PAIHENG XU

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RESEARCH INTEREST

Natural Language Processing, Computational Social Science, Causal Inference

EDUCATION

University of Maryland, College Park, USA *2021 - present*
Ph.D. Student in Computer Science

Johns Hopkins University, Baltimore, USA *2018 - 2020*
M.S.E in Computer Science

Southwest University, Chongqing, China *2014 - 2018*
B.E in Computer Science

RESEARCH EXPERIENCE

UNIVERSITY OF MARYLAND, COLLEGE PARK   College Park, MD
Research Assistant – Advisor: Wei Ai & Jing Liu   *Sep. 2021 - present*

· Discover latent and **distributional patterns** in text by combining LLMs with **causality-inspired** frameworks.
· Investigate **bias** and **spurious correlation** mitigation for text **classification** and LLM **alignment**.
· AI for Edu - LLM-based transcript analysis to identify effective teaching practices and measure teaching quality.

Research Assistant – Advisor: Louiqa Raschid & Vanessa Frias-Martinez   *Jan. 2023 - present*

· Model correlations between geo-co-location and social media engagement using **statistical** & **LLM**-based methods.
· Link online interaction patterns with offline community outcomes to promote pro-social behaviors.

JOHNS HOPKINS UNIVERSITY   Baltimore, MD
Full-time Research Developer – Advisor: Mark Dredze   *Jun. 2020 - Aug. 2021*

· Develop Twitter-based social mobility indices to study demographic differences in social distancing behavior. [link]
· Apply embedding- and transformer-based models to discover e-cig brands and track sentiment shifts on social media.

Research Assistant – Mentor: Zach Wood-Doughty   *Nov. 2018 - May 2020*

· Demographic inference on Twitter with distant supervision (Package); study linguistic variation across racial groups.

INDUSTRY EXPERIENCE

ADOBE RESEARCH   San Jose, CA
Research Scientist Intern – Mentor: Haoliang Wang   *May 2025 - Aug. 2025*

· Design style understanding and **personalized** suggestion generation through LVLM-based design pattern uncovering.
· **User-centric evaluation** for personalization using paired image comparisons to capture design preferences.

ADOBE RESEARCH   San Jose, CA
Research Scientist Intern – Mentor: Vishy Swaminathan, Gang Wu, & Xiang Chen   *May 2024 - Aug. 2024*

· **Skill development** for software scripting through code generation & offline simulations using **LLM-based agents**.

ADOBE RESEARCH   Remote
Research Scientist Intern – Mentor: Tong Yu & Haoliang Wang   *May 2022 - Aug. 2022*

· Learning knowledge from Critical Service Outage reports for auto-remediation.
· Adaptive Question Generation for Extractive Question Answering using In-context Learning.

SELECTED PUBLICATIONS

* denotes equal contribution

Paiheng Xu, Louiqa Raschid, Vanessa Frias-Martinez, Does Geo-co-location Matter? A Case Study of Public Health Conversations during COVID-19. *To appear in ICWSM 2026.*

Paiheng Xu, Gang Wu, Xiang Chen, Tong Yu, Chang Xiao, Franck Dernoncourt, Tianyi Zhou, Wei Ai, Vishy Swaminathan, Skill Discovery for Software Scripting Automation via Offline Simulations with LLMs. *arXiv:2504.20406*, 2025.

Paiheng Xu*, Xiaoyu Liu*, Junda Wu, Jiaxin Yuan, Yifan Yang, Yuhang Zhou, Fuxiao Liu, Tianrui Guan, Haoliang Wang, Tong Yu, Julian McAuley, Wei Ai, Furong Huang, Large Language Models and Causal Inference in Collaboration: A Comprehensive Survey. *Findings of NAACL 2025.*

Paiheng Xu*, Yuhang Zhou*, Bang An, Wei Ai, Furong Huang, GFairHint: Improving Individual Fairness for Graph Neural Networks via Fairness Hint. *Transactions on Knowledge Discovery from Data, 2025*

Paiheng Xu, Jing Liu, Nathan Jones, Julie Cohen, Wei Ai, The Promises and Pitfalls of Using Language Models to Measure Instruction Quality in Education. *NAACL 2024.*

Yuhang Zhou, **Paiheng Xu**, Xiaoyu Liu, Bang An, Wei Ai, Furong Huang, Explore Spurious Correlations at the Concept Level in Language Models for Text Classification. *ACL 2024.*

Paiheng Xu, David A. Broniatowski, Mark Dredze, Twitter Social Mobility Data Reveal Demographic Variations in Social Distancing Practices During the COVID-19 Pandemic. *Scientific Reports*, 2024.

Yuhang Zhou*, Jing Zhu*, **Paiheng Xu**, Xiaoyu Liu, Xiyao Wang, Danai Koutra, Wei Ai, Furong Huang, Multi-Stage Balanced Distillation: Addressing Long-Tail Challenges in Sequence-Level Knowledge Distillation. Findings of EMNLP 2024.

Paiheng Xu*, Zach Wood-Doughty*, Xiao Liu, Mark Dredze, Using Noisy Self-Reports to Predict Twitter User Demographics. *SocialNLP@NAACL*, 2021.

Paiheng Xu, Mark Dredze, David A. Broniatowski, The Twitter Social Mobility Index: Measuring Social Distancing Practices from Geolocated Tweets. *Journal of Medical Internet Research*, 2020.

Paiheng Xu, Likang Yin, Zhongtao Yue, Tao Zhou, On Predictability of Time Series. *Physica A: Statistical Mechanics, its Applications* 523, 345-351 (2019).

Paiheng Xu, Rong Zhang, Yong Deng, A Novel Visibility Graph Transformation of Time Series into Weighted Networks. *Chaos, Solitons & Fractals* 117, 201-208 (2018).

TECHNICAL SKILLS

Languages	Python, MATLAB, R, C/C++, C#, LaTeX, Markdown, Bash
Tools	Transformers, PyTorch, TRL, HF Agents, Scikit-learn, NLTK, Statsmodels, NetworkX

HONOR & AWARDS

Dean's Fellowship, University of Maryland
National Scholarship, Ministry of Education, China
Outstanding Graduates, Southwest University
Meritorious Winner, Interdisciplinary Contest in Modeling (ICM)

TEACHING & SERVICE

Teaching Assistant: Introduction to Artificial Intelligence, Fall 2022
Program Committee: ICWSM 2022, 2025
Reviewer: ARR 2025; KDD 2025; TheWebConf 2025; TPAMI
Sub-Reviewer: ACL 2021; KDD 2022; SIGIR 2022-2025