Jaehwan Jeong

Email | Google Scholar | LinkedIn | Website

Research Interests

Embodied AI, Robotic Learning, Autonomous Systems
Multi-modal learning, Generative model, AI safety

Education

- **Korea University** *Mar. 2024 - Fe. 2029 (Expected)*
  Ph.D. - Artificial Intelligence Seoul, South Korea
- **Chung-Ang University** *Mar. 2017 - Fe. 2021*
  B.E. - Electrical & Electronic Engineering Seoul, South Korea

Experience

- **Structures-Computer Interaction Lab @ University of California, Los Angeles (UCLA)** *Mar. 2025 - Present*
  *Visiting Graduate Researcher; **Smart Farm Team Lead** (Advisor: Prof. Khalid)*

  Project: Autonomous 3D Mapping via Robotic Scanning. *(in progress)*
  - Designed and modeled a **Field Robot** in **URDF**, integrating **Stereo Cameras**, **IMU**, **GNSS**, **Robotic Arm**.
  - Enabled real-time, **On-device** localization and mapping through **Sensor Fusion** and **SLAM**.
  - Implemented a **VLM(A)-driven** hierarchical policy to generate global plans for **Navigation** to the target area.
  - Deployed a **Next-Best-View (NBV)** algorithm for coordinated base and arm motion during **3D Scanning**.

  Project: Vision-Guided Robotic Pollination via Plant Grasping and Vibration. - **[J3]**
  - Designed an **End-to-End** system integrating a **Robotic Arm** with an **RGB-D Camera** via **Hand-Eye Calibration**.
  - Developed a novel **3D Plant Skeletonization** algorithm to compute optimal, collision-free grasp poses.
  - Utilized a **Physics-based Simulation** to model plant dynamics and determine optimal vibration intensity.
  - Achieved a **92.5%** success rate in **Real-world** trials across 10 morphologically diverse plants.

  Project: A Robotic Platform for Long-Term Agricultural Data Collection. - **[J2]**
  - Designed a robust **Field Robot** from scratch, responsible for all custom **Mechanical** and **Electrical Systems**.
  - Integrated and **Time-synchronized** a multi-modal sensor suite (**Stereo Cameras**, **LiDAR**, **IMU**) for **On-device**.
  - Developed a WebRTC-based, full-stack **Teleoperation System** for low-latency, long-range (**1,400+ miles**) control.
  - Validated **Platform Robustness** with a month-long, **18 TB** data collection in **Real-world** farmland.

- **Computer Vision Lab @ Korea University** *Mar. 2024 - Fe. 2025*
  Ph.D. Student Researcher (Advisor: Prof. Sangpil Kim)

  Adversarial noise for Deepfake AI safety. *(collaborated with Dr. Jaewook Chung @ **Samsung Research**)* - **[C2]**
  - Generated **Perturbations** for **Deepfake** defense by targeting the **Cross-Attention Mechanism** of **Diffusion Models**.
  - Validated **Robust Performance** across diverse architectures, including **Diffusion-based** and **GAN-based** models.

  Multi-object audio-to-video generation. *(collaborated with Dr. Eugenio Culurciello @ **Purdue Univ.**)* - **[J1]**
  - Enabled **A2V generation** on a **T2V Diffusion Model** by training a specialized **Audio Encoder**.
  - Implemented **Multi-object generation** by modifying the **Cross-Attention Mechanism** during **Inference**.

- **Computer Vision Lab @ Korea University** *Jul. 2023 - Fe. 2024*
  Undergraduate Research Intern (Advisor: Prof. Sangpil Kim)

  Diffusion-based long video generation. *(collaborated with Dr. Wonmin Byeon @ **NVIDIA Research**)* - **[C1]**
  - Enabled **Long Video Generation** on a **T2V Diffusion Model** by modifying the **Inference** process.
  - Achieved **State-of-the-Art** performance across all video generation benchmarks with the proposed methodology.

- **Military Officer** *Mar. 2021 - Jun. 2023*
  Signal Company, 5th Armored Brigade, Republic of Korea Army
  - Wired communication network management (UTP, Optical cables) - 1st Lieutenant
  - Operations and Tactical Planner - 2nd Lieutenant

PUBLICATIONS

C=CONFERENCE, J=JOURNAL

[J3] **Jaehwan Jeong***, Tuan-Anh Vu*, Radha Lahoti, Jiawen Wang, Vivek Alumootil, Sangpil Kim, M. Khalid Jawed, ***Vision-Guided Targeted Grasping and Vibration for Robotic Pollination in Controlled Environments***, under review, 2025 [PDF] [GitHub]

[J2] **Jaehwan Jeong**, Tuan-Anh Vu, Mohammad Jony, Shahab Ahmad, Md. Mukhlesur Rahman, Sangpil Kim, M. Khalid Jawed, ***AgriChrono: A Multi-modal Dataset Capturing Crop Growth and Lighting Variability with a Field Robot***, under review, 2025 [PDF] [GitHub]

[C2] **Jaehwan Jeong**, Sumin In, Sieun Kim, Shin han yi, Jonghen Jeong, Sang Ho Yoon, Jaewook Chung, Sangpil Kim, ***FaceShield: Defending Facial Image against Deepfake Threats***, International Conference on Computer Vision (**ICCV**) 2025 [PDF] [GitHub]

[J1] Sieun Kim, **Jaehwan Jeong**, Sumin In, Seung Hyun Lee, Seungryong Kim, Saerom Kim, Wooyeol Baek, Sang Ho Yoon, Eugenio Culurciello, Sangpil Kim, ***Semantically Complex Audio to Video Generation with Audio Source Separation***, Engineering Applications of Artificial Intelligence (**JCR IF Top 10%**) 2025 [PDF] [GitHub]

[C1] Gyeongrok Oh, **Jaehwan Jeong**, Sieun Kim, Wonmin Byeon, Jinkyu Kim, Sungwoong Kim, Sangpil Kim, ***MEVG: Multi-event Video Generation with Text-to-Video Models***, European Conference on Computer Vision (**ECCV**) 2024 [PDF] [GitHub]

ACADEMIC SERVICE

- **Conference Reviewer**
  IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025
  IEEE/CVF International Conference on Computer Vision (ICCV), 2025
  The 29th International Conference on Developments in Language Theory (DLT), 2025
- **Journal Reviewer**
  Computer Vision and Image Understanding (CVIU), 2025
  Engineering Applications of Artificial Intelligence (EAAI), 2025

PATENTS

[P1] **Jaehwan Jeong**, Sangpil Kim, ***Method and Apparatus for Protecting Facial Image based on Disturbance Signal to Counter Deepfake Attack***, Korean Patent, No. 10-2025-0118588 (2025.08.25)

SKILLS

- **Programming**
  PyTorch, TensorFlow, Hugging Face, scikit-learn, OpenCV, Open3D,
  ROS (Robot Operating System), Flask, WebRTC (Janus)
- **Languages**
  Native speaker in Korean
  Fluent in English