



INHA UNIVERSITY Al Convergence Research Center Al Graduate School



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01

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Director's Profile



Director, In Kyu Park

PROFILE

- Ph.D. in Engineering, Seoul National University
- Professor, School of Electrical and Electronic Engineering, Inha University (2004 ~ Present)
- Visiting Scholar, UCSD (2018~2019)
- Visiting Associate Professor, MIT Media Lab (2014~2015)
- Researcher, Mitsubishi Electric Research Laboratories (2007~2008)
- Member of Technical Staff, Samsung Advanced Institute of Technology (2001~2004)
- Research Areas: Computer Vision, Graphics, Deep Learning
- · Website: http://image.inha.ac.kr

• Message from the Director

Al Innovation Hub Driving Incheon's Industry Growth

The Al Convergence Research Center at Inha University was established in April 2020 after being selected for the Ministry of Science and ICT's Al Convergence Research Center project. In May 2022, the center was additionally selected for the Al Convergence Innovation Graduate School project, solidifying its dual role as a convergence research center and a convergence graduate school.

We are the first specialized center in Incheon for AI research and education. Our center integrates AI with key regional industries, such as manufacturing, logistics, ports, and healthcare, to develop AI-converged talent and industry-academia collaboration. In collaboration with 58 partners, including Incheon Metropolitan City and Korean Air, we are advancing industry-academia-government cooperation to drive industrial innovation and disseminate AI technologies.

The Graduate School of Al Convergence at the center operates the Al program within the Department of Electrical and Computer Engineering, systematically producing around 50 Al specialists with master's and doctoral degrees each year. Our 24 faculty members provide high-quality instruction across 20+ core-Al courses, from foundational to advanced topics, and 30 specialized Al convergence tracks in areas like manufacturing, logistics, ports, and medical.

Al Convergence Research Center leverages Incheon's industrial strengths and Inha University's expertise to develop Al-converged talent and promote Al. We are committed to creating a platform linking local governments, industries, and universities for Al convergence research, driving regional industry growth as well as nationwide Al adoption.

Professor **In Kyu Park**, Director of the Al Convergence Research Center (Dept. of Electrical and Computer Engineering)

Vision and Strategic Plan



Al-Converged Talent and Technology Dissemination Hub

BRIDGE – Model for Convergence
 Research Center and Graduate School –



MISSION

Develop specialized talent for the innovative Al-convergence industry

Build Reinforced Industry by Developing Al-Generating Engineers

- Regional hub convergence research center that connects universities and industries to develop Al talents and technology dissemination
- Train talents specialized in industrial innovation and enhance the competitiveness of industries
- Academy-Industry Twin: Advancing industry-academia collaboration for enhanced talent development

Al **Strategic** Convergence Goals **Areas Strategic** AI BRIDGE to Manufacturing Al Convergence Specialized Research Plan AI BRIDGE to Logistics Al Convergence Specialized Education Al BRIDGE to Ports(Airports/Seaports) Al Convergence Industry Collaboration **Detailed** AI BRIDGE to Medical Disseminate and Share Al Convergence Plan

Scalable Big Data Sharing Platform

- Al+Perception Visual Perception Research
- Al+Logistics Spatiotemporal Intelligence Research
- Al+Prediction Time Series Forecasting Research
- Al+Diagnosis Medical Data Analysis and Prediction Research

Industry-Academia Convergence Active Learning Platform

- Al major programs training 50 master's and doctoral students annually
- Training industry-Al specialized talent
- Connecting curriculum with the Graduate School of Manufacturing and Logistics

Sustainable Industry-Academia Al Convergence Platform

- Promoting collaboration with local companies
- Operating industry-academia joint projects and creating workbooks
- Enhancing two-way exchanges through internships, employment, and extracurricular activities School of Manufacturing and Logistics

Scalable and shareable Al Convergence infrastructure

- Establishing Al infrastructure and sharing with the local community
- Disseminate Al across various disciplines within the university
- Tailored Al education programs for industry professionals

Platforms-Based Research, Education, and Industry-Academia Collaboration

- · Big Data Sharing Platform: Development of data processing and integration technologies
- Industry-Academia Al Convergence Platform : Al Convergence Projects Course
- Active Learning Platform: Fostering Al Convergence experts aligned with A⁵ I: Active, Achievable, Adaptive, Affordable Al

Introduction to the Al Convergence Research Center

What is the Al Convergence Research Center?



