Omid Reza Heidari

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RESEARCH INTERESTS

Multimodal AI | Large Language Models | Reinforcement Learning | Computer Vision | Optimization

EDUCATION

Concordia University, *Montreal, CA* 2023 - 2025
Master of Science in Computer Science GPA: 3.5/4.00
Advisers: Yang Wang and Xinxin Zu
Research project: Domain Shifts in Object Detection in X-ray Images

Islamic Azad University, *Zanjan, IR* 2017 - 2022
Bachelor of Engineering in Computer Engineering GPA: 3.47/4.00

WORK EXPERIENCE

Vita Detection *Montreal, CA*
Machine Learning Intern Apr 2025 - Present

- Developed and implemented domain adaptation techniques for object detection in security X-ray images, applying the Align and Distill (ALDI) method to enhance model robustness.
- Designed and optimized deep learning models using PyTorch and PyTorch Lightning on Amazon Web Services (AWS) and Compute Canada for large-scale experiments.
- Analyzed and benchmarked multiple approaches for cross-domain object detection, improving model generalization under domain shifts.

The University of British Columbia *Vancouver, CA*
Machine Learning Intern Nov 2024 - Feb 2025

- Implemented the state-of-the-art models in PyTorch and PyTorch Lightning, such as OmniMotion, Real NVP, "Betrayed by Attention", and Neural Radiance Fields (NeRF) on Google Cloud Platform (GCP) and Compute Canada.
- Reviewed and discussed approximately 5-7 research papers per week, analyzing various approaches to improve the performance and accuracy of previous methodologies.
- Enhanced model accuracy for detecting occluded objects by around 7%.

Zanjan University of Medical Science *Zanjan, IR*
Data Research Analyst Jul 2022 - Jan 2023

- Conducted research on Machine Learning and Electroencephalogram signals.
- Utilized Welch, Convolution, and Fourier transform to compute connectivity, power, and amplitude.
- Applied low-data techniques, such as data augmentation and transfer learning, to prevent underfitting and improve model performance on limited datasets.

ACADEMIC EXPERIENCE

Concordia University *Montreal, CA*
Teaching Assistant Jan 2024 - Present

- COMP 6771 - Image Processing (Yiming Xiao)
- COMP 6321 - Machine Learning (Yang Wang and Ali Ayub)
- COMP 248 - Object-Oriented Programming I (Nora Houari)
- COEN 352 - Data Structures and Algorithms (Aiman Hanna)
- COMP 353 - Databases (Nematollaah Shiri and Khaled Jababo)
- COMP 352 - Data Structures and Algorithms (Bahareh Goodarzi)
- COEN 243 - Programming Methodology I (Xinxin Zu and Honghao Fu)
- COMP 6961 - Graduate Seminar in Computer Science (Juergen Rilling)

Sharif University of Technology *Tehran, IR*
Teaching Assistant Sep 2022 - Feb 2023

- CE 717 - Machine Learning (Ali Sharifi-Zarchi and Behrooz Azarkhalili)

Zanjan University *Zanjan, IR*
Teaching Assistant Sep 2021 - Jun 2022

- Digital Logic Design (Ali Azarpeyvand)
- Computer Architecture (Ali Azarpeyvand)
- Principles of Database Design (Davud Mohammadpur)

SKILLS

- **Programming Languages**: Python, MATLAB, C++
- **Frameworks**: PyTorch, PyTorch Lightning, Scikit-learn, PySpark, OpenCV
- **Databases**: MySQL, PostgreSQL, Redis, MongoDB
- **Services**: AWS, GCP, RabbitMQ
- **Languages**: English (fluent), French (fluent), Persian (fluent)

PROFESSIONAL SERVICE

Reviewer Sep 2025
NeurIPS 2025 - Efficient Reasoning workshop.

Ethics Reviewer Jul 2025
NeurIPS 2025

PUBLICATIONS

2025

- **Heidari, O. R.**, Wang, Y., Zuo, X. ALDI-ray: Adapting the ALDI Framework for Security X-ray Object Detection. *Submitted to ICASSP 2026 Conference*
- **Heidari, O. R.**, Reid, S. , Yaakoubi, Y. AgentiQL: An Agent-Inspired Multi-Expert Architecture for Text-to-SQL Generation. *Submitted to NeurIPS 2025 Workshop*
- Yousefi, F., Dadashi, M., **Heidari, O. R.** Efficacy of left prefrontal-temporoparietal tDCS on symptom reduction and cognitive improvement in schizophrenia: A randomized, sham, controlled, parallel-group study. *Brain Stimulation Journal*

2024

- Wasi, A. T., **Heidari, O. R.***, Anam, N.*, Hasan Rafi, T. A Review of Human-Centric Evaluation of Cultural Bias in Indic Languages within LLMs: Rethinking Research Directions.
- **Heidari, O. R.***, Gu, L.*, Li, J. N.*, Wang, Y. Retrieval Augmented Generation for Natural Language Query in Egocentric Videos. 🥇 *Selected as the Best Poster at Mila - Quebec AI Institute*

2023

- Zakerian Zadeh, A., Dadashi, M., **Heidari, O. R.** Assessment of Structural Connectivity and Brain Volumes after tDCS in Stroke: A Machine Learning Method. *Authorea (Preprint)*