Ahmad Sajedi

PH.D · COMPUTER VISOIN SCIENTIST AND ENGINEER

sajedi.ah@gmail.com | ahmadsajedii.github.io | github.com/AhmadSajedii

Education

University of Toronto — *Toronto, CA*

PH.D. IN ENGINEERING SCIENCE – ELECTRICAL AND COMPUTER STREAM — *Sep 2020 - Aug 2024*

- **Thesis:** "On the Effect of Data on Image Classification Tasks"
- **Supervisors:** Prof. Konstantinos N. Plataniotis & Prof. Yuri A. Lawryshyn
- Thesis Award Candidacy

University of Waterloo — *Waterloo, CA*

M.SC. IN ENGINEERING SCIENCE – ELECTRICAL AND COMPUTER STREAM — *Sep 2018 - Aug 2020*

- **Thesis:** "Coding for Data Analytics: New Information Distances"
- **Supervisor:** Prof. En-hui Yang
- Outstanding Graduates with Honor

Amirkabir University of Technology — *Tehran, IR*

B.SC. IN ENGINEERING SCIENCE – ELECTRICAL AND COMPUTER STREAM — *Sep 2014 - Aug 2018*

- **Thesis:** "Time and Frequency Synchronization for OFDM Signal with Software Defined Radio"
- **Supervisor:** Prof. Mohammad Javad Emadi
- Outstanding Graduates with Honor

Professional Experience

Royal Bank of Canada (RBC) — *Toronto, CA*

PH.D. STUDENT RESEARCHER — *Jan 2022 - Aug 2024*

- Designed data-centric efficient learning pipelines using a custom feature proxy loss to minimize training costs
- Successfully published three papers at **ICCV 2023**, **CVPR 2024**, and **ECCV 2024**
- Completed the invention disclosures for three patents: DataDAM, D2M, and TabDD
- Implemented new dataset distillation algorithms for large-scale computer vision and tabular datasets

Centre for Management of Technology & Entrepreneurship (CMTE) — *Toronto, CA*

GRADUATE RESEARCH ASSOCIATE — *Sept 2021 - Aug 2024*

- Introduced novel contrastive learning frameworks for multi-label classification tasks
- Defined a new probabilistic distance metric with applications in signal processing and machine learning
- Successfully evaluated and presented findings as two technical papers and oral presentations

Multimedia Lab (Bell) — *Toronto, CA*

GRADUATE RESEARCH ASSOCIATE — *Sept 2020 - Aug 2024*

- Investigated the effect of data on the image classification tasks, particularly on *Efficient Learning* and *Multi-label Representation Learning*
- Designed six different frameworks for distilling the knowledge from model-to-model, data-to-data, and data-to-model for efficient training
- Built frameworks and executable libraries for streamlining graduate student research
- Successfully published 6 papers at top-tired computer vision conferences

Multimedia Communications Lab (Leitch) — *Waterloo, CA*

GRADUATE RESEARCH ASSISTANT — *Sept 2018 - Aug 2020*

- Improved time and space computational costs for training deep CNN models using sparsity and patterns in the feature maps
- Collaborated with other engineers to refine data pipelines and model infrastructure as packaged libraries

Publications & Preprints

MACHINE LEARNING AND COMPUTER VISION (1 ICCV, 3 ECCV, 1 CVPR-DD, 3 NEURIPS, 2 ICASSP, 1 ACM, 1 T-PAMI)

Data-to-Model Distillation: Data-Efficient Learning Framework
Ahmad Sajedi, Samir Khaki, Lucy Z. Liu, Ehsan Amjadian, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
*European Conference on Computer Vision **(ECCV)**, 2024*

DataDAM: Efficient Dataset Distillation with Attention Matching
Ahmad Sajedi,Samir Khaki,Ehsan Amjadian, Lucy Z. Liu, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
*Proceedings of the IEEE/CVF International conference on computer vision **(ICCV)**, 2023*

ATOM: Attention Mixer for Efficient Dataset Distillation
Ahmad Sajedi, Samir Khaki, Kai Wang, Lucy Z. Liu, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
*Proceedings of the IEEE/CVF Computer Vision and Pattern Recognition **(CVPR-DD)**, 2024*

ProbMCL: Simple Probabilistic Contrastive Learning for Multi-label Visual Classification
Ahmad Sajedi, Samir Khaki, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
*IEEE International Conference on Acoustics, Speech and Signal Processing **(ICASSP)**, 2024*

A New Probabilistic Distance Metric with Application in Gaussian Mixture Reduction
Ahmad Sajedi, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
*IEEE International Conference on Acoustics, Speech and Signal Processing **(ICASSP)**, 2023*

Multi-label Dataset Distillation with Matching Set Construction
Ahmad Sajedi, Samir Khaki, Kai Wang, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
***NeurIPS** 2024 Pending*

Exploring the Effects of Data Condensation on Tabular Datasets
Ahmad Sajedi, Samir Khaki, Kai Wang, Lucy Z. Liu, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
***NeurIPS** 2024 Pending*

Supervised Contrastive Learning for Multi-label Visual Representation
Ahmad Sajedi, Samir Khaki, Konstantinos N. Plataniotis, Mahdi S. Hosseini
***ECCV** 2024 Pending*

Subclass Knowledge Distillation with Known Subclass Labels
Ahmad Sajedi, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
*IEEE 14th Image, Video, and Multidimensional Signal Processing Workshop **(IVMSP)**, 2022*

