Zhexu (Alex) Jin

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Education

2023 - present	PhD Candidate in Statistics	**University of Illinois, Urbana-Champaign**
2019 - 2023	BS in Data Science	**Duke Univeristy / Duke Kunshan Univeristy**

Research Interests

Low Rank Models; High Dimensional Statistics; Community Detection; Clustering; Computational Topology; Optimal Transport; Nonconvex Optimization; Computational to Statistical Gap; Clustering

Publications

[1] Shanru Lin, Temirlan Sabyrbayev, **Zhexu Jin**, Gaoyang Li, Huansheng Cao, and Dongmian Zou. "TopoUT: Enhancing Cell Segmentation Through Efficient Topological Regularization". In: *2024 IEEE International Symposium on Biomedical Imaging (ISBI)*. IEEE. 2024, pp. 1–5. DOI: 10.1109/ISBI56570.2024.10635428.

[2] **Zhexu Jin**, Mario Andrés Velásquez Angel, Ivan Mura, and Juan Felipe Franco. "Enriched spatial analysis of air pollution: Application to the city of Bogotá, Colombia ". In: *Frontiers in Environmental Science* (2022), p. 1777. DOI: 10.3389/fenvs.2022.966560. URL: https://doi.org/10.3389/fenvs.2022.966560.

[3] **Zhexu Jin**, Gaoyang Li, Huansheng Cao, and Dongmian Zou. *Towards Geometry-Aware Cell Segmentation in Microscopy Images*. Medical Imaging meets NeurIPS. 36th Conference on Neural Information Processing Systems, 2022. URL: https://nips.cc/media/PosterPDFs/NeurIPS%5C%202022/63451.png.

Projects

Mixture of Common Subspaces/Manifolds (Ongoing) Advised by Dr. Joshua Agterberg

- Proposed an efficient algorithm to clustering mixture of low rank symmetric matrices
- Proved consistency of algorithm and characterized exactly its statistical and computational limit
- Proved identifiability requirement for estimating mixture of common subspaces and manifolds.

Topologically Aware Medical Image Segmentation Advised by Dr. Dongmian Zou

- Proposed and implemented an efficient loss inspired by computational topology that preserves the geometry and topology of segmentation
- Sped up the loss computation with a novel 1 dimensional simplification
- Bench-marked the segmentation performance on commonly used deep learning models with varying segmentation losses

Stochastic Modeling in Public Health Advised by Dr. Ivan Mura

- Implemented a model for spatial temporal interpolation of pollutant concentration across the city of Bogotá
- Used computational geometry tools to analyze regional disparity of air pollution exposure.
- Created stochastic petri net model for disease progression and analyzed its reachability sets and convergence time using simulation.

Skills

Programming Languages	Python, Java, JavaScript, SQL, R, C, Matlab, Markdown, HTML,LaTeX
Technology/Frameworks	PyTorch, TensorFlow, OpenCV, CuPy, Selenium, GitHub, Git, Conda, CUDA
Languages	English (Advanced), Mandarin (Native), Spanish (Beginner)

Honors and Services

Teachers Ranked as Excellent by Students	University of Illinois, Urbana-Champaign	2023, 2024
Vice President	Statistical Doctoral Student Assosiation	2023 - 2024
UIUC Block Fellowship	University of Illinois, Urbana-Champaign	2023
Graduate with Distinction	Duke Kunshan University	2023
Undergraduate Travel Grant, NIPS 2022	Duke Kunshan University	2022
Student Experiential Learning Fellow	Duke Kunshan University	2021

Teaching

Grading Teaching Assistant (UIUC)	STAT 511 Mathematical Statistics	2025
Grading Teaching Assistant (UIUC)	STAT 426 Statistical Modeling II	2024, 2025
Lab/Discussion Teaching Assistant (UIUC)	STAT 107 Data Science Discovery	2023, 2024
Textbook Editor (DKU)	STAT 403 Deep Learning	2023

Professional Experience

Santoni Shoes Company, Shanghai 2020 - 2021

Predicted machine failures in shoe-making production line and conducted homogeneous tests on data distribution to detect anomalies

New Ruipeng Pet Company, Shanghai 2020 - 2021

Built statistical models for evaluating customer lifetime value and automating customer segregation using random forests and support vector machine