Dr. Jaehong Yoon

(last updated: Jul-10-2024)

Contact Information

University of North Carolina, Chapel Hill, NC
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Links: Homepage, Google Scholar, Twitter

Research Interests

For my long-term research goal, I've been dedicated to developing lifelong adaptability in embodied AI systems and multimodal foundation models (e.g., VLM, MLLM, diffusion models) within dynamic real-world environments. These systems aim to be reliable, improvable, interactive, and compositional, addressing practical, real-world challenges to better understand human behavior and significantly impact our daily lives. My research interest includes the following topics:

- Multimodal/Video Large Language Models: Comprehension, Generation, and Faithfulness
- Compositional Generalization: Continual Learning and Compositional Reasoning
- Efficient Training/Inference: Parameter-efficient Learning, Model Compression, and Federated Learning

Research Experience

Postdoctoral Research Associate, UNC Chapel-Hill, NC **08/2023 - Current**
Advisor: Prof. Mohit Bansal

Postdoctoral Research Associate, KAIST, South Korea 03/2023 - 08/2023
Advisor: Prof. Sung Ju Hwang

Visiting Student, Weizmann Institute of Science, Israel 10/2022 - 11/2022
Host: Prof. Yonina Eldar

Research Intern, Microsoft Research, China 11/2021 - 04/2022
Visual Computing Group
Mentor: Dr. Yue Cao

Research Scientist, MLAI Lab., KAIST, South Korea 02/2018 - 08/2018

Education

KAIST, Daejeon, South Korea

Ph.D., School of Computing, Aug 2018 - Feb 2023

- Thesis: *"On-device, Online Continual Learning for the Real World"*
- The Best Ph.D. Dissertation Award from KAIST College of Engineering
- The Best Ph.D. Dissertation Award from KAIST School of Computing
- Machine Learning and Artificial Intelligence (MLAI) Lab
- Adviser: Prof. Sung Ju Hwang
- Area of Study: Machine Learning

UNIST, Ulsan, South Korea

M.S., Computer Science, Aug 2016 - Feb 2018

- Thesis: *"Combined Group and Exclusive Sparsity for Deep Neural Networks"*
- Adviser: Prof. Sung Ju Hwang
- Area of Study: Machine Learning

B.S., Computer Science Engineering, Mar 2012 - Aug 2016

- Biological Science Minor

Conference Publications

*: equal contribution

[C23] ***EnvGen: Bootstrapping Embodied Agent Training with LLM-Generated Environments***
Abhay Zala*, Jaemin Cho*, Han Lin, **Jaehong Yoon**, and Mohit Bansal
Conference on Language Modeling **(COLM) 2024**, Philadelphia, PA

[C22] ***Mementos: A Comprehensive Benchmark for Multimodal Large Language Model Reasoning over Image Sequences***
Xiyao Wang, Yuhang Zhou, Xiaoyu Liu, Hongjin Lu, Yuancheng Xu, Feihong He, **Jaehong Yoon**, Taixi Lu, Gedas Bertasius, Mohit Bansal, Huaxiu Yao, and Furong Huang
Annual Meeting of the Association for Computational Linguistics **(ACL) 2024**, Bangkok, Thailand

[C21] ***STELLA: Continual Audio-Video Pre-training with Spatio-Temporal Localized Alignment***
Jaewoo Lee*, **Jaehong Yoon***, Wonjae Kim, Yunji Kim, and Sung Ju Hwang
CVPR 2024 Workshop on Continual Learning (CLVision)
International Conference on Machine Learning **(ICML) 2024**, Vienna, Austria

[C20] ***EVEREST: Efficient Masked Video Autoencoder by Removing Redundant Spatiotemporal Tokens***
Sunil Hwang*, **Jaehong Yoon***, Youngwan Lee*, and Sung Ju Hwang
CVPR 2024 Workshop on Transformers for Vision (T4V), **Spotlight Presentation**
International Conference on Machine Learning **(ICML) 2024**, Vienna, Austria