Role of the Al Convergence Research Center

• Enhancing Al Convergence Research

Enhance "creative convergence (AI+X) research" tailored to industry specialization

• Operating Curricula in Al Convergence

Al convergence curricula with a focus on project-based, problem-solving education

• Strengthening Industry-Academia Collaboration

Strengthen Al convergence collaboration by securing top researchers and addressing industry needs

Supporting Commercialization and Consulting

Strengthen 'Creative Convergence Capabilities' by providing AI technology commercialization and application consulting, as well as internship programs, to meet the diverse AI needs across industries

History

April 2020 - Selected for the Ministry of Science and ICT's Al Convergence Research Center Support Project

May 2020 - Signed agreement with the IITP and launched operations

- Built dedicated website and logo, signed agreements with 22 partner institutions

- Established Al Major in the Graduate School's Dept. of Electrical and Computer Engineering September 2020

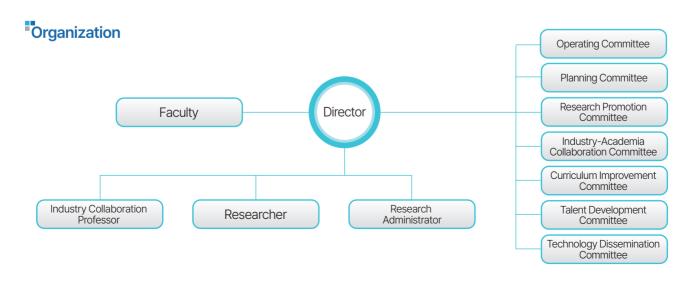
and Al Convergence Major in the College of Engineering at Inha University

January 2021 - Established the AI Convergence Research Center administrative office, PBL lecture room,

and server room

April 2021 - Al Convergence Research Center opening ceremony

May 2022 - Selected for the Ministry of Science and ICT's Al Convergence Innovation Graduate School Project



Faculty and Research Staff

Faculty

Al-Core Faculty



Doguk Kim
Assistant Professor,
Dept. of Artificial Intelligence

Ph.D., Korea Advanced Institute of Science and Technology Research Interests: Machine Learning/Deep Learning Automation, Efficient Deep Learning, Computer Vision, Natural Language Processing http://sites.google.com/view/inha-aif-lab



Byung Hyung Kim
Assistant Professor,
Dept. of Artificial Intelligence

Ph.D., Korea Advanced Institute of Science and Technology Research Interests: Affective Computing, Brain-Computer Interface, Machine Learning http://affctiv.ai



Youngsung Kim
Assistant Professor,
Dept. of Artificial Intelligence

Ph.D., Yonsei University Research Interests: Machine Learning, Deep Learning, Multimodal Al http://youngsungkim-ai.github.io



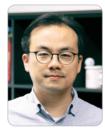
Yeongjin Kim
Assistant Professor, School of
Electrical and Electronic Engineering

Ph.D., Korea Advanced Institute of Science and Technology Research Interests: Intelligence Cloud, Edge Computing http://sites.google.com/view/yeongjinkim



Daeyoung Park Professor, School of Electrical and Electronic Engineering

Ph.D., Seoul National University Research Interests: Machine Learning, Signal Processing http://spml.inha.ac.kr



In Kyu Park
Professor, School of Electrical and
Electronic Engineering

Ph.D., Seoul National University Research Interests: Computer Vision, Graphics, Deep Learning http://image.inha.ac.kr



Seung-Hwan Bae Associate Professor, Dept. of Computer Science and Engineering

Ph.D.,Gwangju Institute of Science and Technology Research Interests: Computer Vision, Machine Learning http://cvl.inha.ac.kr



Young-Duk Seo Assistant Professor, Dept. of Computer Science and Engineering

Ph.D., Korea University
Research Interests: Recommender
systems, Data Mining, IoT
http://sites.google.com/view/kdd-lab



Byung Cheol Song
Professor, School of Electrical and
Electronic Engineering

Ph.D., Korea Advanced Institute of Science and Technology Research Interests: Computer Vision, Image Processing http://cvip.inha.ac.kr



Byung-Seok Shin
Professor, Dept. of Computer Science
and Engineering

Ph.D., Seoul National University Research Interests: Computer Graphics, 3D Medical Visualization http://medialab.inha.ac.kr

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Al-Core Faculty



Jeong Seop Sim
Professor, Dept. of Computer Science
and Engineering

Ph.D., Seoul National University Research Interests: Algorithms, Bioinformatics http://theory.inha.ac.kr



Mun-Kyu Lee
Professor, Dept. of Computer Science
and Engineering

Ph.D., Seoul National University Research Interests: Information Security & Cryptology, Block Chain, Al Security http://islab.inha.ac.kr



Bowon Lee Professor, School of Electrical and Electronic Engineering

Ph.D., University of Illinois Urbana-Champaign Research Interests: Audio, Speech Processing, Speech Understanding http://dsp.inha.ac.kr



Sang-Chul Lee Professor, Dept. of Computer Science and Engineering

Ph.D., University of Illinois Urbana-Champaign Research Interests: Biomedical Image Processing, Computer Vision, Al http://imageinfo.inha.ac.kr



