Obin Kwon

Contact Information

Postdoc in Kinetic Intelligent Machine LAB (KIMLAB),
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Research Area

Embodied AI, **Robot Learning**, **Perception for Robots**
- Scene Representation for Robot Policy
- Decision Making, Imitation Learning, Reinforcement learning
- Visual Localization and Mapping

Skills

Programming Language: Python, C++, MATLAB
Software: ROS, PyTorch, TensorFlow, OpenCV

Experience

KIMLAB, Postdoctoral Research Associate. July. 2024 - Now
- Champaign, Illinois, United States
- Advisor: Prof. Joohyung Kim (joohyung@illinois.edu)

Sequor Robotics, AI/Robotics Researcher. Oct. 2023 - June. 2024
- Seoul, Korea
- Developed a visual localization system in warehouses.

NAVER LABS, Research Intern. Jan. 2023 - July. 2023
- Seongnam, Korea
- Developed a visual localization system based on simple wayfinding maps.

Education

M.S.&Ph.D. in Electrical and Computer Engineering 2018 - 2024
- Seoul National University, Seoul, Korea
- Advisor: Prof. Songhwai Oh (songhwai@snu.ac.kr)
- Dissertation Title: *"Scene Representation Learning for Visual Navigation"* (Distinguished Dissertation Award)

B.S. in Electrical and Computer Engineering 2014 - 2018
- Seoul National University, Seoul, Korea

Publications

Jeongho Park, **Obin Kwon**, and Songhwai Oh, "Spatially-Conditional 3D Furniture Generation Model for Indoor Scene Generation," *IEEE International Conference on Control, Automation and Systems (ICCAS)*, Oct. 2024.
Keywords: Scene Generation, 3D Model Generation

Minsoo Kim, **Obin Kwon**, Howoong Jun, and Songhwai Oh, "RNR-Nav: A Real-World Visual Navigation System Using Renderable Neural Radiance Maps," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Oct. 2024. (Oral Presentation, Accepted)
Keywords: Localization and Mapping, Neural Rendering, Visual Navigation, 3D Reconstruction

Obin Kwon, Dongki Jung, Youngji Kim, Soohyun Ryu, Suyong Yeon, Songhwai Oh, Donghwan Lee, "WayIL: Image-based Indoor Localization with Wayfinding Maps", *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.
Keywords: Visual Localization, Tracking & State Estimation, BEV-map

Jeongho Park, **Obin Kwon** and Songhwai Oh "Attention-Based Randomized Ensemble Multi-Agent Q-Learning," *IEEE International Conference on Control, Automation and Systems (ICCAS)*, Oct. 2023.
Keywords: Multi-Agent Reinforcement Learning, Ensemble Learning

Obin Kwon, Jeongho Park, and Songhwai Oh, "Renderable Neural Radiance Map for Visual Navigation," *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, Jun. 2023. (Highlight, Acceptance Rate: 2.5%)
Keywords: Localization and Mapping, Neural Rendering, Visual Navigation, 3D Reconstruction

Nuri Kim, **Obin Kwon**, Hwiyeon Yoo, Yunho Choi, Jeongho Park, and Songhwai Oh, "Topological Semantic Graph Memory for Image-Goal Navigation", *Conference on Robot Learning (CoRL)*, Dec. 2022. (Oral, Acceptance Rate: 6.5%)
Keywords: Semantic Scene Graph, Object Detection, Graph-based Localization and Navigation.

