Jingquan LI

+(86) 18475541173 – jingquanli@link.cuhk.edu.cn – rennyli.github.io – Shenzhen, China

RESEARCH INTERESTS

Artificial Intelligence in Healthcare & Education; Neuroscience-Informed Auditory Processing; Human-Centered Interaction & Collaboration; Mobile Health; Accessible Computing

EDUCATIONAL BACKGROUND

The Chinese University of Hong Kong, Shenzhen (CUHK-Shenzhen) **Shenzhen, China**
Bachelor of Engineering in Computer Science and Engineering *09/2019 – 07/2025 (Expected)*
** Took two gap years between the third and fourth year of study for personal and academic growth.*

Notable Courses: *Computational Laboratory, Machine Learning, Digital Logic and Systems, Database System, Linear Algebra, Operating Systems, Programming Methodology, Probability and Statistics, Discrete Mathematics, Cloud Computing, Data Structures, Biology, Software Engineering, Parallel Programming, Computer Networks.*

WORKING PAPERS & PUBLICATIONS

[1] **J. Li**, S. Wang, S. Cai, X. Zhang, H. Li. *"Brain Signal-Based Auditory Spatial Attention Detection: Evolution from Linear to Non-Linear Models", 2024. (Under Revision)*
[2] **J. Li**, M. Li, C. Liang, P. An. *"MemoryAI: An AIGC-powered pipeline for enhancing user memory with associative techniques and dynamic visuals", 2024. (Working Paper)*
[3] **J. Li**, K. Chen, Q. Shi, X. Wan. *"A Multimodal Fusion Framework for Neonatal Asphyxia Classification Using FHR Time-Series and Clinical Data with Data Augmentation via Diffusion Models", 2024. (Working Paper)*
[4] X. Cao, **J. Li**, F. Meng, Y. Zou, G. Cao. *"Deep Learning-Based Prediction of Protein-Protein Interactions on Short Protein Datasets", 2024. (Working Paper)*
[5] **J. Li**, X. Cao. *"PASIR: A Proactive Social Interaction Robot Empowered by Multimodal Data Fusion and BCI-Driven Emotion Prediction Models". 2024 International Conference on Social Robotics (ICSR). (Oral Presentation)*

RESEARCH EXPERIENCE

EEG Signal Processing and Deep Learning for Auditory Neuroscience **Shenzhen, China**
CUHKSZ – Cross-modal Cognitive Computing (C3) Lab, Supervisor: Prof. Haizhou LI *01/2024 – Present*

- EEG Electrode Visualization: Resolved issues with Freesurfer licensing and recon-all process failures, transitioning to LeGUI for electrode visualization with limited success. Leveraged dcm2niix for efficient MRI/CT DICOM to NIfTI conversion, but faced compatibility problems related to missing GTK dependencies, affecting visualization stability.
- Spatial Sound Localization Review: Conducted a review of public EEG datasets, achieving state-of-the-art benchmarks by integrating self-recorded EEG data. Implemented CNN and attention mechanisms, reaching over 97% accuracy in spatial sound localization, confirming their superiority in capturing auditory spatial cues.
- Emotional and Semantic Entropy in Auditory Attention: Designed and conducted a dichotic listening experiment to investigate the influence of emotional and semantic entropy on selective auditory attention. Utilized EEG recordings to analyze alpha-band lateralization and temporal response functions, providing insights into the dynamic interplay between emotional unpredictability and semantic variability in auditory processing.
- EEG Music Emotion Recognition (ICASSP 2025): Applied mixup data augmentation to achieve 99.6% accuracy in subject decoding, demonstrating enhanced robustness. Designed a hierarchical classification model based on valence-arousal dimensions, integrating EEG and music features, which achieved 48.5% accuracy in a four-category emotion classification task, significantly improving recognition accuracy and interpretability.

AIGC-Driven Approaches for Memory Assistance and Human-AI Interaction **Shenzhen, China**
Southern University of Science & Technology, Supervisor: Prof. Pengcheng AN *02/2024 – Present*

- Explored AIGC's impact on Human-AI interaction by analyzing cutting-edge studies. Developed a memory augmentation framework leveraging Transformer-based LLMs and integrated LumaAI-generated videos from abstract representations, achieving enhanced memory recall via adaptive multimodal fusion and iterative user-centered feedback loops.
- Conducted codesign workshops to evaluate AIGC-generated videos for learning and recall. Feedback analysis revealed a 0.64 correlation between memory difficulty and tool effectiveness, leading to refinements in video-based memory cues for future testing.

- Conducted a controlled study with 100 participants, comparing the impacts of video, image, and text-based memory aids on immediate and delayed recall. Utilized advanced statistical techniques, including repeated measures ANOVA and Mixed ANOVA, to reveal significant differences in memory retention across modalities, informing optimal content presentation strategies.

Multimodal Fusion and Data Augmentation for Neonatal Asphyxia Prediction **Shenzhen, China**
Shenzhen Research Institute of Big Data, Supervisor: Prof. Xiang WAN *05/2024 – Present*

- Processed 55,200 delivery records, smoothing blood gas signals via interpolation and merging files by hospital ID. This produced a dataset with 482 positive and 1,500 normal control samples for analysis.
- Analyzed state-of-the-art methods from CVPR and MICCAI on CNNs, multimodal fusion, and wavelet transforms specifically for small datasets. Identified critical challenges in overfitting and feature extraction, forming the foundation for data preprocessing strategies and advanced model architecture development.
- Reproduced the PE-MVCNET model to fuse FHR images and clinical data. Employed advanced diffusion probabilistic models for synthetic data generation to address class imbalance, with ongoing validation against benchmark public datasets prior to private dataset application.

