Xiao Han

Contact Information

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Research Interests

My research interests lie in the field of data mining, machine learning, and artificial intelligence, with a particular focus on anomaly detection, fairness-aware machine learning, root cause analysis, and reinforcement learning.

Education

Utah State University, Logan, UT — Aug 2020 - May 2024
Ph.D. in Computer Science
Advisor: Dr. Shuhan Yuan

George Washington University, Washington, DC — Aug 2018 - May 2020
M.S. in Data Analytics

Oregon State University, Corvallis, OR — Sep 2014 - Dec 2016
M. Eng. in Computer Science

Shandong University, Jinan, Shandong, China — Sep 2008 - May 2012
B. Eng. in Computer Science and Technology

Honors and Awards

Outstanding Graduate Student, Utah State University, 2024
Presidential Doctoral Research Fellowship, Utah State University, 2020 - 2024
Graduate Student Travel Award, Utah State University, 2023
Student Travel Award, IEEE BigData, 2021
Student Travel Award, CIKM, 2021
Continued Success Scholarship, Oregon State University, 2015

Publications and Preprints

Publications

1. **Xiao Han**, Saima Absar, Lu Zhang, Shuhan Yuan. Root Cause Analysis of Anomalies in Multivariate Time Series through Granger Causal Discovery. In Proceedings of the International Conference on Learning Representations (**ICLR Oral**). 2025
2. **Xiao Han**, Shuhan Yuan, and Mohamed Trabelsi. LogGPT: Log Anomaly Detection via GPT. In 2023 IEEE International Conference on Big Data (**Big Data**). 2023.
3. **Xiao Han**, Lu Zhang, Yongkai Wu, and Shuhan Yuan. On Root Cause Localization and Anomaly Mitigation through Causal Inference. In Proceedings of the 32nd ACM International Conference on Information & Knowledge Management. (**CIKM**). 2023.
4. **Xiao Han**, Lu Zhang, Yongkai Wu, and Shuhan Yuan. Achieving Counterfactual Fairness for Anomaly Detection. In Pacific-Asia Conference on Knowledge Discovery and Data Mining. (**PAKDD**). 2023.
5. **Xiao Han**, Depeng Xu, Shuhan Yuan, and Xintao Wu. Few-shot Anomaly Detection and Classification Through Reinforced Data Selection. In 2022 IEEE International Conference on Data Mining (**ICDM**). 2022.
6. **Xiao Han**, He Cheng, Depeng Xu, and Shuhan Yuan. InterpretableSAD: Interpretable Anomaly Detection in Sequential Log Data. In 2021 IEEE International Conference on Big Data (**Big Data**). 2021.

7. **Xiao Han** and Shuhan Yuan. Unsupervised cross-system log anomaly detection via domain adaptation. In Proceedings of the 30th ACM International Conference on Information & Knowledge Management. (**CIKM**). 2021.

Preprints

1. **Xiao Han**, Lu Zhang, Yongkai Wu, and Shuhan Yuan. On Interpretable Anomaly Detection Using Causal Algorithmic Recourse. arXiv preprint. 2022.

Research Experience

Research Assistant, Utah State University
Logan, UT
Aug 2024 - Oct 2024
Aug 2023 - May 2024
May 2022 - May 2023
Aug 2020 - Aug 2021

- Developed an framework (InterpretableSAD) to detect anomalies in sequential log data. Applied data augmentation and interpretable machine learning techniques to enhance performance.
- Implemented a transfer-learning framework (LogTAD) using adversarial domain adaptation for detecting anomalies across multiple systems. Utilized transfer learning principles to improve detection accuracy.
- Created a framework (FADS) for few-shot anomaly detection and classification. Incorporated semi-supervised and reinforcement learning techniques to enhance performance with limited labeled samples.
- Designed a framework (CFAD) to ensure counterfactual fairness in anomaly detection. Maintained consistent detection outcomes while considering causation-based fairness.
- Built a framework (ADCAR) for root cause analysis in anomaly detection. Identified abnormal features and provided actionable recommendations using causal inference techniques.
- Produced an interpretable anomaly detection framework focusing on explanations and recommended recourse actions in time series anomaly detection.

Machine Learning and AI Intern, Nokia Bell Labs
Murray Hill, NJ
Jun 2023 - Aug 2023

- Conducted a patent application as part of the research team.
- Developed research on anomaly detection for log data, leveraging reinforcement learning techniques specifically designed for large language models.
- Implemented a robust framework using PyTorch to effectively address the challenges associated with anomaly detection.

Teaching Experience

Teaching Assistant, Department of Computer Science
Utah State University, Logan, UT
Aug 2021 - May 2022

- CS 5665 Introduction to Data Science
- CS 6665 Data Mining

Working Experience

Applied Scientist, Twitch
Twitch, San Francisco, CA
Oct 2024 - Present

- Develop and deploy machine learning models to detect and mitigate harmful or abusive behavior in Twitch's online community.
- Design and experiment with responsible AI techniques to enhance fairness, transparency, and user safety in automated moderation systems.

Machine Learning and AI Intern, Nokia Bell Labs
Nokia Bell Labs, Murray Hill, NJ Jun 2023 - Aug 2023

- Conducted a patent application as part of the research team.
- Performed in-depth research on anomaly detection for log data, utilizing large language models (LLM) and leveraging reinforcement learning techniques, such as Proximal Policy Optimization (PPO) and Advantage Actor-Critic (A2C), to enhance the F1-score across multiple datasets.

Technical Skills

Languages: C++, Java, Python, Haskell, SQL
Database Systems: MySQL, MongoDB, ArangoDB, SQLite
Developer Tools: Linux, Unix, Git, Jetbrains, AWS, Databricks
Certification: Certified Information Systems Auditor (CISA)

Synergistic Activities

Conference Reviewer

- IEEE International Joint Conference on Neural Networks (IJCNN) 2023, 2024, 2025
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2022, 2024
- International Conference on Electrical, Computer and Energy Technologies (ICE-CET) 2025

Journal Reviewer

- ACM Transactions on Modeling and Performance Evaluation of Computing Systems
- Elsevier Computers & Security Reviewer
- Elsevier Engineering Applications of Artificial Intelligence
- Elsevier Information Science
- Elsevier SoftwareX
- Frontiers in Big Data
- IEEE Transactions on Information Forensics and Security
- IEEE Transactions on Computational Social Systems
- IEEE/CAA Journal of Automatica Sinica
- Intelligent Data Analysis
- Springer Applied Intelligence
- Springer International Journal of Data Science and Analytics

Service

- IEEE International Conference on Big Data Session Chair / Student Volunteer 2021