Yuanhao (Henry) Shen

Education

Queen's University **Kingston, ON** **Sep 2024 – Present**

- **Ph.D in Computer Science**
- **Supervisor:** Xiaodan Zhu
- **Research Interests:** AI for Science, Agents, Large Language Models (LLMs), Natural Language Processing (NLP).

New York University **New York City, NY** **Sep 2022 – May 2024**

- **M.S. in Data Science (Cum Laude), GPA: 3.82/4.00**
- **Relevant Coursework:** Natural Language Understanding, Reinforcement Learning, Deep Learning, Mathematics in Deep Learning, Big Data.

New York University Shanghai **Shanghai, China** **Sep 2018 – May 2022**

- **B.S. in Data Science (Cum Laude), GPA: 3.81/4.00**
- **Relevant Coursework:** Machine Learning, Linear Algebra, Probability and Statistics, Fundamental Algorithms.
- **Scholarships and Awards:** ZhenTong Scholarship (RMB 120, 000), Dean's List of Academic Year.

Skills

- **Programming:** Python Notebook, Slurm Commands, MySQL, Latex
- **AI & NLP:** ChatGPT, Llama3, Pandas, Numpy, Pytorch, Transformers

Research and Project Experience

SMARTCAL: An Approach to Self-Aware Tool-Use Evaluation and Calibration **May 2023 - July 2024**

Summer Intern, supervised by Prof. Xiaodan Zhu (Queen's University) and Dr. Lei Chen (Rakuten Research at Boston). Work accepted to EMNLP 2024 Industry Track.

- Demonstrated the tool-abuse behavior during tool-augmented reasoning of LLM agents as well as an tendency of agents being overconfident in tool usage.
- Proposed a novel framework SMARTCAL that consists of three modules to mitigate the observed issues in tool-abuse.
- Conducted extensive experiments to demonstrate the effectiveness of SMARTCAL with an improvement of 8.6 percent more in QA performance and 21.6 percent less in Calibration Error

Causal Relationship Extraction from Political News Texts **Jan 2024 - May 2024**

Master's Capstone Project, supervised by Prof. Guillaume Frechette, Center for Data Science.

- Implemented an LLM-driven pattern-recognition pipeline to extract causal relations within political news texts.
- Created a synthetic dataset containing the causal relation triplets used for fine-tuning on smaller scale LLMs.
- Visualized the relationship between extracted entities with a directed graph and conducted qualitative analysis.

Transfer Learning Based Fine-Tuning on Figurative Language Detection **Feb 2023 - May 2023**

Coursework Project, supervised by Prof. Sophie Hao, Center for Data Science.

- Linked Figurative speech with valence, arousal, and dominance (VAD) scores based on previous works and explored its potential application in figurative speech detection.
- Used sarcasm and metaphor dataset from twitter and performed single task learning on BERTweet for VAD regression. Applied Max-pooling technique to obtain text representation and add a decoder layer for classification task.
- Conducted HPC-based model pre-training and used adapter as the parameter-efficent fine-tuning strategy.

Sentiment Analysis in High Frequency Trading **Mar 2022 - May 2022**

Undergraduate's Capstone Project, supervised by Prof. Dan Wang, New York University Shanghai.

- Acquired historical daily stock prices and daily news headlines from Wharton Researh Database (10 million) and constructed a LSTM model for sentiment analysis.
- Incorporated sentiment analysis results into the DDPG algorithm and used GCC for remote training.
- Calculated the overall returns of the model and compared it with the baseline. Achieved around 10% improvement in cumulative return and 20% less in maximum drawback.