

ENYAN DAI

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RESEARCH INTERESTS

Trustworthy Graph Neural Networks, Trustworthy AI for Science, Graph Foundation Model

EDUCATION

The Pennsylvania State University (PSU), State college, USA 2019 – Present

Ph.D. candidate in College of Information Sciences and Technology

Advisor: Dr. Suhang Wang

Expected graduate date: Jun. 2024

Catholic University of Leuven (KU Leuven), Leuven, Belgium 2017 – 2018

M.S. in Artificial Intelligence (Cum Laude)

Advisor: Dr. Marie-Francine Moens

University of Science and Technology of China (USTC), Hefei, China 2012 – 2016

B.S. in Mechanical Engineering

PUBLICATIONS

Summary

Until 2/12/2024, my google citation is 806. My publications can be generally categorized into the following areas, and each category is attached with representative works:

- Fair graph model learning on protected sensitive attributes [14],[6],[9],[10]
 - **Enyan Dai**, and Suhang Wang. “Say No to the Discrimination: Learning Fair Graph Neural Networks with Limited Sensitive Attribute Information.” In Proceedings of 14th ACM International Conference on Web Search and Data Mining (**WSDM 2021**)
- Robustness of graph neural networks under adversarial attacks [2],[1],[7],[3],[26] label noises [11], and graph heterophily [5],[8],[24]
 - **Enyan Dai**, Jie Wei, Hui Liu, and Suhang Wang. “Towards Robust Graph Neural Networks for Noisy Graphs with Sparse Labels.” **Oral paper** In Proceedings of 15th ACM International Conference on Web Search and Data Mining (**WSDM 2022**)
 - **Enyan Dai**, Charu Aggarwal, and Suhang Wang. “NRGNN: Learning a Label Noise-Resistant Graph Neural Network on Sparsely and Noisily Labeled Graphs.” In Proceedings of 27th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (**KDD 2021**)
 - **Enyan Dai***, Minhua Lin*, Xiang Zhang, Suhang Wang. “Unnoticeable Backdoor Attacks on Graph Neural Networks.” In Proceedings of The Web Conference 2023 (**WWW 2023**)
- Privacy-preserving on graph-structured data [1],[6],[23],[25]
 - **Enyan Dai**, Limeng Cui, Zhengyang Wang, Xianfeng Tang, Yinhan Wang, Monica Chen, Bing Yin, Suhang Wang. “A Unified Framework of Graph Information Bottleneck for Robustness and Membership Privacy.” Accepted by 29th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (**KDD 2023**)
- Self-explainable graph neural networks [13], [20], [28]
 - **Enyan Dai**, and Suhang Wang. “Towards Self-Explainable Graph Neural Network.” In Proceedings of 30th ACM International Conference on Information and Knowledge Management (**CIKM 2021**)

- AI for social good applications [4],[12],[15],[18],[19],[22],[27]
 - **Enyan Dai**, and Jie Chen. “Graph-Augmented Normalizing Flows for Anomaly Detection of Multiple Time Series.” **Spotlight paper** in Proceedings of International Conference on Learning Representations (**ICLR 2022**)
 - **Enyan Dai**, Yiwei Sun and Suhang Wang. “Ginger Cannot Cure Cancer: Battling Fake Health News with a Comprehensive Data Repository.” In Proceedings of International AAAI Conference on Web and Social Media (**ICWSM 2020**)

