Heejeong Nam

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Research Interests

Representation Learning, Computer Vision, Multimodal Learning

Education

Yonsei University   Mar. 2019 ∼ Feb. 2024
Bachelor of Science in Electrical and Electronic Engineering, Minor in Astronomy
- GPA: 3.94/4.30 (**Major 4.10/4.30**)

University of California, Los Angeles   Jan. 2022 ∼ Jun. 2022
Exchange Program, Electrical and Computer Engineering

Publications

2024

[1] Joohyeong Lee, Heejeong Nam, Kwanhyeong Lee, Sangchul Hahn. **Compact and De-biased Negative Instance Embedding for Multi-Instance Learning on Whole-Slide Pathological Images**, *in International Conference on Acoustics, Speech and Signal Processing (ICASSP)* [pdf]

2023

[2] Heejeong Nam. **SCADI: Self-supervised Causal Disentanglement in Latent Variable Models**, *in NeurIPS 2023 Workshop on Causal Representation Learning* [pdf]

[3] Heejeong Nam. **Enhanced Open Set Recognition via Disentangled Representation Learning**, *in 4th Korea Artificial Intelligence Conference* pp.208-210

Work Experiences

Boeing Korea | *Seoul, South Korea*   Jan. 2024 ∼ Present
Machine Learning Research Intern

Linq Labs | *Massachusetts, United States (remote)*   Sep. 2023 ∼ Dec. 2023
Industry-academic cooperation.

AITRICS | *Seoul, South Korea*   Oct. 2022 ∼ Feb. 2023
Research Intern

Vision Research Lab (UCSB) | *California, United States*   Jun. 2022 ∼ Sep. 2022
Research Intern

Research Experiences

Demand Forecasting of Intermittent and Lumpy Time Series   Jan. 2024 ∼ Present
Boeing, South Korea
- Developed a new metric by modifying cross-correlation for multivariate forecasting to address the complex challenge of predicting demand for over 50,000 parts in a short-term and sparse context.
- Analyzed data characteristics and created a comprehensive model pipeline, improving performance by approximately 15-20%.
- Created a tool to visualize parts with similar purchasing patterns, enhancing interpretability.

Knowledge Graph based In-Context Knowledge Editing in LLMs   Sep. 2023 ∼ Dec. 2023
Linq Labs, United States (Advisor : Prof. Jy-Yong Sohn)

- Developed a novel method for editing Large Language Models (LLMs) using in-context learning (ICL), focusing on locality by providing only target-relevant information in demonstrations.
- Identified the reasoning limitations of existing models and incorporated knowledge graphs (KGs) as a solution, enhancing the comprehensiveness and effectiveness of demonstrations.

Compact and De-biased Multiple Instance Learning Dec. 2022 ∼ Sep. 2023
AITRICS, South Korea

- Reconceptualized weakly supervised multiple instance learning (MIL) on pathology as a semi-supervised approach, leveraging the unique characteristic of negative bags containing only negative instances as a form of labeled data.
- Developed a novel add-on module involving intra-instance diversification and inter-instance similarity to fully utilize rich information within individual instances.
- Mathematically proposed supplementary loss functions and empirically proved that our instance-level representation is compact and debiased, thereby improving performance through the addition of our module.

Self-supervised Structured Causal Disentanglement Mar. 2023 ∼ Sep. 2023
Yonsei University, South Korea (Advisor : Prof. Dosik Hwang)

- Introduced a two-stage learning process to launch a self-supervised learning algorithm for understanding causal relationships, comprising an observer and an interpreter.
- Employed the masked-Structured Causal Model (SCM) and utilized the properties of Directed Acyclic Graph (DAG) to anchor observed factors to underlying factors, thereby capturing the major causality among them.
- Analyzed learned causality by visualizing graphs and generating counterfactual images through do-operations.

Enhanced Open Set Recognition via Feature Disentanglement Jun. 2023 ∼ Sep. 2023
Yonsei University, South Korea

- Developed open set recognition model that enhances unknown generation through collaboration of style-content disentangling and optimized the training flow for improved batch utilization.
- Examined the effectiveness of the disentanglement-based manifold mix-up in enhancing performance, specifically in aiding the objective of open set recognition.

Normal Pressure Hydrocephalus Prediction Jun. 2022 ∼ Sep. 2022
Vision Research Lab, UCSB, United States (Advisor : Prof. B.S. Manjunath)

- Assisted a real-time prediction project for Normal Pressure Hydrocephalus (NPH) on BisQue platform, via semantic segmentation on 3D brain CT scans.
- Initiated a 5-class segmentation based on intensity difference that were introduced through morphology.
- Implemented more stable post-processing methods to address the issue of ventricle-subarachnoid similarity, ensuring accurate separation and refined predictions.

PRESENTATIONS AND POSTERS

SCADI: Self-supervised Causal Disentanglement in Latent Variable Models | *Poster* Dec. 2023
NeurIPS 2023 workshop on Causal Representation Learning [Poster]

Disentangled Representation Learning | *Invited Talk* Nov. 2023
Yonsei Artificial Intelligence [Slide]

Enhanced Open Set Recognition via Disentangled Representation Learning | *Presentation* Sep. 2023
The 4th Korea Artificial Intelligence Conference [Slide]

EXTRACURRICULAR ACTIVITIES

Volunteer, NeurIPS 2023 | *Louisiana, United States* 2023

Executive, Yonsei Artificial Intelligence (YAI) | *Yonsei University, South Korea* 2023

Vice Chair, Electrical & Electronic Engineering Student Council | *Yonsei University, South Korea* 2020

Chair, Electrical & Electronic Engineering Student Council | *Yonsei University, South Korea* 2019

Honors and Awards

Jilli scholarship (Merit based scholarship) 2021
Awarded to students at Yonsei University who have shown academic excellence.

Yonsei Internal Scholarship 2020
Awarded for outstanding leadership as the executive of the student council.

Languages

Fluent in **English** (TOEFL IBT 111 out of 120)
Native in **Korean**