Xinyi Liu

ML in Visualization **Human-AI Interaction** **Visual Analytics**

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Research Interests

As a post-graduate HCI researcher at Harvard Medical School, I'm deeply passionate about exploring a broad range of research interests. My prior endeavors centered on the intricacies of high-dimensional data visualization and the impact of examples on data visualization design ideation. At present, I'm delving into innovative VR-based visualization interactions and pioneering intelligent systems for seamless visual explanations.

Education

The University of Texas at Austin *Austin, TX*
M.S., Operational Research & Industry Engineering *Expected Spring 2024*
Beneficiary of tuition waiver and complimentary insurance.

University of Maryland *College Park, MD*
B.S., Department of Computer Science (3.5/4, high-level top10%) *2018-2022*
Double Major: Department of Economics

Publications

Published works:
Hannah K. Bako, **Xinyi Liu**, Leilani Battle, Zhicheng Liu
Understanding how Designers Find and Use Data Visualization Examples
IEEE Transactions on Visualization & Computer Graphics (IEEE Vis'22 **with strongly agree**)

In-review works:
One as a co-first author at Harvard research internship, submitted to ACM CHI 2024
The other as the second author at UMD remote internship, submitted to ACM CHI 2024

Research Experience

Georgia Tech, Remote Research Assistant, IVLab, *advised by Prof. Yalong Yang* *2023.8-12*
- Develop guidance on mapping 2-D Visualization Interactions to Virtual Reality, accompanied by VR demos to enhance user comprehension.
- Targeting a submission for this paper to the Euro graphics Workshop on Visualization in Scientific Computing 2024 as the first author.

The University of Texas at Austin, differences in API between IOS & Android *2023.9-12*
Graduate Research Assistant, McCombs School of Business
- Devised a crawling strategy to extract hierarchical API data from the multi-layered Android website.
- Employed NLP models to assess similarities in function-specific APIs between iOS & Android.
- Preparing a manuscript for submission to a business journal.

Harvard Medical School, Postgraduate Research Fellow, Nils Gehlenborg Lab *Boston, MA*
advised by Prof. Nils Gehlenborg & Prof. Qianwen Wang *2023.6-9*

- Introduced a computational method powered by LLM to systematically analyze thousands of high dimensional visualizations from Single cell papers, a significant shift from the previous manual analyses.
- Wrote all the codes for the project which will be accessible on GitHub after the paper decision.
- Extracted pivotal insights for cell biology high dimensional visualization which are accessible via an interactive website, will be available after the paper decision.
- Designed and conducted an interview study to validate our findings.
- Showed our findings of high-dimensional data visualization taxonomy can be generalized to other high-dimensional data domain.
- Submitted to ACM CHI 2024 as a co-first author.

University of Maryland, Remote Research Assistant, Human-Data Interaction Lab
advised by Prof. Zhicheng Liu *2023.3-2023.8*

- Conducted comprehensive evaluations to deduce the impact of example visualizations on design parameters including layout, composition, type, and interactivity.
- Acquired insights pinpointing the refining capabilities of examples on visualization quality and effectiveness.
- Submitted to ACM CHI 2024 as the second author.

The University of Texas at Austin, Disease Progressing Model, AI Health Lab *Austin, TX*
*Graduate Research Assistant, Department of Computer Science*s *Summer 2022-Fall 2022*

- Created a novel machine learning model to extract temporal patterns of chronic diseases.
- Implemented the Karmalego Algorithm (Fast Time Interval Mining) to extract temporal patterns as a baseline.
- *It was the first explainable machine learning model to extract temporal patterns which ismore efficient than traditional data structure algorithm.*

UMD, Undergraduate Research Assistant, Human-Data Interaction Lab *College Park, MD*
advised by Prof. Zhicheng Liu *2021.9-2022.3*

- Engaged in a research study titled “Understanding how Designers Find and Use Data Visualization Examples”.
- Formulated a Qualtrics survey for participant selection and executed qualitative coding on the acquired data.
- Identified and articulated gaps between the current visualization tools and user preferences, generating valuable insights for subsequent system improvements.
- Honored to be the second author of this paper accepted by IEEE Transactions on Visualization & Computer Graphics 2022.

