Sejin Kim

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EDUCATION

Mar. 2017 ~ Feb. 2023	**Korea Advanced Institute of Science and Technology** School of Computing Thesis: Region-Level Spatio-Temporal Prediction Based on Transfer Learning for Data-Poor Cities *Advisor: Jae-Gil Lee* *Ph.D. in Computer Science*	Daejeon, Korea
Sep. 2013 ~ Aug. 2016	**Korea Advanced Institute of Science and Technology** School of Computing Thesis: Design and implementation of cost-based query optimization for Odysseus/OOSQL *Advisor: Kyu-Young Whang* *M.S. in Computer Science*	Daejeon, Korea
Feb. 2009 ~ Aug. 2013	**Korea Advanced Institute of Science and Technology** School of Computing *B.S. in Computer Science*	Daejeon, Korea

WORK EXPERIENCES

- **GIST AI Graduate School** - Postdoctoral Researcher, Apr. 2023 - Present
- **WITLab** - Lecturer for Korea Olympiad in Informatics (KOI), Mar. 2017 - Feb. 2023
- **GraphAI Labs** - AI Reseracher, Feb. 2023 - Mar. 2023
- **KAIST AITRC** - DB Researcher, Sep. 2016 - Aug. 2017

RESEARCH INTERESTS

- Human-like reasoning and abstraction
- ARC-AGI and compositional generalization
- Program synthesis and neuro-symbolic learning
- Reinforcement learning with trajectory modeling
- Human–AI alignment through reasoning augmentation

CONFERENCES

1. **<u>Kim, S.</u>***, Choi, H., Lee, S., Kim, S.† (2026), "ARCTraj: A Dataset and Benchmark of Human Reasoning Trajectories for Abstract Problem Solving", KDD Datasets and Benchmarks. *(top conference, acceptance rate: 29%)*

2. Cho, G.*, Im, J., Lee, J., Yi, H., **<u>Kim, S.</u>**†, Kim, S.† (2026), "TRACED: Transition-aware Regret Approximation with Co-learnability for Environment Design", ICLR. *(top conference, acceptance rate: 28%)*

3. Park, J.*, Park, J., Shim, J., **<u>Kim, S.</u>**, Vennemann, P., Kim, S.† (2025), "Composed Program Induction with Latent Program Lattice", NeurIPS NeurReps Workshop.

4. Park, J.*, Kim, Y., **<u>Kim, S.</u>**, Lee, B.J., Kim, S.† (2025), "Diffusion-model-guided Implicit Q-learning with Adaptive Revaluation", CoRL LEAP Workshop.

5. **<u>Kim, S.</u>***, Lee, H., Kim, S.† (2025), "Addressing and Visualizing Misalignments in Human Task-Solving Trajectories", KDD. *(top conference, acceptance rate: 18%)*

6. **<u>Kim, S.</u>***, Lee, H., Kim, S.† (2025), "Addressing and Visualizing Misalignments in Human Task-Solving Trajectories", ICLR Bi-Align Workshop.

7. **<u>Kim, S.</u>***, Kim, S.† (2024), "System-2 Reasoning via Generality and Adaptation", NeurIPS S2R Workshop.

8. Lee, S.*, Sim, W.*, Shin, D., **<u>Kim, S.</u>**, Kim, S.† (2024), "Reasoning Abilities of Large Language Models through the Lens of Abstraction and Reasoning", NeurIPS S2R Workshop.

9. Shim, S.*, Ko, D.*, Lee, H., Lee, S., Song, D., Hwang, S., **<u>Kim, S.</u>**, Kim, S.† (2024), "O2ARC 3.0: A Platform for Solving and Creating ARC Tasks", IJCAI Demo.

10. Lee, J.*, Sim, W.*, **<u>Kim, S.</u>**†, Kim, S.† (2024), "Enhancing Analogical Reasoning in the Abstraction and Reasoning Corpus via Model-Based RL", IJCAI IARML Workshop.

11. Lee, H.*, **<u>Kim, S.</u>***, Lee, S., Hwang, S., Lee, J., Lee, B.†, Kim, S.† (2024), "ARCLE: The Abstraction and Reasoning Corpus Learning Environment for Reinforcement Learning", CoLLAs.

12. Park, J.*, Im, J.*, Hwang, S.*, Lim, M.*, Ualibekova, S., **<u>Kim, S.</u>**, Kim, S.† (2023), "Unraveling the ARC Puzzle: Mimicking Human Solutions with Object-Centric Decision Transformer", ICML ILHF Workshop.