Sunwoo Lee Assistant Professor, Dept. of Computer Science and Engineering

Ph.D., Northwestern University Research Interests: Scalable Machine Learning, Distributed Deep Learning, Federated Learning http://sites.google.com/view/lmls-lab



Yongwoo Lee Assistant Professor, School of Electrical and Electronic Engineering

Ph.D., Seoul National University Research Interests: Cryptography, Privacy Protection http://crypto.inha.ac.kr



Hongki Lim Assistant Professor, School of Electrical and Electronic Engineering

Ph.D., University of Michigan Research Interests: Generative Model, Image Processing, Computer Vision https://milab-inha.github.io



Dong-Wan Choi Associate Professor, Dept. of Computer Science and Engineering

Ph.D., Korea Advanced Institute of Science and Technology Research Interests: Big Data, Data Mining http://bigdata.inha.ac.kr



Wonik Choi Professor, School of Electrical and Electronic Engineering

Ph.D., Seoul National University Research Interests: Data Intelligence, Big Data, Al http://dilab.inha.ac.kr

AI-Convergence Affiliated Faculty



Jong-Hyun Kim Associate Professor, Dept. of Design Technology

Ph.D., Korea University Research Interests: Physically-based Simulation, Game Al, Geometry Processing, Digital Twin https://sites.google.com/view/jhkim



Daisik Nam Assistant Professor, Asia Pacific School of Logistics

Ph.D., University of California, Irvine Research Interests: Smart Mobility, Digital Logistics, Transportation http://pytrans.github.io



Minyoung Park Professor, Asia Pacific School of Logistics

Ph.D., University of California, Irvine Research Interests: Logistics System http://gsl.inha.ac.kr



Seung-Buhm Woo Professor, Dept. Ocean Sciences

Ph.D., Cornell University Research Interests: Coastal and Port Engineering, Environmental Hydraulics http://codalweb.wixsite.com/mysite



Hyun-Gyu lee Assistant Professor, College of Medicine

Ph.D., Inha University Research Interests: Medical Al http://hglee6.wixsite.com/inha-mai

Industry Collaboration Professor

Industry Collaboration Professor/Researcher



Byeonghwan Jeon

Ph.D., Seoul National University

Al + Manufacturing Industry-Academia

Collaboration

Previous Position: Master, Device

Solutions, Samsung Electronics



Yan Li

Ph.D., Inha University
Curriculum Development Aligned with
Industry-Academia Needs
Previous Position: Teaching Professor,
Dept. of Computer Engineering,
Inha University

Researcher



Young Cheol Jeong
M.S., Inha University
Industry-Academia Collaboration in the
Field of Logistics and Research on the
Spread of Al



M.S., Inha University
Research and Development of Al
Infrastructure and Educational Platforms



Chaewook Lim
Ph.D., Inha University
Research on spreading AI in the field of portal

Collaborative Partners

Institutions (6)













Companies (52)





















































































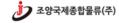




















Educational Goals and Initiatives

Al Convergence Graduate School

- Cultivating Al convergence experts through an industry-academia Al sharing and dissemination platform
- Cultivating Al convergence experts through a scalable big data integration platform

Educational Goals

- Cultivating Al convergence experts through an industry-academia
 Al sharing and dissemination platform
- Cultivating Al convergence experts through a scalable big data integration platform

Development Model

Developing innovative Al convergence talent specialized in manufacturing, logistics, ports (airports/seaports), and medical industries

Initiatives for AI+X Convergence Talent Development

Graduate Degree Program

Al Major in the Dept. of Electrical and Computer Engineering

Al Convergence Major at the College of Engineering

Dedicated to the Admission of Exceptional Students

Tuition Support and Employment Opportunities for the Admission of Outstanding Students

Admission of Outstanding Students from Diverse Backgrounds

Industry-Academia Joint Project

Curriculum on Al+R/ L/P/D Convergence Industry-Academia Projects

Training Field-Ready
Talent by Integrating
Al with Traditional
Industries

Entrepreneurship Program

Entrepreneurship Education for Innovative Value Creation

Sharing Startup Expertise through Collaboration with Partner Companies

Graduate Program Overview

Innovative Industry-Focused Al Convergence Curricula

Specialized Integrated Education for Incheon's Key Industries:

Manufacturing, Logistics, Ports (Airport/Seaport), and Medical
Field-oriented curriculum and textbooks to meet the needs of participating companies

Al Major in the Department of Electrical and Computer Engineering

- Graduate Program for Training Advanced Talent (Master's and Ph.D. programs)
- Annual Admission Quota: 50 Students
- Developing Problem-Solving Skills for Industry Needs through an AI+X Convergence Curriculum
- Full Tuition Support and Prioritized Dormitory Allocation

