Guanchu Wang

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OBJECTIVE

I will be on the job market in Fall 2024 seeking academic positions.

RESEARCH INTERESTS

- **Large Language Model**: Compression and Acceleration of Large Language Models
- **Efficient ML**: ML Acceleration, Memory Efficient Training, Quantization
- **Explainable AI**: Post-hoc Explanation, Amortized Explanation, Real-time explanation
- **AI for Science**: Bio-informatics, Wireless communication

EDUCATIONAL BACKGROUND

- Rice University — Ph.D., Computer Science — Aug. 2020 - May 2025 (expected)
  - *Advisor: Dr. Xia "Ben" Hu*
- University of Science and Technology of China — M.S., Computer Science — Sep 2016 - May 2019
  - *Advisor: Dr. Chen Gong and Dr. Zhengyuan Xu*

RESEARCH EXPERIENCE

- Graduate research assistant, Rice University, Houston — Aug 2021 - present
  - *Large language models.*
    - *One Publication in NeuraIPS 2023.*
  - *Efficient machine learning.*
    - *Two Publications in ICML 2023, and CIKM 2022 (***BEST DEMO AWARD***).*
  - *Explainable machine learning, Fairness in deep learning.*
    - *Three Publications in ECML-PKDD 2023, ICLR2023, and ICML 2022.*
  - *AI for science: Bio-informatics, Wireless communication.*
    - *Two Publications in CIKM 2022 and JOCN 2023.*
  - *Demo work: BED: A Real-Time Object Detection System for Edge Devices.*
    - Configuration: *a MAX78000 micro-controller as CPU, and a camera and a screen as IO devices.*
    - Novelty: *Efficient on-chip inference (300KB DNN model, 1.845 mJ power, and 91.9 ms time per sample).*
    - Dependencies: *MAX78000 AI Micro-controller, ai8x-training, ai8x-synthesis, Pytorch, PyQt (for GUI).*
- Graduate research assistant, Texas A&M University, College Station — Feb 2020 - July 2021
  - *Fairness in deep learning.*
    - *Three publications in AAAI 2021, and NeuraIPS 2021.*
  - *Opensource Package: TODS: An Automated Time Series Outlier Detection System. (1k+ star, 150+ fork)*
    - Functionality: *Data preprocessing, feature engineering, and Point/Time-series/System anomaly detection.*
    - Novelty: *Automated pipeline search and hyper-parameter tuning.*
    - User Interface: *Sk-learn interface, data visualization and graphical user interface (GUI).*
    - Dependencies: *D3M, sklearn, Pyod, PyQt (for GUI), Keras (for deep AD).*
- Research assistant, Westlake University, Zhejiang, P.R.C — Aug 2019 - Jan 2020
  - *Deep reinforcement learning for robotic controlling.*
    - *Two publications in IJCAI 2020, and IJCNN 2021.*
- Graduate research assistant, University of Science and Technology of China, Anhui, P.R.C — Sep 2016 - May 2019

- *Wireless communication algorithms and protocols, and FPGA platform of UV communication system.*
  - *Two publications in Globecom 2017, and ICC 2018.*
  - *Four publications in PJ 2018, TCOM 2018, PJ 2019, and TCOM 2021.*

PUBLICATIONS

Preprints

[P1] **Guanchu Wang***, Zirui Liu*, Shaochen Zhong, Zhaozhuo Xu, Daochen Zha, Ruixiang Tang, Zhimeng Jiang, Kaixiong Zhou, Vipin Chaudhary, Shuai Xu and Xia Hu. "Winner-Take-All Column Row Sampling for Memory Efficient Adaptation of Language Model."

[P2] Chia-Yuan Chang, Yu-Neng Chuang, **Guanchu Wang**, Mengnan Du, Na Zou. "DISPEL: Domain Generalization via Domain-Specific Liberating."

[P3] Yao Rong, **Guanchu Wang**, Qizhang Feng, Ninghao Liu, Zirui Liu, Enkelejda Kasneci and Xia Hu. "Efficient GNN Explanation via Learning Removal-based Attribution."

[P4] Yu-Neng Chuang, **Guanchu Wang**, Fan Yang, Zirui Liu, Xuanting Cai, Mengnan Du, and Xia Hu. "Efficient XAI Techniques: A Taxonomic Survey."

Conference Publications

[C1] Yu-neng Chuang, **Guanchu Wang**, Chia-Yuan Zhang, Kwei-Herng Lai, Ruixiang Tang, Fan Yang, Alfredo Costilla-Reyes, Kaixiong Zhou, Xiaoqian Jiang and Xia Hu. "DiscoverPath: A Knowledge Refinement and Retrieval System for Interdisciplinarity on Biomedical Research." International Conference on Information and Knowledge Management, CIKM 2023, Demo Track.

[C2] **Guanchu Wang**, Mengnan Du, Ninghao Liu, Na Zou and Xia Hu. "Mitigating Algorithmic Bias with Limited Annotations." European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases, ECML-PKDD 2023.

