Aymen Sadraoui, Ph.D.

Machine Learning Engineer & Data Scientist

Computer Vision · Deep Learning · MLOps · Data Engineering

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Professional Summary

Ph.D. in Machine Learning and Artificial Intelligence with experience developing and deploying machine learning solutions across medical imaging and computational pathology. Strong expertise in **Python, PyTorch, computer vision, deep learning, representation learning, and few-shot learning**. Experienced in building automated data-processing pipelines, developing predictive models, and integrating containerized AI applications into clinical workflows. Author and co-author of peer-reviewed publications at **CVPR, ISBI, and ICIP**, combining advanced ML research with practical software and data engineering.

Technical Skills

ML & Deep Learning
Python, PyTorch, Scikit-learn, CNNs, representation learning, few-shot learning, predictive modeling

Computer Vision
OpenCV, OpenSlide, DICOM, whole-slide image processing, image classification, segmentation, image quality control

Data Engineering
ETL/ELT pipelines, data ingestion, multi-center dataset processing, large-scale image processing

MLOps & Tools
Linux, Docker, MLflow, Git, CI/CD, Streamlit, FastAPI, Optuna, model evaluation, calibration, data-drift analysis

Languages
French (Fluent), English (Fluent), Arabic (Native)

Professional Experience

Data Scientist & Machine Learning Engineer — **Feb 2026 – Present**
Deemea — *Paris, France*

- Designed automated **DICOM data ingestion and processing pipelines** integrating hospital PACS and cloud platforms to support multi-center clinical studies.
- Developed deep learning-based **image quality control (QC)** algorithms to detect motion artifacts, slice mismatches, and corrupted data before clinical review.
- Developed computer vision algorithms for **diagnostic support, segmentation, and classification** of CT, X-ray, and MRI scans across orthopedics, oncology, and rheumatology.
- Built and deployed containerized AI services using **Docker and PyTorch**, integrating automated pre-annotations and interactive 3D visualizations into clinical workflows.
- Implemented model evaluation and **MLOps workflows** covering calibration and data-drift analysis to assess robustness across multi-site hospital datasets.
- Worked with radiologists, software engineers, and clinical stakeholders to translate clinical requirements into production-ready AI features.

Ph.D. Researcher in Machine Learning & Computational Pathology — **Jan 2022 – Jan 2026**
CentraleSupélec (OPIS / CVN Lab) & AP-HP Hôpital Bicêtre — *Gif-sur-Yvette, France*

- **Thesis:** *AI-Driven Methods in Histopathology for the Diagnosis and Prognosis of Hepatocellular Carcinoma*. Developed deep learning models for histopathological architecture classification, hepatocellular carcinoma diagnosis, and early recurrence prediction using whole-slide images (WSIs) and clinical metadata.
- Designed **unrolled proximal optimization networks** (AlterPGA, U-AlterPGA, and U-AlterFISTA) for stain separation and normalization of digitized histopathology slides.
- Developed optimization-based methods for **transductive few-shot learning**, including UNEM and PADDLE-based approaches; U-PADDLE achieved 80.3% accuracy in the evaluated 100-shot benchmark.
- Built scalable **ETL and image-processing pipelines** using PyTorch, OpenCV, Scikit-learn, OpenSlide, and Optuna to ingest, tile, and curate more than 4 TB of gigapixel whole-slide image data.
- Designed multi-center evaluation frameworks addressing **generalization, calibration, uncertainty, and interpretability**; the HCC architecture classifier achieved 82.3% accuracy on the external Henri-Mondor cohort.
- Collaborated with pathologists and clinical researchers to translate histopathological criteria into quantitative machine learning objectives and clinically relevant predictive features.

Publications

- **Sadraoui, A.**, et al. (2026). A Proximal Approach for Stain Separation and Normalization of Whole-Slide Histopathological Images. *IEEE International Symposium on Biomedical Imaging (ISBI)*.
- **Sadraoui, A.**, et al. (2025). UNEM: UNrolled Generalized EM for Transductive Few-Shot Learning. *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*.
- **Sadraoui, A.**, et al. (2024). Deep Learning Classification and Quantification of Pejorative and Nonpejorative Architectures in Resected Hepatocellular Carcinoma from Digital Histopathologic Images. *The American Journal of Pathology*.
- **Sadraoui, A.**, et al. (2024). Unrolled Projected Gradient Algorithm for Stain Separation in Digital Histopathological Images. *IEEE International Conference on Image Processing (ICIP)*.
- **Sadraoui, A.**, et al. (2024). A Transductive Few-Shot Learning Approach for Classification of Digital Histopathological Slides from Liver Cancer. *IEEE International Symposium on Biomedical Imaging (ISBI)*.

Education

Ph.D. in Machine Learning & Artificial Intelligence — **2022 – 2026**
CentraleSupélec, Université Paris-Saclay — *Gif-sur-Yvette, France*

Engineering Degree in Signals and Systems Processing — **2018 – 2021**
École Polytechnique de Tunisie — *La Marsa, Tunisia*

Achievements

- **1st Place:** Lung Transplant Rejection Challenge, organized by Hôpital Foch and the Health Data Hub (2024).
- **National Rank 63 / 1,773 (Top 3%):** National Engineering Entrance Exam, Tunisia (2018).