[C19] ***BECoTTA: Input-dependent Online Blending of Experts for Continual Test-time Adaptation***
Daeun Lee*, **Jaehong Yoon***, and Sung Ju Hwang
CVPR 2024 Workshop on Test-Time Adaptation
International Conference on Machine Learning **(ICML) 2024**, Vienna, Austria

[C18] ***Carpe Diem: On the Evaluation of World Knowledge in Lifelong Language Models***
Yujin Lee, **Jaehong Yoon**, Seonghyeon Ye, Sangmin Bae, Namgyu Ho, Sung Ju Hwang, and Se Young Yun
NeurIPS 2023 Workshop on Synthetic Data Generation with Generative AI, **Oral**
The North American Chapter of the Association for Computational Linguistics **(NAACL) 2024**, Mexico City, Mexico

[C17] ***Multimodal Representation Learning by Alternating Unimodal Adaptation***
XiaoHui Zhang, **Jaehong Yoon**, Mohit Bansal, and Huaxiu Yao
The IEEE/CVF Computer Vision and Pattern Recognition Conference **(CVPR) 2024**, Seattle, Washington

[C16] ***ECoFLaP: Efficient Coarse-to-Fine Layer-Wise Pruning for Vision-Language Models***
Yi-lin Sung, **Jaehong Yoon**, and Mohit Bansal
International Conference on Learning Representations **(ICLR) 2024**, Vienna, Austria

[C15] ***Analyzing and Mitigating Object Hallucination in Large Vision-Language Models***
Yiyang Zhou*, Chenhang Cui*, **Jaehong Yoon**, Linjun Zhang, Chelsea Finn, Mohit Bansal, and Huaxiu Yao
NeurIPS 2023 Workshop on Instruction Tuning and Instruction Following
International Conference on Learning Representations **(ICLR) 2024**, Vienna, Austria

[C14] ***Progressive Fourier Neural Representation for Sequential Video Compilation***
Haeyong Kang, **Jaehong Yoon**, Dahyun Kim, Sung Ju Hwang, and Chang D. Yoo
International Conference on Learning Representations **(ICLR) 2024**, Vienna, Austria

[C13] ***Text-Guided Token Selection for Text-to-Image Synthesis with Token-based Diffusion Models***
Jaewoong Lee*, Sangwon Jang*, Jaehyeong Jo, **Jaehong Yoon**, Yunji Kim, Jin-Hwa Kim, Jung-Woo Ha, Sung Ju Hwang
International Conference on Computer Vision **(ICCV) 2023**, Paris, France

[C12] ***Continual Learners are Incremental Model Generalizers***
Jaehong Yoon, Sung Ju Hwang, Yue Cao
International Conference on Machine Learning **(ICML) 2023**, Hawaii, USA

[C11] ***Personalized Subgraph Federated Learning***
Jinheon Baek*, Wonyong Jeong*, Jiongdao Jin, **Jaehong Yoon**, and Sung Ju Hwang
International Conference on Machine Learning **(ICML) 2023**, Hawaii, USA

[C10] ***On the Soft-Subnetwork for Few-shot Class Incremental Learning***
Haeyong Kang, **Jaehong Yoon**, Sultan Madjid, Sung Ju Hwang, Chang D. Yoo
International Conference on Learning Representations **(ICLR) 2023**, Kigali, Rwanda

[C9] ***Bitwidth Heterogeneous Federated Learning with Progressive Weight Dequantization***
Jaehong Yoon*, Geon Park*, Wonyong Jeong, and Sung Ju Hwang
International Conference on Machine Learning **(ICML) 2022**, Baltimore, USA

[C8] ***Forget-free Continual Learning with Winning Subnetworks***
Haeyong Kang*, Rusty Mina*, Sultan Madjid, **Jaehong Yoon**, Mark Hasegawa-Johnson, Sung Ju Hwang, and Chang D. Yoo
International Conference on Machine Learning **(ICML) 2022**, Baltimore, USA