[C3] **Guanchu Wang**, Zirui Liu, Zhimeng Jiang, Ninghao Liu, Na Zou and Xia Hu. "DIVISION: Memory Efficient Training via Dual Activation Precision." International Conference on Machine Learning, ICML 2023.

[C4] **Guanchu Wang***, Yu-Neng Chuang*, Fan Yang, Quan Zhou, Pushkar Tripathi, Xuanting Cai and Xia Hu. "CoRTX: Contrastive Learning for Real-time Explanations." International Conference on Learning Representations, ICLR 2023.

[C5] **Guanchu Wang***, Zaid Pervaiz Bhat*, Zhimeng Jiang*, Yi-Wei Chen*, Daochen Zha*, Alfredo Costilla Reyes*, et al. "BED: A Real-Time Object Detection System for Edge Devices." International Conference on Information and Knowledge Management, CIKM 2022, Demo Track, **BEST PAPER AWARD**.

[C6] **Guanchu Wang***, Yu-Neng Chuang*, Mengnan Du, Fan Yang, Quan Zhou, Pushkar Tripathi, Xuanting Cai and Xia Hu. "Accelerating Shapley Explanation via Contributive Cooperator Selection." International Conference on Machine Learning, ICML 2022.

[C7] Mengnan Du, Subhabrata Mukherjee, **Guanchu Wang**, Ruixiang Tang, Ahmed Hassan Awadallah, and Xia Hu, "Fairness via Representation Neutralization." Neural Information Processing Systems, NeurIPS 2021.

[C8] Kwei-Herng Lai, Daochen Zha, Junjie Xu, Yue Zhao, **Guanchu Wang**, and Xia Hu, "Revisiting Time Series Outlier Detection: Definitions and Benchmarks." Neural Information Processing Systems, NeurIPS 2021.

[C9] Qiangxing Tian, Jinxin Liu, **Guanchu Wang**, and Donglin Wang, "Learning Transitional Skills with Intrinsic Motivation." International Joint Conference on Neural Networks, IJCNN 2021.

[C10] Kwei-Herng Lai*, Daochen Zha*, **Guanchu Wang**, Junjie Xu, Yue Zhao, Devesh Kumar, Yile Chen, Purav Zumkhawaka, Minyang Wan, Diego Martinez, Xia Hu, "TODS: An Automated Time Series Outlier Detection System." AAAI Conference on Artificial Intelligence, demo track, AAAI 2021.

[C11] Qiangxing Tian, **Guanchu Wang**, Jinxin Liu, and Donglin Wang, "Independent Skill Transfer for Deep Reinforcement Learning." International Joint Conference on Artificial Intelligence, IJCAI 2020.

[C12] **Guanchu Wang**, Chen Gong, Zhimeng Jiang, et al. "Signal Characterization for Multiple Access Non-line of Sight Scattering Communication." IEEE International Conference on Communications, ICC 2018.

[C13] **Guanchu Wang**, Chen Gong, et al. "Signal detection and achievable rates for multiple access optical wireless scattering communication." IEEE Global Communication Conference, Globecom 2017.

Journal Publications

[J1] Yuchen Pan, **Guanchu Wang**, Yubo Zhang, Jingyin Tang, Chen Gong, and Zhengyuan Xu. "Graph-based Conflict-free MAC Protocol and Conflict Analysis for Two-layer Ultraviolet Communication Network." IEEE Journal of Optical Communications and Networking, JOCN 2023.

[J2] Zhimeng Jiang, Chen Gong, **Guanchu Wang**, and Zhengyuan Xu. "On the sum-rate capacity of poisson multiple access channel with non-perfect photon-counting receiver." Journal of Communications and Information Networks, JCIN 2020.

[J3] Zhimeng Jiang, Chen Gong, **Guanchu Wang**, and Zhengyuan Xu. "On the Achievable Rate and Capacity for a Sample-based Practical Photon-counting Receiver." IEEE Transaction on Communication, TCOM 2021.

[J4] **Guanchu Wang**, Chen Gong, Zhimeng Jiang, and Zhengyuan Xu. "Multi-layer Superimposed Transmission for Optical Wireless Scattering Communication." IEEE Photonics Journal, PJ 2019.

[J5] **Guanchu Wang**, Chen Gong, and Zhengyuan Xu, "Signal Characterization for Multiple Access Non-line of Sight Scattering Communication." IEEE Transaction on Communication, TCOM 2018.

[J6] **Guanchu Wang**, Kun Wang, Chen Gong, and Zhengyuan Xu. "A 1Mbps Real-time NLOS UV Scattering Communication System with Receiver Diversity over 1km." IEEE Photonics Journal, PJ 2018.

TEACHING

- Spring 2022: Machine Learning with Graph, Teaching assistance, Rice University, USA.
- Spring 2023: Introduction to Information Retrieval, Teaching assistance, Rice University, USA.
- Fall 2018: Matrix Analysis, Teaching assistance, University of Science and Technology of China, PRC.