Jaehong Kim

💌 jaehong950305@gmail.com 🏾 🖀 jaykim305.github.io 🔲 jaykim305 🖬 jaykim3	05 🗅 YouTube
Research Interest	
Al for systems, Al for video streaming, Immersive video, Systems for large-scale Al, Networked system	
Work Experience	
Carnegie Mellon University	Pittsburah PA USA
Postdoctoral Researcher in Computer Science Department	Sep. 2024 - Aug. 2025 (Expected)
Postdoctoral Fellowship Program granted by NRF. (Advisor: Srinivasan Seshan and Anthony Rowe)	оср. 202 / Улад. 2020 (2.рессеа)
Education	
KAIST (Korea Advanced Institute of Science and Technology)	Daejeon, S.Korea
Ph.D. in Electrical Engineering	Feb. 2020 - Aug. 2024 (Expected)
• Thesis title: Enabling High-quality 2D and 3D Live Streaming at Ingest (Advisor: Prof. Dongsu Han)	
KAIST (Korea Advanced Institute of Science and Technology)	Daejeon, S.Korea
M.S. IN ELECTRICAL ENGINEERING	Sep. 2018 - Feb. 2020
• Thesis title: Enhancing Live Video Quality at Ingest Using Online Trained DNNs (Advisor: Prof. Dongsu	Han)
KAIST (Korea Advanced Institute of Science and Technology)	Daejeon, S.Korea
B.S. IN ELECTRICAL ENGINEERING (CUM LAUDE)	Mar. 2014 - Aug. 2018
University of Maryland	College Park MD USA
Exchange Student Program	lan 2016 - May 2016
Publications / Preprints	
CONFERENCE PROCEEDINGS (C), WORKSHOPS (W), PREPRINTS (P)	IOPICS
[P-2] Pushing the Limits of Live 3D Streaming with BlenDR	Volumetric Video
Jaehong Kim, Junha Kim, and Dongsu Han	
Under Review	
[P-1] NerVast: Scaling Neural Video Representation with Enhanced Compression Efficiency	Al for Video
Yunheon Lee, Jaehong Kim, Juncheol Ye, and Dongsu Han	
Under Review	
[C-5] FlexPass: A Case for Flexible Credit-based Transport for Datacenter Networks	Datacenter Networking
Hwijoon Lim, Jaehong Kim, Inho Cho, Keon Jang, Wei Bai, and Dongsu Han	
ACM EuroSys 2023, 🕋 webpage	
[C-4] OUTRAN: CO-OPTIMIZING for Flow Completion Time in Radio Access Network	
	5G Networks
Jaehong Kim, Yunheon Lee, Hwijoon Lim, Youngmok Jung, Song Min Kim, and Dongsu Han	5G Networks
Jaehong Kim, Yunheon Lee, Hwijoon Lim, Youngmok Jung, Song Min Kim, and Dongsu Han ACM CoNEXT 2022 (Best paper award nominee), A webpage	5G Networks
Jaehong Kim, Yunheon Lee, Hwijoon Lim, Youngmok Jung, Song Min Kim, and Dongsu Han ACM CoNEXT 2022 (Best paper award nominee), A webpage [C-3] NeuroScaler: Neural Video Enhancement at Scale	5G Networks Al for Live Streaming
Jaehong Kim, Yunheon Lee, Hwijoon Lim, Youngmok Jung, Song Min Kim, and Dongsu Han ACM CoNEXT 2022 (Best paper award nominee), A webpage [C-3] NeuroScaler: Neural Video Enhancement at Scale Hyunho Yeo, Hwijoon Lim, Jaehong Kim, Youngmok Jung, Juncheol Ye, and Dongsu Han	5G Networks Al for Live Streaming
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Jaehong Kim, Yunheon Lee, Hwijoon Lim, Youngmok Jung, Song Min Kim, and Dongsu Han ACM CoNEXT 2022 (Best paper award nominee), ♣ webpage [C-3] NeuroScaler: Neural Video Enhancement at Scale Hyunho Yeo, Hwijoon Lim, Jaehong Kim, Youngmok Jung, Juncheol Ye, and Dongsu Han ACM SIGCOMM 2022, ♣ webpage [C-2] Neural-Enhanced Live Streaming: Improving Live Video Ingest via Online Learning Jaehong Kim [*] , Youngmok Jung [*] , Hyunho Yeo, Juncheol Ye, and Dongsu Han ACM SIGCOMM 2020, [*] Co-first authors, ♣ webpage [C-1] Neural Adaptive Content-aware Internet Video Delivery Hyunho Yeo, Youngmok Jung, Jaehong Kim, Jinwoo Shin, and Dongsu Han USENIX OSDI 2018, ♣ webpage [P(W)-2] Towards AI-Native Transformation of Media and its Processing Pipeline Seyeon Lee [*] , Jaehong Kim [*] , Yunheon Lee, and Dongsu Han Under Review, [*] Co-first authors [W-1] Neural Cloud Storage: Innovative Cloud Storage Solution for Cold Video Jinyeong Lim, Juncheol Ye, Jaehong Kim, Hwijoon Lim, Hyunho Yeo, and Dongsu Han	5G Networks AI for Live Streaming AI for Live Streaming AI for Video Streaming AI for Video Systems AI for Cloud Storage