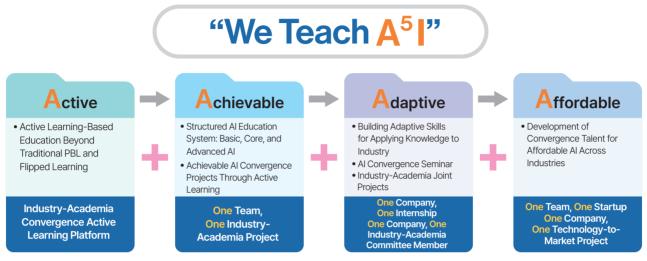


Al Convergence Major at the College of Engineering

- Specialized Al Convergence Master's Program for Working Professionals
- Annual Admission Quota: 30 Students
- Up to 50% Tuition Support (Funded by the University)
- Disseminating Al Convergence through Practical, Specialized Education for Working Professionals in Key Fields

Education Model

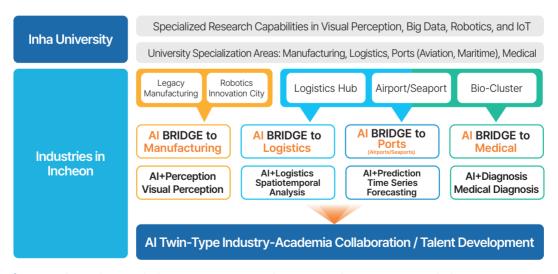
• Training high-level talent with practical experience in Al convergence applied to industry



Educational Model for the Al Convergence Graduate School

Specialized Areas

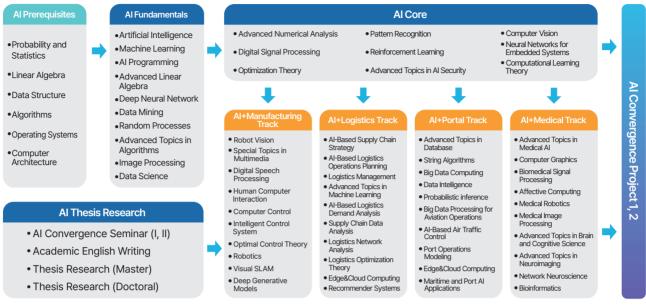
- Manufacturing (AI+R): Core technologies for smart manufacturing and factories, focusing on visual perception
- Logistics(AI+L): Al-based smart management and consumer logistics
- Ports(AI+P): Predictive AI for aviation and maritime
- Medical(Al+D): Al for biosignal and medical imaging in clinical settings



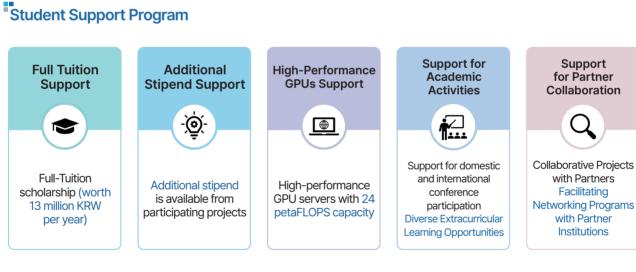
► Manufacturing, logistics, ports, and medical are designated as specialized areas, building on the strengths of Inha University and Incheon

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Curriculum



Curriculum of Al Major in the Dept. of Electrical and Computera Engineering



Key Activities

Al Graduate School Symposium

- Participated in the "Al Graduate School Symposium" organized by the Al Graduate School Council and IITP
- Discussion with industry and academic experts on Al industry-academia collaboration and talent development strategies









Faculty Workshop

• Faculty workshop to share research and upcoming projects within the center









Industry-Academia Collaboration Workshop

• Workshop on AI research and industry trends, focusing on collaboration in education, research, and talent exchange









Industry-Academia Collaboration Meeting

• Regular meetings to share industry trends, exchange information, promote AI, and address company challenges







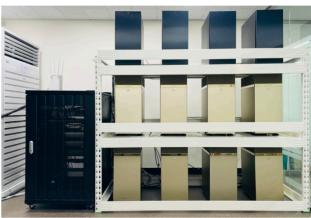


Major Projects and Achievements

Al Computing Server

- Data center-grade GPUs infrastructure (NVIDIA A100, A6000, A40, V100) and small-group GPUs servers
- In collaboration with Incheon Metropolitan City, established a "24 petaFLOPS" All computing center to support researchers at Inha University, partner institutions, local organizations in Incheon





Al Industry-Academia Collaboration and Education Platform

• Jointly establishing an Industry-Academia Al Convergence Platform and an Industry-Academia Active Learning Platform in collaboration with our partner company, MondrianAl

Industry-Academia Convergence Al Platform

- Industry-Academia Al Platform for Disseminating Al Convergence Technology
 - Building a foundation for systematic and sustainable online collaboration between the center and companies
 - Scalable 'Big Data Sharing Platform' that provides a foundation for processing and integrating data from companies