Referred Peer-Reviewed Papers

- [1] **Enyan Dai**, Limeng Cui, Zhengyang Wang, Xianfeng Tang, Yinhan Wang, Monica Chen, Bing Yin, Suhang Wang. “A Unified Framework of Graph Information Bottleneck for Robustness and Membership Privacy.” Accepted by 29th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (**KDD 2023**)
- [2] **Enyan Dai***, Minhua Lin*, Xiang Zhang, Suhang Wang. “Unnoticeable Backdoor Attacks on Graph Neural Networks.” In Proceedings of The Web Conference 2023 (**WWW 2023**)
- [3] Minhua Lin, Teng Xiao, **Enyan Dai**, Suhang Wang. “Certifiably Robust Graph Contrastive Learning.” Accepted by 37th Conference on Neural Information Processing Systems (**NeurIPS 2023**)
- [4] **Enyan Dai**, and Jie Chen. “Graph-Augmented Normalizing Flows for Anomaly Detection of Multiple Time Series.” **Spotlight paper** in Proceedings of International Conference on Learning Representations (**ICLR 2022**)
- [5] **Enyan Dai**, Shijie Zhou, Zhimeng Guo, and Suhang Wang. “Label-Wise Graph Convolutional Network for Heterophilic Graphs.” In Proceedings of Learning On Graphs (**LOG 2022**)
- [6] **Enyan Dai**, Suhang Wang. “Learning Fair Graph Neural Networks with Limited and Private Sensitive Attribute Information.” Accepted by IEEE Transactions on Knowledge and Data Engineering (**TKDE**)
- [7] **Enyan Dai**, Jie Wei, Hui Liu, and Suhang Wang. “Towards Robust Graph Neural Networks for Noisy Graphs with Sparse Labels.” **Oral paper** In Proceedings of 15th ACM International Conference on Web Search and Data Mining (**WSDM 2022**)
- [8] Junjie Xu, **Enyan Dai**, Xiang Zhang, Suhang Wang. “HP-GMN:Graph Memory Networks for Heterophilous Graphs” In Proceedings of The IEEE International Conference on Data Mining (**ICDM 2022**)
- [9] Tianxiang Zhao, **Enyan Dai**, Kai Shu, and Suhang Wang. “Towards Fair Classifiers Without Sensitive Attributes: Exploring Biases in Related Features. ” In Proceedings of 15th ACM International Conference on Web Search and Data Mining (**WSDM 2022**)
- [10] Huaisheng Zhu, **Enyan Dai**, Hui Liu, Suhang Wang. “Learning Fair Models without Sensitive Attributes: A Generative Approach.” Accepted by Neurocomputing
- [11] **Enyan Dai**, Charu Aggarwal, and Suhang Wang. “NRGNN: Learning a Label Noise-Resistant Graph Neural Network on Sparsely and Noisily Labeled Graphs.” In Proceedings of 27th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (**KDD 2021**)
- [12] **Enyan Dai**, Kai Shu, Yiwei Sun, and Suhang Wang. “Labeled Data Generation with Inexact Supervision.” In Proceedings of 27th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (**KDD 2021**)
- [13] **Enyan Dai**, and Suhang Wang. “Towards Self-Explainable Graph Neural Network.” In Proceedings of International Conference on Information and Knowledge Management (**CIKM 2021**)
- [14] **Enyan Dai**, and Suhang Wang. “Say No to the Discrimination: Learning Fair Graph Neural Networks with Limited Sensitive Attribute Information.” In Proceedings of 14th ACM International

- [15] **Enyan Dai**, Yiwei Sun and Suhang Wang. “Ginger Cannot Cure Cancer: Battling Fake Health News with a Comprehensive Data Repository.” In Proceedings of International AAAI Conference on Web and Social Media (**ICWSM 2020**)
- [16] Chacha, Chen, Chieh-Yang Huang, Yaqi Hou, Yang Shi, **Enyan Dai**, and Jiaqi Wang. “TEST POSITIVE at W-NUT 2020 Shared Task-3: Cross-task modeling.” In Proceedings of the Sixth Workshop on Noisy User-generated Text (**WNUT 2020**)
- [17] **Enyan Dai**, Shuaijun Chen, Zhen Han, Xu Jia, Ziluan Liu, Liu Xing, Xueyi Zou, Chunjing Xu, Jianzhuang Liu, and Qi Tian. ”Unsupervised image super-resolution with an indirect supervised path.” In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (**CVPR Workshops**)
- [18] Yuqing Hu, Xiaoyuan Cheng, Suhang Wang, Jianli Chen, Tianxiang Zhao, and **Enyan Dai**. “Times series forecasting for urban building energy consumption based on graph convolutional network.” In **Applied Energy**
- [19] Xiaoyuan Cheng, Yuqing Hu, Jianxiang Huang, Suhang Wang, Tianxiang Zhao, and **Enyan Dai**. “Urban Building Energy Modeling: A Time-Series Building Energy Consumption Use Simulation Prediction Tool Based on Graph Neural Network.” In **Computing in Civil Engineering**

Referred Preprints

- [20] **Enyan Dai** and Suhang Wang. “Towards Prototype-Based Self-Explainable Graph Neural Network.” Submitted to TKDD (Minor Revision)
- [21] **Enyan Dai**, Tianxiang Zhao, Huaisheng Zhu, Junjie Xu, Zhimeng Guo, Hui Liu, Jiliang Tang, and Suhang Wang. “A Comprehensive Survey on Trustworthy Graph Neural Networks: Privacy, Robustness, Fairness, and Explainability.”
- [22] **Enyan Dai**, Yinghan Wang, Xianfeng Tang, Zhengyang Wang, Zheng Li, Limeng Cui, Yifan Gao, Monica Cheng, Bing Yin and Suhang Wang. “Localized Temporal Purchase Event Mining in E-Commerce.”
- [23] **Enyan Dai**, Minhua Lin, Suhang Wang. “PreGIP: Watermarking the Pretraining of Graph Neural Networks for Deep Intellectual Property Protection.”
- [24] Junjie Xu, **Enyan Dai**, Dongsheng Luo, Xiang Zhang, Suhang Wang. “Shape-aware Graph Spectral Learning.”
- [25] Minhua Lin, **Enyan Dai**, Junjie Xu, Suhang Wang. “Stealing Training Graphs from Graph Neural Networks.”
- [26] Zhiwei Zhang, **Enyan Dai**, Minhua Lin. “Rethinking Graph Backdoor Attacks: A Distribution-Preserving Perspective.” Submitted to KDD-2023
- [27] Shuotong Bai, **Enyan Dai**, Liu Lei, Huaxiao Liu. “AIPL: Automated Linking GitHub Issue and PR.” Submitted to TSE (Major Revision)
- [28] Junfeng Fang, **Enyan Dai**, Xiang Wang, Xiangnan He. “LIG: Harnessing the Power of Large Language Models to Enhance Interpretable Graph Neural Networks.”

