Junghyup Lee

Ph.D Student
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EDUCATION

- **Yonsei University, Seoul, Korea**   *Mar. 2018 - Aug. 2024 (Expected)*
  School of Electrical and Electronic Engineering, Joint course of M.S./Ph.D   GPA: 4.25/4.3
  Supervisor: Bumsub Ham

- **Yonsei University, Seoul, Korea**   *Mar. 2012 - Feb. 2018*
  School of Electrical and Electronic Engineering, B.S.   GPA: 4.13/4.3 (Major), 3.92/4.3 (Overall)

RESEARCH INTERESTS

Efficient Machine Learning: Network Architecture Search, Network Quantization, Knowledge Distillation

Computer Vision: Image Matching, Super Resolution

TECHNICAL SKILLS

Languages: Korean, English

Programming: Python, PyTorch, MATLAB, C/C++, CUDA

PUBLICATIONS (FIRST AUTHOR)

- **A Paper About Network Quantization (Under Review)**
  Participated as **a first author**.
  submitted to IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)

- **AZ-NAS: Assembling Zero-Cost Proxies for Network Architecture Search**   *Jun. 2024*
  Junghyup Lee and Bumsub Ham.
  in IEEE Conference on Computer Vision and Pattern Recognition (CVPR)

- **Learning Semantic Correspondence Exploiting an Object-level Prior**   *Mar. 2022*
  Junghyup Lee*, Dohyung Kim*, Wonkyung Lee, and Bumsub Ham (*equal contribution).
  IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), vol. 44, no. 3, pp. 1399-1414

- **Network Quantization with Element-wise Gradient Scaling**   *Jun. 2021*
  Junghyup Lee, Dohyung Kim, and Bumsub Ham.
  in IEEE Conference on Computer Vision and Pattern Recognition (CVPR)

- **Learning with Privileged Information for Efficient Image Super-Resolution**   *Aug. 2020*
  Junghyup Lee*, Wonkyung Lee*, Dohyung Kim*, and Bumsub Ham (*equal contribution).
  in European Conference on Computer Vision (ECCV)

- **SFNet: Learning Object-aware Semantic Correspondence**   *Jun. 2019*
  Junghyup Lee*, Dohyung Kim*, and Bumsub Ham (*equal contribution).
  in IEEE Conference on Computer Vision and Pattern Recognition (CVPR) **(Oral Presentation)**

PUBLICATIONS (CO-AUTHOR)

- **RankMixup: Ranking-Based Mixup Training for Network Calibration**   *Oct. 2023*
  Jongyoun Noh, Hyekang Park, **Junghyup Lee**, and Bumsub Ham.
  in International Conference on Computer Vision (ICCV)

- **Decomposed Knowledge Distillation for Class-Incremental Semantic Segmentation**   *Nov. 2022*
  Donghyeon Baek, Youngmin Oh, Sanghoon Lee, **Junghyup Lee**, and Bumsub Ham.
  in Neural Information Processing Systems (NeurIPS)

- **SIF-NPU: A 28nm 3.48 TOPS/W 0.25 TOPS/mm^2 CNN Accelerator with Spatially** *Sep. 2022*
  Independent Fusion for Real-Time UHD Super-Resolution
  Sumin Lee, Ki-Beom Lee, Sunghwan Joo, Hong Keun Ahn, **Junghyup Lee**, Dohyung Kim,
  Bumsub Ham, and Seong-Ook Jung
  in IEEE European Solid State Circuits Conference (ESSCIRC)

- **OIMNet++: Prototypical Normalization and Localization-aware Learning for** *Oct. 2022*
  Person Search
  Sanghoon Lee, Youngmin Oh, Donghyeon Baek, **Junghyup Lee**, and Bumsub Ham.
  in European Conference on Computer Vision (ECCV)

- **Learning by Aligning: Visible-Infrared Person Re-identification using Cross-Modal** *Oct. 2021*
  Correspondences
  Hyunjong Park*, Sanghoon Lee*, **Junghyup Lee**, and Bumsub Ham (*equal contribution).
  in International Conference on Computer Vision (ICCV)

- **Video-based Person Re-identification with Spatial and Temporal Memory Networks** *Oct. 2021*
  Chanho Eom, Geon Lee, **Junghyup Lee**, and Bumsub Ham.
  in International Conference on Computer Vision (ICCV)

- **Distance-aware Quantization** *Oct. 2021*
  Dohyung Kim, **Junghyup Lee**, and Bumsub Ham.
  in International Conference on Computer Vision (ICCV)

