

PEIZHAO LI

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EDUCATION

Brandeis University, Waltham, Massachusetts, United States

08/2019 - Expected 05/2024

Doctor of Philosophy-Ph.D., Computer Science

Advisor: Professor Hongfu Liu

Beihang University, Beijing, China

09/2015 - 06/2019

Bachelor of Science, Electronic and Information Engineering

Advisor: Professor Xiantong Zhen

RESEARCH SUMMARY

Academic Research: **Artificial Intelligence** and **Machine Learning** with particular interests in **Trustworthy and Responsible AI**, **Machine Learning Fairness**, **Data-centric AI**, and relevant learning/data-centric methods to detect and mitigate bias in machine learning and deep learning applications.

Industrial Research: **Deep Learning**, **Multimodal Learning (Vision + Language)**, and **Computer Vision** with applications in user feedback & attention modeling, document analysis, object detection and tracking with automotive radar and RGB camera images, automatic code editing, and keypoint detection.

TECHNICAL SKILLS

Programming Languages

Python, MATLAB, Shell script, SQL, Java, \LaTeX , HTML

Deep Learning Frameworks

PyTorch, JAX, Tensorflow, Keras, T5X, MMCV, Detectron2

Computational Toolkits

Scikit-Learn, CPLEX Optimizer, Gurobi

Data Processing Frameworks

SeqIO, Apache Spark, Apache Hadoop

Languages

Fluent in English and Mandarin

RESEARCH AND INDUSTRY EXPERIENCE

Amazon Alexa AI

09/2023 - 11/2023

Applied Scientist Intern, Manager: Dr. Xiaohu (Derek) Liu

Bellevue, Washington

- Conducted research on language data augmentation with Large Language Models (LLMs).
- Proposed techniques for prompting LLMs to generate synthetic data for Dialogue State Tracking.

Google Research

05/2023 - 08/2023

Research Intern, Host: Dr. Junfeng He

Mountain View, California

- Conducted research on user attention and feedback modeling on visual content.
- Built multimodal foundation models for saliency, scanpath, and aesthetics score predictions.
- Achieved leading performance on several saliency and scanpath prediction benchmarks.
- Contributed to the collection of the first-ever dataset on user gaze with rating on images.
- Internship contributions were acknowledged by the director through a peer bonus.

Harvard University

01/2023 - 05/2023

Research Fellow, Host: Professor Yiling Chen

Cambridge, Massachusetts

- Conducted research on information elicitation and peer prediction with machine learning.

- Related multitask peer prediction from mechanism design field with multimodal contrastive learning.

Mitsubishi Electric Research Laboratories

05/2022 - 11/2022

Research Intern, Host: Dr. Pu (Perry) Wang

Cambridge, Massachusetts

- Conducted research on object recognition with multi-view radar frequency imaging.
- Proposed a deep learning framework for object segmentation using horizontal and vertical radar images.
- Contributed to an in-door radar dataset collection using internal radar devices.

Mitsubishi Electric Research Laboratories

05/2021 - 08/2021

Research Intern, Host: Dr. Pu (Perry) Wang

Cambridge, Massachusetts (Remote)

- Conducted research on object recognition in autonomous driving using automotive radar.
- Proposed a temporal information-enhanced radar object detection and multi-object tracking framework.
- Authored and prepared a research paper accepted at CVPR 2022.

NEC Laboratories America

02/2021 - 05/2021

Research Intern, Mentor: Dr. Xuchao Zhang

Princeton, New Jersey (Remote)

- Conducted research on automatic and few-shot computer source code editing.
- Proposed a method for learning from a few code snippets and performed well in code refactoring.
- Authored and prepared a research paper accepted at ICLR 2022.

Adobe Research

05/2020 - 11/2020

Research Intern, Primary Mentor: Dr. Jiuxiang Gu

College Park, Maryland (Remote)

- Conducted research on document representation learning, entity recognition, and document classification.
- Proposed a multimodal pre-training framework and performed well on various downstream tasks.
- Authored and successfully submitted a research paper that was accepted at CVPR 2021.

