Sina Malakouti

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Education

University of Pittsburgh — Expected: 2026
PhD in Computer Science — Pittsburgh, PA

- Committee: **Adriana Kovashka (Advisor)**, Boqing Gong, Xiange Lorraine Li, Milos Hauskrecht

Amirkabir University of Technology — 2015 – 2020
B.Sc. in Software Engineering — Tehran, Iran

Recent Experiences

University of Pittsburgh | Graduate Research Assistant — 2022 - Present | Pittsburgh
Vision-Language Foundational Models, Gen AI, Compositional Generalization, Robustness — Advisor: Adriana Kovashka

- Designed benchmarks to uncover biases and limitations in foundation models (understanding and generative) where scaling training data is ineffective.
- Achieved 10% higher human-preference agreement in cross-cultural generation using MLLM-as-a-Judge metrics capturing cultural alignment, hallucination, and exaggeration.
- Improved text-to-image models 5x on rare-relation generation via distillation-based finetuning & synthetic data.
- Fine-tuned Diffusion models via Direct Preference Optimization (DPO) for rare image generation.
- Curated creative ads benchmark proposing 3 novel atypical understanding tasks.
- Revealed MLLMs' visual reasoning limitations, showing 50% drop through semantically hard negatives.
- Developed parameter-efficient methods improving Vision-Lanugage Models generalization against domain shift.
- Improved multimodal LLM visual reasoning on ads by 40% through chain-of-thought prompting.
- Improved robustness in object detection by 12% via descriptive contrastive-based student-teacher method.

Amazon, Prime Video | Applied Scientist Intern — Summer 2024 | New York City
Vision-Language Models, S3, Sagemaker — Mentors: Daniel Peterson, Qipin Chen, Zongyi Liu

- Constructed positive & negative pairs for effective training and evaluation.
- Improved duplicate detection by 10% via novel CLIP and BERT feature fusion via contrastive training.

eBay, Search Science | Applied Research Intern — Summer 2023 | San Jose
Vision-Language Models, Transformers, Imbalanced Data, Hadoop, Spark — Mentors: Mustafa Devrim, Atiq Islam

- Improved sale prediction by 4% via a novel mixture-of-modality expert model; curated effective datasets.

Apple | Computer Vision Intern — Summer 2022 | Cupertino
Imaging Algorithms, Computational Photography, PyTorch, Matlab — Mentors: David Pope, Maxim Smirnov

- Designed a 20× more efficient convolutional network for low-level vision tasks, outperforming in-house methods.

Johannes Gutenberg University | Machine Learning Intern — 2018 - 2019 | Mainz, Germany
Symbolic Netowrks, Hoeffding Trees, Naive Bayes — Mentors: Zahra Ahmadi, Stefen Kramer

- Designed an efficient symbolic deep network using differentiable decision trees, effective on imbalanced data.

Selected Peer-Reviewed Publications

· **Sina.M**, Boqing.G, Adriana.K. Culture in Action: Evaluating Text-to-Image Models through Social Activities. Under Review at **ICLR 2026**

· **Sina.M**, Adriana.K. Role Bias in Text-to-Image Diffusion Models: Diagnosing and Mitigating Compositional Failures through Intermediate Decomposition. **NeurIPS 2025** & ICCVW (Oral)

· **Sina.M***, Aysan.A*, Ashimt.K, Adriana.K. Benchmarking VLMs' Reasoning About Persuasive Atypical Images. **WACV 2025**

· Kyle.B, **Sina.M** *(major contributor)*, Xiang.L.L, Adriana.K. Incorporating Geo-Diverse Knowledge into Prompting for Increased Geographical Robustness in Object Recognition. **CVPR 2024**

- **Sina.M**, Adriana.K. Semi-Supervised Domain Generalization for Object Detection via Language-Guided Feature Alignment. **BMVC 2023**
- **Sina.M***, Zahra.A*, Stefan.K. DeepTreeNetworks: A New Symbolic Deep Architecture. DeCoDeML Workshop, **ECML PKDD 2019**

Technical Skills

Programming Languages	Python, Java, MATLAB, SQL, C, R, JavaScript, HTML/CSS
ML Tools	PyTorch, TensorFlow, Keras, Scikit-learn, DL4j, Weka, Numpy, Pandas
AI & CV Methods	CNNs, RNNs, Transformers & Attention Mechanism, Vision-Language Models (VLMS), Large Language Models (LLMs), Multimodal LLMs (MLLMs), Text-to-Image (T2I) Generative Models, Diffusion Models, Contrastive Learning, Semi-Supervised, Domain Adaptation/Generalization (e.g., Pseudo Labeling, Student-Teacher, Consistency Regularization)
Big Data & Databases	Hadoop, Spark, S3, MySQL, MongoDB, SQLite
Other	Data Engineering, Object-Oriented Design, MVC, Problem-Solving

Other Related Projects

Improving Cultural Faithfulness in Text-to-Image Generation Ongoing
Verifiable Rewards, Concept Unlearning, Task Vectors, Post Training Methods

- Aligning diffusion models to the target culture through verifiable rewards and post-training methods.
- Exploring task-vector and unlearning techniques to encode cultures in the model latent space.

Generation and Evaluation Cross-Cultural Creative ads Ongoing
Post-Training, Multimodal-LLM as a Judge, Text-to-Image Generation, Image Editing, Agentic AI

- Developing cultural theory-based metrics via MLLM as a judge to evaluate cultural relevance across cultures.
- Developing an agentic compositional framework to maximize controllability and creativity.

Weakly Supervised Object Detectors (WSOD) Robustness Toward Domain Shift
Python, PyTorch, Weakly-Supervised Object Detection (WSOD), Domain Robustness

- Revealed WSOD models' higher reliance on domain-specific features compared to fully supervised approaches.
- Developed consistency regularization method with style transfer, improving unseen domain detection by 2%

Multimodal Transformer Fusion For Depression Prediction

- Improved depression prediction by 13% via multimodal transformer-based fusion of video, audio, language.

MuST for Semi-Supervised Medical Image Segmentation
Semi-Supervised Learning, Data Augmentation, Consistency Regularization, Student-Teacher Framework

- Developed student-teacher method with feature space augmentation to learn from unlabeled fMRI images.
- Achieved SOTA on semi-supervised brain lesion segmentation using only 3% labeled data.

Professional Services

Conference Reviewer: CVPR, ICCV, ECCV, NeurIPS, ICLR, AAAI, EMNLP, WACV
Co-Organizer: Demographic Diversity in Computer Vision Workshop, CVPR 2025

Honors & Awards

- **Scholar Award**, Neural Information Processing Systems (NeurIPS), 2025
- **Doctoral Consortium**, Winter Conference on Applications of Computer Vision (WACV), 2025
- **Outstanding Reviewer Award**, European Conference on Computer Vision (ECCV), 2024
- **Travel Award**, Department of Computer Science, University of Pittsburgh, 2023
- **Full SCI Fellowship**, University of Pittsburgh, 2020
- **Honored as an outstanding student**, Amirkabir University of Technology, 2015-2020

Extra Curricular & Leadership

President of Student Scientific Chapter Jan 2017 - March 2018
Computer Engineering, Amirkabir University of Technology Tehran, Iran

- Organized 70+ national and international contests, seminars, and workshops.