Ruiheng Yu

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EDUCATIONAL BACKGROUND

Chongqing University of Posts and Telecommunications 2020.08.26~2024.07.01

- ✧ Degree: Bachelor of Engineering(Honors for an Outstanding Bachelor's Degree)
- ✧ Major: Software Engineering
- ✧ GPA: 3.52/4.0 (86.91/100)
- ✧ Grade Ranking: 13/461

Chongqing University 2023.08.26~2024.07.01

- ✧ Faculty: National Elite Institute of Engineering
- ✧ Minor: Intelligent Vehicle Programming
- ✧ Certificate: Exchange Learning Certificate
- ✧ GPA: 3.5/4.0 (85.75/100)

University of Houston 2024.08.28~Present

- ✧ Major: Biomedical engineering

Reaserch EXPERIENCES

Interpretable & Interactive GNN with Bayesian Edge Scoring and DP Subgraph Sampling
Target on NeurIPS 2025 2025.03.18~Present

- ✧ An interpretable GNN architecture with a Beta-Bernoulli edge mask prior and a DP subgraph prior for adaptive, principled subgraph explanation.
- ✧ A novel loss term using entropic OT (Sinkhorn) to align original graph and subgraph representations, shown to correlate with maximizing mutual information between the graph and its explanation.
- ✧ A full variational inference formulation and ELBO derivation for joint optimization of prediction accuracy and explanation quality, including KL regularization for the edge and subgraph posteriors.
- ✧ An interactive human-in-the-loop fine-tuning loop, combined with counterfactual contrastive training and stochastic edge/node dropout, to refine explanations and improve model trustworthiness.

Functional Brain Networks and Graph Neural Networks
Supervised by Professor LuWang and Liyan 2024.11~Present

- ✧ Built sparse brain graphs using functional connectivity (fMRI) with Pearson correlations for vertex features and partial correlations for edges, retaining the top 10% partial correlations for enhanced interpretability.
- ✧ Applied IBGNN for age group and cognitive task classification, achieving high performance and generating subgraph visualizations to pinpoint crucial brain regions. Explored dynamic and multimodal brain graphs incorporating MEG, fMRI, and DWI data for improved task classification.
- ✧ Prepared Cam-CAN data to produce adjacency matrices and classification labels for fMRI-based age/task predictions, and compared model performance across classifiers.

Brain trigger
Supervised by Professor Mark Chignell and LuWang 2024.12~Present

- ✧ Examined reaction times (RTs) and task accuracy in congruent vs. non-congruent trials, employing hierarchical regression to predict participant age using RTs and performance metrics (e.g., d-prime).
- ✧ Compared BrainTagger game-based assessments with traditional cognitive tasks from the Cam-CAN dataset to confirm sensitivity to age-related fluid intelligence, executive function, and working memory.
- ✧ Investigated BrainTagger's potential for detecting cognitive harm (e.g., post-surgery or chemotherapy) and its

cost-effective, repeatable, and engaging advantages over paper-based tests in both clinical and non-clinical settings.

In Vitro Fertilization Pregnancy Prediction

Group Project, Supervised by Chen Kuo, Associate Professor 2023.04~2023.07

- ✧ Evaluated various machine learning and deep learning algorithm to determine optimal prediction accuracy
- ✧ Conducted parameter selection by combining XGBoost, LGB, LSTM, and CatBoost and Fireworks Algorithms
- ✧ Adopted Genetic Algorithm to optimize parameters unprecedentedly and loss function
- ✧ Predicted pregnancy probability with collected clinical information and respiratory metabolite data comprehensively
- ✧ Utilize IG(Integral gradient) and Counterfactual Explanation method to attribute the most critical features and provide recommendations to patients to improve embryo viability.
- ✧ Obtained a Registration Certificate of Computer Software Copyright for IVF In-vitro fertilization embryo survival Prediction System

Research on video-oriented road traffic sign detection algorithm

Individual Project, Supervised by Chengliang Wang, Professor 2023.11~2024.07

- ✧ Evaluated various deep learning-based object detection algorithms and selected YOLOv8 as my baseline.
- ✧ Inspired by MFDS-DETR, introduced HS-FPN into YOLOv8's neck. High-level semantic features are leveraged to filter low-level features, which are then element-wise added to achieve multiscale fusion, significantly improving representation for sparse traffic signs.Replaced the original CA module with the ELA channel attention mechanism (from Efficient Local Attention for Deep Convolutional Neural Networks), enhancing positional information embedding and detection accuracy.
- ✧ Inspired by TOOD, redesigned the YOLOv8 detection head to improve interaction between classification and localization tasks, ensuring better task alignment.

Employed model pruning and knowledge distillation to reduce model size, facilitating efficient edge deployment and boosting real-time performance.

INTERNSHIPS

iSoftStone

Full-Stack Engineer 2023.06~2023.09

- ✧ Tasked with initial requirement analysis and detailed software design
- ✧ Used Vue, SpinrgCloud, and Mysbatis technology stacks to build projects and the B/S application basic architecture pattern and agile development pattern for project architecture
- ✧ Connected front-end and back-end with RESTful API style and employed Git to control and manage the development process of the project
- ✧ Developed corresponding back-end function points and deployed the project to the server
- ✧ Won the excellent member title

CERTIFICATES

- ✧ Certificate of JAVA Software Development Engineer (Senior) 2023.09.28
- ✧ Certificate of Software Testing Engineer (Senior) 2023.09.28

AWARDS

- ✧ Academic First-class Scholarship of CQUPT(Top 10 of 510) 2023.11.01
- ✧ Academic First-class Scholarship of CQUPT(Top 10 of 510) 2022.11.01
- ✧ Second Place of Blue Bridge Cup C/C++ Group (Provincial) 2022.05.27

SKILLS&TOOLS

- ✧ **Language Skills:** Mandarin (Native); English (IELTS score of 7)
- ✧ **Computer Skills:** C++ (4 yrs); Python (3yrs); JAVA (2yrs); Matlab (2yr); SQL (2yrs)