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Seungjae Baek

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Education

Carnegie Mellon University Pittsburgh, PA
Visiting graduate student in School of Computer Science Aug. 2024 - Feb. 2025
Collaborator: Sebastian Scherer

Ulsan National Institute of Science and Technology Ulsan, Korea
M.S. in Artificial Intelligence Aug. 2023 - Feb. 2026 (exp.)
Advisor: Jeong hwan Jeon
Cumulative GPA: 4.0/4.0[1]
B.S. in Electrical Engineering Feb. 2017 - Aug. 2023[2]

Cumulative GPA: 3.51/4.0[1], Major GPA: 3.63/4.0[1], Advanced GPA: 3.76/4.0[1]
Graduated Cum Laude
B.S. Thesis: *Applying VDN and QMIX in SMAC: A Multi-Agent Reinforcement Learning study*

[1] *GPA converted from a 4.3 scale to a 4.0 scale for standardization.*
[2] *Including mandatory military service, Republic of Korea Army, Feb. 2020 - Sep. 2021*

Research Interests

Planning	Informative Path Planning (IPP), Motion Planning
Reinforcement Learning	Model-Free Learning, Multi-Agent Reinforcement Learning (MARL)
Autonomous System	Unmanned Aerial Vehicles (UAVs), Autonomous Vehicles (AVs)

Publications

Journals

1. Kangbeen Lee*, **Seungjae Baek***, Philjoon Jung, Tae-Hyun Kim, Jeong hwan Jeon†
Cooperative Multi-Agent Reinforcement Learning for Multiple Anti-Aircraft Target Surveillance
Journal of Institute of Control, Robotics and Systems, 30(6), 587-595, 10.5302/J.ICROS.2024.24.0009

Preprints

1. **Seungjae Baek***, Brady Moon*, Seungchan Kim*, Muqing Cao, Cherie Ho, Sebastian Scherer, Jeong hwan Jeon
PIPE Planner: Pathwise Information Gain with Map Predictions for Large Indoor Exploration
Submitted to 2025 International Conference on Intelligent Robots and System (IROS) arXiv:2503.07504

Manuscripts in preparation

1. Jungeun Lee*, **Seungjae Baek***, Jeong hwan Jeon
Deep Reinforcement Learning based Autonomous Ride-Sharing System

* *Equal contributions*

Research Experiences

Carnegie Mellon University Pittsburgh, PA
AirLab
Visiting Researcher Aug. 2024 - Feb. 2025

- Developed an algorithm which optimize indoor exploration via path-wise information gain from predicted global maps
- Participating AirStack, a project for end-to-end multi-drone 3D exploration simulation

Ulsan National Institute of Science and Technology Ulsan, Korea
Robotics & Mobility Lab
Graduate Research Assistant Aug. 2023 - Present

- Developed multi-agent reinforcement learning algorithms for cooperative control of UAVs
- Conducting experiments and simulations for multi-objective ride-sharing RL algorithms with Python

Undergraduate Research Assistant Jul. 2022 - Aug. 2023

- Adapted CTDE (Centralized Training Decentralized Execution) MARL method in video game simulations
- Developed and conducted Python experiments using the CARLA AV simulator

Teaching & Working Experiences

Ulsan National Institute of Science and Technology Ulsan, Korea
ITP117: Introduction to AI Programming II, Head Teaching Assistant Feb. 2024 - Jul. 2024

- Assisted in teaching a course with 120 students alongside 4 other teaching assistants
- Lectured on MLP, CNN and RNN using Tensorflow and Pytorch in English

EEE351: Automatic Control, Student Lecturer of AFEE Aug. 2022 - Dec. 2022

- AFEE is an official student organization under the Electrical Engineering at UNIST
- Organized and facilitated group study sessions for both domestic and international students

Clinomics Inc. Ulsan, Korea
Project Based Learning (PBL) Teaching Assistant Feb. 2023 - Jul. 2023

- Supported a project collaborating with office workers to integrate AI solutions into their workflows
- Using AnoGAN and VAE to generate hypothetical disease-associated DNA methylation data

Achievements

Honors

- **AI Excellence Global Innovative Leader Education Fellowship (total $40,000)** Aug. 2024 - Feb. 2025
  Sogang University & Ministry of Science and ICT, The Government of the Republic of Korea
- **Government-funded Graduate Scholarship (Full-funded)** Aug. 2023 - Present
  Ministry of Science and ICT, The Government of the Republic of Korea
- **UNIST Academic Performance Scholarship (4-Year Full-funded)** Feb. 2017 - Aug. 2023
  Ulsan National Institute of Science and Technology

Awards

- **Undergraduate Research Excellent Poster Session Award** Jul. 2023
  Department of Electrical Engineering, Ulsan National Institute of Science and Technology

Skills & Services

Languages

· **Korean**: Native

· **English**: Advanced (TOEFL: 106 of 120, Reading: 28, Listening: 29, Speaking: 24, Writing: 25)

Programming Languages: C++, Python

Software and Tools: MATLAB, ROS, Git, Docker, CARLA, SUMO, NVIDIA Isaac-sim, PyTorch, Tensorflow

Reviewer: *IROS* (2025)