Frank Junhao RAN

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RESEARCH INTERESTS

- **Large Language Models:** Retrieval-Augmented Generation (RAG), Long Context LLM
- **Algorithm and Compute Efficiency:** Accelarated Computing, Scientific Computing, Efficient ML
- **AI for Science:** Bio-informatics, Traffic, Physics
- **Natural Language Processing:** Rumor Detection, Topic Segmentaion

EDUCATION

Rice University, Houston, TX   08/2023 - 05/2025 (Expected)
Master of Electrical and Computer Engineering, Data Science Track   *GPA: 4.0/4.0*

The Chinese University of Hong Kong, Shenzhen (CUHK-SZ), China   09/2019 - 06/2023
B.Eng. in Computer Science and Engineering   *GPA: 3.44/4.0*
Honors: Bo Wen Scholarship, Dean's List, Undergraduate Research Awards

RESEARCH

DATA Lab, Rice University | *Research Assistant*   02/2024 - Present
Topic: Assessing and Enhancing **Large Language Models** in **Rare Disease Diagnosis**
- Created the ReDis-QA evaluation dataset for assessing rare disease diagnosis
- Developed the ReCOP corpus to facilitate **Retrieval Augmented Generation** (**RAG**) for rare disease diagnosis

EQUAL Lab, Rice Univeristy | *Summer Research Internship*   05/2024 - Present
Topic: Real Time **High Performance Scientific Computing** with **CUDA**
- Stabilized the scientific system for streaiming signal processing by parallelizing data transfer and data processing using a dual buffer solution
- Optimized **cross-correlation** computation algorithm with **CUDA** for two channels of digital signals sampled by Gage Digitizer to memory bound, where the algorithms processing speeds at 9 GB/S
- Developed **magnon correlation g2** computation algorithm with **CUDA**

INTERNSHIP

Ping An Technology, China | *NLP Algorithm Engineer Intern*   02/2023 - 07/2023
Topic: End-to-End Topic Segmentation with Transformer for Long Sequence
- Applied **Transformer for long sequences – Big Bird** to segment documents (Topic Segmentation), showcasing its superiority over traditional hierarchical architectures and achieving state-of-the-art (SOTA) performance – Pk:14.1 % on the Wiki727k Dataset

Topic: Efficient Early Rumor Detection with **Reinforcement Learning**
- Headed the Early Rumor Detection project, a research project aimed at rapidly identifying and limiting the spread of rumors
- Achieved a competitive accuracy of 83.7% in early rumor detection using, on average, just 22% of an tweet event's posts on **Twitter 15** Dataset. This performance nearly matches the 83.9% accuracy of the Rumor Detection Model when processing the full set of posts

HANDS-ON PROJECTS

CyberNet: Traffic Misinformation Detection on Social Media | *Capstone Project*   01/2024 – 04/2024
- Created a comprehensive **traffic misinformation detection benchmark**, capturing diverse traffic incident reports on **Twitter**
- Developed CyberNet, using **LLMs** to extract tweet locations to cross-reference incidents with authoritative reports
- Evaluated CyberNet on the benchmark, demonstrating high accuracy 90.29% and recall 97.59% in identifying misinformation, essential for improving urban mobility

SKILLS

ML Algorithms & DL Architectures: Reinforcement Learning / Transformer / CNN / RNN
Programming Languages: Python / CUDA / Java / JavaScript / C / C++ / SQL (MySQL) / Verilog
Libraries & Frameworks: PyTorch / Spark Java / Django / NumPy / Pandas / Keras / Matplotlib / WandB
English Profficieny: TOEFL (105), GRE (157+170+3.5)