

Renhong Huang

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EDUCATION

Zhejiang University <i>Master, Computer Science</i> <ul style="list-style-type: none">Advised by Yang Yang and Jiarong Xu	Hangzhou, China 2022.9 - 2025.3 (Expected)
Zhejiang University <i>B.E., Computer Science</i> <ul style="list-style-type: none">GPA: 3.97/4.00	Hangzhou, China 2018.9 - 2022.6
National University of Singapore <i>Visiting Student, Computer Science</i> <ul style="list-style-type: none">Courses: Machine Learning, IoT	Lower Kent Ridge Road, Singapore 2021.8 - 2021.9
Fudan University <i>Visiting Student, Computer Science</i> <ul style="list-style-type: none">Advised by Jiarong Xu	Shanghai, China 2022.9 - 2023.9

PUBLICATIONS

- Yifei Sun, Haoran Deng, Yang Yang, Chunping Wang, Jiarong Xu, **Renhong Huang**, Linfeng Cao, Yang Wang, Lei Chen. *Beyond Homophily: Structure-aware Path Aggregation Graph Neural Network*. IJCAI 2022.
- Jiarong Xu, **Renhong Huang**, Xin Jiang, Yuxuan Cao, Carl Yang, Chunping Wang, Yang Yang. *Better with Less: A Data-Centric Prespective on Pre-Training Graph Neural Networks*. NeurIPS 2023.
- Renhong Huang**, Jiarong Xu, Xin Jiang, Chenglu Pan, Zhiming Yang, Chunping Wang, Yang Yang. *Measuring Task Similarity and Its Implication in Fine-Tuning Graph Neural Networks*. AAI 2024.
- Renhong Huang**, Jiarong Xu, Xin Jiang, Ruichuan An, Yang Yang. *Can Modifying Data Address Graph Domain Adaptation?* KDD 2024.
- Renhong Huang**, Jiarong Xu, Zhiming Yang, Xiang Si, Xin Jiang, Hanyang Yuan, Chunping Wang, Yang Yang. *Extracting Training Data from Molecular Pre-trained Models*. NeuIPS 2024 (under review)
- Hanyang Yuan, Jiarong Xu, **Renhong Huang**, Mingli Song, Chunping Wang, Yang Yang. *Towards More Efficient Property Inference Attacks on Graph Neural Networks*. NeuIPS 2024 (under review)
- Jiarong Xu, Zhiming Yang, Xiang Ao, **Renhong Huang**, Chenglu Pan. *Release Graph Pre-Trained Model via Privacy-Preserving Data Augmentation*.
- Tianyi Li, **Renhong Huang**, Jiayu Liu, Tianxin Zheng, Yang Yang, Jiarong Xu. *Structure is All You Need? Label Efficiency MAX with Simple Feature-free Graph Active Learning Paradigm*.

RESEARCH EXPERIENCE

- Ascend Operator Development** 2020.1 - 2021.9
Supervisor: Peng Du Huawei Technologies
- Engaged in vector operator development for Ascend chips, adopt Ascend's Davinci architecture for machine learning operator development.
 - Leveraging Tensor Acceleration Engine and optimizing operator algorithms to achieve high-performance neural network computations.
- Beyond Homophily: Structure-aware Path Aggregation Graph Neural Network** 2021.10 - 2022.1
Supervisor: Prof. Yang Yang Zhejiang University
- Shed light on the path level patterns in graphs to generalize GNNs for both homophily and heterophily graphs.
 - Introduce a structure-aware recurrent cell consisting of order-preserving and distance-aware components to learn the semantic information of neighborhoods.
- Better with Less: A Data-Centric Prespective on Pre-Training Graph Neural Networks** 2021.1 - 2022.9
Supervisor: Prof. Jiarong Xu and Prof. Yang Yang Zhejiang University
- Extensive experiments exploring the relationship between graph pre-training performance and pre-training dataset. Identify the curse of big data phenomenon in graph pre-training: more training data do not necessarily lead to better performance.

