TIANYI(LORENA) YAN

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I am interested in developing more robust, structured, and factual knowledge acquisition models.

EDUCATION

University of Southern California (USC) August 2020 – May 2024

- Major: Computer Science (B.S.)
- GPA: **3.98/4.00**
- Related courses: (* Indicate graduate level course)

Introduction to Artificial Intelligence (A)	Linear Algebra and Diff. Equations (A)
Introduction to Machine Learning (A)	Probability Theory (A)
Advanced Topics in NLP (A)	Mathematical Statistics (A)
*History of Language and Computing (A)	Mathematics of Machine Learning (A)

RESEARCH EXPERIENCE

AI, Language, Learning, Generalization, and Robustness (ALLeGRo) Lab March 2024 – Present
Supervisor: Prof. Robin Jia USC

Knowledge Graph (KG) Attention for Factuality and Efficient Updates in LLMs (Paper in progress)

- Proposed knowledge graph attention that captures entity and relation representations of the inputs and aligns projected LLMs' hidden states of entities with KG model embeddings
- Improved models' factuality while promoting easier and cheaper knowledge editing via updating the KG models and using the new embeddings without retraining LLMs

Language Understanding and Knowledge Acquisition (LUKA) Lab September 2022 – Present
Supervisor: Prof. Muhao Chen USC, UC Davis

Contrastive Instruction Tuning (ACL 2024 Findings)

- Leveraged contrastive learning to enhance large language models (LLMs)' robustness to instruction perturbation by maximizing the similarity among hidden representations of semantically equivalent instruction-input pairs
- Consistently improved LLMs' performance to variations in instructions across character, word, sentence, and semantic levels with an average of +2.5% accuracy

Monotonic Paraphrasing Improves Generalization of Language Model Prompting (Paper under submission)

- Performed ensemble decoding between paraphrase and target LLMs for prompt rewriting and execution
- Decreased the perplexity of generation and improves LLMs' generalization on perturbed and unseen prompts

Robust Natural Language Understanding with Residual Attention Debiasing (ACL 2023 Findings)

- Developed one-stage product-of-experts and residual attention learning techniques by assembling top-level predictions and low-level attention scores to directly address biases in attention patterns of NLU models
- Significantly enhanced model's performance on out-of-distribution datasets (HANS, FEVER-Symmetric, PAWS) with improvements of 12.9%, 11.0%, and 2.7%, respectively

INDUSTRY EXPERIENCE

- Diffusion-based Molecule Generation Research Intern, Tsinghua AIR May 2023 – August 2023
- M365 Deployment Software Engineer Intern, Microsoft June 2022 – August 2022

PUBLICATION

- **Yan, T.**, 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. arXiv preprint arXiv:2403.16038. (Paper under submission) PDF

- Wang, F.*, Huang, J. Y.*, **Yan, T.**, Zhou, W., & Chen, M. (2023). Robust Natural Language Understanding with Residual Attention Debiasing. ACL 2023 Findings. PDF

AWARDS & HONORS

- USC Viterbi School of Engineering CURVE Research Fellowship 2022 – 2023
- USC Academic Achievement Award 2022 – 2023
- USC ABC Innovation First Prize 2021 – 2022

TEACHING

- Teaching assistant for CSCI467 (Intro to Machine Learning) August 2023 – May 2024
- Teaching assistant for CSCI270 (Intro to Algorithms and Theory of Computations) January 2022 – May 2023

SERVICE

- Associations for Computational Linguistics / ARR (Emergency) Reviewer 2024
- Organizer of 2022 California Chinese Entrepreneurship Conference 2022
- Leader of USC CSSA Career Development Mentorship Program 2021 – 2023

INTERESTS

- Language: Mandarin, English
- Hobbies: Cooking, Flute, Piano, Volleyball
  Cooking is my favorite. Welcome to checkout my journal! :D