Jinwoo **Choi**

Ph.D. Student · Reinforcement Learning and Robotics

Seoul, South Korea

wlsdn9350@gmail.com | wlsdn9350.github.io | wlsdn9350 | LinkedIn

Research Overview

My research focuses on developing reinforcement learning algorithms for long-horizon decision-making. In particular, I study how agents can learn useful behavioral abstractions and leverage temporal structure in offline reinforcement learning to improve goal-directed decision-making. I have also contributed to research projects in robotic exploration, path planning, and autonomous driving, gaining experience in algorithm development and real-world testing with robotic and vehicle systems. Building on these experiences, I am interested in extending reinforcement learning methods to complex decision-making problems in robotics.

Research Areas

- **Reinforcement Learning:** Long-Horizon RL, Offline RL, Goal-Conditioned RL, Hierarchical RL, Temporal Abstraction
- **Robotics:** Robot Learning, Path Planning, Autonomous Exploration, SLAM
- **Autonomous Driving:** Decision-Making and Planning, Interaction-Aware Decision-Making, Vehicle Localization

Education

Seoul National University — *Seoul, South Korea*

Ph.D. Student, Electrical and Computer Engineering — *Mar 2018 – Present*

Advisor: Prof. Seung-Woo Seo. Expected graduation: February 2027.

Hanyang University — *Seoul, South Korea*

B.S., Electronic Engineering — *Mar 2012 – Feb 2018*

Two-year leave of absence for military service: Feb 2013 – Feb 2015

Publications

1. **Jinwoo Choi**, Yeonkyu Lee, Jung-Taak Kim, Jisung Bae, and Seung-Woo Seo.
   "FPAS: Frontier-Based Path Planning with Adaptive Sampling for Large-Scale Unknown Environments."
   IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2026.
2. **Jinwoo Choi**, Sang-Hyun Lee, and Seung-Woo Seo.
   "Chain-of-Goals Hierarchical Policy for Long-Horizon Offline Goal-Conditioned RL."
   International Conference on Machine Learning (ICML), 2026.
3. Jisung Bae, Hwichang Kim, **Jinwoo Choi**, Ji-Hoon Hwang, Dong-Wook Kim, Kun Park, and Seung-Woo Seo.
   "ESP-SLAM: Efficient Submap Partitioning for Large-Scale 3D Gaussian Splatting-Based SLAM."
   IEEE Robotics and Automation Letters (RA-L), 2026.
4. **Jinwoo Choi** and Seung-Woo Seo.
   "Dynamic Contrastive Skill Learning with State-Transition Based Skill Clustering and Dynamic Length Adjustment."
   International Conference on Learning Representations (ICLR), 2025.
5. Se-Wook Yoo, Chan Kim, **Jinwoo Choi**, Seong-Woo Kim, and Seung-Woo Seo.
   "GIN: Graph-based interaction-aware constraint policy optimization for autonomous driving."
   IEEE Robotics and Automation Letters (RA-L), 2022.
6. Soomok Lee, **Jinwoo Choi**, and Seung-Woo Seo.
   "Ego-lane index-aware vehicular localisation using the DeepRoad Network for urban environments."
   IET Intelligent Transport Systems, 2021.

Research Project Experience

Development of Strong Autonomous Intelligence Technology for MUMT-based Mission Execution in Rough Terrains

VILAB, Seoul National University

Supported by Agency for Defense Development (ADD) — *Jan 2022 – Present*

- Served as Project Manager for the overall research project (Jan 2022 – Jun 2023).
- Led global path planning research, developing frontier-guided exploration, replanning, and openness-aware adaptive graph sampling (FPAS, IROS 2026).
- Conducted real-world testing of the autonomous exploration system using a Clearpath Husky-based mobile robot (VISKY).
- **Keywords:** Autonomous Exploration, Global Path Planning, Mobile Robotics, C++, ROS

SNUVI: Autonomous Vehicle System for Urban Driving at K-City

VILAB, Seoul National University

Laboratory-Led Project — *Jul 2020 – Feb 2021*

- Served as Team Leader for the overall SNUVI autonomous driving project.
- Developed local path planning algorithms within an integrated autonomous-driving system involving perception, localization, and decision-making modules.
- Participated in real-vehicle testing and system validation at K-City, a national autonomous driving testbed in South Korea.
- **Keywords:** Autonomous Driving, Local Path Planning, System Integration, Real-Vehicle Testing, C++, ROS

Testing Methodologies for Urban Autonomous Driving Algorithms

VILAB, Seoul National University

Supported by ThorDrive — *Jan 2020 – Sep 2020*

- Participated in research on simulation-based testing methodologies for urban autonomous-driving algorithms.
- The research scope included virtual sensor and vehicle modeling, challenging driving scenarios, and safety evaluation criteria.
- **Keywords:** Driving Simulation, Scenario-Based Testing, Virtual Sensors, Safety Evaluation, Python, ROS, CARLA

Human-Level Driving Intelligence for Autonomous Unmanned Vehicles

VILAB, Seoul National University

Supported by Ministry of Science and ICT (MSIT) — *Mar 2018 – Oct 2022*

- Participated in research on learning-based driving intelligence for autonomous unmanned vehicles in complex driving environments.
- The research program addressed integrated perception and cooperative decision-making, including interactions among multiple agents.
- **Keywords:** Autonomous Driving, Integrated Perception, Cooperative Decision-Making, Multi-Agent Systems, C++, ROS

Work Experience

ThorDrive

Seoul, South Korea

Research Intern | High-Level Decision-Making — *Aug 2021 – Oct 2021*

- Developed a hybrid rule-based and reinforcement learning-based high-level decision-making module for autonomous driving, focusing on candidate-path selection for lane changes and detours.
- Built CARLA scenarios involving illegally parked vehicles to investigate RL-based candidate-path selection.

Teaching Experience

Teaching Assistant Interdisciplinary Innovative Capstone Design, Seoul National University (Spring 2019).

Teaching Assistant SNU in Silicon Valley Program, Seoul National University (jointly hosted with Stanford University; Summer 2019).

Academic Service

Conference Reviewer ICML (2026), NeurIPS (2025), ICLR (2025, 2026), ICRA (2025), IROS (2023, 2026).

Journal Reviewer IEEE Robotics and Automation Letters (RA-L, 2022).

Honors & Awards

Excellence Award 2017 Capstone Design Fair, Hanyang University. Project: Traffic Accident Reduction System Using Eye-Tracking Technology.

Technical Skills

Programming Python, C++, C.

Machine Learning Frameworks PyTorch, JAX, TensorFlow.

Robotics & Simulation ROS, CARLA.

Languages Korean (native), English (proficient).