Jaehong Kim

Contact

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Research Interests

High Performance Networked Systems, Deep Learning based Video Delivery, Video Analytics

Education

Korea Advanced Institute of Science and Technology (KAIST) — Feb. 2020 ∼ Present
Ph.D., in School of Electrical Engineering (Advisor: Prof. Dongsu Han)

Korea Advanced Institute of Science and Technology (KAIST) — Aug. 2018 ∼ Feb. 2020
M.S., in School of Electrical Engineering (Advisor: Prof. Dongsu Han)

Korea Advanced Institute of Science and Technology (KAIST) — Feb. 2014 ∼ Aug. 2018
B.S., in School of Electrical Engineering (Cum Laude)

Publications

Conference (* denotes equal contribution.)

- **FlexPass: A Case for Flexible Credit-based Transport for Datacenter Networks**
  Hwijoon Lim, Jaehong Kim, Inho Cho, Keon Jang, Wei Bai and Dongsu Han
  ACM EuroSys 2023 (Acceptance Rate 26/184 (Fall): 14.1%)
- **OutRAN: Co-optimizing for Flow Completion Time in Radio Access Network**
  Jaehong Kim, Yunheon Lee, Hwijoon Lim, Youngmok Jung, Song Min Kim, and Dongsu Han
  ACM CoNEXT 2022 (Acceptance Rate 28/151: 18.5%, **Best paper award nominee**)
- **NeuroScaler: Neural Video Enhancement at Scale**
  Hyunho Yeo, Hwijoon Lim, Jaehong Kim, Yongmok Jung, Juncheol Ye and Dongsu Han
  ACM SIGCOMM 2022 (Acceptance Rate 55/279: 19.7%)
- **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%)
- **Neural Adaptive Content-aware Internet Video Delivery**
  Hyunho Yeo, Youngmok Jung, Jaehong Kim, Jinwoo Shin and Dongsu Han
  USENIX OSDI 2018 (Acceptance Rate 47/257: 18.2%)

Workshop

- **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

Honors and Awards

- **29th Samsung Humantech Paper Award** — Samsung Electronics, Feb. 2023
  Silver Prize (2nd place, Lead-author), Communication & Networks.
- **Google Conference Scholarship (APAC)** — Google, Dec. 2022
- **CoNEXT'22 Student Travel Grant** — NSF & ACM, Oct. 2022
- **28th Samsung Humantech Paper Award** — Samsung Electronics, Feb. 2022
  Gold Prize (1st place, Co-author), Communication & Networks.
- **KAIST Breakthroughs of the Year 2021 Spring** — KAIST, 2021
- **Donghwa Industry Moon Daewon AI Research Scholarship** — KAIST, 2020
- **USENIX OSDI Student Grant** — USENIX, 2018

Research Projects

- **Direct Volume Render Streaming** — Apr. 2022 ∼ July. 2022
  Implemented a DICOM 3D visualization app prototype for Oculus Quest2 using Nvidia **CloudXR** and Unity. Funded by INUCreative Inc. Demo video link (CloudXR), Demo video link (Unity)

- **Neural Video Enhancement at Scale** Oct. 2021 ∼ Dec. 2021
- **Optimizing downlink scheduling in Radio Access Networks (OutRAN)** Aug. 2020 ∼ Present
  Designed a practical flow scheduler for LTE/5G xNodeBs that achieves low-latency for Interactive traffic. Implemented the system on top of **srsRAN** (i.e., open-source LTE/5G software radio suite) and **NS-3**. The scheduler can reduce webpage load time of Android phones up to **34%**. Funded by **Samsung Electronics Co., Ltd. Modem S/W R&D Group.**
- **Deploying Credit-based Proactive Transport for Datacenter Networks** July. 2020 ∼ Jan. 2021
- **Neural-enhanced Live Streaming (LiveNAS)** Nov. 2018 ∼ July. 2020
  Designed a new live ingest system that enhances the origin live stream's quality with online-trained super-resolution DNNs at the ingest server. The system delivers up to **69%** QoE improvement. Implemented client, server with **WebRTC**, **PyTorch** and **ffmpeg**. Led the project as a **team leader**.
- **Neural-enhanced Adaptive Streaming (NAS)** Nov. 2017 ∼ Oct. 2018
  Designed a new video delivery system that integrates super-resolution DNNs with adaptive streaming. Implemented **dash.js** that handles DNN integrated ABR and super-resolution on MPEG video chunks.

Invited Talks

- **OutRAN: Co-optimizing for Flow Completion Time in Radio Access Network**
  Conference talk at CoNEXT'22, Dec., 2022.
- **Neural-Enhanced Live Streaming: Improving Live Video Ingest via Online Learning**
  Virtual conference talk at SIGCOMM'20, Aug., 2020. 10 min talk video link, 20 min talk video link
- **Neural Adaptive Content-aware Internet Video Delivery**
  Poster & Demo Session at OSDI'18, Oct., 2018. Demo video link

Teaching Experience

Teaching Assistant

- **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

Proficient Skills

Programming Languages: C, C++, Python, UNIX shell scripting, Latex, JavaScript
Tools & Frameworks: dash.js, ffmpeg, NS-3 Simulator, srsRAN, Docker, Azure Kinect
Deep Learning Frameworks: Tensorflow, PyTorch
Languages: Korean (native), English (IBT TOEFL 106, test date: 2015.08.22)