Qingyuan Liu

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EDUCATION

Columbia University in the City of New York (CU) **09/2023—Present**
Master of Science in Computer Engineering (Expected) GPA: 4.0/4.33 (Top 3)
Honor: 2024 Spring MS Honors Students, Columbia Engineering Research Highlight, Advanced Master Research Student

Huazhong University of Science and Technology (HUST) **09/2019—07/2023**
Bachelor of Engineering in Computer Science and Technology GPA: 3.75/4.0
Honor: National Second Prize in the China Collegiate Computing Contest-Network Technology Challenge (C4)

PUBLICATIONS (* indicates equal contributions)

- Zhaobin Mo*, Baohua Yan*, **Qingyuan Liu***, Kangrui Ruan and Xuan Di "Graph Out-of-Distribution Generalization via Counterfactual Augmentation", International Conference on Very Large Data Bases (**VLDB**), 2025, to be submitted
- **Qingyuan Liu**, Yun-Yun Tsai, Ruijian Zha, Pengyuan Shi, Victoria Li and Junfeng Yang "LAVID: An Agentic LVLM Framework for Diffusion-Generated Video Detection", IEEE / CVF Computer Vision and Pattern Recognition Conference (**CVPR**), 2025, under review
- **Qingyuan Liu**, Pengyuan Shi, Yun-Yun Tsai, Chengzhi Mao, and Junfeng Yang "Turns Out I'm Not Real: Towards Robust Detection of AI-Generated Videos", IEEE / CVF Computer Vision and Pattern Recognition Conference (**CVPR**) Generative Models for Computer Vision Workshop, 2024, ***Highlight***
- Zhaobin Mo*, **Qingyuan Liu***, Baohua Yan, Longxiang Zhang, and Xuan Di "Causal Adjacency Learning for Spatiotemporal Prediction Over Graphs", in Proceeding of 27th IEEE International Conference on Intelligent Transportation Systems (**ITSC**), 2024
- **Qingyuan Liu**, Yuxuan Zhou, and Shuai Bao "Accurate face swap using cycleGAN", Proc. SPIE 12303, International Conference on Cloud Computing, Internet of Things, and Computer Applications (**CICA**), 2022

RESEARCH EXPERIENCES

Software Systems Laboratory, Columbia University **New York, USA**
Towards Robust Detection of AI-Generated Videos **09/2023—Present**
Research Assistant advised by Prof. Junfeng Yang (CU)

- Developed Diffusion Reconstruction Error (DIRE) based method to detect AI-generate videos; applied video generation model as reconstruction model of video DIRE which took temporal information into account; achieved a detection accuracy of up to 93.7% for videos from their benchmark dataset of videos generated from Stable Vision Diffusion, Sora, Pika, and Gen-2.
  Pr. 1: Turns Out I'm Not Real: Towards Robust Detection of AI-Generated Videos
- Designed an agentic framework LAVID that leverage Large Vision Language Models(LVLMs) in detecting AI-generated videos. The LVLMs will call external tools to extract additional information from the video to facilitate themselves in the detection. Evaluation results show LAVID improves F1 score by 6.2% to 30.2% over the top baseline on the comprehensive dataset across four SOTA LVLMs.
  Pr. 2: LAVID: An Agentic LVLM Framework for Diffusion-Generated Video Detection

DitecT Lab, Columbia University **New York, USA**
Towards Generalizable and Robust Graph Machine Learning **09/2023—Present**
Research Assistant advised by Prof. Sharon Di (CU)

- Designed the Causal Adjacency Learning (CAL) framework, enhancing model prediction performance on the ODD dataset; applied with the heuristic method which contained the correlation calculation and Condition Independence Test; achieved 14.23%, 15.49%, and 50.27% RMSE improvement in SafeGraph dataset, compared with the results based on distance, correlation, and attention matrix separately.

Pr. 1: Causal Adjacency Learning for Spatiotemporal Prediction Over Graphs

- Used the gradient of the counterfactual classifier to interfere with the sampling process of the diffusion model, thus generating diversified datasets. The model trained on the counterfactual dataset is expected to be more generalizable.

Pr. 2: Graph Out-of-Distribution Generalization via Counterfactual Augmentations

BAIR Lab, University of California, Berkeley **Remote**

Causal Inference of LLMs in the Mixture of Experts System **03/2024—08/2024**

Research Assistant advised by Prof. Jiantao Jiao (Berkeley)

- Applied causal inference to identify the specific layers in LLMs that influence their coding capabilities. Evaluated the causal components of LLMs across various tasks, including reasoning and memory tasks. Developed a method to integrate coding abilities by combining layers from multiple agents.

Department of Computer Science, Illinois Institute of Technology **Remote**

Robust Node Injection Attack in Graph Neural Network **05/2021—03/2022**

Research Assistant advised by Prof. Binghui (Alan) Wang (IIT)

- Designed a Node Injection Attack with low correlation between perturbation. DeepWalk used here to measure the correlation between the injected nodes. Then filter the highly correlated injected nodes to increase the robustness of the attack. Experiments demonstrate that the attack retains a comparable level of perturbation even after applying defensive methods.

School of Computing, National University of Singapore **Singapore**

NUS School of Computing (SOC) Summer Workshop 2021 **04/2021—08/2021**

Research Assistant advised by Prof. Anand Bhojan (NUS)

- Designed a multi-factor spatio-temporal GNN to predict stock market trends using the information from Tushare and Yahoo; implemented web crawlers for collecting sentiment analysis and corporate relations.

SELECTED PROJECTS

Bubble Bobble Game **01/2024—05/2024**

Course Project of CSEE4840 Embedded Systems, CU (Rated 1st) Supervisor: Prof. Stephen A. Edwards(CU)

- Designed and implemented bubble bobble game on an embedded system utilizing both the ARM CPU and the FPGA on the DE1-SoC, with a focus on efficient video and audio processing. The system is based on line buffer, integrating various hardware inputs of VGA, Game Controller, Audio Jack, and Keyboard.

Research on 5G Network Slicing System and Strategy for End Users **04/2022—09/2022**

National Second Prize (Top 3% out of 1006 teams worldwide) in C4 Supervisor: Prof. Chen Yu (HUST)

- Applied Reinforcement Learning method to optimize network slicing strategy; tested strategy with 12 cellphones, increasing network throughput by 69.4% and document transfer efficiency by 82.2%.

Microprocessor without Interlocked Pipeline Stages (MIPS) CPU Design **09/2021—10/2021**

Course project of Computer Organization Experiment Supervisor: Prof. Diqing Hu (HUST)

- Designed a CPU from the scratch with MIPS framework on the Logisim platform; Practical structures have been integrated here such as Pipeline Stalling and Brach History table.

TECHNICAL SKILLS

- **Programming Languages:** Python, Java, CUDA, C/C++, HTML/CSS, SQL, Verilog
- **Packages:** TensorFlow, PyTorch, Sci-kit Learn, Transformers, OpenCV, OpenAI
- **Tools/Framework:** Linux, Git, Hadoop, Spark, Latex

EXTRACURRICULAR ACTIVITIES

- **Class President**

  Organized class networking events for 30+ classmates with academia and industries, including Toyota and research laboratories at HUST; Led the class in participating in various activities like the college singing competition.