Sina Malakouti

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Legal status in the US: Permanent Resident (Green Card holder)

Education

University of Pittsburgh Expected: Jan 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 Models, Multimodal LLMs, Text-to-Image Generation, Compositional Generalization, Domain Robustness, Labeled Efficient Methods Advisor: Adriana Kovashka

· Uncovered critical biases and generalization failures in foundational models by designing new benchmarks, especially where scaling training data is ineffective.

· Improved cross-cultural understanding in vision-language and text-to-image models through efficient adapter methods and soft prompting.

· Achieved 15.2-point bias reduction and >70% human preference in action-based relation generation through synthetic data generation and knowledge distillation-based fine-tuning.

· Curated benchmark for creative ads with unusual objects and improved multimodal LLM visual reasoning and ads understanding by 40% through chain-of-thought prompting.

· Improved object detection robustness by 12% through contrastive learning without additional labeled data

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

· Led research on multimodal content understanding & duplicate detection, building an end-to-end pipeline from data acquisition, cleaning, and modeling.

· Achieved 10% improvement via new CLIP and BERT data fusion and chain-of-thought multimodal prompting.

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

· Improved search ranking by 4% via new mixture-of-modality expert model.

· Curated effective training/validation datasets addressing heavily imbalanced data challenges.

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

· Developed neural networks 10×–30× smaller than academic baselines for low-level vision tasks, achieving similar performance and significantly 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

· **S. Malakouti**, A. Kovashka. Role Bias in Text-to-Image Diffusion Models: Diagnosing and Mitigating Compositional Failures through Intermediate Decomposition. Under Review at **NeurIPS**

· **S. Malakouti***, A. Aghazadeh*, A. Khandelwal, A. Kovashka. Benchmarking VLMs' Reasoning About Persuasive Atypical Images. **WACV 2025**

· K. Buettner, **S. Malakouti** *(major contributor)* , X.L. Li, A. Kovashka. Incorporating Geo-Diverse Knowledge into Prompting for Increased Geographical Robustness in Object Recognition. **CVPR 2024**

· **S. Malakouti**, A. Kovashka. Semi-Supervised Domain Generalization for Object Detection via Language-Guided Feature Alignment. **BMVC 2023**

· **S. Malakouti***, Z. Ahmadi*, S. Kramer. 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

- **Compositional Generalization of Text-to-Image Generative Models** Ongoing
  Text-to-Image Models, Compositional Generalization, Curriculum Learning
  - Benchmarking text-to-image models on compositional generalization to test extrapolation from simpler to more complex prompts
  - Building a curriculum-based training method to improve T2I model generalizability.
- **Cross-Cultural Creative ads Generation** Ongoing
  Multimodal-LLM as a Judge, T2I models, Image Editing, Learning with Human Feedback (DPO)
  - Developing cross-cultural theory-based metrics to evaluate cultural relevance across diverse regions.
  - Building reward models and feedback-based editing to generate more effective ads for cultures around the world.
- **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**
  - Achieved 13% improvement in depression severity prediction through multimodal transformer-based fusion of video, audio, and language.
- **MuST for Semi-Supervised Medical Image Segmentation**
  Semi-Supervised Learning, Data Augmentation, Consistency Regularization, Student-Teacher Framework
  - Developed student-teacher method with multi-scale feature-space consistency, enabling fine-grained boundary detection.
  - Achieved SOTA on semi-supervised brain lesion segmentation using only 3% labeled data.

Professional Services

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

Honors & Awards

- **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, talks, and workshops in collaboration with Technische Universität München, Germany, and KTH Royal Institute of Technology, Sweden.