Al-based Active Learning Education Platform

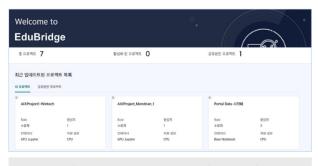
- Al online education platform designed for active and interactive user participation
 - Fundamental online education features (Support for audio, video, collaborative text editing, online discussion sessions, etc.)
 - Feedback loop where students actively engage in the lecture content, which is then integrated back into the platform

Industry-Academia-Research-Education Platform Development Al/Remote Education Framework

Industry-Academia Joint Projects

In-House AI R&D Results

Prototype production completed in 2022



Data/Al Model Development Platform Interface



Video Conferencing Platform Interface

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Industry-Academia Collaboration

• Al Help Desk, Al Tech Clinic

"Al Help Desk" and "Al Tech Clinic" forums are operated on the Center's website (https://aix.inha.ac.kr)





Hanjin Al Academy

- Delivered AI education in collaboration with Hanjin Information & Communication and Korean Air
- Offered practical machine and deep learning courses for Hanjin Group's staff and executives





Al Course for Korean Air Staff and Executives



Basic-Al Course for Hanjin Group Staff

Al Convergence Research Project

- Students, industry mentors, and professors collaborate on industry-sourced mini projects to address real-world demands
- Enhancing students' practical AI expertise and industry adaptability through industry-academic projects
- Data management, Al model development, and video conferencing are conducted on our internally developed Al platform



한 안공시는 관련 문제화점한 모르세트 주제를 받 한 안공시는 관련 문제화점한 모르세트 주제를 받 한공시는 공한 관련 문제화점한 모르세트 수 제 기반한 안공시 글래 대학원생지도교수-산업체 멘토가 땀을 이뤄 얼합하는 반식으로 진행되다. 배학기 전공발수 과 목으로 개설되며, 이번 1학가는 총 20명의 대학원 학생이 13월의 지도교수 및 6계 산업체의 멘토와 안공지능 플랫폼을 교내되고 확산에 다방반에서 14개의 산학 프로젝트를 팀 단위로 수행한다. 학생 활용될 수 있도록 할게되이다.

들은 산업 현장에서 발생하는 화제를 해결함으로 백인규 인하대 인공지능용합면구센터장은 "이 써 산업체에 출부원을 제공하고, 하위 취득 후산 한체 적응력을 높일수 있을 것으로 기대하다. 특히 이 교과목에 인하대 인공지능용합인구센 타가 자세 개합한 인공지능 출뜻분을 도입해 눈길 존 간단. 센타는 자나 강단 인공자(금 교육 및 산학 Industry-academic project company site visit



The project class screen using an artificial intelligence platform

Al Convergence Seminar

- Offered as a regular graduate course, expert-led seminars on various Al-related topics are held each semester
- Opening the seminar to local institutions and the broader local community, contributing to the spread of Al education





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Al Dissemination Research Program

- Al Model Development Challenge for Inha University Students on Selected Al Topics
- Fosters collaboration and strengthens research capabilities across IT and non-IT faculty
- Hosts a symposium for sharing research outcomes

2022 Al Dissemination Research Program







2023 Al Dissemination Research Program







Al Entrepreneurship Seminar and Startup Cases

- Offers foundational knowledge and pre-experience for aspiring entrepreneurs
- Invite renowned CEO-level speakers and present the latest Al trends to increase educational engagement
- Promote outstanding startup cases to stimulate entrepreneurial activities among students and faculty

2023 Αl Entrepreneurship Seminar







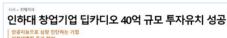
Student-Faculty Startup Cases





인하대 인공지능융합연구센터가 첫 학생 창업사례로 물류 로봇자동화 및 AI 알고리즘 분야 스타트 업 '로비고스(ROVIGOS)'를 배출했다.

인공지능용합연구센터는 학생창업자가 학업과 사업을 병행할 수 있도록 학생연구자 지원 가이드라 인을 마련하여 창업 학생에게도 장학금을 지원하고 있으며, 학생 창업 활성화를 위하여 'AI 창업캠 프' 프로그램을 운영하고 있다.



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인하대학교(총장 조명우)는 장업보육센터 입주기업인 딥카디오(DeepCardio)가 벤처 장업 및 연구 기술의 임상적 가지를 인정받아 소프트뱅크벤처스, 데일리파트너스로부터 40억원 규모의 시리즈A 투자 유치에 성공됐다고 17일 밝혔다.

인공지능으로 심장을 진단하는 기업인 립카디오는 2020년 11월 인하대학교 정보통신공학과 최원의 교수, 컴퓨터공학과 이상을 교수와 인하대병원 심정난과 김대혜, 백용수. 교수가 공동으로 정립한 번 저기업이다. 정립 조가부터 인화박사물과 공학박사물과 진정한 응합으로 이목을 끌었다. 2021년 3월 에는 기술보통기급 Tech벨리 기업에 선정되기도 됐다.

