Charles Chow

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SUMMARY

Software engineer focused on edge AI, computer vision, embedded systems, and real-time performance optimization. Built CUDA video pipelines, Zephyr/BLE firmware, ROS2 stacks, and telemetry systems across hardware/software boundaries.

SKILLS

Languages	C, C++, Python, Go, TypeScript, JavaScript, SQL
Computer Vision / AI	OpenCV, YOLOv8, CUDA, NumPy, PyTorch, TensorFlow
Embedded / Robotics	Zephyr, nRF52, BLE, GATT, SEGGER RTT, ROS2, Nav2, Gazebo, Linux
Systems	REST APIs, WebSockets, PostgreSQL, Redis, Docker, AWS, Git, CloudWatch

RELEVANT EXPERIENCE

Software Engineer Intern, NeuroLeap 05/2025 – 12/2025

- Developed embedded C firmware on Nordic nRF52840 for 20 Hz multi-channel BLE sensor streaming, enabling 5+ engineers to validate long-duration hardware sessions and debug device behavior.
- Tuned BLE connection intervals, MTU/data flow behavior, and runtime diagnostics, reducing packet loss from 9.2% to 1.8% during long-duration sensor sessions.
- Built a Node.js/WebSocket telemetry pipeline and optimized PostgreSQL to handle 1.2M records/hour across 8 channels and 500+ hours of test data.
- Reduced PostgreSQL p95 latency from 420ms to 110ms and improved ingestion throughput 2.8x through indexing, query planning, and connection management.

Software Engineer Intern, Infinite Option 05/2024 – 08/2024

- Reduced recurring production incidents by 32% and lowered MTTR from 45 to 18 minutes by standardizing Joi validation middleware across API endpoints.
- Implemented RBAC, JWT authentication, refresh token rotation, and Redis-backed session invalidation for a Node.js API supporting 2K daily logins.

SELECT PROJECTS

Witmotion BLE IMU Streaming — C, Zephyr, nRF52, BLE, SEGGER RTT, Python

- Built Zephyr firmware on an nRF52832 DK for BLE IMU streaming, including GATT discovery, notification handling, reconnect scanning, and real-time sensor packet decoding.
- Implemented 20-byte BLE packet reassembly, accel/gyro/orientation decoding, and CRC16 validation for sample integrity.
- Added SEGGER RTT and Python host logging to reset the target, capture timestamped data, verify CRCs, and debug packet loss, RSSI, and sample-rate stability.

ROS2 Mobile Robot Stack — ROS2, Nav2, Gazebo, Python, Linux

- Built a differential-drive ROS2 simulation stack with URDF/xacro modeling, Gazebo integration, stable tf2 transforms, and launch-based bring-up.
- Implemented Nav2 waypoint navigation and tuned costmaps, planner/controller parameters, and velocity limits for repeatable autonomous path execution.
- Added rosbag2 logging and ROS2 diagnostics with rqt_robot_monitor to replay failures, inspect system state, and isolate navigation issues.

Traffic Monitoring System — Python, OpenCV, YOLOv8, CUDA, NumPy

- Built an edge-vision pipeline with lane detection, perspective warping, YOLOv8 vehicle detection, FPS overlays, and video output processing.
- Implemented auto-calibrated lane detection with bird's-eye transforms, color masking, sliding-window search, RANSAC fitting, and temporal smoothing.
- Accelerated 1080p lane preprocessing with Numba CUDA, cutting latency 27.9ms to 10.4ms and raising throughput 35.8 FPS to 96.5 FPS.

EDUCATION

Purdue University | M.S. Electrical and Computer Engineering — In Progress

Northeastern University | M.S. Computer Science — May 2026

The Ohio State University | B.S. Mechanical Engineering — Dec 2020