Jun Li

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EDUCATION

Jilin University   Jilin, China

Bachelor of Engineering, Electrical Engineering (GPA: 3.5/4.0)   Sep 2020 - Present

RESEARCH INTERESTS

Deep learning methods for healthcare

Multi-modal data alignment and fusion for temporal medical data and wearable devices

Brain-inspired computation in artificial intelligence

PUBLICATIONS

In press

- **Li, J.**, Guo, Y. (2023). EEG Detection and Prediction of Freezing of Gait in Parkinson's Disease Based on Spatiotemporal Coherent Modes.(Submitted to IEEE JBHI, accepted)
- **Li, J.**, Liu, C., Cheng, S., Arcucci, R., Hong, S. (2024). Clinical language model helps text-ECG pre-Training for zero-shot learning and cross-modal retrieval.(Submitted to MedIA, under review)

Conference Proceedings

- **Li, J.**, Liu, C., Cheng, S., Arcucci, R., Hong, S. (2023). Frozen Language Model Helps ECG Zero-Shot Learning. Medical Imaging with Deep Learning.(**Oral Presentation**)
- Zhou, S., Geng, S., **Li, J.**, Zhang, D., Xie, Z., Cheng, C., Hong, S. (2023). Less is More: Reducing Overfitting in Deep Learning for EEG Classification. Computing in Cardiology.

RESEARCH EXPERIENCE

Harvard Medical School, Supervisor: M.Brandon Westover, M.D., Ph.D. | *Summer Intern*   Jul 2023 - Present
   Creating an EEG Expert-Level AI System for Epilepsy Detection

- Developing an expert-level AI system for detecting seizures and seizure-like events in EEG recordings, capable of classifying abnormal activity in both short (10 seconds) and long (30 minutes) durations.
- Designing a universal EEG visualization interface, assisting neurologists in combining original EEG data with AI system results for expedited and accurate diagnosis.
- Achieving **expert-level performance** for epilepsy detection and addressing previous challenges of artifact misidentification in EEG AI systems through the implementation of hard negative mining.

   Developing a Foundation Model for Cardiac Disease Detection from ECG

- Building a comprehensive ECG foundation model on Harvard-Emory ECG Dataset, which is the **largest ECG dataset** with over 20 million samples.
- Evaluating the generalization capabilities across multiple scenarios, including wearable devices ECG, noisy ECG, and clinical ECG.

Peking University, Supervisor: Shenda Hong, Ph.D. | *Research Assistant*   Nov 2022 - Present
   Leveraging Large Language Models for ECG Detection

- Introduced a multi-modal approach for zero-shot learning in ECG analysis, enabling adaptation to a variety of downstream ECG classification tasks without requiring task-specific fine-tuning.
- Constructed an ECG-text contrast learning framework to align their embeddings and learn their joint latent representation.
- This is the **first work** to apply a large language model for physiological signals, and time series data more broadly.
- Published in Medical Imaging with Deep Learning(Oral Presentation), 2023.

Beihang University, Supervisor: Yuzhu Guo, Ph.D. | *Visiting Student*   Jan 2022 - Nov 2022
   Investigating Spatiotemporal Coherent Modes in EEG During Freezing of Gait

- Analyzed the time and frequency domain features in EEG signals from patients with Parkinson's disease experiencing freezing of gait episodes.

- Developed a data-driven model to uncover spatial patterns of dynamic brain functional connectivity, differentiating between freezing of gait and normal gait events.

PROJECT EXPERIENCE

Intelligent Piano Education System | *Founder & Developer*   May 2021 - Dec 2021

- Developed a multiple sensors piano system with photoelectric sensing system, camera and microphone for simulating and summarizing the multi-modal information during piano playing.
- Applied for an invention patent.

Ligament Reconstruction Surgery System | *Developer*   Dec 2022 - Present

- Developed a computer-aided navigation system for ligament reconstruction surgery, improving the safety and reliability of surgery and reducing the failure rate of surgery.

HONORS AND AWARDS

- 2023 - 2nd Prize on Chinese Collegiate Computing Competition
- 2022 - Outstanding Prize Winner of the Brain Future, top performing undergraduates in Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences
- 2022 - 2nd Prize in the Undergraduate Scholarship of Jilin University
- 2021 - 2nd Prize on National College Student Robot Competition(Robomaster)

PRESENTATIONS

- **Li, J.**, Guo, Y. (2022).EEG Detection and Prediction of Freezing of Gait in Parkinson's Disease Based on Spatiotemporal Coherent Modes. Technologies for Neuroenginnering, virtual.(Poster)
- **Li, J.**, Liu, C., Cheng, S., Arcucci, R., Hong, S. (2023).Frozen Language Model Helps ECG Zero-Shot Learning. Medical Imaging with Deep Learning(Poster and Oral Presentation)

SKILLS

Programming

- Proficient in Python, Matlab, LaTeX, Linux, Pytorch
- Experienced in C/C++

Language

- Chinese (Native), English (Fluent)