Yiyang Feng

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Education

École Polytechnique Fédérale de Lausanne (EPFL) **Sep. 2022 – Present**
Master's Student in Computer Science; 5.64/6.00 *Lausanne, Switzerland*

Xi'an Jiaotong University (XJTU) **Aug. 2018 – July 2022**
Bachelor in Automation Science & Technology; 3.99/4.30 (top 5% among 197 students) *Xi'an, China*

Publications

- Cui, S.=, **Feng, Y.=**, Mao, Y., Hou, Y., & Faltings, B. (2024). Unveiling the Art of Heading Design: A Harmonious Blend of Summarization, Neology, and Algorithm.
  *ACL 2024 Findings with **Best Paper Nomination***
- Cui, S., Milikic, L., **Feng, Y.**, Ismayilzada, M., Paul, D., Bosselut, A., & Faltings, B. (2024). δ-CAUSAL: Exploring Defeasibility in Causal Reasoning. arXiv preprint at arXiv:2401.03183.
  ACL 2024 Findings

Research Interest

I'm interested in various areas in Natural Language Processing (NLP), with a special focus on:

- **Controllable Text Generation**: generating headings for targeted human needs, crafting natural and aligned data for closed information extraction, producing dichotomous outputs, and converting text to SQL under grammar constraints
- **Reasoning Capabilities of NLP systems**: causal reasoning, commonsense reasoning, and defeasible reasoning
- **Alignment**: supervised fine-tuning, reinforcement learning with feedback, prompt tuning, and in-context alignment

Selected Research Experience

Unveiling the Art of Heading Design with Large Language Models (LLMs) **Sep. 2023 – May 2024**
Research Assistant advised by Prof. Boi Faltings *Artificial Intelligence Laboratory, EPFL*

- Contributed a heading generation benchmark: a heading contains an acronym and description from a given abstract
- Formulated three unique controllable elements and proposed corresponding metrics for the heading generation task
- Highlighted our task's challenge under supervised fine-tuning, reinforcement learning, and in-context learning
- Submitted one paper as the co-first author, which is accepted to ACL 2024 Findings with Best Paper Nomination

Unraveling the Symphony of Dichotomous Inference **Feb. 2023 – May 2024**
Semester Project advised by Prof. Boi Faltings and Shaobo Cui *Artificial Intelligence Laboratory, EPFL*

- Introduced dichotomous inference, a task requiring two opposite yet related outputs given the same context
- Devised a novel inference method combining simulated annealing within an Expectation-Maximization framework
- Applied our method to both fine-tuning and in-context learning, showing its superiority across four distinct scenarios
- Submitted one paper as the second author to NeurIPS 2024

Exploring Defeasibility in Commonsense Causal Reasoning **Dec. 2022 – May 2024**
Research Assistant advised by Prof. Boi Faltings and Shaobo Cui *Artificial Intelligence Laboratory, EPFL*

- Contributed a pioneering benchmark emphasizing defeasibility that alters the commonsense causal relationship
- Evaluated BART, T5, GPT-2, and GPT-3.5 on their comprehension of defeasibility in commonsense causal reasoning
- Uncovered the inadequacy of existing metrics in measuring causal strength when defeasibility is involved
- Submitted one paper as the third author, which is accepted to ACL 2024 Findings

A System for Curating High-Quality Closed Information-Extraction Dataset **Sep. 2023 – Feb. 2024**

Semester Project advised by Prof. Robert West and Marija Šakota *Data Science Lab, EPFL*

- Curated a high-quality dataset featuring natural sentences, aligned triplets, and negative examples
- Synthesized positive examples by prompting LLMs and collected negative examples from Wikipedia by WebIE
- Implemented an algorithm that fine-tunes downstream models based on scores from a RoBERTa classifier

Cross Domain Chinese Speech-to-SQL System Design **Dec. 2021 – June 2022**

Bachelor Thesis advised by Prof. Zhongmin Cai *School of Cyber Science and Engineering, XJTU*

- Applied translation-model-based schema-linking and meta-learning for domain generalization to current Text-to-SQL systems on Chinese datasets; improved the validation accuracy at most by 6.6%
- Applied the optimization methods to TypeSQL, SyntaxSQLNet, and IRNet on CSpider and compared their performance
- Combined Chinese speech-to-text model with text-to-SQL systems to build a Chinese speech-to-SQL platform

Selected Course Projects

Distilled ChatGPT Teaching Assistant for EPFL Courses **May 2023 – June 2023**

Project for CS-552 Modern Natural Language Processing *EPFL*

- Created a rich educational dialogue dataset by prompting ChatGPT on EPFL course content and external data
- Distilled ChatGPT (175B) to GPT-2 (355M) by instruction-tuning and reinforcement learning from human feedback
- Developed Mini-GPTA, an educational chatbot leveraging the distilled GPT-2 model for teaching assistance

Fine-tuning and In-context Learning on Commonsense Causal Reasoning (CCR) **Nov. 2022 – Dec. 2022**

Project for CS-433 Machine Learning *EPFL*

- Derived a new cause/effect generation task from the original real/fake causal classification task in the COPA dataset
- Experimented on both tasks using fine-tuning (BART, RoBERTa, ALBERT) and in-context learning models (GPT-3.5)
- Compare the performance of two sets of models and analyze the results using various semantic metrics

Skills

- **Programming**: Python, C, C++, MATLAB, JavaScript, CSS, HTML, Shell, LaTeX
- **Machine Learning and NLP Tools**: Pytorch, Huggingface Transformers, OpenAI, Hydra, wandb, scikit-learn
- **Language**: Chinese (Native), English (C1, TOEFL 108/120)

Teaching Assistant

CS-552 Modern Natural Language Processing (EPFL) **Spring 2024 – 2025**

CS-433 Machine Learning (EPFL) **Fall 2023 – 2024**

Selected Honors and Awards

Chiang Chen Overseas Fellowship (0.2‰), Chiang Chen Industrial Charity Foundation **June 2022**

First Prize Scholarship (3%), Xi'an Jiaotong University **Sep. 2019**