Zhuowen Liang

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EDUCATION

South China University of Technology **Sep. 2021 - Jun. 2025**

Bachelor in Computer Science and Technology **GPA: 3.92/4.0**

Computer Science and Technology (Innovation Class) **Rank: 4/25**

- Elite Class, English-medium instruction
- Implement a second round selection mechanism, admitting only 30 students in the entire school

Relevant Coursework: Math Mathematics Analysis, Neural Network and Deep Learning, The Design and Analysis of Computer Algorithm, Computer Networks, Linear Algebra and Analytic Geometry, Discrete Mathematics, Data Structure

PUBLICATIONS

UNDER REVIEW:

VisTR: Visualizations as Representations for Time-series Table Reasoning (**IEEE Transactions on Visualization and Computer Graphics, 2025**), Second author

AcademiaEyes: Multifaceted Literature Analyses with LLMs Empowered by Knowledge Graph Enhanced Retrieval-Augmented Generation (**ACM Transactions on Interactive Intelligent System, 2025**), Co-first authors

RESEARCH EXPEIENCES

RAG & LLMs for Structured Reasoning **The Hong Kong University of Science and Technology (Guangzhou)**

Research Assistant at Data science and Analytics Thrust **Oct. 2024 - Present**

- Mentor: Professor Nan Tang, Associate Professor in Thrust of Data Science and Analytics.
- Focused on research about LLMs for Structured Reasoning and Retrieval-Augmented Generation (RAG), harnessing the structure information for effective multi-entities question answering in specific.

AcademiaEyes: Multifaceted Literature Analyses with LLMs Empowered by Knowledge Graph Enhanced Retrieval-Augmented Generation **The Hong Kong University of Science and Technology (Guangzhou)**

Research Assistant at Computation Media and Arts Thrust **Jun. 2024 - Sep. 2024**

- Mentor: Professor Wei Zeng, Assistant Professor at Thrust of Computation Media and Arts.
- Constructed an interactive system that supported multifaceted literature analysis using domain-specific knowledge with knowledge graph-enhanced RAG-based LLMs.
- Construction and storage of knowledge graphs. Defined hierarchical relationship from different aspects to store in Neo4j graph database. Utilized the text embedding model to index the contexts for further retrieval.
- Integrated knowledge graphs with RAG-based LLMs. Combined the power of graph-based knowledge representation with retrieval-augmented generation to enhance the retrieval and generation of answers to user queries. Techniques such as Query Translation and RAG-Fusion were employed to enable effective QA for various types of questions.

Visualization-based Time-series Table Reasoning **The Hong Kong University of Science and Technology (Guangzhou)**

Research Assistant at Computation Media and Arts Thrust **Jan. 2024 - Apr. 2024**

- Mentor: Professor Wei Zeng, Assistant Professor at Thrust of Computation Media and Arts.
- Leveraged GPT-4 to extract trend-related keywords from the textual descriptions in the Chart-to-Text dataset, combining these with user labeling strategy to construct our training data.
- Employed the Chroma database to store and index the large collection of visualization references, utilizing the embeddings of CLIP encoder to do the similarity search.
- Conducted t-SNE for dimensionality reduction and used k-means clustering to uncover typical trend features.
- Fine-tuned a pre-trained CLIP text-image model on selected chart-text and chart-sketch pairings to achieve alignment across three modalities, using the ViT encoder and Transformer architecture.

Resident Useful Life prediction (SRP under the guidance of Prof.Fang Li) **South China University of Technology**

Responsible for training deep learning models **Apr. 2023 - Apr. 2024**

- Applied wavelet transform to process the PHM bearing dataset by convolving the signal with wavelet basis functions at different scales and positions to analyze the signal, converting the 1D raw vibration signal into 2D image features.

- Constructed a CNN&LSTM model, where the CNN encoder's outputs were fed in real-time to the LSTM units, yielding predictions for the remaining useful life.
- Applied for Software Copyright.

SUMMER SCHOOL PROGRAMME

National University of Singapore **Singapore**

Artificial Intelligence and Machine Learning Programme **Jul. 2023**

- Focused on topics related to machine learning and digital image processing.
- Led our group to complete the final project on traffic signal recognition, which involved pre-processing, feature extraction, classifier implementation, and cross-validation to optimize classification accuracy.
- Achieved a **distinction** grade and received a letter of **recommendation (10%)**.

PROJECTS EXPERIENCE

Deep Learning Project Design: mathematical formula recognition **(Group work, leader)**

- Used ResNet-34 as the encoder and Transformer as the decoder with cross-entropy loss function to train the model and develop a recognition system. Optimized by adjusting vocabularies.

Software Engineering Project Design: 5G Phone Assessment Website **(Group work, leader)**

- Responsible for Data Extraction, Transformation and Loading (ETL) based on Web Crawler Technology, and leveraged Baidu api to deal with Natural language processing and sentiment analysis of comments.

Database Project Design: Hospital Database Management System **(Group work, member)**

- Responsible for the design of the Admin system by MySQL and Django, including front-end page design and urls jump, as well as the implementation of specific functions at the back end.

SCHOLARSHIPS

Tencent First Price Scholarship **Dec. 2023**

- Only awarded to junior undergraduates in my department
- In my grade level, the proportion of students who win this award is 2%

The First Price Scholarship **Nov. 2023**

The Second Price Scholarship **Nov. 2022**

The Second Price Scholarship **Nov. 2024**

AWARDS

2022&2023 Merit Student (twice) **Nov. 2022**

2022&2023&2024 Excellent League Member (three times) **Nov. 2022**

2022 Chinese Mathematics Competitions(Guangdong) - First Prize **Nov. 2022**

2023 Asia and Pacific Mathematical Contest in Modeling(APMCM) - Third Prize **Dec. 2022**

2023 MathorCup College Mathematical Modeling Challenge - Third Prize **Jun. 2023**

STUDENT LEATHERSHIPS & ACTIVITIES

Volunteer Works **Sep. 2021 - Aug. 2024**

- Assisted in voluntary blood donation service, responsible for measuring blood pressure and guiding form filling.
- Served as a volunteer at the volunteer station, regularly participating in weekend volunteer service activities.

Sports Competitions **Sep. 2021 - Aug. 2024**

- As a leading player, led the class to win third place twice in the college basketball tournament.

Class Works **Sep. 2021 - Aug. 2024**

- Served as the psychology and life committee member for two years, assisting teachers in managing dormitory activities.

SKILLS & INTERESTS

Programming: Python[good], C++, JAVA, SQL, Ruby

Technical skills: Pytorch, Machine learning, Web Crawler, MATLAB, SPSS, Proteus, Excel