



## Sundong Kim

Assistant Professor

[sundong@gist.ac.kr](mailto:sundong@gist.ac.kr) / 062-715-6837

- Professor: AI Graduate School (S7), Room 204
- Lab: AI Graduate School (S7), Room 208

### Education

- 2019: Ph.D. in Knowledge Service Engineering, KAIST
- 2015: M.S. in Industrial and Systems Engineering, KAIST
- 2013: B.S. in Industrial and Systems Engineering, KAIST

### Positions

- 2022-: Assistant Professor, AI Graduate School, GIST
- 2019-2022: Young Scientist Fellow, Institute for Basic Science
- 2018: Research Intern, Microsoft Research Asia

## Join us

Welcome, If you are interested in our lab, please scan the QR code below and submit your CV through the form on our website. We will do our best to respond to your application as soon as possible.

As a faculty member in GIST AI, I have several MS/PhD slots available each year. Applicants are expected to be self-motivated, have strong problem-solving skills, and ability to work collaboratively with international teams. Additionally, I enjoy working with motivated undergraduate students (Thesis I, II, G-SURF), provided that: (1) there's a good research fit, and (2) they are willing to consider joining our lab in the future.



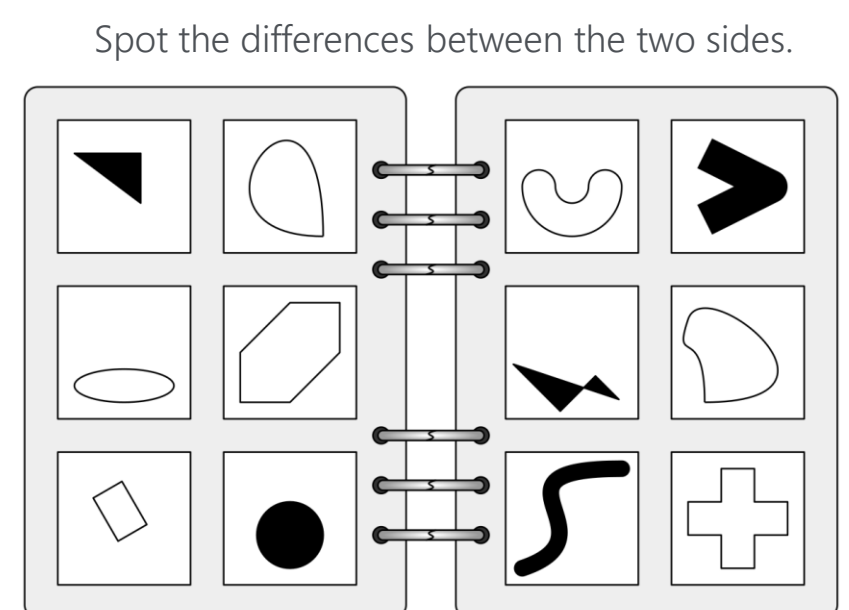
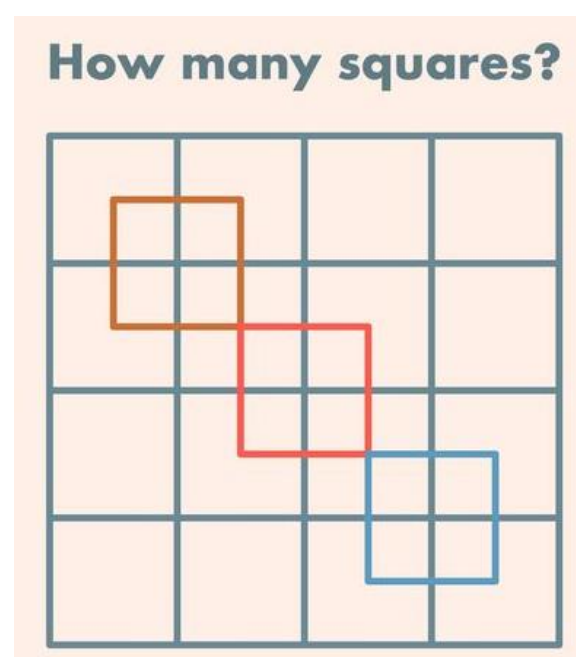
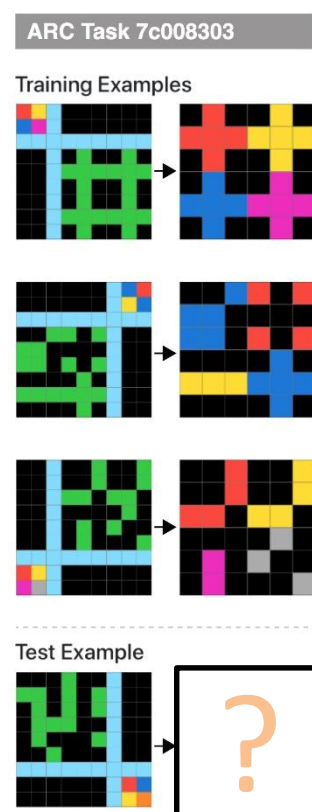
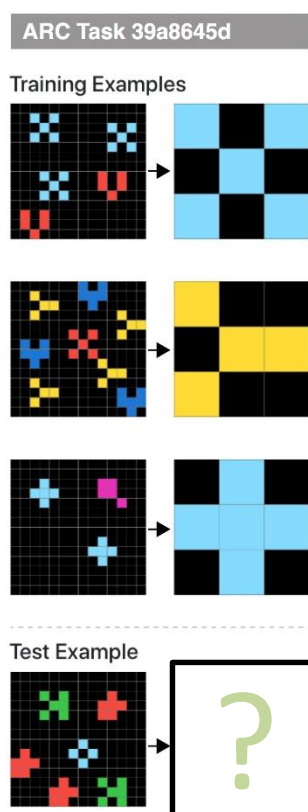
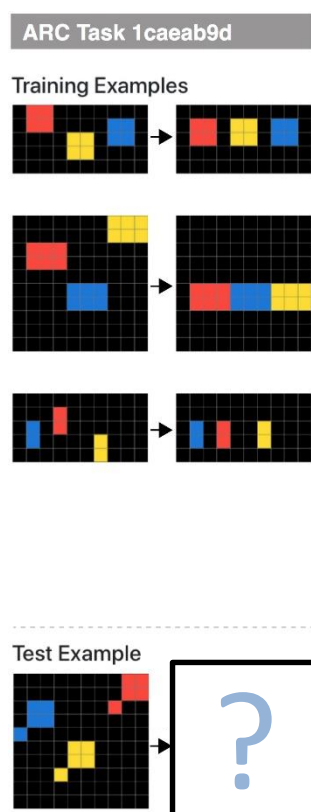
## Research Directions

