Sara Jalili Shani

sjalilis@ualberta.ca | GitHub | LinkedIn | Toronto, Canada
Authorized to work in Canada (valid work permit) | Available to relocate immediately

Summary

Applied AI researcher with an M.Sc. in Computer Science and experience in large language models, multimodal AI, optimization, algorithmic game theory, and simulation. Develops methods for query understanding, concept construction, and inference-time tool selection for vision-language models. Experienced in translating open-ended research problems into Python-based models, experimental frameworks, and quantitative evaluations using real-world data.

Technical Skills

ML Frameworks: PyTorch, Hugging Face Transformers
AI/ML: Large Language Models (LLMs), Vision-Language Models (VLMs), Multimodal AI, Computer Vision, Tool-Augmented LLMs
Optimization/Modeling: CVXPY, CPLEX, linear programming, convex optimization, game theory, auction modeling, market design
Inference & Development Tools: llama.cpp, TensorRT-LLM, vLLM, CUDA

Research Experience

Machine Learning Engineer | Algonet | Tehran, Iran (Remote) | June 2026–Present

inference-time tool-selection algorithm for Vision-Language Models

Python, PyTorch, Hugging Face Transformers, Vision-Language Models, Multimodal Reasoning, Tool Selection

- Developed an inference-time algorithm for selecting appropriate computer vision tools based on user queries for tasks involving spatial reasoning, semantic correspondence, and object localization.
- Evaluated and benchmarked state-of-the-art vision-language models, including Qwen 3, Gemma 4, and InternVL2.5, on multimodal reasoning benchmarks such as MMBench, SEEDBench, and BLINK.
- Surveyed recent literature on tool-augmented language models to inform algorithm design and experimental methodology.

Graduate Research Assistant | University of Alberta | Spring 2024–2026

Counterfactual Analysis of Canada's 3800 MHz Spectrum Auction

Python, Optimization, Auction Simulation, Policy Modeling

- Built a simulation framework for Canada's 2023 3800 MHz auction, covering 20 bidders, 4,099 licenses, 98 rounds, and $2.16B CAD in revenue.
- Estimated bidder valuations from round-by-round bids using linear programming with revealed-preference, nonnegative-utility, and diminishing-return constraints.
- Reproduced final allocations with high fidelity and predicted auction revenue within a 6–10% margin of the real outcome.
- Simulated deployment-based auction rules showing potential broadband expansion to 3.3M+ additional Canadians.
- Resulted in a paper accepted to the ACM Conference on Economics and Computation (EC 2026).

Research Assistant | Amirkabir University of Technology | Summer 2022–Summer 2023

GERIS: Game-Theoretic Filtering of Label Noise in Data Augmentation

Machine Learning, Game Theory, Data Filtering, Computer Vision

- Designed a game-theoretic filtering method for noisy synthetic license plate images generated during data augmentation.
- Classified 2,000–50,000 synthetic noise vectors using Mahalanobis-distance neighborhoods and replicator dynamics.
- Benchmarked against KNN, Naive Bayes, SVM, Random Forest, Isolation Forest, KMeans, SE Network, and Transformer baselines.
- Improved recognition accuracy by 10.05% for digits and 26.78% for alphabets over the real-data baseline, reaching 97.28% final accuracy.
- Resulted in a paper accepted in AUT Journal of Mathematics and Computing.

Education

M.Sc. in Computer Science (GPA: 3.85/4.0) — *University of Alberta, Edmonton, Canada*, 2023–2026
B.Sc. in Computer Science (GPA: 18.28/20) — *Amirkabir University of Technology, Tehran, Iran*, 2018–2023

Publications

- **Jalili Shani, S.**, Joseph, K., McNally, M. B., & Wright, J. R. (2026). *Beyond Revenue and Welfare: Counterfactual Analysis of Spectrum Auctions with Application to Canada's 3800MHz Allocation.* Proceedings of the ACM Conference on Economics and Computation (EC 2026).
- **Jalili Shani, S.**, Ahmadian, R., Rahmani, A., Bideh, M., & Ghatee, M. (2026). *GERIS: A game-theoretic framework for filtering instance-dependent label noise in license plate data augmentation.* Accepted to AUT Journal of Mathematics and Computing.

Awards

Alberta Graduate Excellence Scholarship (AGES), 2025.
Gold Medal, International Conference of Young Scientists, 2018.