[C7] ***Rethinking the Representational Continuity: Towards Unsupervised Continual Learning***
Divyam Madaan, **Jaehong Yoon**, Yuanchun Li, Yunxin Liu, and Sung Ju Hwang
International Conference on Learning Representations **(ICLR) 2022**, Virtual
Oral Presentation (Acceptance Rate = 54/3391 = 1.6%)

[C6] ***Online Coreset Selection for Rehearsal-based Continual Learning***
Jaehong Yoon, Divyam Madaan, Eunho Yang, and Sung Ju Hwang
International Conference on Learning Representations **(ICLR) 2022**, Virtual

[C5] ***Federated Continual Learning with Weighted Inter-client Transfer***
Jaehong Yoon*, Wonyong Jeong*, Giwoong Lee, Eunho Yang, and Sung Ju Hwang
ICML 2020 Workshop on Lifelong Machine Learning Workshop
International Conference on Machine Learning **(ICML) 2021**, Virtual

[C4] ***Federated Semi-supervised Learning with Inter-Client Consistency & Disjoint Learning***
Wonyong Jeong, **Jaehong Yoon**, Eunho Yang, and Sung Ju Hwang
ICML 2020 Workshop on Federated Learning for User Privacy and Data Confidentiality Workshop, **Long Presentation**, **Best Student Paper Award**
International Conference on Learning Representations **(ICLR) 2021**, Virtual

[C3] ***Scalable and Order-robust Continual Learning with Additive Parameter Decomposition***
Jaehong Yoon, Saehoon Kim, Eunho Yang, and Sung Ju Hwang
International Conference on Learning Representations **(ICLR) 2020**, Addis ababa, Ethiopia, Virtual

[C2] ***Lifelong Learning with Dynamically Expandable Networks***
Jaehong Yoon, Eunho Yang, Jeongtae Lee, and Sung Ju Hwang
International Conference on Learning Representations **(ICLR) 2018**, Vancouver, Canada

[C1] ***Combined Group and Exclusive Sparsity for Deep Neural Networks***
Jaehong Yoon and Sung Ju Hwang
International Conference on Machine Learning **(ICML) 2017**, Sydney, Australia

Preprints

[P7] ***Blindness and Hallucinations: Revisiting Multi-modal Alignment in Vision-Language Large Models***
Xinyu Yang, Chenhang Cui, **Jaehong Yoon**, Yiyang Zhou, Yi-Lin Sung, Mohit Bansal, Beidi Chen, and Huaxiu Yao
submitted, 2024.

[P6] ***RACCooN: Remove, Add, and Change Video Content with Auto-Generated Narratives***
Jaehong Yoon*, Shoubin Yu*, and Mohit Bansal
arXiv:2405.18406, 2024.

[P5] ***VideoTree: Adaptive Tree-based Video Representation for LLM Reasoning on Long Videos***
Ziyang Wang*, Shoubin Yu*, Elias Stengel-Eskin*, **Jaehong Yoon**, Feng Cheng, Gedas Bertasius, Mohit Bansal
arXiv:2405.19209, 2024.

[P4] ***SELMA: Learning and Merging Skill-Specific Text-to-Image Experts with Auto-Generated Data***
Jialu Li, Jaemin Cho, Yi-lin Sung, **Jaehong Yoon**, and Mohit Bansal
arXiv:2403.06952, 2024.

[P3] ***CREMA: Generalizable and Efficient Video-Language Reasoning via Multimodal Modular Fusion***
Shoubin Yu*, **Jaehong Yoon***, and Mohit Bansal
arXiv:2402.05889, 2024.

[P2] ***Rapid Structural Pruning of Neural Networks with Set-based Task-Adaptive Meta-Pruning***
Minyoung Song, **Jaehong Yoon**, Eunho Yang, and Sung Ju Hwang
arXiv:2006.12139, 2020.

[P1] ***Adaptive Network Sparsification with Dependent Beta-Bernoulli Dropout***
Juho Lee, Saehoon Kim, **Jaehong Yoon**, Haebeom Lee, Eunho Yang, and Sung Ju Hwang
arXiv:1805.10896, 2018.