13. Kim, S.*, Song, H., **<u>Kim, S.</u>**, Lee, J.-G.† (2020), "Revisit Prediction by Deep Survival Analysis", PAKDD.

14. Yea, S.-G.*, **<u>Kim, S.</u>**, TO, J.-M., Lee, J.-G.† (2016), "SentiWorld: Understanding Emotions between Countries Based on Tweets", ICWSM Demo.

JOURNALS

1. Lee, S.*, Sim, W.*, Shin, D., Hwang, S., Seo, W., Park, J., Lee, S., **<u>Kim, S.</u>**, Kim, S.† (2025), "Reasoning Abilities of Large Language Models: In-Depth Analysis on the Abstraction and Reasoning Corpus", *ACM Transactions on Intelligent Systems and Technology*, 16(6), 1–52.

2. Hwang, S.*, Lee, S., **<u>Kim, S.</u>**†, Kim, S.† (2025), "Solution Augmentation for ARC Problems Using GFlowNet: A Probabilistic Exploration Approach", Transactions on Machine Learning Research.

3. Whang, K.-Y.*, Na, I., Yun, T.-S., Park, J.-A., Cho, K.-H., **<u>Kim, S.</u>**, Yi, I., Lee, B.-S. (2020), "Building Social Networking Services Systems using the Relational Shared-Nothing Parallel DBMS", *Data & Knowledge Engineering,* 125, 101756.

PREPRINTS

1. **<u>Kim, S.</u>***, Kim, S.† (2026), "System 2 Reasoning for Human–AI Alignment: Generality and Adaptivity via ARC-AGI", ICML 2026 Position Paper Track. *(submitted)*

2. Rusli, M.*, Shin, D., **Kim, S.**, Kim, S.† (2025), "Tracing and Correcting Programs: Critic-Guided Synthesis for Visual Reasoning". Data Mining and Knowledge Discovery Journal. *(submitted)*

3. Liyew, W.*, Lee, S., **Kim, S.**, Kim, S.† (2026), "Evolving and Refining Code: A Neuro-Evolutionary Program Synthesis for Compositional Reasoning". GECCO 2026. *(submitted)*

4. Jeon, J.*, Shim, S., **Kim, S.**†, Kim, S.†, Lee, B.† (2025), "Neural MCTS with LLM Guidance for Effective Program Synthesis on Abstraction and Reasoning Corpus". Machine Learning Journal. *(submitted)*

5. Kim, Y.*, Park, J., Kim, H., **Kim, S.**†, Lee, B., Kim, S. (2026), "Diffusion-Based Offline RL for Improved Decision-Making in Augmented ARC Task", KDD 2026. *(submitted)*

ACADEMIC SERVICES

- **Area Chair**, *KDD 2026 Datasets and Benchmark Track*
- **Session Chair**, *KDD 2025*
- **Program Committee Member**, *AAAI 2026; AAAI 2026 AI Alignment Track*
- **Program Committee Member**, *KDD 2025; KDD 2026*
- **Journal Reviewer** (ACM Transactions on Intelligent Systems and Technology) 2025
- **Journal Reviewer** (IEEE Transactions on Knowledge and Data Engineering) 2022; 2023

PATENTS

1. Cho, G., Im, J., Kim, S., **Kim, S.**, "METHODS AND SYSTEMS FOR LEARNING BASED ON DIFFICULTY AND MUTUAL LEARNING", KR-Application No. 10-2025-0160737

2. Park, J., Kim, S., **Kim, S.**, Kim, Y., "METHOD FOR TRAINING AN ADAPTIVE RE-EVALUATION-BASED EXECUTION SYSTEM", KR-Application No. 10-2025-0148979

3. Kim, Y., Kim, S., **Kim, S.**, Kim, H., Park, J., "METHOD AND SYSTEM FOR RULE-BASED SYNTHETIC DATA GENERATION OFFLINE REINFORCEMENT LEARNING", KR-Application No. 10-2025-0148978

4. **Kim, S.**, Lee, H., Kim, S., "METHOD AND SYSTEM FOR AN INTENTION ESTIMATION IN HUMAN PROBLEM-SOLVING TRAJECTORIES", KR-Application No. 10-2025-0135338

5. Lee, H., **Kim, S.**, Kim, S., "METHOD AND SYSTEM FOR IMPLEMENTING A REINFORCEMENT LEARNING ENVIRONMENT CAPABLE OF SOLVING ABSTRACTION AND REASONING CHALLENGE", KR-Application No. 10-2024-0101165