김대혁, 백용수 교수는 심장내과(부정맥), 최원의 교수는 인공지능과 빅데이터, 이상철 교수는 인공 지능과 컴퓨터비전 분야의 권위자이다. 심장 관련 질환에 대한 인공지능 기술 접목에 강점을 가지고

Inha Al Challenge

- Al model development challenge for Inha university students on selected topics Al
- The challenge aims to increase interest in AI and develop more sophisticated AI models
- Organize industry-academia collaboration meetings between sponsoring companies and participating students









2023 Inha Al Challenge







Research Highlights and Rewards

- 157 high-impact publications over the past five years (as of August 2024)
- 62 publications in top conferences and JCR top 10% journals

Publications in journals ranked in the top 10% of the JCR

- Seunghyun Lee and Byung Cheol Song, "Fast filter pruning via coarse-to-fine neural architecture search and contrastive knowledge transfer," IEEE Transactions on Neural Networks and Learning Systems, 2024
- Seokho Ahn, Hyungjin Kim, Euijong Lee and **Young-Duk Seo**, "SenDaL: An effective and efficient calibration framework of low-cost sensors for daily life," **IEEE Internet of Things Journal**, 2024
- Yihuai Liang, Yan Li and **Byeong-Seok Shin**, "Dynamic authenticated keyword search in hybrid-storage blockchain," **Future Generation Computer Systems-The International Journal of eScience**, 2024
- Pyeongjun Choi, Dongho Ham, **Yeongjin Kim** and Jeongho Kwak, "VisionScaling: Dynamic deep learning model and resource scaling in mobile vision applications," **IEEE Internet of Things Journal**, 2024
- Yu Zhao, Yeongjin Kim and Joohyun Lee, "SOQ: Structural reinforcement learning for constrained delay minimization with channel state information," **IEEE Internet of Things Journal**, 2024
- Dohee Kang, Daeha Kim, Donghyun Kang, Taein Kim, Bowon Lee, Deokhwan Kim and Byung Cheol Song, "Beyond superficial emotion recognition: Modality-adaptive emotion recognition system,"
 Expert Systems with Applications, 2024
- Zuyu Zhang, Yan Li, **Byeong-Seok Shin**, "Learning generalizable visual representation via adaptive spectral random convolution for medical image segmentation," **Computers in Biology and Medicine**, 2023
- Minsik Kim and **Daeyoung Park**, "Beamforming vector design and device selection in over-the-air federated learning," **IEEE Transactions on Wireless Communications**, 2023
- Ki-Hwan Kim, Myung-Seok Kim, Hye Min Lee, Myung Hwan Kim and **Seung-Buhm Woo**, "Dominant factors responsible for wave modulation in the macro-tidal Gyeonggi Bay of the Yellow Sea," **Ocean Engineering**, 2023
- Seung-Hwan Bae, "Deformable part region learning and feature aggregation tree representation for object detection," IEEE Trans. on Pattern Analysis and Machine Intelligence, 2023
- Seong-Ho Lee, Dae-Hyeon Park and **Seung-Hwan Bae**, "Decode-MOT: How can we hurdle frames to go beyond tracking-by-detection?," **IEEE Trans. on Image Processing**, 2023
- Kyungtae Lee, Jinhwi Kim, Jeongho Kwak and **Yeongjin Kim**, "Dynamic multi-resource optimization for storage acceleration in cloud storage systems," **IEEE Trans. on Services Computing**, 2023
- Myung-Seok Kim, Seung-Buhm Woo, Hyunmin Eom, Sung Hyup You and Hye Min Lee, "Towards observation-and atmospheric model-based early warning systems for meteotsunami mitigation:
 A case study of Korea," Weather and Climate Extremes, 2022
- Mincheol Kim, Ling Liu and **Wonik Choi**, "Multi-GPU efficient indexing for maximizing parallelism of high dimensional range query services," **IEEE Trans. on Services Computing**, 2022
- Hee-Yong Kwon and Mun-Kyu Lee, "Comments on "PassBio: Privacy-preserving user-centric biometric authentication"," IEEE Trans. on Information Forensics and Security, 2022
- Dae Ha Kim and Byung Cheol Song, "Deep metric learning with manifold class variability analysis,"
 IEEE Trans. on Multimedia, 2022
- Vanchinbal Chinbat and Seung-Hwan Bae, "GA3N: Generative dversarial AutoAugment network,"
 Pattern Recognition, 2022
- Youngjoon Kim, Youngho Kim and **Jeong Seop Sim**, "An improved order-preserving pattern matching algorithm using fingerprints," **Mathematics**, 2022
- Yeongjin Kim, Jaewhan Jeong, Suyoung Ahn, Jeongho Kwak and Song Chong, "Energy and delay guaranteed joint beam and user scheduling policy in 5G CoMP networks," IEEE Trans. on Wireless Communications, 2022

