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Jian Chen

Ph.D. Candidate

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I am a Ph.D. candidate in Computer Science at the University at Buffalo seeking a full-time position. My research interests include generative models, large language models, representation learning, and multimodal techniques and their applications.

Education

Ph.D. in Computer Science, *University at Buffalo, USA* 09/2018 — Present
M.S. in Electrical Enginnering, *Drexel University, USA* 09/2015 — 06/2017
B.S. in Applied Mathematics, *Hunan University, China* 09/2011 — 07/2015

Skills

Tools and Programming Languages: Python, PyTorch, C++, R, Matlab, LaTeX, Markdown

Technical Experience

Intern Research Scientist / Mentor: Ruiyi Zhang / Adobe **05/2024 — 11/2024**

- Currently developing a vision-LLM-based method for multi-page multimodal document understanding, aiming to achieve state-of-the-art accuracy among open-source models and lightweight efficiency for on-device deployment.
- Created the Multi-Modal Reading (MMR) benchmark for evaluating Vision-Language Models' reading ability and tested multiple baseline models. [1]

Research Assistant / Advisor: Changyou Chen / University at Buffalo **09/2022 — Present**

- Customized LLMs for text-based layout planning and editing through supervised fine-tuning. (submitted to ACL Rolling Review - June 2024 [2])
- Contributed to the development of LLaVA-Read, a multimodal large language model that utilizes dual visual encoders and a visual text encoder for enhanced understanding of text-rich images. (submitted to NeurIPS 2024 [3])
- Contributed to the development of an adversarial training-based machine unlearning method, which is applicable to diffusion models. (submitted to NeurIPS 2024 [4])
- Contributed to the development of a probability-based contrastive learning method for 3D molecular representation learning. (submitted to NeurIPS 2024 [5])
- Constructed a document dataset for training of LaRA, a multimodal language model with OCR input to enable reading ability. CVPR 2024 [6]
- Developed a unified model for layout generation using continuous diffusion models with aesthetic constraints, achieving state-of-the-art performance. ICLR 2024 [7]
- Contributed to the development of a unified optimization objective that combines a cross-entropy loss and a contrastive loss to bridge the pretraining bias gap in vision-language models. [8].
- Developed LRA-Diffusion, a noisy label learning method that integrates a diffusion model with pre-trained encoders, achieving 1st place on three leaderboards at papers with code. NeurIPS 2023 [9]

Research Assistant / Advisor: Zhiqiang Xu / MBZUAI **10/2023 — 02/2024**

- Researched the integration of inductive knowledge graph embeddings into large language models.

Research Assistant / University at Buffalo **09/2018 — 09/2022**

- Designed a Continuous-time Markov Chain model for causality inference, applied to cancer mutation datasets. PLOS ONE [10]
- Developed AsMac, a neural network architecture leveraging approximate string matching for enhanced efficiency in biological sequence comparison. Bioinformatics Advances [11, 12]

Intern Research Assistant / UC Santa Barbara **02/2018 — 03/2018**

- Researched in Tensor compression and its applications.

Research Assistant / Drexel University **07/2017 — 02/2018**

- Benchmarked 16S rRNA sequence embedding methods and implemented a k-mer-based method in C++, enhancing computational efficiency. PloS Computational Biology [13]

Data Engineer / EAOs (a start-up company building Bluetooth earbuds fit for motorcycle rider) **05/2017 — 08/2017**

- Developed an audio classifier using short-time Fourier transform for a mobile app. *Philadelphia, PA*

Professional and Volunteer Service

Peer Reviewer

IEEE Transactions on Emerging Topics in Computational Intelligence 2024
International Conference on Machine Learning 2024
Transactions on Machine Learning Research 2024

Volunteer Experience

ACM Conference on Bioinformatics, Computational Biology, and Health Informatics — Niagara Falls, NY, 09/2019
WE16, Society of Women Engineers's Annual Conference — Philadelphia, PA, 10/2016
Workshop on tensor optimization and Application — Changsha, Hunan, China, 05/2015

Awards

Best Graduation Thesis: "Low-rank tensor optimization for video image recovery." — Hunan University, 2015
First place in the University Mathematical Modeling Competition — Hunan University, 2013

Publications

1. **Jian Chen**, Ruiyi Zhang, Yufan Zhou, Jiuxiang Gu, Ryan A. Rossi, and Changyou Chen. Evaluating the reading ability of large multimodal models, 2024
2. **Jian Chen**, Ruiyi Zhang, Yufan Zhou, Jennifer Healey, Zhiqiang Xu Jiuxiang Gu, and Changyou Chen. Text-to-layout: Customizing large language models for layout planning, 2024
3. Ruiyi Zhang, Yufan Zhou, **Jian Chen**, Jiuxiang Gu, Changyou Chen, and Tong Sun. LLaVA-Read: Enhancing Reading Ability of Multimodal Language Models. *arXiv preprint arXiv:2407.19185*, 2024
4. Rohan Sharma, Shijie Zhou, **Jian Chen**, Kaiyi Ji, and Changyou Chen. Discriminative adversarial unlearning, 2024
5. Jiayu Qin, **Jian Chen**, Rohan Sharma, Jingchen Sun, and Changyou Chen. A probability contrastive learning framework for 3d molecular representation learning, 2024
6. Ruiyi Zhang, Yanzhe Zhang, **Jian Chen**, Yufan Zhou, Jiuxiang Gu, Changyou Chen, and Tong Sun. TRINS: Towards Multimodal Language Models That Can Read. *CVPR*, 2024
7. **Jian Chen**, Ruiyi Zhang, Yufan Zhou, and Changyou Chen. Towards Aligned Layout Generation via Diffusion Model with Aesthetic Constraints. *ICLR*, 2024
8. Jingchen Sun, Rohan Sharma, **Jian Chen**, Zihao Lin, and Changyou Chen. A unified optimization objective for vision-language model adaptation, 2024

9. **Jian Chen**, Ruiyi Zhang, Tong Yu, Rohan Sharma, zhiqiang xu, Tong Sun, and Changyou Chen. Label-Retrieval-Augmented Diffusion Models for Learning from Noisy Labels. *NeurIPS*, 2023

10. **Jian Chen**. Timed hazard networks: Incorporating temporal difference for oncogenetic analysis. *PLOS ONE*, 18(3):e0283004, 2023

11. **Jian Chen**, Le Yang, Lu Li, Steve Goodison, and Yijun Sun. Alignment-free Comparison of Metagenomics Sequences via Approximate String Matching. *Bioinformatics Advances*, 2022

12. **Jian Chen**, Le Yang, Lu Li, and Yijun Sun. Predicting alignment distances via continuous sequence matching. *bioRxiv*, 2020

13. Stephen Woloszynek, Zhengqiao Zhao, **Jian Chen**, and Gail L Rosen. 16S rRNA sequence embeddings: Meaningful numeric feature representations of nucleotide sequences that are convenient for downstream analyses. *PLoS computational biology*, 15(2):e1006721, 2019