XIAOMIN LI

lixiaomin170@gmail.com ⋄ LinkedIn ⋄ Google Scholar

EDUCATION

Ph.D. in Computer Science, Texas State University, USA *Sept. 2018 - Aug. 2023*
Advisor: Dr. Vangelis Metsis (vmetsis@txstate.edu)
Completed all required courses for both M.S. and Ph.D. degrees, a total 54 semester credit hours. GPA: 4.0/4.0
B.S. in Computer Science, Lanzhou University, China *Sept. 2014 - June 2018*
University National Ranking: 30. Ranked top 10% student in the Computer Science department. GPA: 4.51/5.0

TEACHING EXPERIENCE

Assistant Professor of Instruction - Texas State University *Aug. 2024 - Present*
Responsible for designing and teaching several courses per semester at undergraduate and master levels. Guide students on their research projects. Participate in department service works.
Lecturer - Texas State University *Aug. 2023 - Aug. 2024*
Designed and Taught three courses, *Foundation of Computer Science II* in C++, *Object Oriented Programming* in Java, and Master level course *Programming Practicum* in C++.
Primary Instructor - Texas State University *2022 Fall and 2023 Spring semesters*
Taught *Foundation of Computer Science II* in C++ for a year; the course covers a wide range of fundamental computer science concepts, including Linux commands, Git, Searching and Sorting algorithms, Pointers, Classes, Linked-lists, Stack and Queue ADTs, Templates, STL, Recursion, etc.
Teaching Assistant - Texas State University *2018 - 2022 Academic Years*
I was the Teaching Assistant for multiple computer science courses, including Machine Learning & Computer Vision (both Undergraduate and Graduate level), Object-Oriented Design, and Operating Systems. My duties were helping professors design assignments and projects, answering students' questions during office hours or emails, and grading.

PROFESSIONAL EXPERIENCE

Machine Learning Research Internship - Ford Motor Company
May - Aug. 2022 (12 weeks), May - Aug. 2021 (12 weeks)
Project Name: Efficient Moving Object Detection via Image Eccentricity Analysis and Sparse Neural Networks
Description: I developed an efficient moving object detection pipeline for videos that leverages image eccentricity and sparse convolution techniques. The image eccentricity algorithm serves as a rapid background subtraction method, while the object detection model is built on sparse convolutions. As a result, the pipeline achieves up to a 2x speedup in object detection with minimal accuracy loss on video frames captured by static traffic cameras.
Outcomes: Research paper published on 2023 IEEE/CVF Winter Conference on Applications of Computer Vision Workshops (WACVW) US Patent: 20230177842

TECHNICAL EXPERTISE

Programming Languages	Python, C++, Java, MATLAB, SQL, CUDA, OpenMP
Data Analysis Tools	PyTorch, TensorFlow, Keras, scikit-learn, SciPy, pandas, Numpy, Matplotlib
Other Useful Tools	Docker, AWS, GCP, Unity, Plotly, Django, Git, Bash, Linux, markdown, HTML
Knowledge Fields	Generative AI, LLM, Machine Learning, Computer Vision, Time Series Analysis Parallel Computing, Efficient AI

DISSERTATION TOPIC

Mitigating Data Shortage in Biomedical Signal Analysis: An Investigation into Transfer Learning and Generative Models
For health-related and medical applications, physiological signals are often expensive to collect and require laborious work by experts to annotate. Besides, such data always face severe imbalance issues where critical but rare cases are hard to collect. In response to the aforementioned issues, I have developed **multiple deep learning approaches**. For example, I have utilized **contrastive learning and transfer learning techniques** to learn general patterns from an adequate amount of unlabeled data. Additionally, I have employed various **generative models, such as autoencoders, GANs, and diffusion models**, to generate minority categorical signals from majority categories. Furthermore, I have used **diffusion models** to address additional biomedical signal problems, including **denoising, anomaly detection, and super resolution**, among others.

