Shahrzad Gholami

Senior Applied Research Scientist at Microsoft (AI for Good Lab)
https://www.microsoft.com/en-us/research/people/sgholami

Education

- **PhD, Computer Science**
  University of Southern California, Los Angeles — *2014 – 2019*
- **M.Sc., Computer Science**
  University of Southern California, Los Angeles — *2015 - 2017*
- **M.Sc., Mechanical Engineering**
  Sharif University of Technology, Tehran — *2011 - 2013*
- **B.Sc., Mechanical Engineering**
  Sharif University of Technology, Tehran — *2007 - 2011*

Work Experience

- **Microsoft** — Redmond, Washington
  Senior Applied Research Scientist — *June 2019 - Present*
  - Developed self-supervised learning models on medical images to obtain image representations and improve downstream classification tasks for macular telangiectasiapatients.
  - Developed self-supervised learning ensemble model based on AdaBoost algorithm for medical images to improve classification results for macular telangiectasiapatients.
  - Implemented convolutional Siamese neural networks for multi-task learning for building segmentation and classification based on satellite imagery data in PyTorch to assess damage after natural disasters.
  - Developed multi-class text classification neural network based on BERT encoders to classify households survey responses in low-resource communities.
  - Developed time series classification neural networks to predict household food insecurity risk in the face of shocks in low-resource areas.
  - Collaborated with hematologists to propose time series clustering solutions for quality-of-life trajectories identification for patients with acute myeloid leukemia.
  - Developed classification models for sepsis post-discharge mortality risk prediction in children considering explainability and parsimony based on explainable boosting machines.
  - Co-mentored a research intern to develop hybrid CNN + RNN predictive model for bird species classification based on spectrogram representation of audio signals.
  - Developed wildfire spatio-temporal risk forecasting models based on XGBoost, random forest and regression methods using historical climate, geospatial and wildfire data.
- **Glidewell Dental Inc.** — Newport Beach, CA
  Machine Learning Engineer — *Apr. 2019 - May 2019*
  - Developed Markov Decision models to predict customer lifetime value to conduct informed marketing campaigns.
- **Vulcan** — Seattle, WA
  Machine Learning Engineer Intern — *May 2019 - Aug. 2019*
  - Worked towards productionization of an machine learning pipeline for prediction of wildlife poaching activities, via web APIs for scale-up across large number of sites.
- **University of Southern California** — Los Angels, CA
  Research Assistant in USC Center for AI in Society — *Aug. 2014 - Apr. 2019*

- Developed novel ML and decision-making algorithms for efficient and accurate prediction of wildlife poaching activities in conservation areas via historical real-world data in multiple national parks in Africa.
- Conducted large-scale field tests to evaluate ML models in real-world and beyond the laboratory ML pipeline planned to be scaled to 600 sites around the world in near future for real-world impact.

