Jinwoo Hong

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Summary

My main interest is to utilize deep learning to solve real-world problems, together. I've hope to understand and help the human by deep learning, in this context, I mainly researched the relationship between brain and psychopathology.

Research & Work Experience

Jan. 2021 – Aug. 2022

Scanner-Generalization Neural Networks for Prediction of General Psychopathology factor (*p*-factor)

- Individual research project
- Defined two problems
    1. Breaking traditional categorical diagnostics by dimensional approach
    2. Addressing non-biological variance in neuroimaging data acquired from multi-scanner
- Found open neuroimaging data, conducted preprocessing, applied domain adaptation technique for end-to-end deep learning model
- Achieved statistically significant improved performance compared to machine learning models

Jan. 2020 – Aug . 2022

fMRI-based Human Emotion Prediction Using **Deep Neural Networks**

- Leader for industrial project
- Based on a 3D fMRI brain activation map, trained 1D-DNN with explicit weight sparsity control & 3D-CNN for emotion prediction
- Reached the unsolved goal by conducting hyperparameter tuning and various normalization techniques (e.g., Gauss Rank, Z-Normalization) for high-dimensional fMRI data

Jun. 2019 –Mar. 2021

Deep Learning for Young Adulthood Depression Prediction

- Leader for national project
- Applied self-supervised learning (sparse denoising autoencoder) to reduce high-dimensional input, achieved improved performance

Jan. 2021 – Aug. 2022

Attention Mechanism for 3D-CNN

- Leader for national project
- Researched application of convolutional block attention module (CBAM) to 3D-CNN and Vision Transformer (ViT) for 3D neuroimaging data

Jan. 2021 – Aug. 2022

Self-Supervised Learning for Multi-Modal fMRI

- Researched modality-invariant features from fMRI pattern from multi-modality (image & sound) using domain adversarial learning framework
- Extracted features by modality classification as pretext task, applied it for inference (downstream)

Skills

Deep Learning Research

- Initiatively carried out research projects, independently defining problems and finding solutions
- Python deep learning frameworks, particularly PyTorch
- Experienced in ML, data visualization such as Scikit-Learn, Matplitlib, Seaborn, OpenCV
- Researched in Linux environment, using Docker for GPU utilization

Medical Image Analysis

- Developed preprocessing pipeline shell script using Linux-based program (e.g., AFNI) and Python libraries (e.g., Nibabel, Nilearn), uploaded it to GitHub
- Individually discovered and analyzed 5+ open high-dimensional neuroimaging data
- Experienced 2 papers and 10+ abstracts reviews for Neuroimage, MICCAI, OHBM, etc

Communication

- Open-eared attitude
- Played a role of lab leader and multiple project leader from the first semester
- Experienced communicating with people of various nationality and age groups

Education

Mar. 2020 – Aug. 2022

Korea University, Seoul, Korea
M.S. Brain & Cognitive Engineering
Brain Signal Processing Lab

Mar. 2016 – Feb. 2020

SEOULTECH, Seoul, Korea
B.S., Electronic & IT Engineering
Microprocessor Lab

Publication & Award

Nov. 2021

Jinwoo Hong, Jong-Hwan Lee. “General Psychopathology Factor (*p*-factor) Prediction Using Resting-State Functional Connectivity and a Scanner-Generalization Neural Network.” **(Submitted)**

Nov. 2021

Best Poster Award

- Korean Society for Human Brain Mapping (KHBM)
- **Jinwoo Hong**, Jong-Hwan Lee. “Predicting General Psychopathology Factor (*p*-factor) Using Resting-State Functional Connectivity via Scanner-Generalization Neural Networks (*SGNN*).”