Beihang University

09/2017 - 03/2019

Undergraduate Research Assistant, Advisor: Professor Xiantong Zhen

Beijing, China

- Conducted research on computer vision applications including facial keypoint detection and object tracking.
- Authored and prepared three research papers accepted at WACV 2019 and ICIP 2019.
- Worked on video object detection and tracking to improve a railway surveillance system.

PUBLICATIONS

Publications in several research fields including **Machine Learning Fairness**, **Multimodal Learning (Vision + Language)**, and **Computer Vision**, etc.

Citations: 448, h-index: 10, i10-index: 10, by Google Scholar, as of 11/08/2023.

Google Scholar profile: <https://scholar.google.com/citations?user=h8UyqB4AAAAAJ&hl>

Conference Publications

- [C1]. **Peizhao Li**, Ethan Xia, Hongfu Liu. Learning Antidote Data to Individual Unfairness. *International Conference on Machine Learning (ICML)*, 2023.
- [C2]. Anshuman Chhabra, **Peizhao Li**, Prasant Mohapatra, Hongfu Liu. Robust Fair Clustering: A Novel Fairness Attack and Defense Framework. *International Conference on Learning Representations (ICLR)*, 2023.
- [C3]. Zizhang Chen, **Peizhao Li**, Hongfu Liu, Pengyu Hong. Characterizing the Influence of Graph Elements. *International Conference on Learning Representations (ICLR)*, 2023.

- [C4]. **Peizhao Li**, Zhengming Ding, Hongfu Liu. Mining Label Distribution Drift in Unsupervised Domain Adaptation. *Australasian Joint Conference on Artificial Intelligence (AJCAI)*, 2023.
- [C5]. **Peizhao Li**, Hongfu Liu. Achieving Fairness at No Utility Cost via Data Reweighing with Influence. *International Conference on Machine Learning (ICML)*, 2022.
- [C6]. **Peizhao Li**, Xuchao Zhang, Ziyu Yao, Wei Cheng, Haifeng Chen, Hongfu Liu. Code Editing from Few Exemplars by Adaptive Multi-Extent Composition. *International Conference of Learning Representations Deep Learning For Code Workshop (ICLRW)*, 2022.
- [C7]. **Peizhao Li**, Pu Wang, Karl Berntorp, Hongfu Liu. Exploiting Temporal Relations on Radar Perception for Autonomous Driving. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2022.
- [C8]. Hanyu Song, **Peizhao Li**, Hongfu Liu. Deep Clustering-based Fair Outlier Detection. *ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2021.
- [C9]. **Peizhao Li**, Jiuxiang Gu, Jason Kuen, Vlad Morariu, Handong Zhao, Rajiv Jain, Varun Manjunatha, Hongfu Liu. SelfDoc: Self-Supervised Document Representation Learning. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.
- [C10]. **Peizhao Li**, Yifei Wang, Han Zhao, Pengyu Hong, Hongfu Liu. Dyadic Fairness: Exploring and Mitigating Bias in Graph Connections. *In Proceedings of the 9th International Conference on Learning Representations (ICLR)*, 2021.
- [C11]. **Peizhao Li**, Han Zhao, Hongfu Liu. Deep Fair Clustering for Visual Learning. *In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020.
- [C12]. **Peizhao Li**, Yanjing Li, Xiaolong Jiang, Xiantong Zhen. Two-Stream Multi-Task Network for Fashion Recognition. *In Proceeding of IEEE International Conference on Image Processing (ICIP)*, 2019.
- [C13]. **Peizhao Li***, Anran Zhang*, Lei Yue, Xiantong Zhen, Xianbin Cao. Multi-Scale Aggregation Network for Direct Face Alignment. *In Proceeding of IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2019. (* equal contribution)
- [C14]. Xiaolong Jiang, **Peizhao Li**, Xiantong Zhen, Xianbin Cao. Model-Free Tracking with Deep Appearance and Motion Features Integration. *In Proceeding of IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2019.

