MINJUN KANG

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Education

Korea Advanced Institute of Science and Technology (KAIST) Mar. 2017 - Aug. 2023
B.S. in Bio and Brain Engineering *Daejeon, South Korea*
GPA: 3.97/4.3, Major GPA : 4.11/4.3

Employment

Cognitive Intelligence Lab, KAIST Sep. 2023 - Current
Research Assistant (Advisor: Se-Bum Paik)
Computational modeling of visual system using neural network

Publications

Kang M.J., Baek S. D., & Paik S.-B. (2024). Hard-wired visual filters for environment-agnostic object recognition. *bioRxiv*. [Link]

Shin J. H., ***Kang M.J.***, & Lee S. A. (2024). Wearable fNIRS-based measurement of dissociable activation dynamics of prefrontal cortex subregions during a delayed match-to-sample task. *Human Brain Mapping*. [Link]

Presentations

2024 Korean Society for Brain and Neural Sciences (**KSBNS**) Oct. 2024
Kang M.J., Baek S. D., & Paik S.-B. Stable receptive fields for flexible adaptation in dynamic environments

2024 Society for Neuroscience (**SfN**) Oct. 2024
Kang M.J., Baek S. D., & Paik S.-B. Stable receptive fields in the early visual pathway for flexible adaptation

2024 Cognitive Computational Neuroscience (**CCN**) Aug. 2024
Kang M.J., Baek S. D., & Paik S.-B. Stable receptive fields in the early layer enable robust continual learning under dynamic environments

2024 Computational and Systems Neuroscience (**COSYNE**) Feb. 2024
Kang M.J., Kim G.S., Lee H.S., & Paik S.-B. Stable receptive fields in the early layer enable robust continual learning

2023 Korean Society for Brain and Neural Sciences (**KSBNS**) Sep. 2023
Kang M.J., Shin J.H., & Lee S.W. Does the prefrontal cortex guide optimal foraging?

2020 Korean Society for Cognitive & Biological Psychology (**KSCBP**) Aug. 2020
Kang M.J., Shin J.H., & Lee S.A. Temporal dynamics of prefrontal cortex subregion activity during working memory task: an fNIRS study

Research Experiences

Cognitive Intelligence Lab Mar. 2022 - Jun. 2023
Research Assistant *1 year 6 months*

- Advisor: Dr. Se-Bum Paik
- Study of early visual pathway's functional role using deep neural network (DNN)
- Examine whether inherent receptive fields enable general object recognition
- Incorporated Gabor filters in the first layer of DNN to model biological brains

- Showed our model recognizes objects under dynamic domain shifts through shape-biased feature encoding
- 1 preprint, 4 conference presentations

Brain and Machine Intelligence Lab Mar. 2022 - Jun. 2023
Undergraduate Research Assistant *1 year 4 months*

- Advisor: Dr. Sangwan Lee
- Study of human model-based (MB) reinforcement learning system using fMRI
- Examine whether MB system would also use temporal difference to estimate drifting rewards and generate reward prediction error (MB-RPE)
- Designed foraging tasks, conducted human behavior experiments
- Analyzed fMRI data, found significant MB-RPE signals from prefrontal cortex
- 1 conference presentation

Developmental Cognitive Neuroscience Lab Dec. 2019 - Aug. 2020
Undergraduate Research Assistant *1 year 8 months*

- Advisor: Dr. Sangah Lee
- Study of prefrontal cortex subregions' temporal dynamics during working memory using fNIRS
- Designed working memory task, conducted human behavior experiments
- Constructed novel MATLAB-based preprocessing toolbox for fNIRS data
- Devised new method for accessing decoding performance over time
- 1 journal paper, 1 conference presentation

Awards

Best Presentation Award at 2020 KSCBP Aug. 2020
* Poster presentation was substituted for recorded video due to COVID-19

Cum Laude, KAIST
* For academic excellence during undergraduate studies Feb. 2024

Experiences

2022 Summer-Fall Undergraduate Research Participation Program Jun. 2022 - Dec. 2022
* Supported 2,000,000 KRW

Undergraduate Student President, Department of Bio and Brain Engineering Mar. 2019 - Dec. 2019
* Planned one-year student welfare projects and promoted department

2023, 2024 Korean Society for Computational Neuroscience Winter School Jan. 2023, 2024

2020, 2023 KSBNS Division of High-level Cognition Workshop (Neurosplash) Aug. 2020, 2023

Harvard-MIT MGH Summer Internship Program Jan. 2020
* Selected as KAIST representative (top 5), but canceled due to COVID-19

Military Service Sep. 2020 - Mar. 2022
* Korea Army, Honorably discharged

Skills

Softwares	MATLAB, Python, LaTex, R, Illustrator
Research skills	Neural network simulation, Neural data analysis (fMRI, fNIRS), Behavioral task design
Languages	Korean (Native), English (TOEFL: 105)