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Gaoxiang Luo

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EDUCATION

UNIVERSITY OF PENNSYLVANIA
Ph.D. in Computer & Information Science
2022-X | Philadelphia, PA

UNIVERSITY OF MINNESOTA
B.S. in Computer Science
Minor in Math
2018-2021 | Minneapolis, MN
Graduated with High Distinction

LINKS

Google Scholar: z.umn.edu/gl-scholar
Homepage: gaoxiangluo.github.io
LinkedIn: z.umn.edu/gl-linkedin
Github: z.umn.edu/gl-git

RESEARCH INTEREST

Machine Learning
Computer Vision
AI for Healthcare
Wireless Sensing
Robustness
Generative Model

HONORS/AWARDS

2021	Google CSRMP[a] Scholar
2021	UROP Scholarship x 2
2021	Maximillian Lando Scholarship
2021	UMN CSpotlight
2018-2021	CSE Dean's List
2021	Tau Beta Pi

SKILLS

Python • C/C++ • MATLAB
PyTorch • TensorFlow • LaTeX

SERVICE

CONFERENCES | Volunteer
Student volunteer at NeurIPS 2021, ICML 2021, ICLR 2021

MURAJ | Reviewer
October 2020 – May 2022
Minnesota Undergraduate Research & Academic Journal (MURAJ) Math and Computer Science Reviewer

[a] CS Research Mentorship Program

PUBLICATION

ACADEMIC PAPER

[1] Le Peng, Hengyue Liang, **Gaoxiang Luo**, Taihui Li, Ju Sun[a]. *Rethink Transfer Learning in Medical Image Classification*. In preparation for IEEE T-MI. [https://arxiv.org/abs/2106.05152] [Project Page]

[2] Le Peng, **Gaoxiang Luo**, Andrew Walker, Ju Sun, Christopher J Tignanelli, et al. *Evaluation of Federated Learning Variations for COVID-19 Diagnosis Using Chest Radiographs from 42 US and European Hospitals*. Accepted to Journal of the American Medical Informatics Association (JAMIA). [https://doi.org/10.1093/jamia/ocac188]

[3] Majid Farhadloo, Carl Molnar, **Gaoxiang Luo**, Yan Li, Shashi Shekhar, et al. *SAMCNet: Towards a Spatially Explainable AI Approach for Classifying MxIF Oncology Data*. Accepted to ACM SIGKDD 2022. [https://dl.acm.org/doi/10.1145/3534678.3539168]

[4] John Burns, Zachary Zaiman, **Gaoxiang Luo**, Le Peng, et al. *Pixel Color Averages by Race in Chest X-Ray*. Under review for JMI.

[5] Jayant Gupta, Carl Molnar, **Gaoxiang Luo**, Joe Knight, Shashi Shekhar. *Towards Comparative Physical Interpretation of Spatial Variability Aware Neural Networks: A Summary of Results*. [https://arxiv.org/abs/2110.15866]

RESEARCH

UNIVERSITY OF PENNSYLVANIA | PhD Student
September 2022 - Present | Philadelphia, PA

- Work on interdisciplinary field of wireless and machine learning.

UNIVERSITY OF MINNESOTA | Undergrad Research Assistant
August 2020 – May 2022 | Minneapolis, MN

- Improved AUPRC of chest x-ray COVID-19 classification by 9% compared to local training, by implementing real-data federated learning with several partner institutes. The case study is featured in the white paper – *Federated Learning for Healthcare Using NVIDIA Clara*. (Advisor: Prof. Ju Sun)
- Proposed a novel **truncated transfer learning** (TL) method in medical imaging classification under data-poor regimes, that consistently leads to comparable or superior performance than its non-truncated counterpart as well as other TL strategies. Our method can be **applied to different deep neural networks** and **generalized to other tasks** (e.g., segmentation). See Publication [1]. (Advisor: Prof. Ju Sun)
- Outperformed current state-of-the-art point set classifiers in terms of accuracy and F1-score on our tumor cell datasets by designing a novel **S**patial-interaction **A**ware **M**ulti-**C**ategory deep neural **N**etwork (**SAMCNet**), contributing **location representation and point pair attention layers** for multi-categorical point set classification. See Publication [3]. (Advisor: Prof. Shashi Shekhar)
- Added to the transparency of **S**patial **V**ariability **A**ware **N**eural **N**etworks (**SVANN**s) by exploring the physical interpretation based on geographically heterogeneous features (e.g., remote sensing indices), using a case study of wetland mapping. See Publication [5]. (Advisor: Prof. Shashi Shekhar)

[a] CV Reference Contact: Prof. Ju Sun [www.sunju.org]

COURSEWORK

UMN

Machine Learning (CSCI 5525)
Deep Learning (CSCI 8980)
Data Mining (CSCI 5523)
Machine Learning Theory (CSCI 8980)
Numerical Methods (MATH 5485)

CISCO RESEARCH | Research Fellow
May 2021 – May 2022 | Remote

- Co-leading an initiative to develop an accurate and reliable automated fracture detection method combining **multi-modal** and **semi-supervised** approaches on chest CT scans and X-rays, to reduce the delays and errors that come along with the current practice of manually identifying fractures. This work is accepted to two undergraduate research conferences NCRC 2022 and NCUR 2022.
(Advisor: Prof. Christopher Tignanelli & Prof. Ju Sun)

CISCO RESEARCH | AL/ML Research Intern
Feb 2022 – July 2022 | Remote

- Building a novel **scalable federated learning (FL) system** by implementing abstraction topologies to simply FLOps for ML engineers with a drastic reduction of deployment effort, filed 2 patents to improve model convergence and communication efficiency. This work is now open-sourced at **Project Flame**.
(Host: Dr. Myungjin Lee) [Slide]

TEACHING & TUTORING

FIFE-PENN CS ACADEMY | Coding Instructor
September 2022 – December 2022 | Philadelphia, PA

- Teaching 2-5th grade students coding in Scratch in the after-school program.

UNIVERSITY OF MINNESOTA | Undergrad Teaching Assistant
September 2020 – December 2021 | Minneapolis, MN

- CSCI 2011 Discrete Math (Fall 2020 & Spring 2021)
- CSCI 2033 Computational Linear Algebra (Fall 2021)

UNIVERSITY OF MINNESOTA LIBRARY | Peer Tutor
September 2020 – December 2020 | Minneapolis, MN

- Tutor single-and-multivariable calculus, linear algebra, intro physics, intro stats, and some programming in Python and C.

MEDIA

[1] *Interning with Cisco Research*. In Cisco Emerging Tech & Incubation (ET&I) Blog. Aug. 12, 2022.

[2] *First gen student chosen for Google mentorship program*. In UMN CS&E Department News. Nov. 19, 2021.

[3] *CSpotlight: Experiencing research as an undergrad*. In UMN Department of Computer Science & Engineering spotlight program. May 12, 2021.

[4] *Application of Artificial Intelligence to Help Fight COVID-19* In Minnesota Undergraduate Research & Academic Journal (MURAJ), Vol.4 No.3, 2021.