Taewon Park, Ph.D.

Research Interests

My research has focused on associative and memory-augmented neural architectures, linear attention, and modular representation learning for long-term reasoning and systematic generalization. Building on this work, my current interest is in continual learning and online adaptation, particularly in bridging fast-weight memory with slow-weight learning so that neural networks can continuously acquire and retain new knowledge while minimizing interference with existing knowledge. I am also interested in exploring how structured and modular representations can support this process, especially in personalized and embodied AI systems that learn through long-term interaction.

Education

Kyungpook National University (KNU), Daegu, Republic of Korea

Ph.D. in Artificial Intelligence *Mar. 2019 – Feb. 2025*
- **Advisor:** Prof. Minho Lee and Prof. Hyun-Chul Kim
- **Dissertation:** Improving Modularity of Deep Neural Networks for Associative Memory and Systematic Generalization

B.S. in Electronics Engineering *Mar. 2015 – Feb. 2019*

Research Experience

Kyungpook National University, Daegu, Republic of Korea *Mar. 2019 – Feb. 2025*

Graduate Researcher
- Investigated associative and memory-augmented neural architectures for retaining and reasoning over information in long sequential data.
- Developed modular representation learning methods, including iterative and discrete decomposition mechanisms, to learn structured representations that support systematic and compositional generalization.

Carnegie Mellon University (CMU), Pittsburgh, PA, USA *Aug. 2022 – Feb. 2023*

Visiting Scholar in School of Computer Science
- AI-intensive program sponsored by the Korean government.

Nara Institute of Science and Technology (NAIST), Nara, Japan *Jan. 2020 – Feb. 2020*

Research Internship in Graduate School of Information Science
- Explored reinforcement learning methods for multiple neural memory blocks.

Conference Publications

[C4] **Discrete Dictionary-based Decomposition Layer for Structured Representation Learning**
Taewon Park, Hyun-Chul Kim, Minho Lee
Conference on Neural Information Processing Systems (**NeurIPS**), 2024.

[C3] **Attention-based Iterative Decomposition for Tensor Product Representations**
Taewon Park, Inchul Choi, Minho Lee
International Conference on Learning Representations (**ICLR**), 2024.

[C2] **Learning Associative Reasoning Towards Systematicity using Modular Networks**
Jun-Hyun Bae*, **Taewon Park***, Minho Lee (**: equal contribution*)
International Conference on Neural Information Processing (**ICONIP**), 2022.

[C1] **4W1H Keyword Extraction-based Summarization Model**
Seungyeon Lee, **Taewon Park**, Minho Lee
International Conference on Electronics, Information, and Communication (**ICEIC**), 2021.

Journal Publications

[J2] **Improving Systematic Generalization of Linear Transformer Using Normalization Layers and Orthogonality Loss Function**
Taewon Park, Hyun-Chul Kim
Mathematics, Vol. 12, No. 21, pp. 3390, Oct 2024. (2023-JCR-IF: 2.3, 21/490, Top 4.2%).

[J1] **Distributed associative memory network with memory refreshing loss**
Taewon Park*, Inchul Choi*, Minho Lee (**: equal contribution*)
Neural Networks, Vol. 144, pp. 33–48, Dec 2021. (2020-JCR-IF: 8.050, 25/273, Top 8.9%).

Industry Experience

PLAYTAG, Seoul, Republic of Korea *Apr. 2026 – Present*

Research Engineer

- Developed a person-centric video understanding framework that combines tracking, re-identification, and VLM-based reasoning to extract structured behavioral representations of individual people across motion, object use, and social interaction.
- Built a grounded video question-answering system for person-specific quantitative and temporal reasoning over extracted behavioral records.
- Contributed these capabilities to `monoxyz.ai`, a video analytics platform for person-level behavioral understanding.

NeoALI, Seoul, Republic of Korea *Mar. 2025 – Apr. 2026*

Research Engineer

- Developed an LLM faithfulness guardrail for on-premise RAG systems that verifies whether generated responses are supported by retrieved evidence under strict latency and resource constraints.
- Designed a hierarchical schema extraction framework that transforms unstructured documents into structured, schema-aware representations for retrieval.
- Developed a schema-guided retrieval approach that routes queries across learned document schemas and aggregates evidence from schema-specific representations.

Selected Projects

Knowledge-augmented AI Agent Through Conversations *2023 – 2023*

- Researched neuro-symbolic memory mechanisms for knowledge-augmented conversational AI agents.

Context Awareness-based Automatic Report Generation *2019 – 2022*

- Led a multimodal report-generation project and researched long-term memory architectures for context-aware summarization.

Context Awareness-based Interactive AI Development *2019 – 2020*

- Researched memory architectures for long-term context modeling in interactive AI systems.

Patents

[P3] **Multi-Model Hierarchical Reasoning Method based on Cognitive Behavioral Cycle, and Device for Performing It**
• Korea Patent Granted No. 10-2666682-00-00 *May. 2024*
Taewon Park, Junwon Lee, Minho Lee

[P2] **Information Processing Method for Systematic Generalization and Electric Device for Performing the Same**
• Korea Patent Granted No. 10-2582003-00-00 *Sep. 2023*
Jun-Hyun Bae, **Taewon Park**, Minho Lee

[P1] **Distributed Associative Memory Network System Enabling to Store the Relation**

Information Existing in Long Sequential Data
• Korea Patent Granted No. 10-2455681-00-00 *Oct. 2022*
Taewon Park, Inchul Choi, Minho Lee

Honors and Awards

- Financial Aid Award from NeurIPS 2024 *2024*
- KNU President's Excellence Award in Brain Korea Forum *2021*
- Academic Excellence Scholarship in Electronics Engineering Department *2019*
- National Science & Technology Scholarship *2017 – 2018*

Academic Service

Reviewer

ICLR'25-27, NeurIPS'25