Honors and Awards _____

(Expected)	NRF Postdoct	oral Fellowship Program	NRF
	Selected as a	orincipal investigator of Postdoctoral Fellowship Program (Nurturing	
	Next-generation	on Researchers) in 2024 granted by the National Research Foundation	
	of Korea (NRF)) with ₩60,000,000 grant for one year.	
Feb. 2023 29th Sams		g Humantech Paper Award	Samsung Electronics
Si	Silver Prize (2)	nd place), Communication & Network	
Dec. 2022 Google Travel s	Google Confe	rence Scholarship	Google LLC
	Travel grants f	or students giving oral presentations at top-tier CS conferences.	
Dec. 2022 ACM CoNE		22 Best Paper Award Nomination & ACM Student Grant	NSF & ACM
	Received the ł	nighest review score with five "4 Accept" ratings.	
Feb. 2022	28th Samsun	g Humantech Paper Award	Samsung Electronics
	Gold Prize (1st	place), Communication & Network	
2021 KAIST Brea		hrough of the Year	KAIST
	For the top 15	most significant research achievements.	
2020	Donghwa Ind	ustry Moon Daewon AI Research Scholarship	KAIST
	Awarded to a	graduate student for outstanding AI research and collaborative spirit.	
2018	USENIX OSDI	Student Grant	USENIX
Patents			
INTERNATIONA	۱L		
US17	7265680	Live video ingest system and method	KAIST
US16612498		Method and apparatus for transmitting adaptive video in real time	KAICT
		using content-aware neural network	KAIST
Domestic (So	uth Korea)		
KR10-23	38986-0000	Method for enhancing live video delivery at ingest point utilizing content-aware neural network	KAIST
KR10-2023-	0164365 (Filed)	Unified Compression Method for RGB and Depth Video in Live 3D Video Streaming	KAIST
KR10-2022-	0091760 (Filed)	Acceleration method for encoding selective super-resolved video	KAIST
KR10-2022-	0091726 (Filed)	Acceleration and scheduling method for video super-resolution based on codec-level information	KAIST
		Practical flow scheduling algorithm designed for 4G/5G radio access	Samsung Electronics &
KR10-2022-0138553 (Filed)		network base stations for low-latency applications	KAIST
		Method of scheduling flow and electronic device performing the	Samsung Electronics &
KR10-2022-0077669 (Filed)		method	, KAIST
KR10-2023-	0181034 (Filed)	Cloud storage system for cold video with content-aware super-resolution	KAIST

Research Experience

Live Volumetric Video Streaming [P-2]

AI-augmented Video Delivery for Immersive Media (NRF, PI)

Sep. 2024 - Aug. 2025 (Expected)

Funded by the National Research Foundation of Korea (NRF) with #60,000,000 for one year as a postdoctoral researcher and Pl. Nov. 2022 - Feb. 2024