University of Maryland, Undergraduate Research Assistant, MIND Lab *College Park, MD*
advised by Prof. Ashok Agrawala *2019.9-12*

- Contributed to a health-tech project for Data Visualization of a Wearable Device to Analyze Patients’ Breath.

- Leveraged MATLAB for intricate health data processing and visualization.
- The proposed technique was subsequently integrated into industrial applications.

Academic Service

- Student volunteer of ACM Designing Interactive Systems Conference (ACM DIS) *2023.7*
- Excellent Student volunteer of ACM Conversational User Interfaces Conference(CUI) *2023.7*
- Association for Women in Computing at the University of Maryland *2020-2022*

Professional Experiences

Software Development Intern, Datayes! *Shanghai, China, Summer 2021*

- Developed user diagnosis card of asset regulation for Galaxy Securities to analyze clients' investment preferences and intelligently recommend products to the clients.
- Applied MySQL database Navicat to design tables, connected sub-tables with the main table by the field of comments, and implemented the project according to the customer's requirements by Java MyBatis, Spring Boot, and Maven

Full-stack Engineer Intern, Yunkong Software Co., Ltd. *Yangzhou, China, Winter 2021*

- Developed a database to manage the staff information for the police station based usingRuoYi framework.
- Created front-end pages using JavaScript, HTML, and jQuery to ensure smooth user experience.
- Developed back-end functions with Java to facilitate staff data management, includingadding, deleting, inputting, outputting, and searching of staff data.

Projects

Wearable long-term stress monitoring system with multimodal sensor fusion *Spring 2023*

- *The system we are building can transmit PPG and EDA raw signals to smartphone apps.*
- *Attached IMU or a microphone to automatically reporting a potential reason to thesestress events.*
- Building an interactive dashboard which can visualize stress over time according to thetime window the user input by Dash library of Python.

Versatility of Transformers *The University of Texas at Austin, 2022*

- Researched the versatility of transformers and reviewed transformer architectures that areused for different domains.
- Experimented on three different domains; Speech Recognition, Natural LanguageProcessing, and Computer Vision and the results displayed the superiority of Transformers over other baseline models.

Attention Isn't Quite All You Need: a Phoneme to Grapheme *University of Maryland, 2021*

- Predicted graphemes from phonemes through LSTM, GRUs, Attention and Seq2seq.
- Achieved over 2/3 prediction accuracy for words not included in the dataset, sourcedfrom dictionary.com.

Honors & Awards

- Got the free registration of ACM Conversational User Interfaces Conference(ACM CUI 2024) due to excellent student volunteer performance in ACM CUI 2023. *2023.7*
- Be invited to Hewlett-Packard & NVIDIA Data Science Summit in Arlington (an invitation-only event for Arlington area Data Scientists *2023.7*
- My poster *'A Novel Machine Learning Model to Do Temporal Medical Data Imputation with Accuracy and Explainability'* was accepted by the summit organized by MD Anderson & Dell Medical School of UT Austin *2022.11*
- Dean's List (top 10% of CS department at UMD) *Spring 2020, Fall 2020, Spring 2022*
- Terrapin Teacher Scholarship at UMD *Spring 2019*
- First prize of Chinese Olympic physics competition of Jiangsu Province *2016.10*
  (Broke the record of my high school since it was the competition for Grade 12 student, but I was a Grade 11 student at that time)

Skills

Languages: Python /Java/JavaScript/HTML/SQL/C /C#/ Ruby / Ocmal / Rust/ MATLAB/ Latex/STATA/JQuery/Node.js
Frameworks: PyTorch / TensorFlow /Keras/Sklearn/Pandas/Spring Boot /MyBatis /Maven/ Tomcat
Tools: Vega/Power BI/Microsoft Excel, Qualtrics