Yizhang ZHU

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EDUCATION

The Hong Kong University of Science and Technology (Guangzhou) **2023.09 - Present**
M.Phil. Student in Data Science and Analytics *GPA 4.00/4.3*
Supervisor: Prof. Yuyu LUO

Chongqing University **2019.09 - 2023.06**
B.Eng. in Computer Science and Technology *GPA 3.61/4.0*

EXPERIENCE

National University of Singapore Chongqing Research Institute **2022.09 - 2023.05**
Visiting Student in Computer Engineering Joint Program *GPA 89.97/100*
Supervisor: Prof. Yung Chii LIANG

PUBLICATIONS

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)

EllieSQL: Cost-Efficient Text-to-SQL with Complexity-Aware Routing Link
Yizhang ZHU, Runzhi JIANG, Boyan LI, Nan TANG, Yuyu LUO
Under Review

RAMer: Reconstruction-based Adversarial Model for Multi-party Multi-modal Multi-label Emotion Recognition Link
Xudong YANG, Yizhang ZHU, 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

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

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**
College Students Big Data Challenging Competition - *National Third Prize*	**2021.11**
National Mathematical Contest of Modeling - *First Prize in Chongqing*	**2021.10**
"Internet+" College Students Innovation Competition - *Silver Prize in Chongqing*	**2021.08**
National Undergraduate Innovation and Entrepreneurship Project - *¥50,000 funding*	**2021.05**
China Collegiate Computing Contest - *Second Prize in Southwest Division*	**2021.08**

SKILLS

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

Professional Skills:

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

Academic Writing Skills: LaTeX, Microsoft Visio