# AMIR MOUSAVI

**Machine Learning Research Engineer | Applied AI & Scientific Software Engineer**

France | am.mousavi97@gmail.com | GitHub | LinkedIn | website | scholar

## PROFESSIONAL SUMMARY

**Machine Learning Research Engineer and PhD candidate with a multidisciplinary background spanning electrical engineering, applied mathematics, statistics, optimization, embedded systems, backend and web development, and applied AI. Experienced in transforming complex and ambiguous problems into well-defined research questions, reproducible experiments, validated machine-learning solutions, and reliable end-to-end software systems. Work spans deep learning, computer vision, generative modelling, statistical and Bayesian methods, graph-based learning, and Retrieval-Augmented Generation (RAG), supported by peer-reviewed and preprint publications and presentations at international conferences. Combines scientific rigor with hands-on software engineering across Python and JavaScript ecosystems, including Django, Flask, Node.js, Express, Next.js, and React. Built backend applications, reproducible data-processing pipelines, and a self-hosted, multi-service document-intelligence platform involving REST APIs, authentication, asynchronous processing, PostgreSQL, Redis, OpenSearch, local model inference, Docker, Linux deployment, and CI/CD. Motivated by real-world challenges that require mathematical reasoning, careful experimentation, thoughtful system design, and the translation of strong research results into reliable, maintainable, user-facing software.**

## CORE EXPERTISE

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|---|---|
| **Machine Learning** | **Deep learning, computer vision, generative modeling, statistical learning, Bayesian methods, graph-based methods, optimization** |
| **Software Engineering** | **Python, JavaScript, Django, Flask, Node.js, Express, Next.js, React, REST APIs** |
| **Data & Infrastructure** | **SQL, PostgreSQL, MongoDB, Redis, OpenSearch, Docker, Nginx, Linux, GitHub Actions, CI/CD** |
| **Applied AI** | **RAG, embeddings, hybrid retrieval, semantic chunking, grounded question answering** |

## PROFESSIONAL & RESEARCH EXPERIENCE

**PhD Candidate & Research Software Developer - Université de Picardie Jules Verne (UPJV)** **2023 - Present**

**Amiens, France | Expected PhD completion: September 2026**

- Develop and evaluate random forest, XGBoost, and multiple regression models with optimized hyperparameters using brain-connectivity data and multidomain clinical assessments from 400 stroke patients, including cognitive and motor-speed scores.
- Build reproducible Python pipelines spanning data preprocessing, feature engineering, hyperparameter optimization, cross-validation, visualization, and model interpretation.
- Apply statistical, Bayesian, and graph-based methods to investigate relationships between brain-connectivity patterns and post-stroke functional outcomes, translating multidisciplinary research questions into computational experiments.
- Collaborate with neuroscientists, healthcare researchers, statisticians, and engineers; presented PhD research at NetSci 2025 in Maastricht, the Netherlands, and at the OHBM 2026 Annual Meeting in Bordeaux, France; prepared a manuscript currently under review.

**Backend Developer - Maralhost** **May 2021 - Oct 2022**

Isfahan, Iran

- Developed and maintained Django backend features, server-side logic, and relational data models for web applications in a hosting and server-services environment.
- Supported Linux deployments and database-backed applications, diagnosed software issues, and maintained collaborative Git workflows.

**Programmer & Electronics Designer - Mobarakeh Steel Company** **Oct 2017 - Oct 2019**

**Mobarakeh, Isfahan, Iran**

- Reverse-engineered and designed an electronic control board for rolling-equipment speed regulation; implemented control algorithms and evaluated system performance and reliability.

## SELECTED MACHINE LEARNING & SOFTWARE PROJECTS

**Medical Imaging & Deep Learning Research - Selected research projects** **2019 - 2026**

- Developed deep-learning approaches for ischemic-stroke lesion segmentation from T1-weighted MRI and lumbar-spine degeneration classification using computer-vision methods.
- Built a CT workflow for lung and infection segmentation and a real-time face-mask detector for Raspberry Pi; additional work includes generative eyes-to-face inpainting, Persian sentiment analysis, and DDPG for secure wireless communications.