PEER-REVIEWED PUBLICATIONS

1. **BioDiffusion: A Versatile Diffusion Model for Biomedical Signal Synthesis** Xiaomin Li, Mykhailo Sakevych, Gentry Atkinson, Vangelis Metsis. Artificial Intelligence for Biomedical Signal Processing. Bioengineering 2024, 11(4), 299;
2. **Generating Realistic Multi-class Biosignals with BioSGAN: A Transformer-based Label-guided Generative Adversarial Network.** Xiaomin Li, Anne Hee Ngu Hiong, Vangelis Metsis. The 25th International Conference on Artificial Intelligence, Las Vegas, USA, 2023.
3. **Conditional Diffusion with Label Smoothing for Data Synthesis from Examples with Noisy Labels.** Gentry Atkinson, Xiaomin Li, Vangelis Metsis. 31th European Signal Processing Conference.(EUSIPCO) Helsinki, Finland, 2023.
4. **EMOD: Efficient Moving Object Detection via Image Eccentricity Analysis and Sparse Neural Networks.** Xiaomin Li, Ramin Nabati, Kunjan Singh, Enrique Corona, Vangelis Metsis, and Armin Parchami. 2023 IEEE/CVF Winter Conference on Applications of Computer Vision Workshops (WACVW), Waikoloa, Hawaii, USA, 2023.
5. **TTS-GAN: A Transformer-based Time-Series Generative Adversarial Network.** Xiaomin Li, Vangelis Metsis, Huangyingrui Wang, and Anne Hee Hiong Ngu. The 20th International Conference on Artificial Intelligence in Medicine (AIME), Halifax, Canada, June 2022.
6. **SPP-EEGNET: An Input-Agnostic Self-supervised EEG Representation Model for Inter-Dataset Transfer Learning.** Xiaomin Li, Vangelis Metsis. The 18th International Conference on Computing and Information Technology, Kanchanaburi, Thailand, May 2022.
7. **Transfer Learning with Fine-Grained Sparse Networks: From an Efficient Network Perspective.** Xiaomin Li, Cody Blakeney, and Ziliang Zong. Resource-Constrained Machine Learning (ReCoML) Workshop of MLSys2020 Conference, Austin, TX, USA, 2020.
8. **Parallel Blockwise Knowledge Distillation for Deep Neural Network Compression.** Cody Blakeney, Xiaomin Li, Yan Yan, and Ziliang Zong. IEEE Transactions on Parallel and Distributed Computing, Dec. 2020
9. **Improving the Cost Efficiency of Large-scale Cloud Systems Running Hybrid Workloads - A Case Study of Alibaba Cluster Traces.** Brad Evermana, Narmadha Rajendrana, Xiaomin Li, and Ziliang Zong. Journal of Sustainable Computing, Oct. 2020.
10. **Craft Distillation: Layer-wise Convolutional Neural Network Distillation.** Cody Blakeney, Xiaomin Li, Yan Yan, and Ziliang Zong. IEEE International Conference on Edge Computing and Scalable Cloud (EdgeCom), New York City, USA, 2020.

SELECTED PROJECTS

A versatile diffusion model for biomedical signal argumentation *Jan. 2023 - Mar. 2024*
Keywords: Diffusion Model, Generative Model, PyTorch Github: BioDiffusion

Transformer GAN generating synthetic time series data *Oct. 2021 - Oct. 2022*
Keywords: Transformer, Generative Model, PyTorch Github: tts-gan, tts-cgan

Self-supervised contrastive learning on EEG data *Aug. 2021 - Oct. 2021*
Keywords: Constrastive learning, Physiological signals, PyTorch Github: eeg-transfer-learning

Supervised & unsupervised EEG feature extraction and transfer learning *Oct. 2020 - May. 2021*
Keywords: Autoencoder, Transfer Learning, Physiological signals, Keras

Paralleling irregular parallel problems with MPI, OpenMP, and CUDA *Jan. 2019 - May 2019*
Keywords: Multi-clusters GPU and CPU parallelization, irregular parallel algorithms

Real-Time foveated rendering with GPU energy consumption analysis *Sept. 2018 - May 2019*
Keywords: OpenGL, HLSL shader, C#, Unity, CPU&GPU profiling Github: Profiling

Improving rendered low-resolution image quality based on GAN *Jan. 2019 - May 2019*
Keywords: Generative models, Unity rendered images, PyTorch

Eye movement signal classification based on GM-HMM Sept. 2018 - Dec. 2018
Keywords: Gaussian Mixture Hidden Markov Model, Infrared camera, C#, MATLAB

PRESENTATIONS

Conference Oral Presentations

1. IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), WAIKOLOA, HAWAII, USA, 2023. (EMOD: Efficient Moving Object Detection via Image Eccentricity Analysis and Sparse Neural Networks.)
2. The 20th International Conference on Artificial Intelligence in Medicine (AIME), Halifax, Canada, 2022. (TTS-GAN: A Transformer-based Time- Series Generative Adversarial Network)
3. The 18th International Conference on Computing and Information Technology (IC2IT), May, Kanchanaburi, Thailand, 2022. (SPP-EEGNET: An Input-Agnostic Self-supervised EEG Representation Model for Inter-Dataset Transfer Learning)
4. Resource-Constrained Machine Learning (ReCoML) Workshop of MLSys2020 Conference, Austin, TX, USA, 2020. (Transfer Learning with Fine-Grained Sparse Networks: From an Efficient Network Perspective)

Conference Poster Presentations

1. WiML workshop of NeurIPS Conference, Virtual, Dec. 2021 (SPP-EEGNET: An Input-Agnostic Self-supervised EEG Representation Model for Inter-Dataset Transfer Learning)
2. 2021 Ford Motor Company's 6th Global Conference, Virtual, Dec. 2021. (Efficient video-based object detection for smart infrastructure using motion embedding from Eccentricity Analysis)

PROFESSIONAL SERVICE

I have been invited to review over 20 journal articles.

1. Reviewer for IEEE Transactions on Neural Networks and Learning Systems, [2022 - Present]
2. Reviewer for IEEE Transactions on Cybernetics, [2022 - Present]
3. Reviewer for Quantitative Finance Journal, [2023 - Present]
4. Reviewer for Signal Processing Journal, [2023 - Present]

SELECTED AWARDS

Doctoral Teaching Assistantship	*2022-2023 Academic Year*
Doctoral Instructional Assistantship	*2018-2022 Academic Year*
Computer Science Graduate Academic Excellence Award	*2020-2021 Academic Year*
Computer Science Graduate Academic Excellence Award	*2019-2020 Academic Year*
Doctoral Merit Scholarship	*2018-2019 Academic Year*
Minor Award of Lanzhou University	*2016-2017 Academic Year*
National Encouragement Scholarship	*2015-2016 Academic Year*
Third-class Award of Lanzhou University	*2014-2015 Academic Year*