TL;DR

- Hands-on experience with autonomous vehicles from working with WATonomous (a student team in the AutoDrive challenge) and MIT-PITT-RW (collaboration between UWaterloo, MIT, UPitt, and RIT).
- 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 sped 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.
- Introduced Dockerized development environment to the team. This enabled everyone to work remotely during the pandemic.

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 1.4k stars and 70K downloads on GitHub.

Vocode (Hackathon Project)

- 100% voice-enabled, Javascript-based text editor. Powered by Nuance's Natural Language Understanding API.
- First place winner of the Nuance API prize at McHacks 2016.

Waterloo Warriors Band

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