6. Lee, J.-G., Lee, C., Kim, J., **Kim, S.**, "RETRIEVAL SYSTEM FOR GEOSOCIAL NETWORKS AND METHOD OF THE SAME", KR-Registration No. 10-2055900-0000

INVITED TALKS

- Korea Software Congress (KSC), Early-Career Researcher Session, Korea, 2025.
- Sunchon National University (SCNU), Colloquium, Korea, 2025.
- Gwangju Institute of Science and Technology (GIST), AI Colloquium, Korea, 2025.
- Ulsan National Institute of Science and Technology (UNIST), Korea, 2025.
- Gwangju Institute of Science and Technology (GIST), AXEL Camp, Korea, 2025.
- Korea Disease Control and Prevention Agency (KDCA), DIDCS Workshop, Korea, 2025.
- University of British Columbia (UBC), EECE Seminar, Canada, 2024.

TEACHING ASSISTANTS

- CS101 **Introduction to Programming**, School of Computing, KAIST

- CS360 **Introduction to Databases**, School of Computing, KAIST

- CS560 **Database Systems**, School of Computing, KAIST

- CS664 **Advanced Database Systems**, School of Computing, KAIST

- KSE525 **Data Mining and Knowledge Discovery**, Dept. of Knowledge Service Engineering, KAIST

- KSE625 **Analytical Methodologies for Big Data**, Dept. of Knowledge Service Engineering, KAIST

AWARDS AND HONORS

- **Outstanding Reviewer**, KDD 2025
  Selected as a Top 10% reviewer for the ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2025.

- **Postdoctoral Fellowship Recipient**, NRF
  Awarded a competitive 2-year fellowship for the project Developing Abstraction and Reasoning Capability for AI Model as Principal Investigator, National Research Foundation of Korea, Sept 2024 - Aug 2026.

- **Excellence Award**, GIST
  Recognized for outstanding research achievements among postdoctoral researchers, Gwangju Institute of Science and Technology, Korea, 2024.

CONFERENCES (DOMESTIC)

1. Lee. J.[*], Lee. S., **Kim, S.**[†], Kim, S.[†] (2023), "Extracting the Core Knowledge of ARC with the World Model", Korea Software Congress.

2. Gu, G.[*], Sim, W., Im, J., **Kim, S.**, Kim, S.[†] (2023), "Using Contrastive Learning for Abstraction and Reasoning Task", Korea Software Congress.

3. Lee. H.[*], **Kim, S.**, Kim, S.[†] (2023), "ARCLE: Gymnasium Environment for Abstraction and Reasoning Corpus", Korea Software Congress.

4. Park., J.[*], Im., J., Lee, Y., Shin, D., **Kim, S.**, Kim, S.[†] (2023), "Abstraction and Reasoning Challenge with Decision Transformer", Korea Computer Congress.

5. Sim, W.[*], Jin, H., **Kim, S.**, Kim, S.[†] (2023), "The Possibility of Prompt Engineering for ARC Problem Solving", Korea Computer Congress.

6. Shin, Y.[*], Park, D., Kang, J., **Kim, S.**[†] (2022), "Contrastive Learning with Segment Supervision for Semi-Supervised Time Series Classification", Korea Software Congress.

7. Kim, B.[*], Na, J., Byun, Y., **Kim, S.**, Lee., J.-G.[†] (2022), "Autoencoder ODEs for Time Series Anomaly Detection", Korea Software Congress.

8. Kim, J.[*], Kim, D., **Kim, S.**, Kang, J., Park, D., Lee., J.-G.[†] (2022), "Performance Comparison of Self-Driving Models With and Without LIDAR Sensors Based on Reinforcement Learning in AWS DeepRacer Platform ", Korea Computer Congress.

9. Trirat, P.[*], Shin, Y., **Kim, S.**[†], Kim, M.[†] (2021), "Generating a Machine Learning Model with a Few Sentences", Korea Software Congress.

10. Kim, B.[*], Kim, S., **Kim, S.**, Lee, J.-G.[†] (2019), "Customer Revisit Prediction Using Macroscale Mobility Information", Korea Software Congress.

11. **Kim, S.**[*] (2018), "A Comparison of Implementation Method of Spatial Operator in Spatial OLAP ", Korea Computer Congress.

JOURNALS (DOMESTIC)

1. Sim, W.[*], Jin, H., **Kim, S.**, Kim, S.[†] (2024), "The Possibility of Prompt Engineering for ARC Problem Solving", KIISE Transactions on Computing Practices.