Gunmin Lee

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Research interest

- Imitation learning based methods using different qualities of data.

- Imitation learning based autonomous driving controller.

- Imitation learning with safety constraints on autonomous driving.

- Application of RLHF methods in autonomous driving.

Education

Mar. 2019 - Present	**Ph.D in Electrical and Computer Engineering** Seoul National University, 1, Gwanak-ro, Gwanak-gu, Seoul, Republic of Korea -Adviser: Prof. Songhwai Oh
Mar. 2015 - Feb. 2019	**B.S. in Electrical and Computer Engineering** Seoul National University, 1, Gwanak-ro, Gwanak-gu, Seoul, Republic of Korea

Publications

International Journals

- Taeoh Ha, Jeongwoo Oh, **Gunmin Lee**, Jaeseok Heo, Do Hyung Kim, Byungkyu Park, Chang-Gun Lee, and Songhwai Oh, "RIANet++: Road Graph and Image Attention Networks for Robust Urban Autonomous Driving under Road Changes," IEEE Robotics and Automation Letters, vol. 8, no. 11, pp. 7815-7822, Nov. 2023.

International Conference

- Hyeokjin Kwon, **Gunmin Lee**, Junseo Lee, and Songhwai Oh "Safe CoR: A Dual-Expert Approach to Integrating Imitation Learning and Safe Reinforcement Learning Using Constraint Rewards," in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Oct. 2024.

- Hojun Chung, Jeongwoo Oh, Jaeseok Heo, **Gunmin Lee**, and Songhwai Oh, "MAC-ID: Multi-Agent Reinforcement Learning with Local Coordination for Individual Diversity," in Proc. of the IEEE International Conference on Robotics and Automation (ICRA), May 2024.

- Minyoung Hwang, **Gunmin Lee**, Hogun Kee, Chan Woo Kim, Kyungjae Lee, and Songhwai Oh, "Sequential Preference Ranking for Efficient Reinforcement Learning from Human Feedback," in Proc. of Neural Information Processing Systems (NeurIPS), Dec. 2023.

- Junseo Lee, Jaeseok Heo, Dohyeong Kim, **Gunmin Lee**, and Songhwai Oh, "Dual Variable Actor-Critic for Adaptive Safe Reinforcement Learning," in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Oct. 2023.

- Jeongwoo Oh, Jaeseok Heo, Junseo Lee, **Gunmin Lee**, Minjae Kang, Jeongho Park, and Songhwai Oh, "SCAN: Socially-Aware Navigation Using Monte Carlo Tree Search," in Proc of the IEEE International Conference on Robotics and Automation (ICRA), May 2023.

- **Gunmin Lee**, Wooseok Oh, Jeongwoo Oh, Seungyoun Shin, Dohyeong Kim, Jaeyeon Jeong, Sungjoon Choi, and Songhwai Oh "Semi-Supervised Imitation Learning with Mixed Qualities of Demonstrations for Autonomous Driving," in Proc. of the International Conference on Control, Automation and Systems (ICCAS), Nov. 2022.

- Jeongwoo Oh*, **Gunmin Lee***, Jeongeun Park, Wooseok Oh, Jaeseok Heo, Hojun Chung, Do Hyung Kim, Byungkyu Park, Chang-Gun Lee, Sungjoon Choi, and Songhwai Oh, "Towards Defensive Autonomous Driving: Collecting and Probing Driving Demonstrations of Mixed Qualities," in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Oct. 2022.

- Timothy Ha, Jeongwoo Oh, Hojun Chung, **Gunmin Lee**, and Songhwai Oh, "RIANet: Road Graph and Image Attention Network for Urban Autonomous Driving," in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Oct. 2022.

- Timothy Ha, **Gunmin Lee**, Dohyeong Kim, and Songhwai Oh, "Road Graphical Neural Networks for Autonomous Roundabout Driving," in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Nov 2021.

- **Gunmin Lee***, Dohyeong Kim*, Wooseok Oh, Kyungjae Lee, and Songhwai Oh, "MixGAIL: Autonomous Driving Using Demonstrations with Mixed Qualities," in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Oct. 2020.

- Kyunghoon Cho, Timothy Ha, **Gunmin Lee**, and Songhwai Oh, "Deep Predictive Autonomous Driving Using Multi-Agent Joint Trajectory Prediction and Traffic Rules," in Proc. of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Nov. 2019. [Software]

*: equal contribution

Research Project

- Robot Learning: Efficient, Safe, and Socially-Acceptable Machine Learning (2019-Present)
  - Funded by Ministry of Science and ICT (MSIT)

- Robot Learning from Demonstrations with Mixed Qualities (2019-2022)
  - Funded by Ministry of Science and ICT (MSIT)

- A Study on Reinforcement Learning for Self-Driving Vehicle Steering/Braking Control (2020)
  - Funded by Hyundai Mobis

- General-Purpose Deep Reinforcement Learning Using Metaverse for Real World Applications (2022-Present)
  - Funded by Ministry of Science and ICT (MSIT)

- Development integrated control system for multimobility and service demonstration (2023-Present)
  - Funded by Ministry of Trade, Industry and Energy (MOTIE)

Experiences

- Technical Research Personnel for Korean Army   (2022 - Present)

Exceptional Experiences

- Alumni Association President for Dankook University High School & Seoul National University (2019 - 2023)

- Lab Captain for Robot Learning Laboratory of Seoul National University (Aug. 2021 - Jul. 2022)

- Studied abroad in Canada (Jan. 2007 - Aug. 2008)

Hardware/Software Skills

- **Programming:** Python, ROS, Git, Docker, Pytorch
- **Tools:** Autonomous Car, Vicon, LaTeX, AWS

Teaching Experience

- Introduction to Intelligent Systems   Fall 2019
- Introduction to Electronic Circuits and Laboratory   Spring 2017

References

- Google Scholar   https://scholar.google.com/citations?hl=ko&user=s07bJKcAAAAJ
- Linkedin   https://www.linkedin.com/in/gunmin-lee-1166071a9/
- Openreview   https://openreview.net/profile?id= Gunmin_Lee1
- IEEE authors   https://ieeexplore.ieee.org/author/37087323658

Language Skills

- Korean: Native
- English: Bilingual (TOEIC 960)
- Japanese: Intermediate (N2)