Charles Zhang

(613) 600-2451
charles.y.zhang@uwaterloo.ca
www.charleszhang.ca
www.github.com/charlesyz

University of Waterloo | B. Computer Science 2023
4.0 GPA | President's Scholarship of Distinction

Summary of Qualifications

- Professional real time embedded C / C++ development experience
- Experience with autonomous vehicle path planning algorithms
- Strong front-end knowledge from industry experience and personal iOS / web projects
- **Programming:** C++, C, Python, Bash, Swift, Typescript, JavaScript, HTML, CSS, DXL, Scala
- **Technical**: Unix, ROS, Eigen, Angular, Bootstrap, Docker, Git, Jenkins, Jira, DOORS,

Work Experience

Cisco Systems Canada | Software Development co-op | Ottawa May 2019 – August 2019

- Created unit tests for Cisco ASR9000 edge routers, used by Verizon, Bell, Google Cloud for routing major internet traffic
  - Wrote 100s of testcases for Layer 3 MPLS, GRE packet forwarding using the C XTF framework
  - Improved test coverage by 35% (25% line, 40% branch) for over 50,000 lines of code
- Spearheaded model-based expected value generation to reconcile packet forwarding and data plane
- Improved Jenkins test infrastructure stability, reducing flaky testcases from 15% to < 1%
  - Implemented C shared state memory cleanup and a python automated re-try system
- Experience with embedded C, TCP-IP stack, Cisco CEF, networking protocols (BGP, GRE, MPLS, SRv6)

Ciena Networks | Software Automation co-op | Ottawa July 2018 – August 2018

- Automated migration of Ciena's requirements management database from IBM Rational DOORS to Jama using Python and DXL
- Updated Ciena's Budgeting Website's frontend using Angular 6, Angular Material, and TypeScript
- Created responsive web templates with Node.js, Bootstrap, CSS Flexbox, and Jasmine unit testing
- Gained experience with git, dev-ops, code reviews, software documentation

Waterloo Design Teams

Watonomous | Path Planning Manager | Waterloo January 2019 – Present

- Software manager in a 100-student project, converting a Chevy Bolt into a level 4 autonomous car for the GM SAE Autodrive Competition
- Currently implementing a local planner based on potential fields and model predictive control (MPC)
- Improved obstacle avoidance costmap efficiency by 80% using the C++ Eigen matrix library, triple shear rotation algorithm, optimized ray-tracing, and a singleton graphics cache
- Managing a team of 15 students implementing the global planner, local planner, feedback controller
- Designed a class hierarchy for occupiable objects using the factory method pattern

Projects

Article Generator iOS App July 2018 – January 2019

- Created an iOS app in Swift that generates style-mimicking text using a Recurrent Neural Network
- Used Python, Keras, Tensorflow to train the model, CoreML to integrate the model into the app
- Trained the model on Amazon Web Services using Docker Swarm
- Gained experience with web scraping, data collection, and data sanitization

Tetris Neural Network March 2018

- Developed a Neural Network from scratch that plays Tetris using a Genetic Algorithm in a week
- Built a Tetris game simulator with a standardized API to allow programmatic interaction
- Used Pygame for graphical display and NumPy for game-state representation and computation

EzJigsaw IOS App August 2017 – October 2017

- Built an iOS app that allows users to build customized Jigsaw games from their own images
  - Downloaded over 300 times in 6 different countries within the first month
- Used the SpriteKit graphics library to create the user interface
- Practiced the model-view-controller design pattern, project management, and version control

Arduino Development October 2016 – January 2017

- Made an autonomous maze-solving robot based on the Arduino Microcontroller
- Implemented a custom depth-first-search algorithm to map and solve a physical maze

Education

University of Waterloo – Waterloo, Ontario Expected April 2023

- 92% Cumulative GPA, Dean's Honours List, President's Scholarship of Distinction