Yizhang ZHU

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EDUCATION

The Hong Kong University of Science and Technology (Guangzhou) **2025.09 - Present**
Ph.D. Student in Data Science and Analytics
Supervisor: Prof. Yuyu LUO

The Hong Kong University of Science and Technology (Guangzhou) **2023.09 - 2025.07**
M.Phil. in Data Science and Analytics
Supervisor: Prof. Yuyu LUO

Chongqing University **2019.09 - 2023.06**
B.Eng. in Computer Science and Technology

EXPERIENCE

Tsinghua University **2025.06 - 2025.09**
Visiting Student in Database Group, Department of Computer Science and Technology
Supervisor: Prof. Guoliang LI

National University of Singapore Chongqing Research Institute **2022.09 - 2023.05**
Visiting Student in Computer Engineering Joint Program
Supervisor: Prof. Yung Chii LIANG

PUBLICATIONS

EllieSQL: Cost-Efficient Text-to-SQL with Complexity-Aware Routing Link
Yizhang ZHU, Runzhi JIANG, Boyan LI, Nan TANG, Yuyu LUO
Conference on Language Modeling (COLM 2025)

Are Large Language Models Good Statisticians? Link
Yizhang ZHU, Shiyin DU, Boyan LI, Yuyu LUO, Nan TANG
Advances in Neural Information Processing Systems (NeurIPS 2024)

RAMer: Reconstruction-based Adversarial Model for Multi-party Multi-modal Multi-label Emotion Recognition Link
Xudong YANG, Yizhang ZHU, Nan TANG, Yuyu LUO
International Joint Conference on Artificial Intelligence (IJCAI 2025)

LEAD: Iterative Data Selection for Efficient LLM Instruction Tuning Link
Xiaotian LIN, Yanlin QI, Yizhang ZHU, Themis Palpanas, Chengliang CHAI, Nan TANG, Yuyu LUO
Under Review

Boosting Text-to-Chart Retrieval through Training with Synthesized Semantic Insights Link
Yifan WU, Lutao YAN, Yizhang ZHU, Yinan MEI, Jiannan WANG, Nan TANG, Yuyu LUO
Under Review

AskChart: Universal Chart Understanding through Textual Enhancement Link
Xudong YANG, Yifan WU*, Yizhang ZHU*, Nan TANG, Yuyu LUO
Under Review

SRAG: Structured Retrieval-Augmented Generation for Multi-Entity Question Answering over Wikipedia Graph Link
Teng LIN, Yizhang ZHU, Yuyu LUO, Nan TANG
Under Review

Goldman: Reading the Fed, Riding the Trend in Gold Markets with Multi-Agent LLMs Link
Qiqi DUAN, Changlun LI, Yao SHI, Yizhang ZHU, Nan TANG, Yuyu LUO
Under Review

PROJECTS

EllieSQL Link

Cost-Efficient Text-to-SQL with Complexity-Aware Routing

- Proposed a routing framework to optimize computational costs in Text-to-SQL by directing queries to suitable pipelines based on estimated complexity.
- Introduced Token Elasticity of Performance (TEP), a novel metric evaluating cost-efficiency by balancing performance gains and token usage.
- Investigated multiple router implementations, including classification-based (KNN, SFT), cascading, and preference learning-based (pairwise ranking, DPO) routers.
- Achieved $> 40\%$ reduction in token costs without compromising performance on Bird benchmark, improving TEP by $2\times$ over non-routing approaches.

GNN4SL Link

LLM-Enhanced Semantic-Aware Graph Learning for Schema Linking in NL2SQL

- Reformulated schema linking task as a link prediction problem in graph learning, where the objective was to establish connections between natural language query nodes and schema element nodes.
- Utilized large language models to generate semantic vector embeddings, thereby enhancing the representation of semantic information.
- Constructed a graph dataset based on the Spider and Bird training sets to train GNN models (GCN, GAT, and RGAT), enabling a more effective capture of schema structural information.

StatQA Link

Benchmarking LLMs' Capabilities in Statistical Analysis

- StatQA Benchmark: Introduced a pipeline to synthesize a high-quality StatQA dataset, novelly curated for testing LLMs in specialized statistical analysis involving assessment of method applicability.
- Extensive Experiments: Systematically evaluated representative open-source and proprietary LLMs to establish our benchmark, also investigated the impact of in-context learning and supervised fine-tuning.
- Comparative Study between Humans and LLMs: Highlighted distinct strengths and weaknesses between humans and LLMs, revealed the potential for complementarity and collaboration.
- Explored and discussed research opportunities in this field.

FUNDINGS AND AWARDS

Data Science and Analytics Thrust Volunteer Grant	**2025.05**
Greater Bay Area CS Academic Poster Competition - *Most Popular Poster Award*	**2025.03**
HKUST(GZ) Red Bird M.Phil. Studentship	**2023.09 - 2025.06**
Excellent Graduates of Chongqing University	**2023.06**
General Scholarship of Chongqing University	**2022.09**
National Mathematical Contest of Modeling - *First Prize in Chongqing*	**2021.10**
National Undergraduate Innovation and Entrepreneurship Project - *¥50,000 funding*	**2021.05**

SKILLS

English Proficiency: IELTS: 7.0 (Listening: 7.5, Reading: 8.5, Speaking: 6, Writing: 6.5)

Professional Skills:

- Programming: Python, SQL, Java, C/C++, Verilog, JavaScript
- AI/Data Science: PyTorch, PEFT, vLLM, TRL, PyG, LangChain; Hadoop, Spark
- Development: Git; FastAPI; Vue, Streamlit; JMeter
- Computer Architecture/Hardware: FPGA, Vivado; Arduino

Academic Writing Skills: LaTeX, Microsoft Visio, OmniGraffle, Figma