

Haoyan Yang

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RESEARCH INTEREST

My research interests are focused on Large Language Models (LLMs), specifically in the following four areas:

- ◆ Retrieval-Augmented Generation (RAG)
- ◆ Reliability and Trustworthiness of LLMs
- ◆ Advanced Post-Training and Alignment Methods
- ◆ Efficient Fine-Tuning

EDUCATION

New York University

Master of Science in Data Science, GPA: 3.86/4.0

Sep. 2023 – May 2025

Beijing Normal University-Hong Kong Baptist University United International College

Bachelor of Science in Data Science, GPA: 3.84/4.0 (1/94)

Sep. 2019 – Jun. 2023

PUBLICATIONS

Haoyan Yang, Zhitao Li, et al. (2023). “PRCA: Fitting Black-Box Large Language Models for Retrieval Question Answering via Pluggable Reward-Driven Contextual Adapter”. In: *Proceedings of the 2023 Conference on Empirical Methods in Natural Language Processing*, pp. 5364–5375.

Yuxuan Chen*, **Haoyan Yang*** et al. (2024). *BURExtract-Llama: An LLM for Clinical Concept Extraction in Breast Ultrasound Reports*. Accepted as an oral paper at ACM MM 2024 Workshop.

Haoyan Yang (2023). “Multimodal Stock Price Forecasting Using Attention Mechanism Based on Multi-Task Learning”. In: *Asia-Pacific Web (APWeb) and Web-Age Information Management (WAIM) Joint International Conference on Web and Big Data*. Springer, pp. 454–468.

Haoyan Yang, Hongjiu Zhang, et al. (2023). “Swarm Intelligence Optimization of UAV Routing with Simultaneously Stochastic Pick-up and Delivery during COVID-19”. In: *2023 8th International Conference on Cloud Computing and Big Data Analytics (ICCCBDA)*. IEEE, pp. 579–587.

Haoyan Yang, Yixuan Wang, Xu Xingyin, et al. (2024). “Can We Trust LLMs? Mitigate Overconfidence Bias in LLMs through Knowledge Transfer”. In: *arXiv preprint arXiv:2405.16856*.

Haoyan Yang*, Zhitao Li* et al. (2024). “PFID: Privacy First Inference Delegation Framework for LLMs”. In: *arXiv preprint arXiv:2406.12238*.

Haoyan Yang, Yixuan Wang, Keyue Tong, et al. (2024). “Exploring Performance Contrasts in TableQA: Step-by-Step Reasoning Boosts Bigger Language Models, Limits Smaller Language Models”. In: *arXiv preprint arXiv:2411.16002*.

Haoyan Yang, Ting Hua, et al. (2024). *Dynamic Noise Preference Optimization for LLM Self-Improvement via Synthetic Data*. Under Review by ICLR 2025.

RESEARCH EXPERIENCE

Reward-driven Adapter for Enhanced Retrieval Question Answering (ReQA)

- Proposed the Pluggable Reward-driven Contextual Adapter (PRCA) method to treat LLMs as black boxes in retrieval-augmented modes, addressing fine-tuning constraints of limited local computational resources.
- Approved that PRCA enhanced average ReQA performance by 3%, 6%, and 9%, and up to 20% on three QA datasets, and robustly adapted to various configurations of retrievers and generators.
- Authored and published a paper on this work at the EMNLP 2023 conference.

Mitigating LLM Overconfidence Bias with Knowledge Transfer (KT)

- Introduced a KT method that leverages larger models with advanced reasoning capability to transfer knowledge through chain-of-thoughts (CoT), fine-tuning smaller ones to correct their overconfidence bias.
- Demonstrated that KT achieved average improvements of 55.3% and 43.1%, respectively, over vanilla and QA models with serious overconfident bias, in metrics of accuracy, ROB, and ECE.

Privacy-Preserving in LLMs Using Model Sharding 🔗

- Proposed a Privacy First Inference Delegation (PFID) framework for preserving privacy within LLMs by localizing user data via model sharding, reducing the need to share data with central servers.
- Showed that PFID achieved average drops of 1.14% and 8.07% in COMET and BLEU scores, respectively, compared to the original pipeline, significantly outperforming the drops in the scenario of data interception (28.16% and 51.58%), highlighting the model’s ability to maintain performance while enhancing data privacy in machine translation tasks.

Table-Logic Sequential Prompting for TableQA Performance Analysis 🔗

- Proposed the Table-Logic Prompting method for step-by-step reasoning in TableQA tasks, achieving a 7.8% accuracy improvement in large LMs (e.g., Llama-3-70B) on HybridQA while identifying an 11% performance decline in small LMs (e.g., Llama-2-7B).
- Analyzed performance gaps, highlighting limitations of step-by-step reasoning in small LMs.

Smart Retrieval-Augmented Generation (S-RAG) System for Financial Documents 🔗

- In collaboration with S&P Global Ratings Company, develop a S-RAG system to answer financial questions based on multiple data formats, such as PDFs, CSVs, and PNGs.

PROFESSIONAL EXPERIENCE

Samsung Research America

May 2024 - Aug. 2024

Researcher Intern (NLP Focused); Supervisor: Ting Hua & Shangqian Gao; Mountain View, US

- Researched methods for utilizing synthetic data generated by LLMs to facilitate model self-improvement.
- Proposed Dynamic Noise Preference Optimization to achieve LLM self-improvement via self-generated data.

NYU Langone Health

Mar. 2024 - Now

Research Assistant (NLP for Healthcare Focused); Supervisor: Artie Shen; Remote, US

- Built a pipeline that integrates LLMs and vision models for breast ultrasound report generation.
- Fine-tuned LLaMA-3-8B using 4k breast report data, achieving a 10% improvement compared to few-shot learning and performance comparable to GPT-4 under human-annotated labels.

Ping An Technology | Subsidiary of the leading insurance company in China

Mar. 2023 - Jun. 2023

Algorithm Engineer Intern (NLP Focused); Supervisor: Zhitao Li; Shenzhen, China

- Conducted self-motivated research on LLMs and published two papers as the first author under the supervision.
- Developed an intelligent QA system based on the LLM “Phoenix” tailored for the insurance and finance sector.
- Reduced manual customer service workload by 20% with the new intelligent QA system, achieving cost savings.

SF Express | Leading logistics company in China

Aug. 2021 - Sep. 2021

Data Analyst Intern; Shanghai, China

Tongcheng Travel | Leading online travel service company in China

Jun. 2021 - Jul. 2021

Data Analyst Intern; Suzhou, China

AWARDS

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| ◆ President’s Honour Roll × 7 (2019 - 2023) | ◆ Scholastic Award (Top 2%, 2022 - 2023) |
| ◆ Outstanding Academic Poster Award (2022 - 2023) | ◆ First Class Scholarship × 3 (Top 4%, 2020 - 2023) |
| ◆ Student Internship Scholarship Award (2020 - 2021) | ◆ Second Class Scholarship (Top 12%, 2019 - 2020) |

SKILLS

Programming Languages	Python, R, Java, C, SQL, MATLAB, HTML/CSS, JavaScript
Technologies/Frameworks	Mathematics, Statistics, NLP, Machine Learning, Deep Learning, Time Series Analysis, Data Analysis, Regression, Big Data, Tableau, Pytorch, Tensorflow