Workshop Presentations

[W1] ***BiTAT: Neural Network Binarization with Task-dependent Aggregated Transformation***
Geon Park*, **Jaehong Yoon***, Haiyang Zhang, Xing Zhang, Sung Ju Hwang, and Yonina C. Eldar
ECCV 2022 Workshop on Computational Aspects of Deep Learning (CADL)

Patents (US only)

Method and Apparatus with Neural Network and Training
Jaehong Yoon, Saehoon Kim, Eunho Yang, and Sung Ju Hwang
US 20210256374 A1, Aug 2021

Electronic Apparatus and Method for Re-learning Trained Model
Jaehong Yoon, Eunho Yang, Jeongtae Lee, and Sung Ju Hwang
US 20180357539 A1, Dec 2018

Professional Services

Area Chair

2024 *Conference on Empirical Methods in Natural Language Processing* (EMNLP)

Reviewer

2018, 2019, 2020, 2021, 2022, 2023, 2024 *Neural Information Processing System* (NeurIPS)
2019, 2020, 2021, 2022, 2023, 2024 *International Conference on Machine Learning* (ICML)
2019, 2020, 2021, 2022, 2023, 2024 *International Conference on Learning Representations* (ICLR)
2022, 2023, 2024 *Conference on Lifelong Learning Agents* (CoLLAs)
2020 *International Joint Conferences on Artificial Intelligence* (IJCAI)
2020 *Association for the Advancement of Artificial Intelligence* (AAAI)

2021, 2023 *IEEE Transactions on Pattern Analysis and Machine Intelligence* (TPAMI)
2020, 2022 *IEEE Transactions on Neural Networks and Learning Systems* (TNNLS)
2022 *Journal of Artificial Intelligence Research* (JAIR)

2021 *IEEE/ACM Transactions on Networking* (ToN)
2020 *Neural Networks* (NN)

Awards & Honors

Google PaliGemma Academic Program Award, 2024

The Best Ph.D. Dissertation Award from KAIST College of Engineering, 2023

The Best Ph.D. Dissertation Award from KAIST School of Computing, 2023

NeurIPS Top Reviewers Award, 2019

NAVER Ph.D. Fellowship Award, 2017

Invited Talks

Jul. 2024. CSE/GSAI, Postech, *Lifelong-Adaptive and Self-Evolving AI Systems for Real-world Dynamics and Modalites*

Jul. 2024. Electronics and Telecommunications Research Institute (ETRI), *Lifelong-Adaptive and Self-Evolving AI Systems for Real-world Dynamics and Modalites*

Jul. 2024. AI Graduate School, KAIST, *Lifelong-Adaptive and Self-Evolving AI Systems for Real-world Dynamics and Modalites*

Jun. 2024. AI Graduate School, UNIST, *Large-scale Multimodal Learning: Continuity, Efficiency, and Unification*

Nov. 2023. LG AI Research, *Lightweight Video & Multimodal Learning*

Jun. 2023. Edinburgh University, *Towards Continuously Evolving AI*

Apr. 2023. CMU & MBZUAI, Prof. Eric Xing's Group, *Federated and Continual Learning with Heterogeneous Clients*

2022. UT Austin, Prof. Kristin Grauman's Group, *Online Coreset Selection for Rehearsal-based Conitnual Learning*

2022. Korea Computer Congress (KCC), "Representational Continuity for Unsupervised Continual Learning"

2019. Samsung SDS, "Lifelong Learning with Dynamically Expandable Networks"

2018. NAVER Corp., Tech. Talk, "Lifelong Learning with Dynamically Expandable Networks"

2018. SK-Telecom, Tech. Open Connect (T-T.O.C), "Lifelong Learning with Dynamically Expandable Networks"

2017. Korea Software Congress (KSC), "Combined Group and Exclusive Sparsity for Deep Neural Networks"

References

Prof. Mohit Bansal, Professor, University of North Carolina (UNC) Chapel Hill, US
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Prof. Sung Ju Hwang, Associate Professor, KAIST, South Korea
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Prof. Eunho Yang, Associate Professor, KAIST, South Korea
Email: eunhoy@kaist.ac.kr

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