Designed a novel RGB-D representation and delivery scheme for live 3D video streaming. It reduces depth error by 8.7 × (RMSE) and improves RGB quality by **3.18 dB** (PSNR) given the same bandwidth. Compared to Google's Draco, it offers **89.6%** better compression efficiency. Demonstrated real-time performance using **Azure Kinect** Camera attached to the Jetson device. Aug. 2020 - June. 2022

Cross-layer Optimization for 5G Radio Access Networks [C-4]

Developed a new transport-layer scheduling in 5G Networks that delivers better latency for latency-sensitive traffic without the QoS information. Implemented the design both on NS-3 and on top of srsRAN gNodeB, which runs on USRP Software Defined Radios (SDR). Reduced the webpage load time up to 34% outperforming legacy 4G/5G MAC schedulers. Funded by Samsung Electronics Modem S/W R&D Group.

Neural-enhanced Live Video Delivery [C-2, C-3]

Designed a new live ingest framework that ensures high-quality live streaming to viewers by enhancing origin live video quality with online-trained super-resolution DNNs at ingest servers. Implemented the client and ingest server with WebRTC, PyTorch, and ffmpeg. Improved quality of experience for live stream viewers up to 69% or saved streamer's bandwidth usage by 45.9%.

Neural-enhanced Adaptive Streaming [C-1]

Contributed to the development of a neural adaptive content-aware video delivery system, a first application of neural enhancement in adaptive video streaming. Implemented an end-to-end system on top of MPEG DASH (dash.js) and TensorFlow. Improved the quality of user experience by 43.08% or saved 17.13% of network bandwidth.

Mentoring Experience

Individual Study

- Junha Kim (B.S. KAIST / Jun. 2023 Present): Mentored research on live 3D streaming [P-2]. Read his experience 希 here.
- Yunheon Lee (B.S. KAIST → Ph.D. Candidate KAIST / Jun. 2021 Present): Mentoring research on 5G [C-4], and AI for video [P-1].
- Jinyeong Lim (M.S. KAIST): Mentored research on AI for cloud storage [W-1].
- Euijun Jeong (B.S. KAIST): Mentored research on an efficient cluster-wise training scheme for content-aware neural-enhancement.

Undergraduate Research Program (URP)

• Hyojin Choi (B.S. KAIST / Jan.2023 - Jun.2023): Mentored research on deep neural video compression.

Teaching Experience

Teaching Assistant

Presentation ____

Advanced Computer Networking and Cloud Computing (EE618)	Spring 2021
Network Programming (EE324)	Fall 2020, Fall 2021
SK Hynix ASK Program	Aug. 2020
Systems and Applications of Artificial Intelligence and Machine Learning (EE793)	Spring 2020
 Programming Structures for Electrical Engineering (EE209) 	Spring & Fall 2019, Spring & Fall 2022

Computer Science & Engineering Department Seminar/Interview at UNIST Ulsan, S.Korea Improving the Quality of Experience (QoE) of Internet Applications Jun. 2024 **Conference talk at CoNEXT'22** Rome, Italy Presented OutRAN: Co-optimizing for Flow Completion Time in Radio Access Network. Demo Dec. 2022 Conference talk at SIGCOMM'20 Presented Neural-Enhanced Live Streaming: Improving Live Video Ingest via Online Learning. Aug. 2020 ■ 20-min talk . ■ 10-min talk Demo & Poster session at OSDI'18 Carlsbad, CA, USA Presented demo of Neural Adaptive Content-aware Internet Video Delivery. Demo Oct. 2018

Academic Service _

2023, 2024 IEEE/ACM transactions on networking, Role: Reviewer

Skills_ **Programming** Python, C/C++, JavaScript, CUDA AI Frameworks TensorFlow, PyTorch, TensorRT

Other Skills dash.js, ffmpeg, NS-3, srsRAN, Docker

Languages Korean (native), English (fluent, IBT TOEFL 106)

References ____

Available upon request.

Virtual

Nov. 2018 - July. 2020

Mar. 2017 - Oct. 2018