Alvin Jinsung Choi

Nationality: United States of America / Republic of Korea (Dual Citizenship)
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Education

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2024 – Present
Master of Science in Electrical Engineering *Republic of Korea*

- Research topic: 3D Computer Vision, 3D Scene Understanding, Embodied AI
- Advisor: Prof. Hyun Myung
- GPA: 4.15 / 4.3

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2017 – Feb. 2024
Bachelor of Science in Electrical Engineering *Republic of Korea*

- GPA: 3.56 / 4.3

Research Experiences

Master Research Assistant, Urban Robotics Lab Mar. 2024 – Present
KAIST *Republic of Korea*

- Advisor: Prof. Hyun Myung (`https://urobot.kaist.ac.kr/`)
- Developed a 3D neural surface reconstruction framework for the **Robot Experience** project, leveraging uncertainty-aware geometry from posed RGB images. Reconstructed real-world environments and integrated them into a robot learning pipeline for hyper-realistic training. (*3D Reconstruction, NeRF, Neural Surface Reconstruction*)
- Designed a multi-robot **Neural SLAM** system using 3D Gaussian Splatting for map representation in dynamic environments. Built mapping, localization, and loop-closure modules based on 3DGS. (*3D Gaussian Splatting, Multi-robot SLAM*)
- Worked on the **Vision-Language-Autonomy** project, investigating how vision-language models support embodied decision-making. Developed an object-goal navigation framework and integrated object detection, 3D scene graph generation, and visual grounding to enable robust embodied autonomy. (*Vision-Language Models, Embodied AI, Visual Grounding, Object-Goal Navigation*)

Undergraduate Research Intern, Urban Robotics Lab Mar. 2023 – Feb. 2024
KAIST *Republic of Korea*

- Advisor: Prof. Hyun Myung (`https://urobot.kaist.ac.kr/`)
- Developed core competencies in robotics, 3D computer vision, 3D reconstruction, ROS, and SLAM.
- Implemented, evaluated, and analyzed baseline algorithms for neural SLAM and 3D neural reconstruction frameworks.

Undergraduate Research Intern, NICA Lab Jun. 2022 – Dec. 2022
KAIST *Republic of Korea*

- Advisor: Prof. Young-Gyu Yoon (`https://nica.kaist.ac.kr/`)
- Neuro-Instrumentation & Computational Analysis (NICA) Lab
- Developed core competencies in computer vision and deep learning.
- Investigated deep learning–based denoising techniques for neuron-cell detection and analyzed their performance.

Publications

NeuDonatello: Uncertainty-Aware SDF Learning for High-Fidelity Neural Surface Reconstruction
Alvin Jinsung Choi, *Wanhee Kim, Taeyun Kim, Dasol Hong, Wooju Lee, Hyun Myung*†
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026 (Under review)
Project page: `https://alvinjinsung.github.io/NeuDonatello/`

CLUE: Adaptively Prioritized Contextual Cues by Leveraging a Unified Semantic Map for Effective Zero-Shot Object-Goal Navigation
Taeyun Kim, ***Alvin Jinsung Choi***, *Dasol Hong, Hyun Myung*†
IEEE International Conference on Robotics and Automation (ICRA), 2026 (Under review)
Project page: `https://alvinjinsung.github.io/CLUE/`

ActiveGrounder: 3D Visual Grounding with Object-Hull-Guided Active Observation
Dasol Hong, Juhye Park*, Taeyun Kim, Jeewon Kim, Jei Kong, Wanhee Kim,* ***Alvin Jinsung Choi****, Wooju Lee, Hyun Myung*†
IEEE-RAS International Conference on Humanoid Robots (Humanoids) Workshop on Bridging Humanoid Robotics and Foundation Models: Embodied Intelligence and AI Integration, 2025 (Poster)
Project page: `https://dazory.github.io/ActiveGrounder/`

GSDB: A Lightweight Database for Gaussian Splatting Map-based Visual Localization Leveraging Edge-aware and Quality-guided View Filtering
Sungjae Shin, Wanhee Kim, ***Alvin Jinsung Choi****, Hyun Myung*†
International Conference on Control, Automation, and Systems (ICCAS), 2025 (Best Paper Award)
Project page: `https://sungjaeshin.github.io/gsdb.github.io/`

Work Experiences

SK Hynix Dec. 2019 – Feb. 2020
Winter Intern *Icheon, Republic of Korea*

- Project: SSD reliability assessment
- Improved SSD reliability evaluation by enhancing vibration testing through analysis and mitigation of frequency-specific vulnerabilities.

