Alfred Cueva

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EDUCATION

Georgia Institute of Technology **Aug. 2025 – May 2027**
MS in Robotics *Georgia, United States*
- Coursework: Deep Reinforcement Learning, Computer Vision, Vision-Language Models, Advanced Mobile Robotics

Seoul National University **Mar. 2020 – Feb. 2024**
BS in Mechanical Engineering (Robotics Concentration) | GPA: 9.12/10.0 *Seoul, South Korea*
- Coursework: Reinforcement Learning, Advanced Programming, Autonomous Navigation, Deep Learning, Linear Control

SKILLS

Languages: Python, C++, MATLAB, Julia
ML & Perception: PyTorch, YOLO, Vision-Language Models, Diffusion Models, Model Optimization
Robotics: ROS2, Gazebo, Isaac Gym/Sim/Lab, PyBullet, MuJoCo, Multi-Sensor Fusion (LiDAR/Camera/Radar)
Core Expertise: Autonomous Navigation, Real-Time Perception, End-to-End ML Pipelines, Model Deployment

WORK EXPERIENCE

Samsung **Mar. 2024 – Aug. 2025**
Robotics & ML Software Engineer *Seoul, South Korea*
- Led the deployment of a production **YOLOv5** perception system, achieving **92%** detection accuracy for mobile robots. Oversaw the full ML lifecycle, including dataset curation (10K+ labeled images), model development, and real-time on-device inference. **[Coverage]**
- Directed the development of an autonomous navigation stack for **KUKA** platforms using **RRT*** and **Hybrid A*** path planning with real-time obstacle avoidance, enabling safe operation in dynamic, cluttered environments.
- Implemented state-of-the-art models such as **DINO** and **NeRF** for high-fidelity image reconstruction, improving 3D scene understanding and sensor perception pipelines.
- Spearheaded precision control and **SLAM**-based localization software for a 7-DOF manipulator, reducing positioning error by **15%**; recognized with **$10,000** award in **[Smart Construction Challenge]**.
- Optimized model inference latency by **30%** through neural network pruning and quantization for embedded deployment.

Samsung **Jul. 2023 – Aug. 2023**
Engineering Intern *Seoul, South Korea*
- Built thermal anomaly detection system using CNNs for semiconductor facilities, achieving 40% efficiency gain through optimized architecture design and GPU acceleration.
- Implemented real-time human tracking with PixyCam for AGV collision avoidance in safety-critical environments.
- Benchmarked Isaac Sim for robotics simulation, optimizing GPU compute workloads for real-time control loops.

RESEARCH EXPERIENCE

Georgia Institute of Technology | LIDAR Lab | Prof. Ye Zhao **Aug. 2025 – Present**
- Lead development of multi-modal perception models for humanoid loco-manipulation using diffusion and Reinforcement Learning on large-scale robot interaction datasets with real-time inference constraints. *Under review for ICRA.*
- Developing vision-based motion planning combining generative diffusion with constrained optimization for safe manipulation in complex environments.

Seoul National University | DYROS Lab | Prof. Jaeheung Park **Dec. 2022 – Feb. 2024**
- Designed model-free RL + Bayesian Optimization framework for bipedal robot co-design, achieving 19% speed improvement and 22% cost reduction in sim-to-real transfer. *Outstanding Thesis Award (1/120).* **[Paper]**

PROJECTS

Multi-Modal Perception for Autonomous Maze Navigation | [GitHub] **Aug. 2025 – Dec. 2025**
- Built end-to-end autonomous navigation system fusing camera-based sign classification with LiDAR wall detection for real-time path planning. Implemented full ROS2 perception-planning-control pipeline achieving reliable long-horizon navigation.

Autonomous Racing with Vision-Based Control | [GitHub] **Aug. 2023 – Nov. 2023**
- Developed imitation learning pipeline from expert demonstrations, training vision-based policies for high-speed racing. Deployed on physical RC car with camera/LiDAR fusion for real-time perception and control at 30Hz.

Deep RL for Combinatorial Optimization | [GitHub] **Aug. 2024 – Sept. 2024**
- Designed custom RL environment and reward shaping for 2D bin packing, training neural policies achieving 80%+ packing efficiency under real-world constraints with sequential decision-making.