Hyemin Ahn*, **Obin Kwon***, Kyungdo Kim, Jaeyeon Jeong, Howoong Jun, Hongjung Lee, Dongheui Lee, and Songhwai Oh, "Visually Grounding Language Instruction forHistory-Dependent Manipulation", *IEEE International Conference on Robotics and Automation (ICRA)*, May. 2022. (∗ equal contribution)
Keywords: Language Instruction Following, Manipulation Robot

Obin Kwon, Nuri Kim, Yunho Choi, Hwiyeon Yoo, Jeongho Park, and Songhwai Oh, "Visual Graph Memory with Unsupervised Representation for Visual Navigation", *IEEE/CVF International Conference on Computer Vision(ICCV)*, Oct. 2021.
Keywords: Visual Scene Graph, Graph-based Localization and Navigation, Imitation Learning, Reinforcement Learning

Obin Kwon and Songhwai Oh, "Image-Goal Navigation Algorithm using Viewpoint Estimation," *IEEE International Conference on Control, Automation and Systems (ICCAS)*, Oct. 2021.
Keywords: Visual Navigation, Reinforcement Learning, Representation Learning

Minyoung Hwang, **Obin Kwon**, and Songhwai Oh, "Geometric Understanding of Reward Function in Multi-Agent Visual Exploration," *IEEE International Conference on Control, Automation and Systems (ICCAS)*, Oct. 2021.
Keywords: Multi-Agent Reinforcement Learning, Exploration.

Obin Kwon and Songhwai Oh, "Learning to Use Topological Memory for Visual Navigation", *IEEE International Conference on Control, Automation and Systems (ICCAS)*, Oct. 2020.
Keywords: Visual Scene Graph, Imitation Learning, Reinforcement Learning

Honors

Distinguished Dissertation Award — August 2024
- Electrical and Computer Engineering, Seoul National University

Lecture & Research Scholarship Spring 2024
- Seoul National University

Brain Korea 21 Plus Scholarship Fall 2020-Spring 2022, Fall 2023
- Seoul National University

Kim Jeong-sik Special Scholarship Spring 2015 - Fall 2017.
- Kwanak Corporation, SNU Electrical and Compucter Scholarship Foundation
- Full tuition + α

Merit-based University Admission Scholarship Spring 2014
- Yongin City Scholarship Foundation

Research Experiences

Superhuman Multimodal Sensing for Manipulation, 2024 - Now
- Funded by Toyota Research Institute

Robot Learning: Efficient, Safe, and Socially-Acceptable Machine Learning, 2019 - 2024
- Funded by Ministry of Science and ICT (MSIT), Korea

AI Technology for Guidance of Mobile Robots with Uncertain Maps, 2019 - 2023
- Funded by Ministry of Science and ICT (MSIT), Korea

Autonomous Navigation Multi-Agent Deep Reinforcement Learning, 2020 - 2021
- Funded by Hyundai Autoever

Teaching Experiences

Teaching Assistant @ Seoul National University
- Deep Reinforcement Learning (Topics in Control and Automation) Spring 2021
- Theory and Lab of IoT, AI, and Big Data Fall 2019
- Introduction to Intelligent Systems Fall 2018

Professional Services

Reviewer
- IEEE Robotics Science and Systems.
- IEEE Robotics & Automation Letters.
- IEEE Transactions on Robotics.
- IEEE Transactions on Pattern Analysis and Machine Intelligence.
- IEEE Transactions on Automation Science and Engineering.
- IEEE International Conference on Intelligent Robots and Systems.
- International Conference on Ubiquitous Robots

Talk
- Invited tech talk at NAVER, Feb, 2022.

References

Prof. Joohyung Kim
- Associate Professor at Department of Electrical and Computer Engineering, University of Illinois Urbana-Champaign (UIUC).
- Email: joohyung@illinois.edu

Prof. Songhwai Oh
- Professor at Department of Electrical and Computer Engineering, Seoul National University (SNU).
- Email: songhwai@snu.ac.kr

Prof. Hyemin Ahn
- Assistant Professor at Artificial Intelligence Graduate School (AIGS), Ulsan National Institute of Science and Technology(UNIST)
- Email: hyemin.ahn@unist.ac.kr

Prof. Sungjoon Choi
- Assistant Professor at Department of Artificial Intelligence, Korea University
- Email: sungjoon-choi@korea.ac.kr