

# 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

<b>Université Grenoble Alpes</b> <i>Ph.D. in Computer Science</i> ↗	<i>2023 - Present</i>
◦ <b>Research:</b> Deep Learning Efficiency, Representation Learning	
<b>Sharif University of Technology</b> <i>M.Sc. in Computer Science</i> ↗	<i>2018 – 2022</i>
◦ <b>Coursework:</b> Deep Learning, Speech Processing	
<b>University of Tehran</b> <i>B.Sc. in Electrical Engineering</i>	<i>2013 – 2018</i>
◦ <b>Coursework:</b> Linear Algebra, Pattern Recognition, Digital Signal Processing	

## Research Interests

<b>Deep Learning Efficiency</b>	<b>Representation Learning</b>
◦ Tensor Decomposition ◦ Knowledge Distillation ◦ Model Pruning ◦ Memory, Training and Inference Time	◦ Semi-Supervised Learning ◦ Pseudo Labeling ◦ Contrastive Learning

## Inverse Problems

- Image Denoising
- Image Super Resolution
- MRI and CT Imaging

## Research Experience

<b>Ph.D. Thesis</b> <i>APTIKAL team</i> ↗	<i>2023 - Present</i>
◦ Developed an innovative approach to reduce computational complexity and parameters of deep learning models using <b>tensor decomposition</b> techniques. ◦ Designed a <b>constraint-based loss</b> 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 <b>LoRA residual blocks, label grouping, and information-preserving penalties</b> to reduce distribution shift and information loss. ◦ Working on semi-supervised learning, particularly <b>pseudo-labeling</b> . Investigate why bias does not destabilize training in pseudo-labeling, developing <b>theoretical insights and adaptive contrastive loss</b> methods to address it.	

**Research Collaborator**  
*University of Basel* ↗

2021 – 2022

- 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.

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## Publications

**Unified Framework for Pre-trained Neural Network Compression via De-composition 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](#) ↗

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## Skills

**Programming Tools:** Python, Pytorch, Tensorflow, Java

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