INVITED TALKS

Trustworthy GNNs in Fairness, Robustness, and Privacy

Jul. 2023

Invited by University of Science and Technology of China

GNNs for Robustness and Membership Privacy Invited by Peking University	Jul. 2023
Graph Structure Learning for Robustness Invited by Amazon MARS Lab	Aug. 2022
Fairness and Explainability in Graph Neural Networks Invited by DataFun Summit 2022	Jun. 2022

EXPERIENCE

Research Intern in Amazon, USA Localized Temporal Purchase Event Mining on Query Product Graphs Manager: Dr. Xianfeng Tang	May. 2022 – Dec. 2022
Research Intern in MIT-IBM Watson AI Lab, USA Power grid time series data modeling with graph neural network for Anomaly Detection Manager: Dr. Jie Chen	May 2021 – August 2021
Research Intern in Cloudwalk, China Computation acceleration of the Deep CNN face detection Manager: Mr. Jiwei Li	May 2017 – August 2017

TEACHING EXPERIENCE

Teaching Assistant in PSU DS 402: Explainable AI and Reinforcement Learning Instructor: Prof. Jonathan E. Dodge	Fall 2023
Instructor in Deepshare Online Course: Adversarial Attacks and Defenses on Graph Learning	Spring 2023
Teaching Assistant in PSU IST 452: Legal Environment of Privacy and Security Instructor: Prof. Marc Friedenberg	Spring 2023
Teaching Assistant in PSU IST 510: Computational Foundations of Informatics Instructor: Prof. Wilson Shomir	Spring 2022
Teaching Assistant in PSU DS 310: Machine Learning and Data Analytics Instructor: Prof. Suhang Wang	Spring 2022
Teaching Assistant in PSU DS 402: Introduction to Social Network Mining Instructor: Prof. Suhang Wang	Fall 2021
Teaching Assistant in PSU DS 402: Introduction to Social Network Mining Instructor: Prof. Suhang Wang	Fall 2020

STUDENTS & MENTEES

Minhua Liu , Ph.D. student in PSU Referred papers [3],[2] Research Co-advising with Prof. Suhang Wang, and Prof. Xiang Zhang	Jun. 2022 - Present
Junjie Xu , Ph.D. student in PSU Referred papers [24],[8] Research Co-advising with Prof. Suhang Wang, and Prof. Xiang Zhang	Sep. 2021 - Present
Fali Wang , Ph.D. student in PSU Project of model ownership verification on large language models Research Co-advising with Prof. Suhang Wang	Sep. 2022 - Present
Zhiwei Zhang , Ph.D. student in PSU Project of adversarial attacks on graph model pre-training Research Co-advising with Prof. Suhang Wang	Sep. 2022 - Present
Shijie Zhou , Master Student in PSU Referred paper [5] Research Co-advising with Prof. Suhang Wang	Sep. 2021 - Dec. 2022

SERVICE

- **Program Committee Member:** AAAI (2023, 2024), KDD (2022, 2023), ASONAM (2022, 2021), WSDM (2024, 2023, 2022), SDM (2024)
- **Reviewer & External Reviewer:** NeurIPS (2022, 2023), ICML (2023), ICLR (2024), KDD (2021, 2020), The Web (2021, 2022), SIGIR (2021, 2022), WebSci (2020), CIKM (2022, 2022, 2023), LOG (2022), ICIG (2021, 2023), BigData (2021), TPAMI, Neurocomputing, TKDD, TNNLS, Neural Networks
- **Judge:** Mathematical Contest in Modeling (2020, 2022, 2023)

SELECTED HONORS

Awards

- Ph.D. Student Award for Research Excellence in College of IST (Highest award in IST)
- Outstanding Graduate Award in Qinghe City of 2018, 2020, 2021, and 2022
- Scholarship for Outstanding Students in USTC of 2012, 2014 and 2015
- KDD Student Travel Award of 2023
- CIKM Student Travel Award of 2021
- WSDM Student Travel Award of 2021 and 2022

Media Coverage

- Our work about anomaly detection on power grids with graph neural networks has been reported by The Register, MIT Press, and SciTechDaily
- Our work of FairGNN is reported in New machine learning model could remove bias from social network connections by PSU News and republished by ACM news.
- Our survey about trustworthy graph neural networks is reported by PaperWeekly and KDnuggets