

# Donghwa Kang

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## RESEARCH INTERESTS

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Computer vision, Multi-modal learning, Facial analysis, Eye tracking, Event-based vision

## EDUCATION

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**Hongik University**, Seoul, South Korea  
M.S., Electronic & Electrical Engineering Mar. 2024 — Present

**Hongik University**, Seoul, South Korea  
B.S., Electronic & Electrical Engineering Mar. 2021 — Feb. 2024

## RESEARCH EXPERIENCE

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**Image Understanding Lab**, Hongik University Mar. 2024 — Present  
*Graduate Research Assistant* Advisor: Dongwoo Kang

- Developed a cross-modal fusion attention module for facial keypoints alignment using event and RGB data. Analyzed differences between synthetic and real event-based facial data under varying lighting and motion conditions.
- Contributed to an event-based remote eye tracking framework by adapting it to facial data. Investigated asynchronous video processing and generated synthetic facial event data to address dataset limitations.
- Conducted foundational research for an IITP government-funded research initiative on developing high-speed (1000Hz) near-gaze tracking for XR systems, leveraging expertise in remote eye tracking to inform the study of multi-sensor pupil segmentation and tracking algorithms.

**Image Understanding Lab**, Hongik University Jun. 2022 — Feb. 2024  
*Undergraduate Research Assistant* Advisor: Dongwoo Kang

- Investigated pupil detection under large head rotations by utilizing head pose estimation and optimal alignment points to improve robustness in non-frontal views.
- Conducted research on translating Korean Sign Language into Korean in medical service settings, using human pose estimation models with a focus on facial expressions.

## PUBLICATIONS

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### Journal

**Kang, Donghwa**, Kim, J., & Kang, D. “Event-based Facial Keypoint Alignment via Cross-Modal Fusion Attention and Self-Supervised Multi-Event Representation Learning.” IEEE Transactions on Circuits and Systems for Video Technology. (Under review) [Paper]

**Kang, Donghwa**, & Kang, D. (2025). “An Adaptive Learning Framework for Event-Based Remote Eye Tracking.” Expert Systems with Applications, 128038. [Paper]

**Kang, Donghwa**, & Kang, D. (2024). “Head Pose-Aware Regression for Pupil Localization From a-Pillar Cameras.” IEEE Access, 12, 11083-11094. [Paper]

### Conference

Park, S., **Kang, Donghwa**, Kang, B., & Kang, D. (2025). “Superpixel-Guided Region-Adaptive Synthetic Event Generation for Event-Based Facial Keypoint Alignment.” Proceedings of the Korean Institute of Broadcast and Media Engineers Conference (*Accepted*)

Lee, E., **Kang, Donghwa**, & Kang, D. (2025). “Blink Detection on Event Cameras with Sequence-Aware Event2Vec Representations.” Proceedings of the Korean Institute of Broadcast and Media Engineers Conference (*Accepted, Excellence Award*)

**Kang, Donghwa**, & Kang, D. (2024). “Enhanced Eye Center Detection Approach for Large Head Pose.” Proceedings of the Korean Institute of Broadcast and Media Engineers Conference, 1194-1197. [Paper]

## PRESENTATIONS

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**Kang, Donghwa, & Kang, D.** "Head Pose-Aware Pupil Alignment on Driver Monitoring System." Presented at the *IEEE International Conference on Information and Communication Technology Convergence (ICTC)*, Jeju, South Korea, Oct. 2024. (Recent Results, Poster Presentation)

**Kang, Donghwa, & Kang, D.** "Enhanced Eye Center Detection Approach for Large Head Pose." Presented at the Korean Institute of Broadcast and Media Engineers Conference, Jeju, South Korea, Jun. 2024. (Oral Presentation)

**Kang, Donghwa, Choi, J., & Kang, D.** "Precision Sign Language Translation Research Through Emotion Analysis During Telemedicine Consultations." In *Proceedings of the 2023 Fall Conference of the Korean Society for Internet Information (KSII)*, pp. 85-86, Yeosu, South Korea, Nov. 2023. (Poster Presentation)

## PROJECTS

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**AI Video Masking Service for Privacy Protection**  
*Naver Boostcamp AI Tech*

Jun. 2023 — Jul. 2023  
[GitHub]

- Developed a comprehensive AI video masking service utilizing instance segmentation and face recognition for efficient personal information anonymization.
- Focused on masking entire human bodies, beyond just faces, to prevent portrait rights infringement and enhance privacy protection in diverse video content.
- Contributed to data cleansing, human segmentation model fine-tuning, and implemented video editing for the service.

