Lutao Yan

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Education

South China University of Technology **Sep. 2021 – Now**
Bachelor of Science in Data Science and Big Data Technology *Guangdong, China*

Research Interest

Multi-modal Learning and Generation, MLLM, LLM, Data Management

Publication

Evaluating Task-based Effectiveness of MLLMs on Charts

- Author: Yifan Wu*, **Lutao Yan***, Yuyu Luo, Yunhai Wang, Nan Tang (* Equal Contribution)
- Conference: **IEEE VIS 2024**: Visualization & Visual Analytics (CCF-A) *positive review*
- Main Contribution: Curate the first benchmark focus on low-level data analysis tasks on charts. A large-scale dataset with 89,388 quartets (chart, task, question, answer). Propose a novel textual prompt strategy, named Chain-of-Charts, which boosts model performance by 24.36%.
- Link: Paper

Academic Experience

Hong Kong University of Science and Technology (Guangzhou) **Jan 2024 - Present**
Reaserch Intern *HKUST, guangzhou*

- Mentor: Yuyu Luo (DSA Thrust)
- Focus Yuyu Luoon visual analysis based on multimodal large language model (MLLM). Proposed a benchmark and data prompt for MLLMs
- Investigate how visual modifications to charts, such as altering visual elements and introducing perturbations, affect GPT-4V's performance. Summarize our work into a paper summited to IEEE VIS.

South China University of Technology **April 2023 – May 2024**
Research Assistant *Future Technology Department*

- Mentor: Ye Liu, Jin Xu
- Investigate cross-domain recognition techniques for lie detection. Conduct significance test using t-test and try to analyze eye movement and facial expression across multiple datasets.
- Develop a deception detection multimodal feature extraction and significance test tool.
- Implement big data analytics based on health data.

National University of Singapore **July 2023**
Invited Student *School of Computing, NUS*

- Mentor: Prabhu Natarajan
- Improve image quality by implement advanced computer vision applications to recognize traffic signs.
- Enhance visual model performance with 98% accuracy by fine-tuning and get Distinction Grade(1%) at last assessment.

Projects

3D Lipstick Special Effects | *Python, OpenCV, NumPy, Media-pipe* **June 2023**

- Detect the face through the depth camera and get the key points of the five facial features to determine the position and outline of the lips.
- Based on the RGB value and depth data set by the user through the slider, the color is adjusted and the lip area is colored.
- Multiple rounds of testing to maintain the robustness of the model under various complex conditions, the project involves knowledge of deep learning and computer vision.

Student Grade Management System Development | *C++, Linux, Socket Programming* **December 2023**

- Collaborated in a team to design a server-client architecture for handling student grades, with multi-user access and distinct permissions for administrators, teachers, and students.
- Implemented efficient data communication using socket programming and created a snapshot feature for file changes, optimizing space and performance.

Enlightening course designs | *Java, Pycharm, C++, MySQL, python* **September 2023**

- Developed normal form decomposition tool for improving the efficiency and maintainability of data processing using MySQL and Python.
- Designed a campus drink ordering simulation system using Java.
- Designed a C++-based regional vehicle scheduling method that optimises vehicle allocation, improves the efficiency of intra-regional traffic and logistics, and reduces costs.
- Boston area home price prediction model implemented with machine learning.
- Developed a machine learning strategy for index enhancement using LSTM.

Honors and Awards

Future Technology Taihu Innovation Prize **CNY 5000 Scholarship**
Second Prize *2023*

National Contemporary Undergraduate Mathematical Contest in Modeling(CUMCM) **National competition**
Third Prize *2022*

Mathematical Contest in Modeling(MCM) **International competition**
Successful Participant *2022*

Thrice-Good Student of the Year **University-level Award**
Top 10% *2022*

Baidu "Paddle Paddle" Cup **Enterprise competition**
Excellence Award *2021*

Core Courses

Bachelor Courses:

Mathematics: Calculus II (4.0/4.0), Discrete Mathematics (4.0/4.0), Complex Variable(3.7/4.0) etc.

CS/CE: Advanced Language Programming (4.0/4.0), Introduction to Bid Data (4.0/4.0), Data Structure (3.7/4.0), Introduction to Engineering (4.0/4.0), Computer Network (4.0/4.0), Artificial Intelligence and 3D Vision (4.0/4.0), Database System (3.7/4.0), Introduction to Computer and Software Engineering (4.0/4.0), LLM and AI Engineering Design (3.7/4.0), Cloud Computing and Big Data Platform (3.7/4.0) etc.

Others: Engineering Drawing (4.0/4.0), General Physics III (3.7/4.0),Technical Commucation (4.0/4.0) etc.

Overseas Courses:

Carnegie Mellon University: A Window to Data Science in Technology Online Project-Based Learning Program (A Grade)

Cambridge Girton College: Artificial intelligence and applications in cybersecurity, software and security engineering Spring Programme (Upper Second Class)

Technical Skills

Languages: Python, Java, C, C++, SQL,Matlab
Developer Tools: VS Code, Eclipse, Google Cloud Platform, PyCharm,Visual Studio
Technologies/Frameworks: Linux, Pytorch,GitHub, MySQL, Tableau

Miscellaneous

Hobby: Python, Java, C, C++, SQL,Matlab
Personal Homepage: My blogs and interesting life shared at Link