**DocuMind - Scientific Document Intelligence & RAG Platform** **2026**

- Architected a self-hosted, multi-service platform for organizing scientific PDFs, retrieving evidence, and answering grounded questions with page-level citations.
- Implemented structured extraction, semantic chunking, embeddings, and vector, keyword, and hybrid retrieval with OpenSearch and local inference through Ollama.
- Designed provenance-aware asynchronous processing with Python services, Node.js, Express, Next.js, PostgreSQL, Redis, Docker, Nginx, authentication, and CI/CD.

**PaperMind - Scientific PDF Processing Services** **2026**

- Developed Python and FastAPI services that transform scientific publications into canonical, machine-readable packages containing metadata, hierarchical text, references, figures, tables, formulas, provenance, and quality information.
- Designed reusable API and command-line workflows for validation, indexing, retrieval, and RAG pipelines, then integrated the services into DocuMind.

**Baxter Chess-Playing Robot - Vision-Based Robotic Chess System** **2026**

- Integrated Kinect-based computer vision, chess-state reasoning, Stockfish, FastAPI, ROS, calibration, and motion control to detect human moves and command a Baxter robot to move pieces physically.

## EDUCATION

**PhD Candidate in Neuroscience - Université de Picardie Jules Verne (UPJV)** **2023 - Expected Sep 2026**

**Amiens, France**

- Research focus: machine learning and data-science methods for stroke and brain connectivity, statistical modeling, graph analysis, optimization, cross-validation, and reproducible scientific computing.

**MSc in Electrical Engineering - Telecommunications - Shiraz University of Technology** **2019 - 2023**

Shiraz, Iran

- Thesis: Quantification of damaged lung tissue due to COVID-19 using computed tomography images.

**BEng in Electrical Engineering - Telecommunications - University of Isfahan** **2015 - 2019**

**Isfahan, Iran**

- Final project: Persian-language e-commerce sentiment analysis with positive/negative classification and negative-term extraction.

## SELECTED PUBLICATIONS


**Mousavi Mobarakeh, S. A.** *VRXU-net: A Deep Learning Approach for Brain Ischemic Stroke Lesion Detection and Segmentation in T1W MRI.* arXiv, 2026. doi:10.48550/arXiv.2605.21633

**Mousavi, A.** *RAX-NET: Residual Attention Xception Network for Brain Ischemic Stroke Segmentation in T1-Weighted MRI.* medRxiv, 2025. doi:10.1101/2025.09.26.25336733

**Mousavi, A.** *Lumbar Spine Degenerative Classification Using YOLO v8 and DeepScoreNet.* medRxiv, 2024. doi:10.1101/2024.12.06.24318595

**Mousavi Mobarakeh, S. A.**; Kazemi, K.; Aarabi, A.; Danyal, H. *Empowering Medical Imaging with Artificial Intelligence: A Review of Machine Learning Approaches for the Detection, and Segmentation of COVID-19 Using Radiographic and Tomographic Images.* arXiv, 2024. doi:10.48550/arXiv.2401.07020

Hassanpour, A.; **Mousavi Mobarakeh, S. A.**; Etefaghi Daryani, A.; Ramachandra, R.; Yang, B. *Synthetic Face Generation Through Eyes-to-Face Inpainting.* IEEE IJCB, 2023, pp. 1-8. doi:10.1109/IJCB57857.2023.10449216


**Full publication list:** Google Scholar

## TEACHING & ADDITIONAL INFORMATION

**Teaching:** Teaching Assistant for approximately 60 hours of university-level Python and machine-learning instruction, laboratory support, and student guidance (2025-2026).

**Languages:** Persian/Farsi (native); English (professional proficiency); French (B1 listening, A2 speaking, A1 writing).