

Hua Yang

cs_yanghua@mail.scut.edu.cn | yanghuattt@gmail.com

EDUCATION

South China University of Technology Sep 2021 – June 2024(excepted)

M.S. , Computer Technology GPA: 3.93 / 4.0 Weighted Score: 89.09/100

Central South University Sep 2017 – June 2021

B. S. , Electronic Information Science and Technology GPA: 3.73 / 4.0 Weighted Score: 90.06/100

Research interests:

Trustworthy AI, Graph neural network, Interpretable artificial intelligence, AI for health, and Affective computing

PUBLICATIONS

Hua Yang, C. L. Philip Chen, Bianna Chen, and Tong Zhang. “Facexplainer: Generating model-faithful explanations for graph neural networks` guided by spatial information”. IEEE International Conference on Bioinformatics & Biomedicine (BIBM), 2023.

Hua Yang, C. L. Philip Chen, Bianna Chen, and Tong Zhang. “Improving the Interpretability through Maximizing Mutual Information for EEG Emotion Recognition”. IEEE Transactions on Affective Computing (TAC, under review), 2023.

RESEARCH EXPERIENCE

Generating Model-faithful Explanations for Graph Neural May 2022 – April 2023

Networks Guided by Spatial Information (academic research, completed)

Supervisor: Dr. C. L. Philip Chen, SCUT

- Develop a non-parametric efficient post-hoc explainer for graph neural networks by combining Gradient-based Class Activation Mapping (GradCAM) and Permutation-based Methods.
- Reveal the limitations of the graph rules used in the explanation generating process, which has been strongly proved through explaining chemical graph datasets with ground truth, such as MUTAG and BBBP.
- Reproduce leading methods on benchmark datasets to evaluate the effectiveness of our method. The results demonstrated that our approach led to significant improvements in efficiency and effectiveness.

Result: Paper: *Hua Yang, C. L. Philip Chen, Bianna Chen, and Tong Zhang. “Facexplainer: Generating model-faithful explanations for graph neural networks guided by spatial information”. IEEE International Conference on Bioinformatics & Biomedicine (BIBM), 2023.*

Improving the Interpretability through Maximizing May 2022 – present

Mutual Information for EEG Emotion Recognition (academic research, in progress)

Supervisor: Dr. C. L. Philip Chen, SCUT

- Propose a self-explainable graph neural network based (GNNs) on Graph Information Bottleneck to maximizes the mutual information between the brain topology among electrodes and emotions labels for EEG-based emotion recognition task.
- Design a much faster post-hoc explainer for GNNs in EEG-Based emotion recognition. The proposed CACAexplainer identifies explanations by conducting subgraph searches to optimize the mutual information (MI) objective, with spatial information serving as a guidance.
- The proposed model exhibited enhanced accuracy in experiments involving EEG-based emotion recognition and more precisely captured the decisive components of the data.

Result: *Hua Yang, C. L. Philip Chen, Bianna Chen, and Tong Zhang. “Improving the Interpretability through Maximizing Mutual Information for EEG Emotion Recognition”. IEEE Transactions on Affective Computing (TAC, under review), 2023.*

Obstructive sleep apnea hypopnea

syndrome evaluation (Competition, completed)

May 2023 – Oct 2023

Supervisor: Dr. Tong, Zhang, SCUT

- Implement data cleaning. Firstly, noise such as motion artifacts is removed through MATLAB, and then manual feature

extraction is achieved by extracting time-frequency domain signal features, such as continuous band power, wavelet transform, and Time-domain signal autocorrelation.

- Apply multiple machine learning or deep learning methods. Due to the significant individual differences in physiological signals, various methods, such as random forest, CNN, MLP, and GNN, are used for feature extraction to maximize the diversity of classification boundaries for later selection.
- Use validation sets and classification balance for decision fusion. By using a dataset with individual differences as the validation set and selecting models with more balanced classification as the main prediction model, good results were achieved after decision fusion.

Result: *Rank: 5/171, winning prize*

A Video Recommendation System Based on EEG Emotion

June 2021 – August 2021

Recognition Using Graph Neural Networks (project practice, completed)

Supervisor: Dr. Tong, Zhang, SCUT

- By performing short-time Fourier transform and calculating Cosine Distance on both the real-time collected data and the existing training data, we fine-tuned the pre-trained model, resulting in an improvement in the model's generalization ability on unseen subjects.
- The real-time data collected from the 32 electrode EEG cap sensor was digitally filtered, and LDS smoothing was performed. After calculating its DE features, the subject's current emotions were predicted through the fine-tuned model.
- We gathered video materials designed to induce emotions and conducted experiments on humans regarding the relatively strong basic emotions of sadness and joy. The resulting verification confirmed the effectiveness of the data collection, processing, and model fine-tuning steps.

Result: A complete platform that is capable of delivering specific videos to users based on their current emotional state

Intelligent ECG monitoring system based on

Dec 2019 – May 2020

graphene flexible electrode (biomedical engineering competition, completed)

Supervisor: Dr. XiaoWen Xu, CSU

- The MIT-BIH dataset was used to train a CNN network for detecting arrhythmia, and the resulting model was deployed on mobile devices, such as Android phones.
- We were able to transmit data via Bluetooth to the target Android platform using STM32. The data was managed and stored using SQLite and displayed the electrocardiogram by utilizing a custom brush.

Result: Second prize of Central Area of National Undergraduate Optoelectronics design competition

Second prize of Central South University biomedical engineering Innovation design competition.

PROFESSIONAL EXPERIENCE

Center for Brain Cognitive Computing, Pazhou Lab (Guang Zhou) - Intern

May 2022 – May 2023

- Responsible for collecting emotional datasets based on EEG, practical application of emotion recognition based models.
- Responsible for exploration of new interpretable graph neural networks for affective computing on EEG.

Central South University - Teaching Assistant

Sep 2017 – Jan 2019

- College English

SKILL AND LANGUAGE

Skills: Python, Matlab, C++, R, Office, Quartus, Proteus, Multisim

Language: Mandarin, English