Guanchu Wang

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OBJECTIVE

To look for an intern position.

RESEARCH INTERESTS

- **Explainable Machine Learning**: Post-hoc explanation, Learn to Explain, Real-time Interpretation, Shapley value
- **Fairness in Deep Learning**: Bias Mitigation, Shortcut Learning, Social Good
- **Anomaly Detection**: Anomaly Detection, Time-series Anomaly Detection, Deep Anomaly Detection
- **Others**: Compression of Deep Learning, Acceleration, Deep Reinforcement Learning

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*
- Dalian University of Technology — B.S., Communication Engineering — Sep 2012 - May 2016
  - *GPA: Top 2% among 400+ students*

RESEARCH EXPERIENCE

- Graduate research assistant, Rice University, Houston — Aug 2021 - present
  - *Explainable machine learning, compression of deep learning.*
    - *Two conference publications in ICML 2022, and CIKM 2022.* **BEST PAPER AWARD** *in CIKM 2022.*
    - *Two submissions to ICLR 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 conference publications in AAAI 2021, and NIPS 2021.*
  - *Opensource Package: TODS: An Automated Time Series Outlier Detection System. (500+k star, 90+ 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 conference 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 conference publications in Globecom 2017, and ICC 2018.*
- *Four journal publications in PJ 2018, TCOM 2018, PJ 2019, and TCOM 2021.*

PUBLICATIONS

Preprints

[P1] **Guanchu Wang***, Yu-Neng Chuang*, Fan Yang, Quan Zhou, Pushkar Tripathi, Xuanting Cai and Xia Hu. "CoRTX: Contrastive Learning for Real-time Explanations."

[P2] **Guanchu Wang**, Zirui Liu, Zhimeng Jiang, Ninghao Liu, Na Zou and Xia Hu. "A Concise Framework of Memory Efficient Training via Dual Activation Precision."

[P3] **Guanchu Wang**, Mengnan Du, Ninghao Liu, Na Zou and Xia Hu. "Mitigating Algorithmic Bias with Limited Annotations."

Conference Publications

[C1] **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**.

[C2] **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.

[C3] Mengnan Du, Subhabrata Mukherjee, **Guanchu Wang**, Ruixiang Tang, Ahmed Hassan Awadallah, and Xia Hu, "Fairness via Representation Neutralization." Neural Information Processing Systems, NeurIPS 2021.

[C4] 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.

[C5] Qiangxing Tian, Jinxin Liu, **Guanchu Wang**, and Donglin Wang, "Learning Transitional Skills with Intrinsic Motivation." International Joint Conference on Neural Networks, IJCNN 2021.

[C6] 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.

[C7] Qiangxing Tian, **Guanchu Wang**, Jinxin Liu, and Donglin Wang, "Independent Skill Transfer for Deep Reinforcement Learning." International Joint Conference on Artificial Intelligence, IJCAI 2020.

[C8] **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.

[C9] **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] Zhimeng Jiang, Chen Gong, **Guanchu Wang**, et al. "On the Achievable Rate and Capacity for a Sample-based Practical Photon-counting Receiver." IEEE Transaction on Communication, TCOM 2021.

[J2] **Guanchu Wang**, Chen Gong, Zhimeng Jiang, et al. "Multi-layer Superimposed Transmission for Optical Wireless Scattering Communication." IEEE Photonics Journal, PJ 2019.

[J3] **Guanchu Wang**, Chen Gong, and Zhengyuan Xu, "Signal Characterization for Multiple Access Non-line of Sight Scattering Communication." IEEE Transaction on Communication, TCOM 2018.

[J4] **Guanchu Wang**, Kun Wang, Chen Gong, et al. "A 1Mbps Real-time NLOS UV Scattering Communication System with Receiver Diversity over 1km." IEEE Photonics Journal, PJ 2018.

TECHNICAL SKILLS

- Coding: Python (Pytorch, Keras, Sklearn, Pyod, Gym), Matlab, C++ ($\leq$C++11), Verilog (ISE).
- Mathematics: Calculus, statistics, optimization, matrix analysis, Complex analysis, Signal processing.
- Teamwork: Collaboration (Github, Gitlab), teamwork (Slack, MS Team, Zoom), paper writing (latex, overleaf).