- Propose a better-with-less framework for graph pre-training: fewer, but carefully chosen data are fed into a GNN model to enhance performance of pre-training. Experiment shows our model beats the graph pre-training competitor by an average of 9.94% and 17.83% under freezing and fine-tuning mode respectively.

Measuring Task Similarity in Fine-Tuning Graph Neural Networks 2022.9 - 2023.1
Supervisor: Prof. Jiarong Xu and Prof. Yang Yang *Zhejiang University & Fudan University*

- Studies the specific application scope of graph pre-trained models, i.e., the extent to which downstream tasks can benefit from specific pre-training tasks.
- Introduce the measure task consistency to quantify the similarity between graph pre-training and downstream tasks. Moreover, a novel fine-tuning strategy, Bridge-Tune, is proposed to further diminish the impact of the difference between pre-training and downstream tasks.

Release Graph Pre-trained Model via Privacy-Preserving Data Augmentation. 2022.8 - 2022.10
Supervisor: Prof. Jiarong Xu *Fudan University*

- Target a privacy-preserving graph pre-training model to facilitate the knowledge sharing environment, which allows data owners to disclose their pretrained models without exposing privacy.
- Introduce two causality-inspired principles for graph pre-training model to break down causality-inspired principles for graph pre-training model: privacy-preserving principle and generalization principle.

Can Modifying Data Address Graph Domain Adaptation? 2023.4 - 2023.9
Supervisor: Prof. Jiarong Xu and Prof. Yang Yang *Zhejiang University & Fudan University*

- Identifies limitations in solely adapting the model to address the graph domain adaptation. Inspired by the theoretical generalization bound, we identify two key principles (Alignment & Rescaling) for data-centric method.
- Introduce a novel data-centric method GraphAlign, that generates a small yet transferable graph. Experiment shows GraphAlign outperforms the best baselines by an average of 3.38%, with graph as small as 1% of the original training graph.

Extracting Training Data from Molecular Pre-trained Models. 2023.10 - 2024.4
Supervisor: Prof. Jiarong Xu *Zhejiang University & Fudan University*

- Pre-trained models contain a large amount of information. Privacy leakage issues need to be considered when attackers attempt to extract knowledge (training datasets) from pre-trained models
- Experiments demonstrate that even with only query access to molecular pre-trained models, there is a considerable risk of extracting training data.

Towards More Efficient Property Inference Attacks on GNN. 2023.10 - 2024.4
Supervisor: Prof. Jiarong Xu *Zhejiang University & Fudan University*

- Pre-trained models contain a large amount of information. Privacy leakage issues need to be considered when attackers attempt to extract knowledge (training datasets) from pre-trained models
- Propose an efficient graph property inference attack by leveraging model approximation techniques. Extensive experiments across real-world scenarios demonstrate improvement with average increases of 2.7% in attack accuracy.

Simple Feature-free Graph Active Learning Paradigm. 2022.12 - 2023.6
Supervisor: Prof. Jiarong Xu *Zhejiang University*

- To lower the labeling cost or achieve higher performance under budget constraints, active learning and few-shot learning techniques are employed together to facilitate better training.
- Propose a simple yet effective model-free AL paradigm, which uses a novel unsupervised loss function to enhance the model in few-shot AL scenarios.

SELECTED AWARDS AND HONORS

Outstanding Graduate Thesis 2022
 Award of Honor for Graduate at Chu Kochen Honors College of Zhejiang University, 2022
 Third Prize, Zhejiang University's Academic Year Scholarship, 2018 - 2021
 Meritorious Winner for American Mathematical Competition (top 7%), 2021
 Outstanding Academic Model, Zhejiang University, 2018-2021
 Second Prize, Province Mathematics Competition, 2020

RESEARCH INTEREST

Graph Neural Networks, Transfer Learning, Data-centric AI, Private AI.