Lechen Zhang

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Education

University of Michigan, Ann Arbor **Aug 2022 – May 2024**

- **MS in Information Science | GPA:** 4.00/4.00
- **Related coursework:** Applied Data Science (A+), Information Retrieval (A+), Machine Learning (A+)

Shanghai Jiao Tong University **Sep 2019 – Aug 2023**

- **BSE in Electrical and Computer Engineering**
- **Related coursework:** Computer Vision (A), Data Structures and Algorithms (A), Computer Organization (A)

Research Experience

Research Assistant | Advisor: Lu Wang | University of Michigan **May 2024 – Present**

- **Factuality Evaluation pipeline and benchmark in practical scenarios** May 2024 - Present
  - Develop a new factuality evaluation pipeline that is more comprehensive and efficient than existing methods.
  - Build a benchmark of prompts that are challenging and meaningful to LLMs by clustering and filtering LMSYS dataset.

Research Assistant | Advisor: David Jurgens | University of Michigan **Aug 2023 – Present**

- **Prompt Evaluation and Auto-optimization System based on Reinforcement Learning** Jan 2024 - Present
  - Develop large-scale prompt generation and evaluation framework across 50 benchmarks.
  - Design new RL strategies to construct system prompts that maximize response quality across all types of tasks.
- **Robustness of LLMs' personality under Psychometric Instruments** Aug 2023 – Dec 2023
  - Build evaluation dataset and metrics that measures the robustness of various LLMs' personalities under spurious prompt variation and rephrased statements (including Comprehensibility, Sensitivity, Consistency), and evaluate on 17 different LLMs.
  - Experiment the personality and robustness shifts under different conditions, such as injecting personalities through prompts, and fine-tuning LLMs (Llama2, Flan-T5, etc.) on various corpora (Bible, 4chan, r/Donald, etc.).

Research Assistant | Advisor: Guifu Ding | Shanghai Jiao Tong University **May 2021 – May 2022**

- **Microfluidic heat dissipation system based on Micro-Electro-Mechanical System (MEMS)**
  - Design bionic heat dissipation structure and do Finite Element Method (FEM) Simulation on Ansys Fluent.
  - Analyze FEM simulation data and optimize heat dissipation structure to improve efficiency and stability.

Publications (* Equal Contribution)

- **When Reply-All Becomes Reply-None: Modeling Intent, Expectation, and Responsiveness in an Email Conversation**
  Aparna Ananthasubramaniam, Hong Chen, Jiaxin Pei, Abraham Israeli, Hua Shen, Nancy Xu, Kenan Alkiek, **Lechen Zhang**, Bowen Yi, Sushrita Rakshit, Mingqian Zheng, Omkar Yadav, Michael Jiang, Bangzhao Shu, Haotian Zhang, David Jurgens
  ***In submission* | All Equal Contribution**
- **You don't need a personality test to know these models are unreliable: Assessing the Reliability of Large Language Models on Psychometric Instruments**
  Bangzhao Shu*, **Lechen Zhang***, Minje Choi, Lavinia Dunagan, Lajanugen Logeswaran, Moontae Lee, Dallas Card, David Jurgens
  ***NAACL 2024 Main Conference Oral** (arXiv, Github)*

Personal Projects (https://orange0629.github.io/)

- **NLP - Tourist Destination Introduction Generation Language Model** based on Fine-tuning Flan-T5 (Link)
  - Develop algorithms employing Sentence Encoder and TextRank to extract representative information (512 tokens) from lengthy tourist comments (above 4000 tokens).
  - Fine-tune Flan-T5 model and design effective prompts to generate introductions from extracted information, resulting 97% improvement in ROUGE score compared to the original model.
- **Information Retrieval - Tourist Destination Search Engine** based on PyTerrier (Link)
  - Implement BM25 search engine and Query Expansion techniques based on Sequential Dependence and Cooccurrence Frequency, leading to a notable 10% enhancement in Retrieval Accuracy.
  - Design Random Forest Reranking Algorithm utilizing extracted text features, including sentiments, sentence-to-vector and pair-wise BERT score, resulting a substantial 20% improvement in NDCG ranking scores.

Skills & Abilities

- **Languages:** Python, C++, C#, C, Matlab, SQL, HTML, Django, Kotlin, Elm, LaTeX
- **Tools:** Unity, Android Studio, Tableau, SparkSQL, Vivado, mySQL, Flask