Under Review Papers

- {U1}. **Peizhao Li**, Junfeng He, Gang Li, Rachit Bhargava, Shaolei Shen, Nachiappan Valliappan, Youwei Liang, Hongxiang Gu, Venky Ramachandran, Golnaz Farhadi, Yang Li, Kai J Kohlhoff, Vidhya Navalpakkam. UniAR: Unifying Human Attention and Response Prediction on Visual Content.
- [U2]. Youwei Liang, Junfeng He, Gang Li, **Peizhao Li**, Arseniy Klimovskiy, Nicholas Carolan, Jiao Sun, Jordi Pont-Tuset, Sarah Young, Feng Yang, Junjie Ke, Krishnamurthy Dj Dvijotham, Katie Collins, Yiwen Luo, Yang Li, Kai J Kohlhoff, Deepak Ramachandran, Vidhya Navalpakkam. Rich Human Feedback for Text-to-Image Generation.
- [U3]. Anshuman Chhabra, **Peizhao Li**, Prasant Mohapatra, Hongfu Liu. ‘What Data Benefits My Classifier?’ Enhancing Model Performance and Interpretability through Influence-Based Data Selection.
- [U4]. Tingwei Liu, **Peizhao Li**, Hongfu Liu. Dual Node and Edge Fairness-Aware Graph Partition.
- [U5]. Yuan Zhang, **Peizhao Li**, Feng Pan, Hongfu Liu, Pengyu Hong, Xiuwen Liu, Jinfeng Zhang. Applications of AlphaFold beyond Protein Structure Prediction.

Preprints

- [P1]. Xiaolong Jiang*, **Peizhao Li***, Yanjing Li, Xiantong Zhen, Xianbin Cao. Graph Neural Based End-to-end Data Association Framework for Online Multiple-Object Tracking. *arXiv preprint:1907.05315*, 2019. (* equal contribution)

PATENTS

1. Jiuxiang Gu, Vlad Morariu, Varun Manjunatha, Tong Sun, Rajiv Jain, **Peizhao Li**, Jason Kuen, Handong Zhao. Self-supervised Document Representation Learning. U.S. Patent Application No. 17/333,892.

OPEN-SOURCE CONTRIBUTIONS

FairPy: A Python Library for Machine Learning Fairness 03/2023 - Now

Project link: <https://github.com/brandeis-machine-learning/FairPy/tree/dev>

A Python library for promoting fairness in machine learning, which includes a collection of benchmark datasets, fair algorithms, and evaluation metrics for convenient utilization.

Awesome Machine Learning Fairness: A Paper and Resource List 07/2021 - Now

Project link: <https://github.com/brandeis-machine-learning/awesome-ml-fairness>

A vast collection of over 250 papers, articles, and resources spanning multiple research fields and practical applications, all dedicated to the topic of machine learning fairness.

TEACHING EXPERIENCE

Computer Vision 01/2023 - 05/2023

Teaching Assistant, with Professor Hongfu Liu

Marketing Analytics 09/2021 - 12/2021

Teaching Assistant, with Professor Xavi Vidal-Berastain

Discrete Structures 09/2021 - 12/2021

Teaching Assistant, with Professor Timothy Hickey

Computer Vision 01/2021 - 05/2021

Teaching Assistant, with Professor Hongfu Liu

Advanced Topics in Graph Mining 09/2020 - 12/2020

Teaching Assistant, with Professor Chuxu Zhang

Topics in Natural Language Processing 01/2020 - 05/2020

Teaching Assistant, with Professor Constantine Lignos

Data Structures and the Fundamentals of Computing 09/2020 - 12/2020

Teaching Assistant, with Professor Hongfu Liu

PROFESSIONAL SERVICES

Reviewed over 100 conference and journal manuscripts.