Protein Interaction Prediction: Deep Learning Benchmarking and Visualization **Shenzhen, China**
Shenzhen University of Advanced Technology, Supervisor: Prof. Gang CAO *05/2024 – 01/2025*

- Protein-Protein Interaction Analysis: Evaluated embedding techniques such as SeqVec and contact maps, uncovering limitations in long-sequence models. Introduced short-sequence training to enhance computational efficiency while preserving prediction accuracy.
- Data Curation and Visualization: Balanced the STRING dataset and developed a cross-species protein database using CDHIT. Applied Matplotlib, Seaborn, and Pandas to effectively visualize and analyze data distributions, supporting robust model training.
- Benchmark Development: Optimized and trained GNN models on curated short-sequence data, achieving 99.94% accuracy and 98.85% F1-score. Established a high-performance benchmark to guide future advancements in protein interaction predictions.

INVENTION PATENTS

- *A Cross-Modal Fetal Heart Monitoring Clinical Decision-Making System Based on Joint Attention Mechanisms and State-Space Models. (Patent Number: CN2411940S)*
- *An Audio-Visual System for Sleep Promotion Based on 40Hz Gamma Frequency Stimulation. (Patent Number: CN 202411422680.6)*
- *Ensemble deep learning models for EEG-based auditory attention decoding. (Under Review)*
- *Binary-Temporal Convolutional Neural Network for Multi-Class Auditory Spatial Attention Detection. (Under Review)*
- *A Visual Memory Training System Based on AI-Generated Content. (Under Review)*

PROFESSIONAL EXPERIENCE

Search Technology Center Asia (STCA), Microsoft **Beijing, China**
Technical Product Manager – Supervisor: Xinwei NIE *07/2022 – 12/2022*

- Competitor Analysis and Product Development: Conducted in-depth analysis of browser extensions, focusing on user interaction and performance. Collaborated on a Bing extension by applying machine learning techniques to assess and improve translation plugins, directly influencing product design and enhancing user engagement.
- **Search Interface Optimization:** Refined trending search interfaces for Bing and Windows, utilizing predictive modeling and user behavior analysis to propose SwiftKey enhancements. Integrated natural language processing (NLP) to optimize typing predictions, improving UI design and overall user experience.
- **Cross-Department Data Collaboration:** Partnered with the sports content team to enhance World Cup-related search results. Leveraged data analysis and machine learning to refine Bing's search algorithms, delivering accurate, context-aware results and improving user satisfaction during high-traffic periods.

HONORS & AWARDS

- 2024 Undergraduate Research Award, CUHK-Shenzhen, 12/2024.
- Ranked 4th, 2025 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) EEG Music Classification Challenge, 11/2024.
- ICSR 2024 Robot Design Competition Finalist, 09/2024.
- 2024 Bremen Big Data Challenge: Global Top 10 Ranking, 03/2024.
- Top 10 Finalist (Adult Division), China Region, 2023 Hit Like A Girl Global Drumming Contest, 03/2023.
- Shenzhen Diligentia College Shanqun Scholarship, CUHK-Shenzhen, 08/2020.

LEADERSHIP & EXTRACURRICULAR ACTIVITIES

- **Leadership Experience:** *Organized Students' Union events, such as the Freshman Ball and New Year Blessings, while managing team members, logistics, marketing, and event coordination.*
- **Artistic & Creative Involvement:** *Served as a percussionist for university orchestra, spokesperson for GlamorDrums, and founder of 'RennyDrums' to promote music through campus and regional performances.*
- **Volunteer & Social Impact:** *Volunteered with HOPE NGO to organize child protection webinars and co-developed China's first campus accessibility toolkit with UNICEF.*

LANGUAGES & SKILLS

Standard English Tests: *TOEFL: 94 (Speaking: 23, Writing: 25); GRE: 319 (Verbal: 149, Quant: 170, Writing: 3.5).*
Programming: *Python, Sklearn, Pandas, Numpy, PyTorch/Tensorflow, Shell, Matlab, LaTeX, Markdown, SQL, Git.*
Other Skills: *Prompt Engineering, Web Develop, Quantitative & Qualitative Data Analysis, Interface Design (Figma).*

ACADEMIC REFERENCES

Prof. Haizhou LI, School of Data Science, CUHK-Shenzhen, Webpage.
Prof. Wei-Chung HSU, School of Data Science, CUHK-Shenzhen, Webpage.
Assoc. Prof. Xiang WAN, Shenzhen Institute of Big Data, CUHK-Shenzhen, Webpage.
Prof. Gang CAO, School of Life and Health Sciences, Shenzhen University of Advanced Technology, Webpage.
Asst. Prof. Pengcheng AN, School of Design and Creativity, Southern University of Science & Technology, Webpage.
Assoc. Prof. Changmiao WANG, Shenzhen Institute of Big Data, CUHK-Shenzhen, Webpage.