Ali AGHABABAEI

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Summary

I am a final-year Ph.D. student at Université Grenoble Alpes, supervised by Professor Massih-Reza Amini. My research explores model efficiency and representation learning within machine learning and deep learning, with the goal of designing scalable and practical AI systems.

Education

Université Grenoble Alpes   *2023 - Present*
Ph.D. in Computer Science ↗
- **Research:** Deep Learning Efficiency, Representation Learning

Sharif University of Technology   *2018 – 2022*
M.Sc. in Computer Science ↗
- **Coursework:** Deep Learning, Speech Processing

University of Tehran   *2013 – 2018*
B.Sc. in Electrical Engineering
- **Coursework:** Linear Algebra, Pattern Recognition, Digital Signal Processing

Research Interests

Deep Learning Efficiency
- Tensor Decomposition
- Knowledge Distillation
- Model Pruning
- Memory, Training and Inference Time

Representation Learning
- Semi-Supervised Learning
- Pseudo Labeling
- Contrastive Learning

Generative AI
- Probabilistic Modeling
- Image Denoising
- Image Super Resolution

Research Experience

Ph.D. Thesis   *2023 - Present*
APTIKAL team ↗
- Developed an innovative approach to reduce computational complexity and parameters of deep learning models using **tensor decomposition** techniques.
- Designed a **constraint-based loss** function to identify optimal tensor decomposition ranks for pre-trained models, enhancing model efficiency while preserving accuracy.
- Developing new method for efficient deep learning training by improving greedy supervised learning . Proposed **LoRA residual blocks, label grouping, and information-preserving penalties** to reduce distribution shift and information loss.
- Working on semi-supervised learning, particularly **pseudo-labeling**. Investigate why bias does not destabilize training in pseudo-labeling, developing **theoretical insights and adaptive contrastive loss** methods to address it.

Research Collaborator   *2021 – 2022*
University of Basel ↗

- ○ Conducted analysis of inverse problems, including image denoising, limited-view computed tomography (CT), and wave scattering, utilizing invertible neural networks.
- ○ Approximate data distribution with normalizing flow to identify out-of-distribution samples, improving model robustness and reliability.

M.Sc. Thesis   *2018 – 2021*
Electronic Research Institute ↗

- ○ Proposed a patch-wise feature analysis approach for identifying forgery in video frames, aimed at enhancing deepfake detection capabilities.
- ○ Developed a straightforward method to enhance the generalization and robustness of deepfake detection models.

B.Sc. Thesis   *2016 – 2017*
University of Tehran

- ○ Designed and implemented a video quality meter to assess video quality in terms of blockiness and blurriness distortions in a no-reference mode.

Publications

Unified Framework for Pre-trained Neural Network Compression via Decomposition and Optimized Rank Selection   Sep 2025

Ali Aghababaei-Harandi, Massih-Reza Amini

[ECML-PKDD 2025 ↗]

Deep variational inverse scattering   Mar 2023

AmirEhsan Khorashadizadeh, ***Ali Aghababaei-Harandi***, Tin Vlašić, Hieu Nguyen, Ivan Dokmanić

[EuCAP 2023 ↗]

Conditional injective flows for Bayesian imaging   Feb 2023

AmirEhsan Khorashadizadeh, Konik Kothari, Leonardo Salsi, ***Ali Aghababaei-Harandi***, Maarten de Hoop, Ivan Dokmanić

[IEEE Transactions on Computational Imaging ↗]

Skills

Programming Tools: Python, Pytorch, Tensorflow, Java

Theoretical: Pattern Recognition, Design and Analysis of Algorithms, Creative Problem Solving