Conference Reviewer

- Conference on Neural Information Processing Systems (NeurIPS), 2022, 2023
- International Joint Conference on Artificial Intelligence (IJCAI), 2023
- European Conference on Computer Vision (ECCV), 2022
- International Conference on Computer Vision (ICCV), 2023
- IEEE International Conference on Data Mining (ICDM), 2022, 2023
- ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD), 2022, 2023

- IJCNN at IEEE World Congress on Computational Intelligence (IJCNN), 2022
- Conference on Uncertainty in Artificial Intelligence (UAI), 2022, 2023
- International Conference on Machine Learning (ICML), 2022, 2023
- IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022, 2023, 2024
- International Conference on Learning Representations (ICLR), 2022, 2023, 2024
- AAAI Conference on Artificial Intelligence (AAAI), 2022, 2023, 2024
- International Conference on Advanced Communications and Computation (INFOCOMP), 2021

Journal Reviewer

- IEEE Transactions on Circuits and Systems for Video Technology
- IEEE Transactions on Knowledge Discovery from Data
- IEEE Transactions on Multimedia
- IEEE Transactions on Artificial Intelligence
- IEEE Computational Intelligence Magazine
- IEEE Access
- Machine Learning
- Big Data
- Neurocomputing
- Neural Networks
- Journal of Combinatorial Optimization
- Journal of Electronic Imaging
- IET Image Processing
- IET Computer Vision

Others

- External Review Panel, MIT School of Computer Science, Brandeis University

ACADEMIC TALKS

Harmonizing Fairness with Utility via Data-centric Approaches

- Salesforce AI Research Singapore 10/2023

An Introduction to Fair Machine Learning

- Guest lecture on COSI/ECO-148B: Introduction to Machine Learning, Brandeis University 04/2023
- Guest lecture on BUS/FIN-241A: Machine Learning for Business, Brandeis University 04/2023
- Guest lecture on COSI-159A: Computer Vision, Brandeis University 04/2023
- GSAS Computer Science Alumni Celebration, Brandeis University 03/2023
- MRSEC-Waltham High School Pizza Talk Series, Waltham High School 09/2022
- Brandeis Precollege Academic Immersion Program, Brandeis University 03/2022

Releasing the Tradeoffs in Algorithmic Fairness

- International Business School Ph.D. Seminar, Brandeis University 03/2022
- Computer Science Seminar, Brandeis University 02/2022

Code Editing from Few Exemplars by Adaptive Multi-Extend Composition

- Data Science and System Security Department, NEC Laboratories America 07/2021

Two-Stream Multi-Task Network for Fashion Recognition

- IEEE International Conference on Image Processing 09/2019
- Multi-Scale Aggregation Network for Direct Face Alignment**
- IEEE Winter Conference on Applications of Computer Vision 01/2019

MEDIA COVERAGE

- Research Summary: Achieving Fairness at No Utility Cost via Data Reweighing with Influence 07/2023
- The AI Ethics Brief, Montreal AI Ethics Institute

AWARDS

- NIJ FY23 Graduate Research Fellowship, \$55,500 2023
- Meta Research Ph.D. Fellowship Finalist (83/3200+) 2023
- GSAS Career Fellowship, Brandeis University 2023
- Dissertation Research Award, Brandeis University 2022
- COSI Outstanding Research Award, Brandeis University 2022
- Library's Research Excellence Prize, Brandeis University 2022
- Alfred Schonwalter Summer Research Fellowship, Brandeis University 2022
- ICML Complimentary Registration 2022
- CVPR Travel Grant Award 2022
- CVPR Virtual Registration Waiver Award 2022
- Ph.D. Fellowship, Brandeis University 2019 - 2023
- Academic Excellence Fellowship, Beihang University 2017 - 2018
- Competition Excellence Fellowship, Beihang University 2017
- Second Prize in National Undergraduate Electronics Design, Beijing 2017
- Outstanding Volunteer Award, Beihang University 2017

Latest Update: 11/2023