Our lab aims to bridge symbolic and data-centric AI with a focus on analogical reasoning:

- Creating a gamified, high-quality data collection tool for gaining insights on human problem solving.
- Developing playgrounds for running reinforcement learning experiments for analogical reasoning tasks.
- Enhancing model-based reinforcement learning (World Models) for better analogical reasoning.
- Integrating program synthesis with LLM and RL for analogical reasoning tasks
- Exploration of how human-level abstract reasoning can be achieved through self-supervised learning

### Methodologies

- Reinforcement learning
- Program synthesis
- Representation learning
- Few-shot learning
- Continual learning
- Explainable AI
- Analogical reasoning
- Software engineering
- Open-source development



## Publications (Updated: Jun 2024)

### International Conferences / Journals

- Reasoning Abilities of Large Language Models: In-Depth Analysis on the Abstraction and Reasoning Corpus, **Under revision at ACM Transactions on Intelligent Systems and Technology**, arXiv:2403.11793.
- ARCLe: The Abstraction and Reasoning Corpus Learning Environment for Reinforcement Learning, **CoLLAs 2024**
- O2ARC 3.0: A Platform for Solving and Creating ARC Tasks, **IJCAI Demo 2024**
- Regulation Using LLMs to Generate Synthetic Data for Evaluating Analogical Ability, **IJCAI Workshop 2024**
- Abductive Symbolic Solver on Abstraction and Reasoning Corpus, **IJCAI Workshop 2024**
- Enhancing Analogical Reasoning in the Abstraction and Reasoning Corpus via Model-Based RL, **IJCAI Workshop 2024**
- Unraveling the ARC Puzzle: Mimicking Human Solutions with Object-Centric Decision Transformer, **ICML Workshop 2023**
- Playgrounds for Abstraction and Reasoning, **NeurIPS Workshop 2022**

