TIANYI LORENA YAN

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I am interested in developing more factual, robust, and efficient foundation models.

EDUCATION

University of Southern California (USC)

- **B.S.** in Computer Science
- GPA: 3.99/4.00
- Related courses: (* Indicate graduate level course) Introduction to Artificial Intelligence (A) Introduction to Machine Learning (A) Advanced Topics in NLP (A) *History of Language and Computing (A)

RESEARCH EXPERIENCE & PUBLICATIONS

Promote, Suppress, Iterate: How Language Models Answer One-to-Many Factual Queries

Supervisor: Prof. Robin Jia

- Proposed Token Lens to decode attention outputs of important tokens and examined how large language models (LLMs) perform subject promotion, multi-answer retrieval, and copy suppression
- Designed and implemented causal interventions on attention outputs to demonstrate how MLPs use subject information from attention to retrieve answers and previous answer tokens for knowledge retrieval and suppression

Contrastive Instruction Tuning

Supervisor: Prof. Muhao Chen

- Proposed to leverage contrastive learning to enhance LLMs' robustness to instruction perturbation by maximizing the similarity among hidden representations of semantically equivalent instruction-input pairs
- Consistently improved LLMs' performance to perturbations in instructions across character, word, sentence, and semantic levels with +2.5% in accuracy compared to LLMs trained with instruction data augmentation

Monotonic Paraphrasing Improves Generalization of Language Model Prompting

Supervisor: Prof. Muhao Chen

- Implemented ensemble decoding between paraphraser and target LLMs to rephrase prompts to have low perplexity for the target models
- Evaluated and enhanced LLMs' performance on zero-shot prompting and perturbed, unseen task instructions

Robust Natural Language Understanding with Residual Attention Debiasing

Supervisor: Prof. Muhao Chen

- Implemented Product-of-Experts and residual attention learning that assembles output logits and low-layer attention scores from auxiliary model and target models to mitigate unknown biases in NLU model attention patterns
- Enhanced models' performance on out-of-distribution datasets (HANS, FEVER-Symmetric, PAWS) with improvements of 12.9%, 11.0%, and 2.7%, respectively

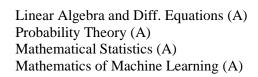
MuirBench: A Comprehensive Benchmark for Robust Multi-image Understanding

Supervisor: Prof. Muhao Chen

- Curated datasets to evaluate models' multi-image understanding ability across 12 tasks (scene ordering, temporal reasoning, etc.)
- Conducted human evaluation to assess model performance and validated dataset quality for benchmarking

PUBLICATIONS

- Yan, T.L., & Jia, R. (2025). Promote, Suppress, Iterate: How Language Models Answer One-to-Many Factual Queries. To be submitted to ACL 2025. PDF
- Yan, T.L., Wang, F., Huang, J. Y., Zhou, W., Yin, F., Galstyan, A., Yin, W., & Chen, M. (2024). Contrastive Instruction Tuning. ACL 2024 Findings. PDF
- Liu, Q., Wang, F., Xu, N., Yan, T., Meng, T., & Chen, M. (2024). Monotonic Paraphrasing Improves Generalization of Language Model Prompting. EMNLP 2024 Findings. PDF



ACL 2024 Findings

EMNLP 2024 Findings

To be submitted to ACL 2025

ACL 2023 Findings

Aug 2020 - May 2024

ICLR 2025

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- Wang, F.*, Huang, J. Y.*, Yan, T., Zhou, W., & Chen, M. (2023). Robust Natural Language Understanding with Residual Attention Debiasing. ACL 2023 Findings. PDF
- Wang, F., Fu, X., ..., Yan, T., ... & Chen, M. (2024). MuirBench: A Comprehensive Benchmark for Robust Multiimage Understanding. ICLR 2025. PDF

INDUSTRY EXPERIENCE

Tsinghua AIR, Diffusion-Based Molecule Generation Research Intern

Supervisor: Prof. Hao Zhou

Implemented an end-to-end pipeline to jointly train EGNN-based variational autoencoder (VAE) and diffusion models for generating high-affinity ligands given protein pockets

May 2023 - Aug 2023

Jun 2022 - Aug 2022

• Pretrained unconditional VAEs on large-scale ligand-only datasets and conditioned diffusion models on protein pockets to generate ligands from the VAE's latent space, addressing the scarcity of paired ligand-pocket data

Microsoft M365 Deployment, Software Engineer Intern

- Designed and implemented a dashboard to centralize global deployment issues from scattered alert emails and visualize them in real time using React
- Monitored and stored real-time issue data to Cosmos NoSQL database with C# and ASP.NET

AWARDS & HONORS

•	USC Viterbi School of Engineering CURVE Research Fellowship	2022 - 2023
٠	USC Academic Achievement Award (3.75 cGPA or higher)	2022 - 2023
٠	USC ABC Innovation First Prize (1 st place among 60+ teams)	2021 - 2022
	Co-founded Ctrl+F, a platform for centralizing on-campus internship and research resources; awarded \$1,000.	

TEACHING

 Teaching Assistant, University of Southern California – Viterbi School of Engineering CSCI 467: Intro to Machine Learning CSCI 270: Intro to Algorithms and Theory of Computations 	Aug 2023 - May 2024 Jan 2022 - May 2023		
SERVICE			
Associations for Computational Linguistics / ARR (Emergency) Reviewer	2024		
Leader of USC CSSA Career Development Mentorship Program	2021 - 2023		
Organizer of 2022 California Chinese Entrepreneurship Conference	2022		

Organizer of 2022 California Chinese Entrepreneurship Conference

INTERESTS & SKILLS

- Language: Mandarin, English
- Skills: Full-stack web development, Figma
- Hobbies: Cooking, Flute, Piano, Volleyball •

Cooking is my favorite. Welcome to checkout my journal! :D