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) *Seoul, South Korea*

- Coursework: Reinforcement Learning (Graduate), Humanoid Robot Bipedal Walking and Control (Graduate), Sensor-Based Spatial Intelligence (Graduate), Introduction to Robotics, 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).

Samsung C&T **Jul. 2023 – Aug. 2023**

Engineering Intern - Supervisor: Ph.D. Jun-ho Hyun *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-ride funding for undergraduate studies **Mar. 2019 – Mar. 2024**
- COAR Scholarship - Full ride for IB Diploma Programme (0.2% admission rate) **Mar. 2016 – Feb. 2019**

Awards & Honors

- Smart Construction Robotics Challenge: Awarded 10k USD for novel drilling robot for semiconductor sites **Sep. 2024**
- Outstanding BS Thesis Presentation Award (1 out of 120) **Dec. 2023**
- Samsung C&T Corporation Global Intern (1 of 40 recipients nationwide) **Jul. 2023**
- Student Researcher Fellowship: Awarded 1k USD funding for undergraduate research **Jan. 2023**
- Certificate of Appreciation (OUTTA): Conferred by the Dean of 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 *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