

Hyeongheon Cha

Ph.D. student

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RESEARCH INTEREST SUMMARY

Passionate about developing **on-device AI** systems, aim to create **cutting-edge, adaptable, and efficient software for real-world environments.**

EDUCATION

03/2022 – present	Korea Advanced Institute of Science and Technology (KAIST) <i>M.S. and Ph.D. in School of Electrical Engineering</i> Advisor: Sung-Ju Lee	Daejeon, Republic of Korea
03/2017 – 02/2022	Korea Advanced Institute of Science and Technology (KAIST) <i>B.S. in School of Electrical Engineering</i> GPA: 3.85/4.3	Daejeon, Republic of Korea

PROJECTS

08/2023 – present	On-device Efficient DNN Adaptation Framework for Real-time Applications <i>Project leader in KAIST Network and Mobile System Lab</i> <ul style="list-style-type: none">• Aim to develop a novel time-efficient on-device DNN adaptation strategy for real-time mobile applications, balancing model accuracy and inference speed.• Exploring model adaptation methods that enable real-time inference on extremely resource-constrained devices.
05/2022 – 03/2024	Translating Knowledge from Large-Scale Images to IMU Sensing Applications <i>Project member in KAIST Network and Mobile System Lab</i> <ul style="list-style-type: none">• Developed a specialized semi-supervised algorithm for IMU-based tasks.• Implemented state-of-the-art Contrastive Learning algorithms and conduct evaluations.• Developed an inference application for demo and on-device benchmarking on smartphones.
09/2023 – 11/2023	Domain-aware Contrastive Federated Learning with Major Domain Group Selection Approach in Extreme Non-iid Conditions <i>Final project of Advanced Big data – AI Integration class</i> <ul style="list-style-type: none">• Developed a novel model contrastive federated learning approach considering domain-wise non-iidness, and suggested Major Domain Group (MDG)-based client selection method, which appropriately selects half of the clients from the major.
02/2023 – present	Development of Novel Networking Technology for Micro-Scale Cluster Robots <i>Project leader in KAIST Network and Mobile System Lab</i> <ul style="list-style-type: none">• Developed distributed resource allocation algorithms, routing protocols, and routing metrics suitable for cluster robot operation.• Performed network analysis using the NS3 simulator.
02/2021 – 09/2023	Development of Drone/Smartphone based Hidden Camera Detection System <i>Project member in KAIST Network and Mobile System Lab</i> <ul style="list-style-type: none">• Built & trained several lightweight AI models to distinguish camera lenses from ordinary reflective objects.• Developed an application for real-time inference on Android smartphone/drone platforms using that model.

- 02/2020 – 12/2020 **Development of Automatic Stethoscope Blood Pressure Measuring Chair**
Leader of Inbody Co., Future Innovation Team Interns
- Crafted fully operational prototype chair with the tablet application.
 - Implemented software functions included estimating heart height using the front camera (AI based facial tracking), controlling a laser and motor module using BLE communication, and managing measurement results with the cloud server.

PUBLICATIONS

Poster: Time-Efficient Sparse and Lightweight Adaptation for Real-Time Mobile Applications

Hyeongheon Cha, Taesik Gong, and Sung-Ju Lee

Accepted in MobiSys'24 Posters

IMG2IMU: Translating Knowledge from Large-Scale Images to IMU Sensing Applications

Hyungjun Yoon, Hyeongheon Cha, Canh Hoang Nguyen, Taesik Gong, and Sung-Ju Lee

Under review

Sherlock: Automated Hidden Camera Detection with Shutter Speed Adaptation

Sooyoung Park, Hyeongheon Cha, Sriram Sami, Jun Han and Sung-Ju Lee

Under review

PROFESSIONAL EXPERIENCE

02/2021 – 02/2022	KAIST, Network and Mobile System Lab <i>Undergraduate Research Intern</i>	Daejeon, Republic of Korea
02/2020 – 08/2020	InBody Co., Future Innovation Team <i>Research Intern</i>	Seoul, Republic of Korea
08/2019 – 09/2019	KAIST, Smart and Mobile System Lab <i>Individual Research Intern</i>	Daejeon, Republic of Korea

AWARDS & HONORS

2022	Magna Cum Laude <i>Korea Advanced Institute of Science and Technology</i>
2019	Noyeop Cultural Foundation Scholarship <i>Noyeop Cultural Foundation</i> One person per department, provided until graduation
2017	Dean's list <i>Korea Advanced Institute of Science and Technology</i> Outstanding student in the department

LEADERSHIP EXPERIENCE

2024 – 2024	Graduate Student Council President <i>KAIST School of Electrical Engineering</i>
2020 – 2020	Team Leader <i>InBody Co., Future Innovation Team</i>
2018 – 2019	Undergraduate Student Council President <i>KAIST School of Electrical Engineering</i>
2018 – 2019	Freshman Program Designer <i>Korea Institute of Science and Technology</i> Design and operate special classes and programs for KAIST freshmen

SKILLS

Programming – Python, C, C++, Java | **Machine Learning** – Pytorch, Tensorflow, Tensorflow Lite |
Hardware Prototyping – Arduino, RaspberryPi, Qorvo | **Network Simulation** – NS3 simulator