Yiran Li

PhD Candidate @ Visualization & Interface Design Innovation Lab, VIDI
University of California – Davis

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RESEARCH FOCUS

My research is centered on the intersection of Explainable AI (XAI) and Visual Analytics (VA). I specialize in devising advanced interpretation methodologies to enhance the **understanding, evaluation, and diagnosis of AI systems**. Additionally, I engineer visualization systems to further augment and streamline the interpretation and analytical processes.

EDUCATION

Sep. 2018 – Jun. 2024 (Expected)
PhD Candidate in Computer Science
University of California – Davis, United States
Advisor: Dr. Kwan-Liu Ma
Thesis: Visual Analytics Assistance to Interpreting, Analyzing and Improving Machine Learning Models

Sep. 2014 – Jun. 2018
Bachelor of Science in Mathematics and Applied Mathematics, Bachelor of Arts in English
Chu Kochen Honors College, Zhejiang University, Hangzhou, China
Advisor: Dr. Zhiyi Tan
Thesis: A Survey on Integer Programming Solvers in MATLAB and Python

Jun. 2017 – Sep. 2017
Exchange Undergraduate Researcher
University of California – Davis, United States
Advisor: Dr. Kwan-Liu Ma
Project: Uncertainty-Aware Visual Analytics of Dark Matter Simulation Data

Jun. 2016 – Sep. 2016
Exchange Undergraduate Student
Harvard University, United States

PROFESSIONAL EXPERIENCE

Sep. 2018 – Present
University of California – Davis
Graduate Research Assistant, with Dr. Kwan-Liu Ma
- Research in the field of Visual Analytics for Explainable Machine Learning

Jun. 2023 – Sep. 2023
Visa Research
Research Internship, with Dr. Junpeng Wang
- Research on efficient image exploration and image caption steering using vision-language transformers.
- Development of a visual analytics system that integrates image and text exploration and steering.

Jun. 2022 – Sep. 2022
Visa Research
Research Internship, with Dr. Junpeng Wang
- Research on interpretation of vision transformers and their large-scale attentions.
- Development of a visual analytics system enabling efficient exploration of attentions across heads in vision transformers.

Jun. 2017 – Sep. 2017
University of California – Davis
Summer Research Program, with Dr. Annie Preston and Dr. Kwan-Liu Ma
- Research on uncertainty visualization of dark matter simulations.
- Development of an approach quantifying uncertainty based on bootstrapping on small samples of simulation data.

PUBLICATIONS

2024
Visual Analytics for Efficient Image Exploration and User-Guided Image Captioning
Yiran Li, Junpeng Wang, Prince Aboagye, Chin-Chia Michael Yeh, Yan Zheng, Liang Wang, Wei Zhang, and Kwan-Liu Ma
PacificVis *IEEE PacificVis TVCG Journal Track,* ***Acceptance Rate: 11.5% (15 out of 131)***

2023
How Does Attention Work in Vision Transformers? A Visual Analytics Attempt
Yiran Li, Junpeng Wang, Xin Dai, Liang Wang, Chin-Chia Michael Yeh, Yan Zheng, Wei Zhang, and Kwan-Liu Ma
PacificVis *IEEE PacificVis Conference,* ***Best Paper Honorable Mention and published in TVCG***

Visual Analytics of Neuron Vulnerability to Adversarial Attacks on Convolutional Neural Networks
Yiran Li, Junpeng Wang, Takanori Fujiwara, and Kwan-Liu Ma
TIIS *ACM Transactions on Interactive Intelligent Systems, Special Issue on Human-Centered Explainable AI*

A Study of Healthcare Team Communication Networks using Visual Analytics
Hsiao-Ying Lu, **Yiran Li**, Brittany Garcia, Shin-Ping Tu, and Kwan-Liu Ma
ICMHI *ACM International Conference on Medical and Health Informatics*

2021 **A Visual Analytics System for Water Distribution System Optimization**
Yiran Li, Erin Musabandesu, Takanori Fujiwara, Frank J. Loge, and Kwan-Liu Ma
VIS *IEEE Visualization Conference (Short Paper)*

ChartStory: Automated Partitioning, Layout, and Captioning of Charts into Comic-Style Narratives
Jian Zhao, Shenyu Xu, Senthil Chandrasegaran, Chris Bryan, Fan Du, Aditi Mishra, Xin Qian, **Yiran Li**, and Kwan-Liu Ma
TVCG *IEEE Transaction on Visualization and Computer Graphics*

2020 **A Visual Analytics System for Multi-Model Comparison on Clinical Data Predictions**
Yiran Li, Takanori Fujiwara, Yong K. Choi, Kathering Kim, and Kwan-Liu Ma
Visual Informatics *IEEE PacificVis Conference (VisMeetsAI Workshop), published in Visual Informatics*

Comparative visual analytics for assessing medical records with sequence embedding
Rongchen Guo, Takanori Fujiwara, **Yiran Li**, Kelly M. Lima, Soman Sen, Nam K. Tran, and Kwan-Liu Ma
Visual Informatics *IEEE PacificVis Conference (VisMeetsAI Workshop), published in Visual Informatics*

Umbra: A Visual Analysis Approach for Defense Construction Against Inference Attacks on Sensitive Information
Xumeng Wang, Chris Bryan, **Yiran Li**, Rusheng Pan, Yang Liu, Wei Chen, and Kwan-Liu Ma
TVCG *IEEE Transaction on Visualization and Computer Graphics*

2018 **Visual Analysis of Simulation Uncertainty Using Cost-Effective Sampling**
Annie Preston, **Yiran Li**, Franz Sauer, and Kwan-Liu Ma
LDAV *IEEE Symposium on Large Data Analysis and Visualization*

AWARDS AND HONORS

2023 Best Paper Honorable Mention on IEEE PacificVis

2023 Research Fellowship for Spring 2023 from the Graduate Group in Computer Science of UC Davis

COMPUTER SKILLS

Programming Languages

Python, JavaScript/CSS/HTML, C/C++, MATLAB

Frontend/Backend Libraries

D3, Bootstrap, Vue, Flask

Machine Learning

PyTorch, TensorFlow

SERVICE AND OUTREACH

Program Committee

2023 Workshop on Visual Analytics in Healthcare (VAHC)

Paper Reviewer

2024 IEEE PacificVis TVCG Track Papers

2023 IEEE VIS Full Papers

2023 IEEE PacificVis Full Papers

2023 ChinaVis Full Papers

2023 The Journal of Supercomputing

2023 IEEE VIS VAHC Workshop

2022 ChinaVis Full Papers

2021 IEEE VIS TREX Workshop