Hwiyeon Yoo

CONTACT INFORMATION

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RESEARCH INTERESTS

Embodied Navigation, Semantic Planning, Robot Learning, Vision-Language-Action (VLA), Key Information Extraction, Anomaly Detection

EXPERIENCE

Machine Learning Researcher, Boeing AI Mar. 2024 - Present
- Developing OCR-based key information extraction and document understanding solution for aircraft manufacturing automation
- Developing vision-based inspection solutions for aircraft manufacturing

EDUCATION

Ph.D. in Electrical and Computer Engineering Mar. 2017 - Feb. 2024
- Robot Learning Laboratory, Seoul National University, Seoul, Korea
  - Advisor: Prof. Songhwai Oh
- Thesis: Efficient and Effective Visual Context-Based Topological Representations for Embodied Agent Navigation

B.S. in Electrical and Computer Engineering Mar. 2012 - Feb. 2017
- Seoul National University, Seoul, Korea

INTERNATIONAL JOURNAL

Hwiyeon Yoo, Yunho Choi, Jeongho Park, and Songhwai Oh, "Commonsense-Aware Object Value Graph for Object Goal Navigation," *IEEE Robotics and Automation Letters (RA-L)*, 2024.

Wooseok Oh, **Hwiyeon Yoo**, Timothy Ha, and Songhwai Oh, "Local Selective Vision Transformer for Depth Estimation Using a Compound Eye Camera," *Pattern Recognition Letters*, 2023.

Hwiyeon Yoo, Geonho Cha, and Songhwai Oh,"Deep Ego-Motion Classifiers for Compound Eye Cameras," *Sensors*, vol. 19, no. 23, Dec. 2019.

INTERNATIONAL CONFERENCE

Hwiyeon Yoo, Yunho Choi, Jeongho Park, and Songhwai Oh, "Commonsense-Aware Object Value Graph for Object Goal Navigation," *40th Anniversary of the IEEE Conference on Robotics and Automation (ICRA@40)*, Sep. 2024.

Nuri Kim, Obin Kwon, **Hwiyeon Yoo**, Yunho Choi, Jeongho Park, and Songhwai Oh, "Topological Semantic Graph Memory for Image-Goal Navigation," in *Proc of the Conference on Robot Learning (CoRL)*, Dec. 2022. (Oral Presentation, Acceptance Rate: 6.5%)

Obin Kwon, Nuri Kim, Yunho Choi, **Hwiyeon Yoo**, Jeongho Park, and Songhwai Oh, "Visual Graph Memory with Unsupervised Representation for Visual Navigation," in *Proc. of the International Conference on Computer Vision (ICCV)*, Oct. 2021.

Hwiyeon Yoo, Jungho Yi, Jong Mo Seo, and Songhwai Oh, "Actualization of Deep Ego-motion Classification on Miniaturized Octagonal Compound Eye Camera," in *Proc. of the International Conference on Control, Automation and Systems (ICCAS)*, Oct. 2021. (Best Poster Paper Award Winner)

Hwiyeon Yoo and Songhwai Oh, "Localizability-based Topological Local Object Occupancy Map for Homing Navigation," in *Proc. of the International Conference on Ubiquitous Robots*, Jul. 2021.

Hwiyeon Yoo, Nuri Kim, Jeongho Park, and Songhwai Oh, "Path-Following Navigation Network Using Sparse Visual Memory," in *Proc. of the International Conference on Control, Automation and Systems (ICCAS)*, Oct. 2020.

Hyemin Ahn, Timothy Ha*, Yunho Choi*, **Hwiyeon Yoo***, and Songhwai Oh, "Text2Action: Generative Adversarial Synthesis from Language to Action", in *Proc. of the IEEE International Conference on Robotics and Automation (ICRA)*, May 2018. (* equally contributed)

See full list at *https://hwiyeon.github.io*

Honors

Awards and Scholarships

- Best Poster Paper Award Winner, International Conference on Control, Automation and Systems (ICCAS) 2021
- Brain Korea 21 Plus Scholarship, Seoul National University 2020 - 2021

Research Experience

Development of AI/ML-Based Solutions for Aircraft Manufacturing Automation and Inspection at Boeing

- Development of visual key information extraction models and document understanding solutions based on OCR and VLM.
- Development of anomaly detection algorithms for visual inspection.

Mar. 2024 -

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

- Implementation of a vision-based object goal navigation algorithm for embodied agents in real robot navigation.

2023 - Feb. 2024

AI Technology for Guidance of a Mobile Robot to its Goal with Uncertain Maps in Indoor/Outdoor Environments - Ministry of Science and ICT (MSIT)

- Development of a vision-based path following and homing navigation algorithm for embodied mobile robots with building semantic map.
- Development of a vision-based image goal and object goal navigation algorithm for unknown environments for embodied mobile robots using semantic graph memory.
- Deployment of the navigation algorithms on a real mobile robot - Clearpath Jackal.

2019 - 2023

Realistic 4D Reconstruction of Dynamic Objects - Ministry of Science, ICT, and Future Planning (MSIT)

- Development of a 3D point cloud matching algorithm.
- Development of a 3D human motion reconstruction algorithm by using human part segmentation and tracking.

2017 - 2019

Skills

Computer Skills

- Python, Pytorch, C++/C, ROS

Language Skills

- Korean, English