

Shuyue Jia (Bruce)

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CONTACT INFORMATION

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RESEARCH STATEMENT

I am a Ph.D. candidate working on

- **Evidence-based Medicine and Healthcare**
- **Multimodal Foundation Models** for Medical and Clinical Applications
- **Retrieval-Augmented Generation (RAG), Tool Using, and Automate Workflows**
- **Visual and Language Multimodal Learning**
- **Generative AI**, *e.g.*, Diffusion Probabilistic Models
- **AI for Medicine, Healthcare, and Science**, *e.g.*, Medical Imaging with AI

My ultimate goal is to **develop safe, reliable, and extensible Artificial General Intelligence (AGI) systems** that can improve human lives. As part of my research, I actively develop open-source software, toolkits, and machine/deep learning libraries. I am also interested in creating new benchmark databases to further advance the field. Source codes of all my works will be shared on 🌐 GitHub, the trained models and datasets will be released on 🤗 Hugging Face, and some of my applied research on Vision and Language will be developed as 🧩 **products**.

ACADEMIC APPOINTMENTS

Boston University, MA, USA **Research Assistant** May 2024 - Present

- Principal Investigator: Prof. Vijaya B. Kolachalama
- Projects: Evidence-based Medicine, Foundation Models, Generative AI, and Medical Imaging with AI

City University of Hong Kong, Hong Kong **Research Assistant** Sept 2021 - Apr 2023

- Principal Investigator: Prof. Shiqi Wang
- Projects: Image Quality Assessment (IQA) and Perceptual Optimization


EDUCATION

Boston University, Boston, MA, USA Sept 2023 - May 2028 (expected)

- Ph.D. Candidate in Computer Engineering, Department of Electrical and Computer Engineering
- Supervisor: Prof. Vijaya B. Kolachalama
- Expertise: Foundation Models, Generative Models, Vision and Language Multimodal Learning, Medical Imaging

City University of Hong Kong, Hong Kong May 2021 - June 2023

- M.Phil. in Computer Science, Department of Computer Science
- Supervisor: Prof. Shiqi Wang
- Expertise: Image Quality Assessment, Perceptual Optimization, and Deep Learning
- Thesis: No-reference Image Quality Assessment via Non-local Modeling

- B.Eng., Intelligence Science and Technology Major, School of Computer Science
- Supervisor: Prof. Yimin Hou and Prof. Jinglei Lv
- Expertise: Deep Learning
- Thesis: Brain-computer Interface Signals Classification and Its Applications based on Deep Learning Methods
- Creator and Maintainer of  GitHub repo **EEG-DL** (**obtained 900+ stars and 200+ forks**), a Deep Learning library written by TensorFlow for EEG Tasks (Signals) Classification.

- Visiting Student, Department of Computer Science
- Selected coursework: Computer Systems and Architecture (A+), University Writing and Communication (PASS)

PEER-REVIEWED PUBLICATIONS

Journal Publications

- MedPodGPT: A Multilingual Audio-augmented Large Language Model for Medical Research and Education
Shuyue Jia, Subhrangshu Bit, Edward Searls, Lindsey Claus, Pengrui Fan, Varuna Jasodanand, Meagan Lauber, Divya Veerapaneni, William Wang, Rhoda Au, Vijaya B. Kolachalama *   
medRxiv (Under Review)
- MedSyn: Text-guided Anatomy-aware Synthesis of High-Fidelity 3D CT Images  
 Yanwu Xu, Li Sun, Wei Peng, **Shuyue Jia**, Katelyn Morrison, Shyam Visweswaran, Motahhare Eslami, Kayhan Batmanghelich *
IEEE Transactions on Medical Imaging (IEEE T-MI, IF in 2024: 8.900)
- GCNs-Net: A Graph Convolutional Neural Network Approach for Decoding Time-resolved EEG Motor Imagery Signals    
Shuyue Jia, Yimin Hou, Xiangmin Lun, Ziqian Hao, Yan Shi, Yang Li, Rui Zeng, Jinglei Lv *
IEEE Transactions on Neural Networks and Learning Systems (IEEE T-NNLS)
IF in 2022: 14.255, Top 0.1% most cited articles published in Engineering in 2022
 GitHub Repo obtained **900+ stars and 200+ forks**
- Deep Feature Mining via Attention-based BiLSTM-GCN for Human Motor Imagery Recognition
Shuyue Jia *, Yimin Hou, Xiangmin Lun, Shu Zhang, Tao Chen, Fang Wang, Jinglei Lv   
Frontiers in Bioengineering and Biotechnology
IF in 2021: 6.064, Top 1% most cited articles published in Engineering in 2022
- A Novel Approach of Decoding EEG Four-Class Motor Imagery Tasks via Scout ESI and CNN  
 Yimin Hou, Lu Zhou *, **Shuyue Jia**, Xiangmin Lun
Journal of Neural Engineering
IF in 2020: 5.379, Top 1% most cited articles published in Engineering in 2020
 GitHub Repo obtained **190+ stars and 40+ forks**
- PMU Measurements based Short-term Voltage Stability Assessment of Power Systems via Deep Transfer Learning 
 Yang Li *, Shitu Zhang, Yuanzheng Li, Jiting Cao, **Shuyue Jia**

