Majid Farhadloo (Permanent Resident)

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About Me

Dedicated professional with 5+ years of experience in **Machine Learning** & **Data Science** with a focus on scalable, end-to-end solutions. Proven expertise in designing and deploying ***spatially-informed deep learning*** models that enhance predictive accuracy and deliver measurable impact across diverse domains, including scientific computing and healthcare. Skilled in Python, SQL, state-of-the-art AI methods, and big data technologies for algorithm development, data pre-processing, modeling, and visualization.

Education

- **University of Minnesota, Twin Cities** — *Aug 2019 - June 2025*
  Doctor of Philosophy (Ph.D.) in Computer Science | *Spatial Computing Research Group* — Minneapolis, MN
  - Research area: Supervised and self-supervised spatially-informed deep representation learning
  - Thesis Committee: Prof. Shashi Shekhar, Prof. Vipin Kumar, Prof. Svetomir Markovic, and Prof. Yoga Varatharajah
- **University of Minnesota, Twin Cities** — *Aug 2019 - May 2022*
  Master of Science (M.S.) in Computer Science — Minneapolis, MN
  - Relevant Courses: AI/ML, Computer Vision, NLP, Deep Learning, Spatially-Enabled AI, Distributed Sys, Numerical Algorithms
- **California State University, Fresno** — *Aug 2017 - May 2019*
  Bachelor of Science (B.S.) in Computer Science — Fresno, CA

Work Experience

- **University of Minnesota, Twin Cities [🌐]** — *Jan 2021 - Present*
  Graduate Research Assistant — Minneapolis, MN

  Spatially-Informed Deep Learning for Biomedical Applications
  - **Tools:** PyTorch, OpenCV, Scikit-learn, Python, Git, Google Cloud, CUDA, Slurm, Parallel Programming
  - Designed spatially-informed self-supervised and ensemble models for domain adaptation, increasing classification accuracy by up to 30% across diverse spatial domains.
  - Led the development of a spatially explainable deep neural network, achieving a 17% accuracy gain and up to 10× speedup over state-of-the-art methods using transformer-based attention mechanisms.
  - Analyzed cutting-edge biomedical imaging data (spatial single-cell oncology datasets) to uncover novel location-dependent cellular interactions associated with tumor progression; findings were validated by collaborating oncologists.
  - Leveraged cloud computing and GPU resources to accelerate spatial modeling on large biomedical datasets.

  Physics-Guided Foundation Models
  - **Tools:** Hugging Face Transformers, GANs, VAEs, PyTorch, Retrieval-Augmented Generation (RAG)
  - Spearheaded the vision of physics-guided foundation models by embedding broad and domain-specific physical principles into generative AI models to enable outputs that are both physically consistent and generalizable to out-of-distribution scenarios.
  - Proposed novel training strategies incorporating physical constraints, including physics-based surrogate augmentation for pre-training, architecture-level inductive biases, and physics-informed regularization.
- **Granville Homes, LLC [🌐]** — *Jul 2018 - Jul 2019*
  Developer Intern — Fresno, CA
  - **Tools:** Python, SQL, ArcGIS, JavaScript, HTML, CSS, PHP
  - Developed customized python-based interactive map visualizations to improve spatial assessment for housing zones by 20%.
  - Integrated advanced custom fields into WordPress, reducing front-end workload by 40% and accelerating content updates.

Technical & Soft Skills

- **Programming Languages & Data Tools:**
  - Python, Java, C/C++, Shell/Bash, MATLAB, R, MySQL, BigQuery, Scikit-learn, OpenCV, Scipy, Git, Pandas, Matplotlib, Tableau
- **Deep Learning:**
  - PyTorch, Keras, HF Transformers, LangChain, TensorFlow
- **Big Data & Cloud Computing Tools:**
  - Apache Spark, Hadoop, HDFS, PySpark, Hive, Kafka, Google Cloud, Kubernetes, Databricks, MongoDB Atlas
- **MLOps:** MLflow, Weights & Biases, TensorBoard, Docker
- **Soft Skills:** Critical Thinker, Methodical and Organized Programmer, Self-Motivated, Interdisciplinary Researcher, Cross-Functional Collaborator, Strong Communicator, Active Learning, Problem-Solving
- **Fields of Interest:** Generative AI, Multi-modal AI, NLP, Computer Vision, AI in Healthcare, Bioinformatics, Computational Biology, Spatial Data Science, Explainable & Responsible AI, Data-Driven decision making.