Honors and Awards

CMU Vision-Language-Autonomy Challenge (4th place) | *Awards* 2025

- 4th place on CMU VLA Challenge for IROS Workshop on AI Meets Autonomy: Vision, Language, and Autonomous Systems, 2025. (Advanced to real-world evaluation)
- Developed a model capable of taking natural-language queries or commands about a scene and generating appropriate navigation-based responses by reasoning about semantic and spatial relationships.

Project page: `https://alvinjinsung.github.io/Vision-Language-Autonomy/`

ICCAS 2025 Best Paper Award | *Awards* 2025

- Received the Best Paper Award for the paper "GSDB: A Lightweight Database for Gaussian Splatting Map-based Visual Localization Leveraging Edge-aware and Quality-guided View Filtering" at the 25th International Conference on Control, Automation, and Systems (ICCAS 2025), organized by ICROS.
- Selected as the single Best Paper Award winner among 800 participants and 487 presented papers, following nomination as one of five Outstanding Paper Award Finalists.

CES 2023 KAIST Hall Student Coordinator | *Honors* Sep. 2022 – Jan. 2023

- Coordinated and managed the KAIST exhibition hall at CES 2023, overseeing operations and visitor engagement

LG Global Challenger | *Awards, Honors* Jun. 2019 – Sep. 2019

- Topic: Artificial Organ Customizing Project using Digital Twin
- Conducted interviews and site visits at 5 leading international institutes in 4 countries, focusing on research in systems biology and computational methods for biomedical technology.

Patents

Method And Apparatus for Constructing a Lightweight Database for Visual Localization Based on Gaussian Splatting
Hyun Myung, Sungjae Shin, Wanhee Kim, ***Alvin Jinsung Choi***
KIPO 10-2025-0159588

Academic Services

Reviewer | *IEEE International Conference on Robotics and Automation (ICRA)* 2026
Reviewer | *IEEE Robotics and Automation Letters (RA-L)* 2025
Student Volunteer | *Conference on Robot Learning (CoRL)* 2025

Teaching

Teaching Assistant Sep. 2025 – Present
EE Career Development II

Teaching Assistant Mar. 2025 – Jun. 2025
Electronics Design Lab: Communication System Design Using MATLAB and SIMULINK

Teaching Assistant Sep. 2024 – Dec. 2024
Introduction to Electronics Design Lab

Extracurricular Activity

Hanwha-KAIST Mentorship Program Mentor | *Mentoring* Mar. 2023 – Feb. 2024

KISS Summer School Buddy, KAIST | *International Activity* Jun. 2019 – Aug. 2019

LG-KAIST Global School Mentor | *Mentoring* Mar. 2019 – Dec. 2019

Samsung Dream Class Mentor | *Mentoring* Mar. 2019 – Dec. 2019

KAIST Cambodia Volunteer Team | *Volunteering* Sep. 2018 – Feb. 2019

KAIST Baseketball Team, Doolly | *University Club* Mar. 2017 – Feb. 2020

Official Student Ambassador of KAIST, Kainuri | *University Organization* Mar. 2017 – Feb. 2019

Leadership Experiences

Counseling Assistant Sep. 2024 – Present
School of Electrical Engineering, KAIST

Military Service, Republic of Korea Army Aug. 2020 – Feb. 2022
Information and Communications

Technical Skills

Languages: Python, C/C++, MATLAB
Frameworks: PyTorch, Habitat-Sim, ROS, Gazebo
Tools & Platforms: Git, Docker, VS Code, PyCharm
Libraries: NumPy, Matplotlib, OpenCV

Language Skills

Korean: Native
English: Native (TOEFL 112, OPIC Advanced Low)

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Github: https://github.com/alvinjinsung