

Elias Ramzi | PhD student

Paris, France

✉ elias.ramzi@lecnam.net

☎ +33 6 28 25 40 88

🌐 elias-ramzi

PhD student specialized in deep learning and computer vision.

Experiences

PhD in Computer Science, Le Cnam & Coexya (France) - 3 year PhD

2021-2024 (*expected*)

My PhD in deep learning is focused on computer vision and image retrieval:

- Published three papers in major international machine learning conferences (NeurIPS, ECCV, ICML), two of which as first author.
- Worked in computer vision for image retrieval, on topics such as ranking losses and hierarchical data from both mathematical and experimental aspects.
- Collaborated with an industrial researcher (Google research) to release the first hierarchical landmark image retrieval dataset [↗](#) as part of a submission to a journal (under-review, TPAMI). It has 1.4m images and three levels of hierarchies: 100k unique landmarks, 78 super-categories and 2 final labels.
- Used the public HPC cluster Jean Zay [↗](#) to train neural networks in a distributed fashion with up to 4 nodes totalling 16 GPUs.
- Co-supervised an intern at Coexya during 6 months to work on weakly-supervised learning.
- Collaborated with two PhD students at Le Cnam, leading to a pre-print on collaborative filtering using graph neural networks and an ICML'23 publication on out-of-distribution detection using energy-based models.
- Lead 20 hours of machine learning and deep learning lab works as a teaching assistant at Le Cnam.

Research intern in deep learning, Le Cnam (France) - 5 month internship

2020

Deep learning for 3D medical image segmentation. I used a learned confidence measure (ConfidNet) to combine segmentation results from different 2D U-Nets.

Data engineer / Data scientist, Sancare (France) - 6 month internship

2019

Deep learning applied to healthcare. I participated in the development of a data pipeline to extract data from the hospitals' servers to Sancare's data model. I worked on the interpretability of a deep neural network using the layer-wise relevance propagation.

Data engineer, Balto (Australia) - 6 month internship

2018

Startup working on last mile delivery of fresh food. I worked on the automation of data processing.

Education

PhD in Computer Science, Le Cnam & Coexya (France)

2021-2024 (*expected*)

I investigate deep learning approaches to image retrieval. Specifically, I work on designing appropriate ranking losses to train deep neural networks for image retrieval. I also contributed on out-of-distribution detection using energy-based models and worked on collaborative filtering recommendation using graph neural networks.

Supervisor: Nicolas Thome [↗](#) (Sorbonne Université, Paris, France).

Advisors: Nicolas Audebert [↗](#), Clément Rambour [↗](#) (Le Cnam, Paris, France).

Industrial advisor: Xavier Bitot [↗](#) (Coexya, Paris, France).

Engineering diploma, CentraleSupélec (France)

2016-2020

Courses in signal processing (sound, image, speech), machine learning, statistical models (estimators, Bayesian learning), data science (data mining, sparse data representation, NLP).





Preparatory school, PSI*, Lycée Lakanal (France)

2014-2016

Intense courses in mathematics and physics.

Technical skills




Open source projects

- Code to train out-of-distribution detectors with HEAT (ICML'23):  HEAT.
- First of its kind hierarchical landmark dataset (TPAMI, under review):  google-landmark.
- Code to train models with HAPPIER (ECCV'22) for hierarchical image retrieval  HAPPIER.
- Code to train models with ROADMAP (NeurIPS'21) for image retrieval:  ROADMAP.

Technologies

- My programming language: Python (PyTorch, NumPy, Hydra, Pandas, Scikit-Learn, Jax).
- My work environment : Linux/MacOS + Git + VS Code & Github Copilot + Jupyter Notebook.
- Other tools: LaTeX, SLURM, Shell script.

Contributions to open-source

- Pytorch metric learning:  pytorch-metric-learning.
- Implementation of Mixture of Experts:  mixture-of-experts.
- Pytorch-lightning:  lightning.

Miscellaneous

- French is my mother tongue and I speak English at C1 level.
- I enjoy running and have run 20km and semi-marathon races. I also like climbing and hiking.

Publications

Elias Ramzi, Nicolas Audebert, Clément Rambour, André Araujo, Xavier Bitot and Nicolas Thome. "Optimization of Rank Losses for Image Retrieval." Under review, IEEE Transactions on Pattern Analysis and Machine Intelligence (under-review – TPAMI). online: <https://arxiv.org/pdf/2309.08250.pdf>

Marc Lafon, **Elias Ramzi** Clément Rambour, Nicolas Thome. "Hybrid Energy Based Model in the Feature Space for Out-of-Distribution Detection." in Proceedings of the 40th International Conference on Machine Learning (ICML, 2023). online: <https://arxiv.org/abs/2305.16966>

Elias Ramzi, Nicolas Audebert, Nicolas Thome, Clément Rambour, and Xavier Bitot. "Hierarchical Average Precision Training for Pertinent Image Retrieval." in Proceedings of the 17th European Conference on Computer Vision (ECCV, 2022). online: <https://arxiv.org/abs/2207.04873>

Elias Ramzi, Nicolas Thome, Clément Rambour, Nicolas Audebert, and Xavier Bitot. "Robust and Decomposable Average Precision for Image Retrieval." Advances in Neural Information Processing Systems, 34th (NeurIPS, 2021). online: <https://arxiv.org/abs/2110.01445>