Honors and Awards

- **MIDAS Future Leader Summit** *Apr 2024*
  University of Michigan
- **SDM Doctoral Forum** *May 2024*
  SIAM International Conference on Data Mining (SDM'24)
- **Student Travel Award** *Sep 2019, Aug 2022, Apr 2023*
  National Science Foundation
  - SIAM International Conference on Data Mining
  - ACM SIGKDD Conference on Knowledge Discovery and Data Mining
  - ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems
- **Dean Scholarship** *Aug 2018*
  College of Science and Mathematics, California State University – Fresno
- **International Ambassador Scholarship** *Jan 2018 & Aug 2018*
  International Office, California State University – Fresno
- **McDonald's HACER® National Scholarship** *June 2016*
  Ronald McDonald House Charities

Teaching Experience

- **University of Minnesota, Twin Cities [🌐]** *Aug 2019 - May 2021*
  Graduate Teaching Assistant Minneapolis, MN
- Managed lectures, students' queries, assignments, labs, and exams for classes over 40 students.
- Mentored graduate and undergraduate students on interdisciplinary projects.
- Guest lecture topics: Physical database design, Data Mining, Data Mining Trends.

Courses: CSCI 8715 Spatial Data Science Research (*Spring '22 & '24*); CSCI 4707 Practice of Database Systems (*Spring '21*); CSCI 5715 Spatial Data Science (*Fall '20*); CSCI 1913 Algorithms and Data Structures (*Spring '20*); CSCI 5708 Arch and Implementation of DBMS (*Spring '20*); CSCI 2011 Discrete Structure (*Fall '19*).

Service & Leadership

- **Session Chair,** SIAM International Conference on Data Mining Spring 2023
- **Program Committee/Reviewer,** ACM Transactions on Knowledge Discovery from Data, Data & Knowledge Eng, IEEE Transactions on Big Data, Geoinformatica, PKDD (2024, 2025), SIAM DM (2023), SIGSPATIAL (2020, 2021), SIGKDD (2021, 2022), SSTD (2021) Aug 2021 - Present
- **Spatial Computing Research Group Mentor** Spring 2022 - Present
  - Guided students in research fundamentals, leading to successful placements in graduate programs and industry roles.
  - Mentored high school students in research thinking, supporting advancement to science fairs and international levels.
- **International Ambassador (IA)** Aug 2018 - May 2019
  - Supported international students in cultural adjustment and transition to life at Fresno State.
  - Organized fun, informative monthly events for 50-150 international students facilitating community building.

Selected Publications

C=Conference, J=Journal, W= Workshop, B = Book Chapter

[C.1] Farhadloo et al (2025). **Spatially-Delineated Domain-Adapted AI Classification: An Application for Oncology Data**. *Society for Industrial and Applied Mathematics (SIAM) International Conference on Data Mining (SDM' 25)*, 2025.

[J.1] Farhadloo et al (2024). **Spatial Computing Opportunities in Biomedical Decision Support: The Atlas- EHR Vision.** *ACM Trans. Spatial Algorithms Syst. 10, 3, Article 21 (September 2024), 36 pages.*

[C.2] Farhadloo et al (2024). **Towards Spatially Lucid AI Classification in Non-Euclidean Space: An Application for MxIF Oncology Data**. *SIAM International Conference on Data Mining (SDM' 24)*, 2024.

[C.3] Farhadloo et al (2022). **SAMCNet: Towards a Spatially Explainable AI Approach for Classifying MxIF Oncology Data.** *The 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD '22), 2022.*

[W.1] Farhadloo et al (2024). **Vision: Physics-guided Foundation Models.** *In Proceeding of 2nd Knowledge-guided ML Bridging Scientific Knowledge and AI workshop at the 39th Annual AAAI Conference on Artificial Intelligence.*

[W.2] Li* and Farhadloo* et al (2022). **CSCD: Towards Spatially Resolving the Heterogeneous Landscape of MxIF Oncology Data.** *In Proceedings of the 10th ACM SIGSPATIAL International Workshop on Analytics for Big Geospatial Data (BigSpatial '22), 2022* ***(*equal contribution) (Best Paper Award).***

[C.4] Li, Y., Yang, M., Eagon, M., Farhadloo, M., Xie, Y., Northrop, W., and Shekhar. **Eco-PiNN: A Physics-informed Neural Network for Eco-toll Estimation.**, *SIAM International Conference on Data Mining (SDM' 23)*, 2023.

[J.2] Cecotti, H., Rivera, A., Farhadloo, M., and Villarreal, M. **Grape detection with Convolutional Neural Networks.** *Expert Systems with Applications., 113588.*, 2020.

[B.1] Golmohammadi, J., Xie, Y., Gupta, J., Farhadloo, M., Li, Y., Cai, Y., Detor, S., Roh, A., & Shekhar, S. **An Introduction to Spatial Data Mining (4th Quarter 2020 Edition).** *The Geographic Information Science & Technology Body of Knowledge.* 2020.