AWARDS

- **Silver Prize (First Author)** *Feb. 2022*
  28th Samsung Humantech Paper Award

- **Gold Prize (First Author)** *Feb. 2021*
  27th Samsung Humantech Paper Award

- **Excellence Award (First Author)** *Dec. 2020*
  Graduate Student Paper Contest in Yonsei University

- **Silver Prize (First Author)** *Feb. 2019*
  25th Samsung Humantech Paper Award

SCHOLARSHIP

- **Global Ph.D Fellowship** *Mar. 2019 - Feb. 2024*
  National Research Foundation of Korea (NRF)

SELECTED PROJECTS

- **Development of Fundamental Technology and Integrated Solution for** *Apr. 2022 - Present*
  Next-Generation Automatic Artificial Intelligence System
  Supported by the SW StarLab project of IITP

  – Develop a network architecture search algorithm
  – Develop a network quantization algorithm
  – Implement the algorithms using PyTorch
  – Outcomes: 1 conference paper, 1 journal paper (under review), 1 patent (application)

- **N^{2}OC: Neural-Networks-on-Chip for Real Time Super-Resolution** *Dec. 2018 - Nov. 2021*
  Supported by Samsung Science & Technology Foundation

  – Develop an efficient super-resolution algorithm
  – Develop network quantization methods for hardware implementation
  – Implement the algorithms using PyTorch and release them as open-source projects
  – HW/SW co-optimization for designing a super-resolution chip
  – Outcomes: 4 conference papers, 2 patents (registration), 1 patent (application)

- **Dense Semantic Correspondence Based on Deep Learning:** *Mar. 2018 - Feb. 2020*
  From Supervised Learning to Unsupervised Learning
  Supported by National Research Foundation (NRF) of Korea

  – Develop a semantic correspondence (pixel-level image matching) algorithm
  – Implement the algorithm using PyTorch and release it as an open-source project
  – Outcomes: 1 conference paper, 1 journal paper, 1 patent (registration)

PATENTS

- **Quantization Apparatus and Method for Artificial Neural Network** *Sep. 2023*
  10-2023-0116857, KR (Application)

- **Image Upscaling Apparatus and Method Based on Learning with Privileged** *Jun. 2023*
  Information
  10-2543690, KR (Registration)

- **Quantization-Aware Training Apparatus and Method** *Apr. 2023*
  10-2023-0049837, KR (Application)

- **Apparatus and Method for Class Incremental Semantic Segmentation Learning** *Dec. 2022*
  based on Decomposed Knowledge Distillation
  10-2022-0185609, KR (Application)

- **Quantizer for Artificial Neural Networks and Loss Backpropagation Method Thereof** *Jun. 2022*
  10-2409476, KR (Registration)

- **Apparatus and Method for Person Re-Identification based on Video with Spatial** *Dec. 2021*
  and Temporal Memory Networks
  10-2021-0179580, KR (Application)

- **Quantizer and Quantization Method for Artificial Neural Network** *Oct. 2020*
  10-2020-0135673, KR (Application)

- **Semantic Matching Apparatus and Method** *Oct. 2020*
  10-2166117, KR (Registration)

EXPERIENCE

- **Reviewer**
  – IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI).
  – IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2020, 2021, 2022, 2023, 2024.
  – Neural Information Processing Systems (NeurIPS), 2020, 2021, 2022.
  – International Conference on Computer Vision (ICCV), 2019, 2021.
  – European Conference on Computer Vision (ECCV), 2020.
  – AAAI Conference on Artificial Intelligence (AAAI), 2023.

- **Presentations & Invited Talks**
  Invited Talk (Network Quantization)
  – *Naver Labs Seminar* *Jun. 2022*

  Poster Presentation (Network Quantization with Element-wise Gradient Scaling)
  – *Naver AI Author Meetup - Computer Vision* *Sep. 2021*
  – *Korean Conference on Computer Vision (KCCV)* *Aug. 2021*

  Poster Presentation (Video Pose Propagation using Semantic Correspondence)
  – *32nd Workshop on Image Processing and Image Understanding (IPIU)* *Jan. 2020*

  Poster Presentation (SFNet: Learning Object-aware Semantic Correspondence)
  – *Samsung AI Forum (SAIF)* *Nov. 2019*
  – *Workshop on Frontiers of Electrical Engineering (FREE) in Yonsei University* *Oct. 2019*
  – *Korean Conference on Computer Vision (KCCV)* *Jul. 2019*