# Juncheol Ye

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## RESEARCH INTEREST

**Video systems**, **AI for systems**, **Systems for AI**.

## EDUCATION

**Korea Advanced Institute of Science and Technology (KAIST)** — Feb 2022 - Present
Ph.D. in Electrical Engineering (Advisor: Dongsu Han)

**Korea Advanced Institute of Science and Technology (KAIST)** — Feb 2020 - Feb 2022
M.S. in Electrical Engineering (Advisor: Dongsu Han)

**Pusan National University** — Feb 2016 - Feb 2020
B.S. in Electronic Engineering (Summa Cum Laude)

## PUBLICATIONS

(C1) **SAND: A New Programming Abstraction for Video-based Deep Learning**
Juncheol Ye, Seungkook Lee, Hwijoon Lim, JiHyuk Lee, Uitaek Hong, Youngjin Kwon, and Dongsu Han
**ACM SOSP 2025** (Acceptance Rate 66/369: 17.9%)

(C2) **NarrAD: Automatic Generation of Audio Descriptions for Movies with Rich Narrative Context**
Jaehyeong Park, Juncheol Ye, Seungkook Lee, Hyun W Ka, and Dongsu Han
**IEEE/CVF WACV 2025** (Acceptance Rate 930/2458: 37.8%)

(C3) **Accelerating Model Training in Multi-cluster Environments with Consumer-grade GPUs**
Hwijoon Lim, Juncheol Ye, Sangeetha Abdu Jyothi, and Dongsu Han
**ACM SIGCOMM 2024** (Acceptance Rate 62/366: 16.9%)

(C4) **AccelIR: Task-aware Image compression for Accelerating Neural Restoration**
Juncheol Ye, Hyunho Yeo, Jinwoo Park, and Dongsu Han
**IEEE/CVF CVPR 2023** (Acceptance Rate 2360/9155: 25.7%)

(C5) **NeuroScaler: Neural Video Enhancement at Scale**
Hyunho Yeo, Hwijoon Lim, Jaehong Kim, Youngmok Jung, Juncheol Ye, and Dongsu Han
**ACM SIGCOMM 2022** (Acceptance Rate 55/281: 19.5%)

(C6) **NEMO: Enabling Neural-enhanced Video Streaming on Commodity Mobile Devices**
Hyunho Yeo, Chan Ju Chong, Youngmok Jung, Juncheol Ye, and Dongsu Han
**ACM MobiCom 2020** (Acceptance Rate 62/384: 16.1%)

(C7) **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** (Acceptance Rate 53/250: 21.2%)

(W1) **Neural Cloud Storage: Innovative Cloud Storage Solution for Cold Video**
Jinyeong Lim, Juncheol Ye, Jaehong Kim, Hwijoon Lim, Hyunho Yeo, and Dongsu Han
**ACM HotStorage 2023** (Acceptance Rate 34/87: 39.1%)

## PROJECTS

**A New Programming Abstraction for Video-Based Deep Learning** — May 2024 - Dec 2024
Ph.D. student, KAIST

- Designed a programming abstraction to encapsulate complex pre-processing pipelines in video-based deep learning tasks.
- Reduced pre-processing overhead through system-level optimizations, including storage caching and task scheduling.
- Enhanced resource efficiency by implementing a sharing strategy for multi-task scenarios utilizing the same dataset.

**Accelerating Model Training in Multi-cluster Environments with Consumer-grade GPUs** — Aug 2023 - Feb 2024
Ph.D. student, KAIST

- Investigated optimal trade-offs between batch size and gradient compression rate to achieve the best Time-To-Accuracy (TTA) under bandwidth constraints.
- Applied acceleration techniques to fine-tune large language models (LLMs) and evaluated their performance.
- Enabled collaborative training across on-premise clusters containing consumer-grade GPUs and public cloud clusters.

**Accelerating Dark Web Port Scanning with Tor Hidden Services** — May 2022 - Dec 2025
Ph.D. student, KAIST

- Proposed a latency-aware Tor circuit path selection algorithm to accelerate Tor circuit building time.
- Leveraged GPUs for batch encryption and decryption to enhance processing speed.
- Supported by the Information & Communications Technology Promotion (IITP) grant funded by the Korea government.

**Optimizing Traditional Image Codecs for Neural Enhancement** — Sept 2021 - June 2023
Ph.D. student, KAIST

- Designed a framework that optimizes image compression considering the end-to-end pipeline of IR tasks.
- Implemented a framework on top of python and applied to **JPEG** and **WebP**.
- Reduced computing overhead of image restoration by **29-49%**.

**Financial Management Support through Customer Data Analysis using Machine Learning** Aug 2020 - Aug 2021
M.S. student, KAIST

- Anaylzed real-world customer data and designed a system for predicting customer intentions regarding product extension.
- Implemented an end-to-end system on top of python and integrated with KB Captial's financial management system.
- Funded by **KB Captial Co., Ltd. Financial Accounting Team**.

## SKILLS

**Programming languages:** C/C++, Python          **AI frameworks:** Tensorflow, Pytorch, TensorRT
**Languages:** Korean (native), English (fluent)