DONGXUAN HE

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Education

Purdue University, West Lafayette, IN – M.S. in Robotics — Aug 2025 – Jan 2027 (expected)
Purdue University, West Lafayette, IN – B.S. in Computer Science — Aug 2022 – Aug 2025
Minor: Electrical & Computer Engineering | Dean's List | Teaching assistant: CS240 (Programming in C)

Experience

SmartMore Technology, Shenzhen | C++ Intern — May 2023 – Aug 2023

- Low-latency Trigger Path (C++) — Optimized **C++** serial-command and **SDK** workflows for scanner control, cutting trigger latency by ~20% across 20+ sites; profiled system bottlenecks using perf and improved I/O concurrency.
- Automated SDK Testing (Python, C++) — Designed a concurrent QA framework integrating C++ SDK APIs with **Python** tests; executed 120+ parallel test cases across 1D/2D code formats with 100% consistency pre-release.
- Q&A Intent Classification (Python, ML) — Built and evaluated an intent **classifier** using Logistic Regression and CNN on 10K+ labeled queries; CNN achieved 6.4% higher test accuracy than logistic baseline under 5-fold **CV**.

Hi-think Technology, Shenzhen | C++ Backend Development Intern — May 2024 – Aug 2024

- Realtime Ingestion (Epoll) — Developed event-driven ingestion service processing 4K+ updates/sec from weather feeds using **epoll** non-blocking sockets; reduced message latency by ~40% and stabilized throughput under burst traffic.
- Concurrent Pipeline (C++) — Implemented **lock-free** ring buffer and fixed thread pool for streaming anomaly detection over 300+ data channels; achieved 3× throughput under stress test while preserving deterministic timing.
- Streaming Alerts (gRPC, Protobuf) — Delivered high-frequency alert streams to dashboards via **gRPC** server-streaming with **Protobuf** serialization; cut end-to-end latency by ~30% and maintained reliability for 20K+ clients.

Research Projects

Visual SLAM for Robust Localization

- Reproduced **ORB-SLAM2** pipeline in C++ and validated performance on **KITTI/TUM** benchmark datasets.
- Designed experiments analyzing trajectory drift under noisy visual input and low-feature environments, assessing robustness to perturbations and environmental changes.
- Evaluated performance with **ATE/RPE** metrics, highlighting reproducibility and robustness under perturbations.

Multi-Agent RL & Sim2Real Transfer

- Multi-Agent Systems (**MARL**) — Built simulation environments for cooperative/competitive tasks using Duckietown; analyzed agent coordination stability under stochastic and partially observed dynamics.
- **Sim2Real** Transfer — Prototyped domain randomization and policy adaptation to reduce simulation–reality divergence; benchmarked robustness improvements under noise and delayed feedback.

Autonomous Flight Control System for Turbulence Stabilization

- Designed and assembled a fixed-wing UAV with embedded **control** hardware integrating **IMU**, GPS, and air-pressure sensors; built a multi-sensor **data pipeline** for real-time telemetry using complementary filtering and bias correction.
- Developed adaptive PID-based flight-control firmware in **C++**, implementing **feedback** tuning logic and safety constraints for stability under turbulence; iteratively refined control to minimize oscillation and overshoot by ~25%.
- Conducted repeated flight experiments across varying wind conditions, analyzed response variance in **Python**, and statistically validated improved stability and robustness through model-based evaluation of system dynamics.

Skills

Programming Languages: C++ (concurrency, performance optimization), Python (data analysis, ML pipelines), C, Java
Systems & Tools: Linux, SQL, Git, Docker, gRPC, Protocol Buffers, Thread Pools, Non-blocking I/O (epoll), Bash
ML & Data: PyTorch, TensorFlow, Scikit-Learn, NumPy, Pandas, CUDA, Cross-Validation, Statistical Modeling, Optimization (Convex, Gradient-based), R, MATLAB