**Semantic Segmentation of Hand Bones from X-ray Images**  
*Naver Boostcamp AI Tech*

Jun. 2023  
[GitHub]

- Researched and implemented a range of semantic segmentation models, including FCN, DeepLabV3+, and UNet++, to explore various architectural approaches for the task.
- Designed an experimental pipeline involving data cleansing, various data augmentation techniques, and automated experiments with RabbitMQ.

**Object Detection for Recyclable Waste Classification**  
*Naver Boostcamp AI Tech*

May 2023  
[GitHub]

- Implemented and fine-tuned various object detection models, including the team's best-performing Cascade R-CNN (Swin-S) which achieved a mAP of 0.607.
- Conducted in-depth research on various model backbones and neck architectures to optimize detector performance on the dataset.

**Multi-label Image Classification for Mask Status, Gender, and Age**  
*Naver Boostcamp AI Tech*

Apr. 2023  
[GitHub]

- Researched and implemented various classification architectures, including VGG, Vision Transformer (ViT), and MobileNet, to predict 18 classes related to facial attributes.
- Designed a data augmentation strategy and applied model ensembling techniques, which boosted the final classification accuracy from 62% to over 71%, an improvement of nearly 10%.

## TEACHING EXPERIENCE

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**Multimedia Signal Processing**, Teaching Assistant  
*Hongik University*

Sep. 2025 — Present

- Delivered a guest lecture and led a hands-on Python session on event camera representations.
- Assessed final project presentations on computer vision and deep learning research, assisting with student evaluation and feedback.

**Digital Logic Lab & Design**, Teaching Assistant  
*Hongik University*

Spring 2025

- Facilitated weekly lab sessions by providing technical guidance on digital logic circuit experiments.

## AWARDS & SCHOLARSHIPS

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<b>University of Toronto AI Convergence Education Program</b> <i>Ministry of Science and ICT (MSIT) &amp; IITP, South Korea</i>	Jan. 2026 — Jun. 2026 ( <i>Forthcoming</i> )
<b>Scholarship for Excellence in Science and Engineering</b> <i>Hongik University</i>	Spring 2024 — Present
<b>AI Seoul Tech Graduate School Scholarship</b> <i>Seoul Scholarship Foundation</i>	Fall 2025
<b>Hongik Research Frontier</b> <i>Hongik University</i>	Spring 2025
<b>Scholarship for Research Assistant</b> <i>Hongik University</i>	Fall 2023
<b>Excellence Award, Digital Bio-Health Capstone Design Competition</b> <i>Hongik University</i>	Dec. 2022
<b>Academic Progress Scholarship</b> <i>Hongik University</i>	Fall 2021

## PROFESSIONAL & COMMUNITY ENGAGEMENT

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<b>Volunteer Translator, Compassion Mate</b> <i>Compassion Korea</i>	2021, 2022, Present
• Translated letters between sponsored children and their sponsors (Korean-English).	
<b>International Student Mentor, HI-TOUCH Program</b> <i>Hongik University</i>	Fall 2021, Fall 2022, Present
• Facilitated the academic and personal transition of international students by providing comprehensive one-on-one guidance on study strategies, course inquiries, and campus resources.	
<b>Mentee, Global Cross Mentoring Program</b> <i>Korea Foundation for Women in Science, Engineering, and Technology (WISET)</i>	2024 — Present
• Selected for a competitive mentorship program connecting early-career female scientists in Korea with senior researchers in the U.S. and Europe for career development and global networking.	
<b>Academic Mentor, Seoul Learn Mentoring Program</b> <i>Seoul Metropolitan Government</i>	Mar. 2022 — Apr. 2023
• Tutored local middle and high school students in Math and English, providing both academic planning and career guidance.	
<b>Audio Engineer</b> <i>Yeasung Media, Seoul</i>	Sep. 2018 — Feb. 2020
• Served as a full-time Audio Engineer (1 year 2 months) following a full-time internship (4 months), managing audio production workflows including recording, editing, and mixing.	

## SKILLS

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**Programming Languages:** Python, C, Matlab  
**Tools:** PyTorch, TensorFlow, Keras, NumPy, Pandas, OpenCV, CUDA, Linux  
**Domain Skills:** Deep Learning, Computer Vision, Sensor Fusion, Artificial Intelligence