Haocheng Dai

Contact Information

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Summary

My research interest is centered on developing specialized and trustworthy machine learning tools tailored for computer vision in healthcare settings. My focus extends to, but is not limited to:

- Large Language Models and Retrieval-Augmented Generation [2, 8]
- Trustworthy Machine Learning [2, 3]
- Vision Language and Diffusion Models [1, 2, 5, 8]
- Geometric Deep Learning and Shape Modeling [4, 7, 9, 10]
- Physics-informed Machine Learning [6, 7]

Work Experience

Amazon *Seattle, USA*
Applied Scientist-LLM, Alexa Shopping *2024 - Present*
Working on the next generation LLM-based conversational shopping assistant Rufus.

Amazon *Seattle, USA*
Applied Scientist Intern
Design diffusion models for text inpainting [5]. *2023*
Design vision language models for visual documents understanding [8]. *2022*

Education

University of Utah *Salt Lake City, USA*
Ph.D. in Computer Science *2019 - 2024*
Committee: *S.C. Joshi (Advisor), M. Bauer, S.Y. Elhabian, P.T. Fletcher, R.M. Kirby*

Tongji University *Shanghai, China*
B.Eng. in Computer Science *2015 - 2019*

Institut de Mathématiques de Toulouse *Toulouse, France*
Exchange Student in Mathematics *2019*

Technion - Israel Institute of Technology *Haifa, Israel*
Exchange Student in Electrical Engineering *2018*

Publications & Preprints

1. Therapy-Agnostic Prognostication of Prostate Cancer via MR Imaging and Clinical Data Integration. H. Dai, G. Nelson, G. Morrell, J. Tward, S. Joshi, *In Submission to IEEE International Symposium on Biomedical Imaging (ISBI) 2025*, 🔗.

2. Refining Skewed Perceptions in Vision-Language Models through Visual Representations. H. Dai, S. Joshi, *In Submission to Conference on Computer Vision and Pattern Recognition (CVPR) 2025*, 🔗.

3. The Silent Majority: Demystifying Memorization Effect in the Presence of Spurious Correlations, C. You*, H. Dai*, Y. Min*, J. Sekho, S. Joshi, J. Duncan (*equal contribution), *In Submission to Nature Communications*, 🔗.

4. High-Fidelity CT on Rails-Based Characterization of Delivered Dose Variation in Conformal Head and Neck Treatments, H. Dai, V. Sarkar, C. Dial, M. Foote, Y. Hitchcock, S. Joshi, B. J. Salter, *Applied Radiation Oncology (ARO) 2023*, 🔗.

5. Detect AI-generated Images Uploaded for Risk Evidence Collection in Customer Self-Service Workflow, H. Dai, S. Chen, B. Xiao, Y. Chen, *Amazon Machine Learning Conference (AMLC) 2023*, 🔗.

6. Neural Operator Learning for Ultrasound Tomography Inversion, H. Dai*, M. Penwarden*, R. M. Kirby, S. Joshi (*equal contribution), *International Conference on Medical Imaging with Deep Learning (MIDL) 2023*, 🔗.

7. Modeling the Shape of the Brain Connectome via Deep Neural Networks, H. Dai, M. Bauer, P. T. Fletcher, S. Joshi, *International Conference on Information Processing in Medical Imaging (IPMI) 2023*, Oral Presentation, 🔗.

8. Understanding Visual Documents from Customer Self-Service Workflow using Multimodal Transformer, H. Dai, J. Chou, S. Chen, B. Xiao, Y. Chen, *Amazon Machine Learning Conference (AMLC) 2022*, 🔗.

9. Integrated Construction of Multimodal Atlases with Structural Connectomes in the Space of Riemannian Metrics, K. M. Campbell, H. Dai, Z. Su, M. Bauer, P. T. Fletcher, S. Joshi, *Journal of Machine Learning for Biomedical Imaging (MELBA) 2022*, 🔗.

10. Structural Connectome Atlas Construction in the Space of Riemannian Metrics, K. M. Campbell, H. Dai, Z. Su, M. Bauer, P. T. Fletcher, S. Joshi, *International Conference on Information Processing in Medical Imaging (IPMI) 2021*, François Erbsmann Prize (**Best Paper Award**), 🔗.

Services

Reviewer

- Conferences: *ACM MM, AISTATS, CVPR, ICLR, ICML, MICCAI, MIDL, NeurIPS*
- Journals: *ACM TIST, IEEE TNNIS, Medical Image Analysis, MELBA, SciRep*
- Workshops: *AI for Differential Equations in Science@ICLR*, *WiCV@ECCV*

Honors & Awards

François Erbsmann Prize (Best Paper Award), *IPMI 2021*
Department Fellowship, *School of Computing, University of Utah*
Scholarship for France Excellence Summer School, *French Embassy in China*
Scholarship for Summer School of Technion, *CHE of Israel & Technion*
Chinese Government Scholarship, *Chinese Scholarship Council*
Tongji Scholarship of Excellence (2016, 2017, 2018), *Tongji University*

Technical Skills

`Python, MatLab, C++, PyTorch`