Alfred Cueva

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Research Interests

Optimal Control, Supervised Learning, Reinforcement Learning, Decision Making Under Uncertainties.

Education

Seoul National University — Mar. 2020 – Feb. 2024
*BS in Mechanical Engineering (Robotics Concentration), **GPA: 9.12/10.0*** — *Seoul, South Korea*

- Coursework: Reinforcement Learning (Graduate), Humanoid Robot Bipedal Walking and Control (Graduate), Sensor-Based Spatial Intelligence (Graduate), Deep Learning (Graduate), Mechanical System Modeling and Control

Professional Experience

Samsung C&T — Mar. 2024 – Present
Robotics Engineer — *Seoul, South Korea*

- Developed obstacle detection system using YOLOv5 for collaborative robots with 92% accuracy
- Engineered control software using Disturbance Observer, reducing steady-state error by 15% and enhancing precision of a 7-DOF manipulator.
- Implemented RRT-based motion planning for drill manipulator arms operating on cluttered environments.
- Designed human-machine interface for robotic operation, integrating ROS with visualization tools (Rviz and Gazebo).
- Implemented Hybrid A^* for motion planning in collaborative robots, building testing environments and ROS pipelines for integration and validation.

Samsung C&T — Jul. 2023 – Aug. 2023
Engineering Intern — *Seoul, South Korea*

- Engineered a deep learning algorithm for detecting heat anomalies in semiconductor sites, improving positional accuracy and heat map estimation efficiency by 40%.

Research Experience

Dynamic Robotics Systems Lab — Sep. 2023 – Feb. 2024
Undergraduate Thesis Research Intern - PI: Prof. Jaeheung Park — *Seoul, South Korea*

- Developed a Deep Reinforcement Learning framework to find optimal actuator designs for legged robots with weak actuation using PPO, Potential Based Rewards and Bayesian Optimization.
- Achieved a 19% improvement of the maximum forward velocity under curriculum learning and increased velocity tracking accuracy. Reduced cost of transportation by 22% while ensuring a symmetric gait for added mass scenarios.
- Awarded **Outstanding BS Thesis Presentation Award**

Dynamic Robotics Systems Lab — Dec. 2022 - Jul. 2023
Research Intern - PI: Prof. Jaeheung Park — *Seoul, South Korea*

- Designed novel reward functions for model-free reinforcement learning algorithms (PPO) and evaluated their impact on bipedal locomotion tasks, leading to significant performance enhancements in IsaacGym simulator trials.
- Optimized learning pipeline with parallel environments and hyper-parameter tuning, reducing convergence time.

Soft Robotics & Bionics Lab — Dec. 2021 – Mar. 2022
Research Intern - PI: Prof. Yong-Lae Park — *Seoul, South Korea*

- Designed a Capacitive Touch Sensing Grid as a force control interface for an Industrial Sewing Robot. Modeled force dynamics using Arduino and CoppeliaSim, improved sewing speed by 20%

Scholarships

Global Korea Scholarship. National winner, full funding for undergraduate studies — Mar. 2019 – Mar. 2024
Ministry of Education, Republic of Korea

COAR Scholarship. Full ride for IB Diploma Programme (0.2% admission rate) — Mar. 2016 – Feb. 2019
Ministry of Education, Peruvian Government

Awards & Honors

Smart Construction Challenge | $10,000 award for novel drilling robot for semiconductor sites   **Sep. 2024**
Ministry of Land, Infrastructure and Transport, Republic of Korea
Outstanding BS Thesis Presentation Award (1 out of 120 graduates)   **Dec. 2023**
Samsung C&T Global Intern (1 of 40 recipients nationwide)   **Jul. 2023**
Student Researcher Fellowship | $1,000 funding   **Jan. 2023**
Graduate School of Convergence and Technology, Seoul National University
Certificate of Appreciation (AI Tech Play) | Dean, College of Engineering   **Jul. 2021**

Extracurricular Activities

Peruvian-Korean Academic Association (ASAPEC)   **Mar. 2023 – Dec. 2023**
Founding Member   *Student Association*
- Led a team of 20 members to organize fraternity meetings and informative sessions for prospective students in STEM fields and higher education in Korea, attended by 100+ participants.

Sigma Intelligence Group   **Mar. 2020 – Mar. 2021**
Reviewer   *Club of Seoul National University*
- Assesed projects for the Creative Engineering Fair, evaluating topics such as LIDAR, PLC control, and PID-based path planning techniques.

OUTTA   **Mar. 2021 – Jul. 2021**
Organizer & Instructor   *Non-Profit for AI education*
- Organized 'The First Autonomous Driving Mini Car Coding and Contest' with *MIT Beaver Works*.

- Conducted Python programming workshops for 200+ underprivileged high school students, with 95% reporting improved confidence in coding.

- Led hands-on sessions for ROS and Gazebo, involving more than 30 participants.

Skills

- Languages: Python, C/ C++, MATLAB, Julia

- Frameworks: Pytorch, ROS, Git, MuJoCo, CoppeliaSim, IsaacGym, IsaacSim, PyBullet, OpenAI Gym, SB3

- Optimization: Gurobi, Eigen