- Learning from Mixed Datasets: A Monotonic Image Quality Assessment Model [📄 Paper] [🔗 Codes]
Zhaopeng Feng, Keyang Zhang, **Shuyue Jia**, Baoliang Chen, Shiqi Wang *
IET Electronics Letters
Top 10% most cited articles published in Engineering in 2023
- Improving Performance: A Collaborative Strategy for the Multi-data Fusion of Electronic Nose and Hyperspectral to Track the Quality Difference of Rice [E Paper]
Yan Shi, Hangcheng Yuan, Chenao Xiong, **Shuyue Jia**, Jingjing Liu, Hong Men *
Sensors & Actuators: B. Chemical
IF in 2021: 9.221, Top 10% most cited articles published in Engineering

Conference and Workshop Publications

- No-reference Image Quality Assessment via Non-local Dependency Modeling [📄 Paper] [🔗 Codes] [📄 Slides] [📄 Poster]
Shuyue Jia, Baoliang Chen, Dingquan Li, Shiqi Wang *
IEEE 24th International Workshop on Multimedia Signal Processing (IEEE MMSP'22) (**Poster Presentation**)

Thesis

- No-reference Image Quality Assessment via Non-local Modeling [📄 Permanent Link] [📄 Defense Slides]
Shuyue Jia
M.Phil. Thesis, City University of Hong Kong, May 2023.
- Brain-computer Interface Signals Classification and Its Applications based on Deep Learning Methods
Outstanding Thesis Award [📄 Related Publication] [📄 Defense Slides]
Shuyue Jia
B.Eng. Thesis, Northeast Electric Power University, May 2020.

Note:

1. 📄 Google Scholar Profile
2. * denotes the Corresponding Author

INDUSTRY EXPERIENCE



Philips Research , Shanghai	Natural Language Processing Intern	Jul - Oct 2020
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- Interned at the Precision Diagnosis & Image Guided Therapy (PD&IGT) Department.
- **Medical Concept Mapping**: three levels to map the query to a standard term → BPE and FMM & BMM algorithms for sub-words generation and matching (syntax-level), word vector cosine similarity (semantics-level), and knowledge graph (pragmatics-level).
- **Medical NER**: compared the performances of different models → CRF++, Character-level BiLSTM + CRF, Character-level BiLSTM + Word-level BiLSTM / CNNs + CRF, and deployed the models using Flask and Docker as web apps.
- **Dynamic Webs Crawling**: crawled 620k pages from the NSTL via Python threading and tricks to prevent anti-reptile.


OPEN-SOURCE PROJECTS

Software - MedPodGPT [ Product] [ Paper] [ Codes]


- An online platform for deploying our latest multimodal foundation models for medical and clinical applications.

Library - MedPodGPT Library [ Paper] [ Code]


- A library for benchmarking multilingual medical Large Language Models (LLMs)

Library - EEG Deep Learning Library (**900+ stars and 200+ forks**) [ Paper] [ Code]

- A Deep Learning (DL) library written by TensorFlow for EEG tasks (signals) classification.
- The library has been accepted by the NeuroImaging Tools and Resources Collaboratory (NITRC), National Institutes of Health (NIH), USA.

Toolkit - PromptCraft [ Code] [PyPI Package]

- A prompt perturbation toolkit from the character, word, and sentence levels for prompt robustness analysis.

Benchmark Dataset - GSM8K-Consistency [Dataset (available on  Hugging Face)]



- A benchmark dataset for analyzing the consistency of Arithmetic Reasoning on GSM8K.

AWARDS AND SERVICES

Fellowships and Scholarships

Doctoral Research Fellowship, Boston University, USA	2024 - 2028
Distinguished Computer Engineering Fellowship, Boston University, USA	2023 - 2024
Research Assistantship, City University of Hong Kong, Hong Kong	2021 - 2023
Innovation Scholarship, Northeast Electric Power University, China	2017 - 2019
Excellent Student Scholarship, Northeast Electric Power University, China	2016 - 2020

Mathematics and Physics Competition Awards

2019 Interdisciplinary Contest In Modeling, USA	<i>Honorable Mention Award</i>	 Thesis (English)]	Apr 2019
2018 Mathematical Contest In Modeling, China	<i>First Prize</i>	 Thesis (Chinese)]	Aug 2018
The 32 nd Chinese Physics Olympiad (CPhO), China	<i>Third Prize</i>		Oct 2015
2015 National High School Math League, China	<i>Second Prize</i>		Sept 2015

Academic Services

Speaker Program Chair, Keynotes and Panel Sessions, IEEE Local Conferences, Boston, USA	2024
Local Conference Committee Members, IEEE Boston Section, Boston, USA	2024

Invited Reviewer

More than 80 Paper Reviews

IEEE Transactions on Multimedia (T-MM)
IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)
IEEE Transactions on Industrial Informatics (T-II)
IEEE Journal of Biomedical and Health Informatics (JBHI)
IEEE Open Journal of the Industrial Electronics Society (OJIES)
IEEE MultiMedia (MM)
IEEE Sensors Journal
Journal of Medical Internet Research