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Publications in Al Top Conferences

- Seongho Kim and **Byung Cheol Song**, "All you need is your voice: Emotional face representation with audio perspective for emotional talking face generation," **European Conference on Computer Vision (ECCV)**, 2024
- **Sunwoo Lee**, "Layer-wise adaptive gradient norm penalizing method for efficient and accurate deep learning," **ACM SIGKDD Conference on Knowledge Discovery and Data Mining (SIGKDD)**, 2024
- Ju-Hyeon Nam, Nur Suriza Syazwany, Su Jung Kim and **Sang-Chul Lee**, "Modality-agnostic domain generalizable medical image segmentation by multi-frequency in multi-scale attention," **IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)**, 2024
- Junhyuk Kwon, Seokho Ahn and **Young-Duk Seo**, "RecKG: Knowledge graph for recommender systems," **ACM/SIGAPP Symposium on Applied Computing (SAC)**, 2024
- Haneol Kang and **Dong-Wan Choi**, "Recall-oriented continual learning with generative adversarial meta-model," **AAAI Conference on Artificial Intelligence (AAAI)**, 2024
- Hyunjune Shin and **Dong-Wan Choi**, "Teacher as a lenient expert: Teacher-agnostic data-free knowledge distillation," **AAAI Conference on Artificial Intelligence (AAAI)**, 2024
- Seewoo Lee, Garam Lee, Jung Woo Kim, Junbum Shin and **Mun-Kyu Lee**, "HETAL: Efficient privacy-preserving transfer learning with homomorphic encryption," **International Conference on Machine Learning (ICML)**, 2023
- Seong-Woong Kim and **Dong-Wan Choi**, "Better generalized few-shot learning even without base data," **AAAI Conference on Artificial Intelligence (AAAI)**, 2023
- Sangtae Kim, **Daeyoung Park** and Byonghyo Shim, "Semantic-aware superpixel for weakly supervised semantic segmentation," **AAAI Conference on Artificial Intelligence (AAAI)**, 2023
- Daeha Kim and **Byung Cheol Song**, "Optimal transport-based identity matching for identity-invariant facial expression recognition," **Neural Information Processing Systems (NeurIPS)**, 2022
- Seunghyun Lee and **Byung Cheol Song**, "Ensemble knowledge guided sub-network search and fine-tuning for filter pruning," **European Conference on Computer Vision (ECCV)**, 2022
- Daeha Kim and **Byung Cheol Song**, "Emotion-aware multi-view contrastive learning for facial emotion recognition," **European Conference on Computer Vision (ECCV)**, 2022
- Jonathan Samuel and In Kyu Park, "3D Body reconstruction revisited: Exploring the test-time 3D body
 mesh refinement strategy via surrogate adaptation," ACM International Conference on Multimedia (ACM MM),
 2022
- Seung-Hwan Bae, "Deformable part region learning for object detection," AAAI Conference on Artificial Intelligence (AAAI), 2022
- Jaewoong Choi, Daeha Kim and **Byung Cheol Song**, "Style-guided and disentangled representation for robust image-to-image translation," **AAAI Conference on Artificial Intelligence (AAAI)**, 2022
- Farkhod Makhmudkhujaev, Sungeun Hong and In Kyu Park, "Re-Aging GAN: Toward personalized face age transformation," IEEE/CVF International Conference on Computer Vision (ICCV), 2021
- Hakbin Kim and Dong-Wan Choi, "Pool of experts: Realtime querying specialized knowledge in massive neural networks," ACM SIGMOD/PODS International Conference on Management of Data (SIGMOD), 2021
- Dae Ha Kim and **Byung Cheol Song**, "Hidden emotion detection using multi-modal signals," **ACM Conference on Human Factors in Computing Systems (CHI)**, 2021

Research Highlights and Awards

A student under Prof. Song presented a paper at ECCV 2024



▲ Seongho Kim (Master's student) and Prof. Byung Cheol Song, Dept. of Electrical and Computer Engineering

Kim (Master's student), presented the paper 'All You Need is Your Voice: Emotional Face Representation with Audio Perspective for Emotional Talking Face Generation' at ECCV(European Conference on Computer Vision) 2024.

• Prof. Lee's group presented a paper at MICCAI 2024





▲ Jong Bub Lee (Master's student), Prof. Jung Soo Kim,
Dept. of Internal Medicine, Inha University Hospital,
and Prof. Hyun Gyu Lee, Dept. of Electrical and Computer Engineering

Lee (Master's student), presented the paper COVID19 to Pneumonia:Multi Region Lung Severity Classification using CNN Transformer Position-Aware Feature Encoding Network) at MICCAI(Medical Image Computing and Computer Assisted Intervention) 2024.

