Majid Farhadloo

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Education

University of Minnesota **August 2019 – Expected May 2024**
Doctor of Philosophy, Computer Science *Minneapolis, Minnesota*

University of Minnesota **August 2019 – August 2022**
Master of Science, Computer Science *Minneapolis, Minnesota*

– Relevant Coursework: Machine Learning, Data Mining , Spatial Data Science, Computer Vision, Spatial-Enabled AI

California State University of Fresno **September 2017 – August 2019**
Bachelor of Science, Computer Science *Fresno, California*

Research Experience

Spatially-Explainable AI Approach for MxIF Oncology Data | *Spatial Computing Research Group* **January 2021 - Present**

- Proposed a dynamic point pair prioritization sub-network to learn the most discriminative features in N-way spatial relationships (e.g., tertiary, ternary, etc.).
- Outperformed the competition in separating responders from non-responders in MxIF Oncology data.
- A case study on the tumor-core cancer dataset (e.g., lymph node metastatic melanoma) demonstrated that spatial patterns revealed by the proposed SAMCNet are biologically interpretable by experts in the field.

Understanding COVID-19 Effects on Mobility | *Spatial Computing Research Group* **March 2020 - September 2020**

- Investigated the impact of COVID-19 on travel distance, the number of visitors to points of interest, and time spent at home, along with discovering hangout hotspots and monitoring policy intervention compliance.
- Collaborated on designing an Entity Relationship diagram, system architecture, and implementation to support queries on long-duration visits in addition to fine resolution device count maps to understand spatial bias.
- Collaborated on the design of a community-engaged decision support platform based on a collaboration with end-users and policymakers and evaluated the system by providing custom summary reports and time-series visualizations.

Machine Vision for Object Detection in Vineyard | *Undergraduate Research (Fresno State)* **January 2019 - June 2019**

- Improve crop production monitoring and optimization by tackling the difficult challenges of image segmentation in viticulture.
- Investigated the impact of the input feature space (e.g., color images, histograms of the colors) using Transfer Learning.
- Evaluated the performance of pre-trained deep learning architectures, i.e. using a transfer learning approach for the segmentation.
- The creation of a labeled database of grape images available to other researchers to validate pattern recognition and machine learning algorithms

Professional Experience

Spatial Computing Research Group **Jan 2021 – Present**
Research Assistant *Minneapolis, Minnesota*

- Developing a thesis in the field of spatial data mining for classifying recently available cellular maps derived from novel multiplex immunofluorescence (MxIF) imagery of biopsies for designing immune checkpoint inhibitor cancer therapies.
- Mentored a high school student to comprehend research fundamentals who advanced to compete in State Science Fair, Junior Science & Humanities Symposium (JSHS), and International Science and Engineering Fair.

Department of Computer Science **August 2019 – May 2021**
Teaching Assistant *Minneapolis, Minnesota*

– Courses: Practice of database systems, Spatial data science, Architecture and impl. of DBMS, and Discrete structure

  * Designed homework, labs, and examinations for class over 60 students.
  * Held office hours and answered question via effective remote and in-person sessions with 4.5 student satisfaction.
  * Experienced in holding weekly discussion class and taught lecture sessions.

Granville Homes, LLC **May 2018 – June 2019**
Developer Intern *Fresno, California*

- Assisted in development of portfolios for business partners with the focus on integrating advanced custom fields (ACF) into WordPress content management to reduce the necessity of front-end developers to maintain and update web pages regularly.
- Developed custom maps visualization to render statistical quantification of tracts and fields designated for housing construction and related tasks using ArcGIS tools.

Technical Skills

Languages: Python, Java, SQL, Matlab, HTML/CSS, JavaScript
Machine Learning framework: Pytorch, Matlab Deep Learning Tools, Google Colab
Misc: GitHub, WordPress

Publication

1. Li, Y., *, **Farhadloo, M.,***, Krishnan. S., Xie, Y., Frankel, T.L., Shekhar, S., and Rao, A. 2022. Contrasting Spatial Co-location Discovery: A Case Study for Analyzing MxIF Oncology Imagery. In Proceedings of the (BigSpatial '22): 10th ACM SIGSPATIAL International Workshop on Analytics for Big Geospatial Data (Accepted). (***equal contribution**) **(Best Paper Award)**

2. **Farhadloo, M.**, Molnar, C., Luo, G., Li, Y., Shekhar, S., Maus L. R., Markovic, S., Moore, R., and Leontovich A. SAMCNet: Towards a Spatially Explainable AI Approach for Classifying MxIF Oncology Data. In Proceedings of KDD '2022: The 28th ACM SIGKDD International Conference on Knowledge Discovery Data Mining (SIGKDD 2022).

3. Sharma, A., **Farhadloo, M.**, Li, Y., Kulkarni., A., Gupta., Y., and Shekhar S. Understanding COVID-19 Effects on Mobility: A Community-Engaged Approach. AGILE GIScience 2022.

4. Xie, Y. , **Farhadloo, M.** Guo, N., Shekhar, S., Watkins, E., Kne, L., Bao, H., Patton, A., and Morris, K. A Relational Database for the National Turfgrass Evaluation Program. International Turfgrass Society Research Journal 14.1 (2022): 316-332.

5. Li, Y., **Farhadloo, M.**, Krishnan, S., Frankel, T. L., Shekhar, S., and Rao, A. SRNet: A spatial-relationship aware point-set classification method for multiplexed pathology images. In Proceedings of the (DeepSpatial '21): 2nd ACM SIGKDD Workshop on Deep Learning for Spatiotemporal Data, Applications, and Systems. Vol. 10. 2021.

6. Golmohammadi, J., Xie, Y., Gupta, J., **Farhadloo, M.**, Li, Y., Cai, Y., Detor, S., Roh, A., & Shekhar, S. An Introduction to Spatial Data Mining. The Geographic Information Science & Technology Body of Knowledge. 2020

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

Services to Community

Reviewer | *Spatial Computing Research Group* **August 2019 - Present**

- Journal of Data & Knowledge Engineering
- Journal of IEEE Transactions on Big Data
- International Symposium on Spatial and Temporal Databases, 2021.
- ACM SIGKDD International Conference on Knowledge Discovery & Data Mining, 2020.
- International Conference on Advances in Geographic Information Systems, 2020.
- Fragile Earth: Data Science for a Sustainable Planet, 2020.

Leadership / Volunteership

International Ambassador (IA) | *International Office, Fresno State* **August 2018 - May 2019**

- Assisted in facilitating the adjustment of new international students to the U.S. culture and life at Fresno State.
- Organized monthly fun and informative events for international students with over 50-150 students at each event.

Chevron STEM Zone Instructor | *Chevron, Fresno* **October 2018**

- Assisted in organizing an interactive space for students, teachers, and parents to learn how science, technology, engineering, and mathematics (STEM) relate to sports and everyday life.

Invited Talks/Presentations

Farhadloo, M., SAMCNet: Towards a Spatially Explainable AI Approach for Classifying MxIF Oncology Data
In Proceedings of KDD '2022: The 28th ACM SIGKDD (SIGKDD 2022) (Oral) **August 2022**

Farhadloo, M., Spatial Big Data and Geo-AI in Cancer Immunotherapy Research
CSCi 8715, Spatial Data Science Research, University of Minnesota **April 2022**

Awards and Scholarships

ACM SIGSPATIAL | *NSF Student Travel Grant* **November 2019**

Dean Scholarship | *College of Science and Mathematics, Fresno State* **August 2018**

International Ambassador Scholarship | *International Office, Fresno State* **August 2018 & January 2018**

Ronald McDonald House Charities | *McDonald* **June 2016**