### Domestic Conferences / Journals (Selected)

- ARC 문제 해결을 위한 프롬프트 엔지니어링의 가능성, 정보과학회 컴퓨팅의 실제 논문지 제30권 제2호, 2024
- 인지 및 추론 연구를 위한 테스트베드, 정보과학회논문지 제 51권 제1호, 2024
- ARCLe: 추상화 및 추론을 위한 강화학습 환경, 한국소프트웨어종합학술대회 2023 (우수발표논문상)
- 대형 언어 모델을 활용한 퓨샷 추론 문제의 데이터 증강, 한국소프트웨어종합학술대회 2023 (우수발표논문상)
- 귀납 편향 제공을 위한 색채 어텐션 학습, 한국소프트웨어종합학술대회 2023 (우수논문상)
- 추상화 및 추론 문제 해결을 위한 대조학습, 한국소프트웨어종합학술대회 2023
- 월드모델을 통한 ARC의 핵심 지식 추출, 한국소프트웨어종합학술대회 2023
- ARC 문제 해결을 위한 프롬프트 엔지니어링의 가능성, 한국컴퓨터종합학술대회 2023 (우수발표논문상)
- ARC 문제에서 그래프를 활용한 객체 탐지 연구, 한국컴퓨터종합학술대회 2023
- 인지 및 추론 연구를 위한 Mini-ARC 벤치마크 데이터, 한국소프트웨어종합학술대회 2022 (우수논문상)

## Alumni

I have been fortunate to work with the following students.

Undergraduate Students at GIST Data Science Group:

- Heejun Kim, Jan-May 2024 (GIST EECS → Visting student at UC Berkeley)
- Suyeon Shim, Jan-May 2024 (GIST EECS → SWE Intern at NAVER)
- Dohyun Ko, Jan-May 2024 (GIST EECS → Visting student at UC Berkeley)
- Mintaek Lim, Jan 2023 - May 2024 (GIST EECS → MS/PhD student at SNU ECE)
- Jiwon Park, Jul 2023 - Feb 2024 (GIST EECS → MS/PhD student in our lab)
- Donghyeon Shin, Mar 2023 - Feb 2024 (GIST EECS → MS student in our lab)
- Jaegyun Im, Jan-Dec 2023 (GIST EECS)
- Wonkyu Seo, Mar-Dec 2023 (GIST EECS)
- Gyojoon Gu, Jul-Dec 2023 (GIST EECS → ROK Army)
- Hyunjun Huh, Jul-Dec 2023 (GIST EECS → Visting student at SNU)
- Kena Melkamu Bulcha, Jul-Oct 2023 (GIST EECS)
- Jaehyun Park, Jan-Aug 2023 (GIST EECS → MS/PhD student in our lab)
- Peter Suk, Jul-Aug 2023 (Indiana University Bloomington)
- Tair Djanibekov, Jul-Aug 2023 (Inha University in Tashkent → MS student at KAIST AI)
- Ana Sofia Mendonça, Jul-Aug 2023 (NOVA IMS → IT Consultant at KPMG)
- Hyebin Jin, Mar-Jun 2023 (GIST EECS → Financial Supervisory Service)
- Ohyeon Kwon, Apr-Jun 2023 (GIST EECS → SWE at Startup)
- Doyoon Song, Mar-Jun 2023 (GIST EECS → SWE at Toggle)
- Sabina Ualibekova, Jan-Jun 2023 (GIST EECS)
- Youngdo Lee, Jan-Jun 2023 (KAIST CS)
- Sangwoo Park, Jan-Feb 2023 (KAIST CS)

<https://sundong.kim/members/>