Selected Publications

- *Interpretable Ensemble-based Deep Learning Approach for Automated Detection of Macular Telangiectasia Type 2 by Optical Coherence Tomography*, submitted paper to ICML 2023 workshop on interpretable machine learning in healthcare
- *Leveraging Self-supervised Learning to Boost Automated Detection of Macular Telangiectasia Type 2 by Optical Coherence Tomography*, working paper for submission to JAMA Ophthalmology
- *Modelling Protective Anti-meningococcal Responses and Factors Influencing Antibody Persistence following Vaccination with MenAfriVac: A Machine Learning Approach*, working paper for submission to Lancet medical journal
- *Pediatric Sepsis Post-discharge Mortality Risk Prediction considering Explainability and Parsimony*, working paper for submission to PLOS ONE journal
- **S. Gholami**, C. Robinson, A. Ortiz, S. Yang, J. Margutti, C. Birge, R. Dodhia, J.L. Ferres, *On the Deployment of Post-Disaster Building Damage Assessment Tools using Satellite Imagery: A Deep Learning Approach*, 17th International Workshop on Spatial and Spatiotemporal Data Mining at IEEE ICDM, Nov. 2022
- J. Gauthier, B. Furtuna, J. Mangiavacchi, **S. Gholami**, R. Dodhia, J.L. Ferres, M.L. Sorror, *Novel Data Analytics Identify Predictors of Quality-of-Life Trajectories in Patients Treated for Acute Myeloid Leukemia*, 64th American Society of Hematology Annual Meeting and Exposition, Dec. 2022
- **S. Gholami**, E. Knippenberg, J. Campbell, D. Andriantsimba, A. Kamle , P. Parthasarathy, R. Sankar, C. Birge, J.L. Ferres, *Food Security Analysis and Forecasting: A Machine Learning Case Study in Southern Malawi*, Journal of Data and Policy, Oct. 2022
- G. Gupta, M. Kshirsagar, M. Zhong, **S. Gholami**, J.L. Ferres, *Comparing recurrent convolutional neural networks for large scale bird species classification*, Scientific Reports, Aug. 2021
- M. Kshirsagar, S. Yang, C. Robinson, **S. Gholami**, I. Klyuzhin, S. Mukherjee, M. Nasir, A. Ortiz, F. Oviedo, D. Tanner, A. Trivedi, Y. Xu, M. Zhong, B. Dilkina, R. Dodhia, J.L. Ferres, *Becoming Good at AI for Good*, AAAI/ACM Conference on AI, Ethics, and Society (AIES'21), Apr. 2021
- **S. Gholami**, N. Kodandapani, J. Wang, J.L. Ferres, *Where there's Smoke, there's Fire: Wildfire Risk Predictive Modeling via Historical Climate Data*, Annual Conference on Innovative Applications of Artificial Intelligence (IAAI'21), Feb. 2021
- L. Xu, **S. Gholami**, S. McCarthy, B. Dilkina, A. Plumptre, M. Tambe, R. Singh, M. Nsubuga, J. Mabonga, M. Driciru, Fred Wanyama, A. Rwetsiba, T. Okello, E. Enyel, *Stay Ahead of Poachers: Illegal Wildlife Poaching Prediction and Patrol Planning Under Uncertainty with Field Test Evaluations*, IEEE 36th International Conference on Data Engineering (ICDE'20), Apr. 2020
- **S. Gholami**, A. Yadav, L. Tran-Thanh, B. Dilkina, M. Tambe, *Don't Put All Your Strategies in One Basket: Playing Green Security Games with Imperfect Prior Knowledge*, International Conference on Autonomous Agents and Multiagent Systems (AAMAS'19), May 2019

- **S. Gholami**, S. Mc Carthy, B. Dilkina, A. Plumptre, M. Tambe, M. Driciru, F. Wanyama, A. Rwetsiba, M. Nsubaga, J. Mabonga, T. Okello, E. Enyel, *Adversary Models Account for Imperfect Crime Data: Forecasting and Planning against Real-world Poachers*, International Conference on Autonomous Agents and Multiagent Systems (AAMAS'18), Jul. 2018
- **S. Gholami**, B. Ford, F. Fang, A. Plumptre, M. Tambe, M. Driciru, F. Wanyama, A. Rwetsiba, M. Nsubaga, J. Mabonga, *Taking It for a Test Drive: A Hybrid Spatio-Temporal Model for Wildlife Poaching Prediction Evaluated Through a Controlled Field Test*, Joint European Conference on Machine Learning and Knowledge Discovery in Databases (ECML PKDD'17), Dec. 2017
- D. Kar, B. Ford, **S. Gholami**, F. Fang, A. Plumptre, M. Tambe, M. Driciru, F. Wanyama, A. Rwetsiba, *Cloudy with a Chance of Poaching: Adversary Behavior Modeling and Forecasting with Real-World Poaching Data*, International Conference on Autonomous Agents and Multiagent Systems (AAMAS'17), May 2017

Skills

Languages and Frameworks: Python, Java, C++, R, SQL, PyTorch, TensorFlow

Machine Learning and Deep Learning Techniques: Experience with different types of data including structured and unstructured and relevant methods.

- Supervised Learning Methods: Image segmentation, regression, binary and multi-class classification
- Self-supervised and unsupervised learning, clustering methods
- Explainability techniques e.g., generalized additive models like explainable boosting machines, SHAP, LIME and TabNet
- Time Series modeling and analysis including forecasting, nowcasting and trajectory identification methods

Media Coverage

How eavesdropping on elephants is keeping them safe (BBC)	2019
How AI can stop wildlife poaching (Forbes)	2018
This AI Hunts Poachers (IEEE Spectrum)	2018
Using AI for societal and environmental good at USC CAIS center (Fox News)	2017
A combination of machine learning and game theory is being used to fight elephant poaching in Uganda (Quartz)	2016
Putting Artificial Intelligence On The Hunt For Poachers (Fast Company)	2016
AI springs into action in surprising places (Elsevier)	2016
Outwitting poachers with artificial intelligence (NSF.gov)	2016
Rangers Use Artificial Intelligence to Fight Poachers (National Geographic)	2016
More than boots and bullets: This app could help turn the tide on poaching (LAtimes)	2016
Artificial intelligence to help curb poaching: Study (Firstpost)	2016
Artificial Intelligence for Animal Lovers (Intel)	2016
Outwitting poachers with artificial intelligence (NSF Article)	2016