• Students under Prof. Lee published a paper at CVPR 2024



▲ Ju-Hyeon Nam (Ph.D. student), Nur Suriza Syazwany (Ph.D. student), Su Jung Kim (Ph.D. student), and Prof. Sang-Chul Lee, Dept. of Electrical and Computer

Nam, Suriza, and Kim (Ph.D. students) developed an Al model called "MADGNet" for precise pixel-level prediction of cancer cells and other medical entities. Their paper, titled "Modality-Agnostic Domain Generalizable Medical Image Segmentation by Multi-Frequency in Multi-Scale Attention" was published at CVPR (Computer Vision and Pattern Recognition) 2024.

Master's students under Prof. Choi presented their theses at AAAI 2024



A Haneol Kang (Master's student), Hyunjune Shin (Master's Student), and Prof. Dong-Wan Choi, Dept. of Electrical and Computer

- Kang (Master's student) presented at AAAI 2024 (Association for the Advancement of Artificial Intelligence) on a novel method called "Recall-Oriented Continual Learning with Generative Adversarial Meta-Model," which proposes a unique approach to recall the parameters learned by neural networks, inspired by the way the human brain retrieves memories.
- Shin (Master's student) presented at AAAI 2024 (Association for the Advancement of Artificial Intelligence) on a new knowledge distillation method. He was the first to discover that existing methods could lead to unstable learning performance depending on the teacher model, and developed an effective solution to address this issue.

Prof. Lee's group won second place and received an excellence award at the '2023 Korean Al Competition'



 \blacktriangle Jonghwan Na (Master's student) and Seojin Yoon (Master's student)

Students Na and Yoon under Prof. Lee's group proposed a technique to improve speech recognition rates for a counseling voice dataset. They analyzed data and preprocessed it, and compared the performance of the state-of-the-art Al models to find the optimal model. They won second place in the category focused on "Counseling Speech Recognition".

• Students under Prof. Bae published a paper in IEEE TIP 2023



▲ Prof. Seung-Hwan Bae, Dept. of Electrical and Computer Engineering, and Seong-Ho Lee (Master's student) and Dae-Hyeon Park (Ph.D. student)

Prof. Bae's research group published a paper titled 'Decode-MOT: How Can We Hurdle Frames to Go Beyond Tracking-by-Detection' in IEEE Transactions on Image Processing (TIP), the top-tier journal in the field of image processing. The paper proposes a novel tracking mechanism that enables real-time online operation for existing multi-object tracking technologies.

Research Highlights and Awards

• Prof. Bae published in a top-tier journal in the field of computer and electrical engineering



▲ Prof. Seung-Hwan Bae, Dept. of Electrical and Computer Engineering

Prof. Bae published a paper titled 'Deformable Part Region Learning and Feature Aggregation Tree Representation for Object Detection' in IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), a journal ranked in the top 0.5% in the fields of computer and electrical engineering.

• A student under Prof. Kim won the Bronze Prize at the Samsung HumanTech Paper Award



▲ Prof. Young-Jin Kim, Dept. of Electrical and Computer Engineering, and Kyungtae Lee (Master's student)

Lee (Master's student) received the Bronze Prize at the 29th Samsung HumanTech Paper Award for proposing a technology to enhance next-generation AI applications like autonomous driving, AR, and VR on mobile devices, in the paper titled 'Adaptive DNN Model Partitioning Method for Mobile Vision Applications Using Edge.

Students under Prof. Park received the Participation Prize at the Samsung HumanTech Paper Award and the Excellence Award at the Haedong Outstanding Paper Award



▲ Minsik Kim (Ph.D. student) and Minwoo Kim (Master's student)

- Kim (Ph.D. student) received the Encouragement Prize at the 29th Samsung HumanTech Paper Award for proposing an optimized method for wireless federated learning in the paper titled 'Beamforming Vector Design and User Selection for Wireless Federated Learning'
- Kim (Master's student) received the Excellence Award at the 2023 Winter Conference of the Korean Institute of Communications and Information Sciences (KICS) Haedong Outstanding Paper Award for proposing an efficient signal detection method for MIMO systems using single-bit ADCs in the paper titled 'ADMM-Based Signal Detection Network for Binary MIMO Systems'.

• Prof. Kim's research team published a paper in IEEE Trans. on Cybernetics



▲ Prof. Byung Hyung Kim, Dept. of Electrical and Computer Engineering

Prof. Kim's research team published a paper in IEEE Trans. on Cybernetics, an international top-tier journal in the field of Al, ranked in the top 1%. The team developed a human brain asymmetry activation model and a time-series causal graph model to understand the causal relationship between human behavior and emotions.

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Yangjae Station, Seonbawi Station ▶ Bus 9200 Gwangmyeong Station, Seoksu Station ▶ Bus 3001

Sinchon Station, Seoul Station ▶ Bus 1601



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