FedPnP: Personalized Graph-Structured Federated Learning
Arash Rasti-Meymandi, **Ahmad Sajedi**, Konstantinos N. Plataniotis
***ECCV** 2024 Pending*

High-Performance Convolution using Sparsity and Patterns for Inference in Deep Convolutional Neural Networks
Hossam Amer, Ahmed H. Salamah, **Ahmad Sajedi**, En-hui Yang
***ACM** Pending*

Prioritize Alignment in Dataset Distillation
Zekai Li, Ziyao Guo, Wangbo Zhao, Tianle Zhang, **Ahmad Sajedi**, Kai Wang, Konstantinos N. Plataniotis, Yang You
***NeurIPS** 2024 Pending*

The Past, Present, and Future of Dataset Distillation
Kai Wang, Yuchen Zhang, Ziyao Guo, **Ahmad Sajedi**, Ramakrishna Vedantam, Konstantinos N. Plataniotis, Yang You
***T-PAMI** 2024 Pending*

On the Efficiency of Subclass Knowledge Distillation in Classification Tasks
Ahmad Sajedi, Konstantinos N. Plataniotis
arXiv Preprint

Patents

Efficient Dataset Distillation with Attention Matching
Ahmad Sajedi, Ehsan Amjadian, Samir Khaki, Lucy Z. Liu, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
US Patent

Data-to-Model Distillation
Ahmad Sajedi, Ehsan Amjadian, Samir Khaki, Lucy Z. Liu, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
US Patent

Tabular Dataset Condensation
Samir Khaki, **Ahmad Sajedi**, Lucy Z. Liu, Yuri A. Lawryshyn, Konstantinos N. Plataniotis
US Patent Pending

Invited Talks

2024	Effect of Data on Classification Tasks	@ Royal Bank of Canada	*Toronto, CA*
2023	Dataset Distillation: A Data-Efficient Learning Framework	@ Royal Bank of Canada	*Toronto, CA*
2022	Dataset Distillation: A Data-Efficient Learning Framework	@ University of Toronto	*Toronto, CA*
2022	Visual Explainable AI for Convolutional Neural Networks	@ University of Toronto	*Toronto, CA*
2022	Subclass Knowledge Distillation with Known Subclass Labels	@ Royal Bank of Canada	*Toronto, CA*
2022	Knowledge Distillation for Building Lightweight Models in Classification Tasks	@ University of Toronto	*Toronto, CA*
2021	Sentiment Analysis on Twitter Texts	@ University of Toronto	*Toronto, CA*

Academic Services

Reviewer NeurIPS 2024, ECCV 2024, ICASSP 2024

Primary Chair The First Dataset Distillation Challenge Workshop at ECCV 2024

Teaching

Project TA	Digital Image Processing and Applications, University of Toronto	2023, 2022
Project TA	Data Science Methods and Statistical Learning, University of Toronto	2024, 2023
Project TA	Data Science Methods and Quantitative Analysis, University of Toronto	2023, 2022
Project TA	Introduction to Data Science and Analytics, University of Toronto	2021
Project TA	Introduction to Machine Learning and Data Mining, University of Toronto	2021
Lead TA	Statistics, University of Toronto	2023
Assistant	Probability and Applications, University of Toronto	2024, 2023, 2022, 20221, 2020
Assistant	Probability and Statistics, University of Toronto	2024, 2023, 2022, 2021
Assistant	Probability, Statistics, and Data Analysis I, University of Toronto	2023-2021
Assistant	The Practice of Statistics I, University of Toronto	2023, 2022
Assistant	Matrix Algebra and Optimization, University of Toronto	2021
Assistant	Convex Optimization , University of Waterloo	2020
Assistant	Probability and Statistics, University of Waterloo	2019
Assistant	Discrete Mathematics and Logic I & II , University of Waterloo	2020, 2019

Skills

Programming	Python (Pandas, PyTorch, TensorFlow, NumPy, Scikit-learn. etc.), R(ggplot2), C/C++, MATLAB, HTML.
Miscellaneous	Linux, LaTeX(Overleaf/R Markdown), Tableau, Microsoft Office, Firebase, Git.
Soft Skills	Time Management, Teamwork, Problem-solving, Documentation, Engaging Presentation.

Honors & Awards

2020-2024	Edward S. Rogers Graduate Fellowship	*Toronto, CA*
2020-2024	Graduate Research Fellowship	*Toronto, CA*
2018-2020	Graduate Research Scholarship (GRS)	*Waterloo, CA*
2015-2024	Iran's National Elites Foundation(INEF)'s Grant	*Tehran, IR*
2014	Top 0.1% in Iranian National University Entrance Exam ("Konkoor")	*Tehran, IR*
2012	Finalist in National Chemistry Olympiad	*Tehran, IR*

References

Konstantinos N. Plataniotis	Professor & Director @ University of Toronto,	kostas@ece.utoronto.ca
Yuri A. Lawryshyn	Professor & Director @ University of Toronto,	yuri.lawryshyn@utoronto.ca
Lucy Z. Liu	Director of data science @ Royal Bank of Canada,	lucy.z.liu@rbc.com
Ehsan Amjadian	Director of AI & Technology @ Royal Bank of Canada,	ehsan.amjadian@rbc.com