AE

CURRICULUM VITAE

ADNANE EL AMRANI

ARTIFICIAL INTELLIGENCE ENGINEER

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ALELM Laboratory, EMI — Mohammed V University of Rabat

I PROFILE

AI ENGINEER and doctoral researcher specialising in the design, deployment and industrialisation of large language model systems. Cloud-certified on both Azure and AWS, with hands-on delivery of production Retrieval-Augmented Generation (RAG) architectures serving multilingual users in Modern Standard Arabic, French and Moroccan Darija, backed by end-to-end MLOps pipelines (Docker, MLflow, CI/CD, monitoring, automated retraining). Dual foundation combining four years of French-system *Classes Préparatoires* in advanced mathematics and theoretical physics with applied software and data engineering at scale (Spark, Hadoop, Kafka, >1 TB pipelines). Three peer-reviewed international conference papers presented in Morocco, Bahrain and Egypt (Springer / IEEE, Scopus-indexed), Technical Committee member and reviewer for ICDTA 2026, PhD Volunteers Committee member for EACL 2026 (European Chapter of the ACL, Rabat), and selected participant in the Afretec–UNILAG Doctoral Academy 2.0 at the University of Lagos, where he received a peer award for engagement. Ongoing PhD building an AI-generated Arabic scientific terminology bank from Semitic morphological patterns. A parallel LL.B. in Private Law underpins a distinctive specialisation in AI applied to justice and legal texts, developed through a consultancy internship at the Court of First Instance of Rabat. Trilingual (Arabic / French / English); equally comfortable shipping engineering systems, navigating regulatory constraints and publishing the research behind both.

II TECHNICAL SKILLS

AI & MACHINE LEARNING	PyTorch · TensorFlow · Scikit-learn · Hugging Face · Transformers · BERT · LLMs · Fine-tuning · RAG · Agentic Reasoning · Vector DBs / Qdrant · Prompt Engineering · NLP & Arabic NLP · Sentiment & Stance Detection · Neural Networks
MLOPS & DEVOPS	MLflow · Kubeflow · DVC · Docker · Kubernetes · CI/CD · Model Monitoring · Automated Retraining · Grafana · Prometheus · Experiment Tracking
DATA & CLOUD	Apache Spark · Hadoop · Kafka · ETL / ELT · AWS (S3) · GCP (GCS) · Azure (Blob) · PostgreSQL · MongoDB · Cassandra · Data Quality & Validation · Blockchain Data Pipelines
LANGUAGES & FRAMEWORKS	Python · Java · Scala · C++ · SQL · JavaScript · Caml · Flask · FastAPI · React
APPLIED DOMAINS	Legal & Judicial AI · Arabic Lexical Resources · AgriTech Advisory Systems · Web Accessibility · Customs & Fraud Detection · Economic Forecasting · Civic & Electoral Analytics
MATHEMATICAL FOUNDATIONS	Linear Algebra · Real & Complex Analysis · Measure Theory & Lebesgue Integration · Topology · Abstract Algebra · ODEs & PDEs · Probability & Statistics · Optimisation Theory · Fourier & Laplace Transforms · Numerical Methods · Signal Processing · Quantum Mechanics · Electromagnetism

III CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

Microsoft Certified: Azure AI Engineer Associate 2025
Microsoft

AWS Certified Machine Learning — Specialty 2025
Amazon Web Services

AI Everywhere 2025 — Certificate of Completion 11 December 2025

AspenCore Network (EE Times, Power Electronics News, Embedded, EDN) — international virtual programme of keynotes, panels and technical tutorials

Both cloud credentials were obtained within the first year following graduation.

IV PROFESSIONAL & RESEARCH EXPERIENCE

International Consultant in Artificial Intelligence (internship) 2026

Tribunal de Première Instance de Rabat (Court of First Instance) — Office of Dr. Omar Beriane *Rabat, Morocco*

- Advised on the application of artificial intelligence to judicial workflows within the office of Dr. Omar Beriane, at the intersection of the candidate's AI engineering practice and concurrent legal studies.
- Assessed the feasibility of Arabic-language NLP for the processing of judicial documents — automatic summarisation, document classification and structured information extraction from case files.
- Studied Retrieval-Augmented Generation architectures for legal-text search over Moroccan case law and codified legislation, with attention to source traceability and verifiability of generated answers.
- Addressed the ethical and regulatory dimensions of judicial AI: personal-data protection, anonymisation of decisions, algorithmic transparency and the preservation of human decision-making authority.
- Contributed to reflection on the digital transformation of court services and the modernisation of judicial administration in Morocco.

Teaching & Research Assistant 2023 – 2025

École Mohammadia d'Ingénieurs (EMI), Mohammed V University *Rabat, Morocco*

- Supported instruction, laboratory sessions and assessment for engineering coursework, including *Data Analysis with Python*.
- Conducted research within the ALELM Laboratory (Arabic Language Engineering & Learning Modelling) on Arabic language engineering and AI-driven construction of lexical resources.
- Contributed to the design of the Bank of Arabic Terms (BAT) methodology for systematic generation of Arabic scientific terminology.

Research Assistant 2023 – 2025

Al Akhawayn University in Ifrane — School of Science & Engineering *Ifrane, Morocco*

- Contributed to research projects at the intersection of artificial intelligence, natural language processing and digital transformation.
- Co-developed multilingual AI systems for agricultural advisory, from data collection through model evaluation and user testing.
- Co-authored and prepared manuscripts for submission to international peer-reviewed conferences.

AI Engineer Intern June – August 2024

Orvignon — AgriTech / Applied AI *Rabat, Morocco*

- Designed, built and deployed an AI advisory tool for Moroccan farmers, optimising crop yields and irrigation-water usage under local agronomic constraints.
- Architected an end-to-end Retrieval-Augmented Generation stack on Qdrant vector databases, delivering real-time multilingual recommendations in Arabic, French and Darija.
- Automated a full MLOps lifecycle — containerised deployment, monitoring and continuous retraining — with Docker, MLflow and CI/CD pipelines.
- Ran requirement-gathering and validation cycles with agronomists and farmers to align model outputs with real field conditions; system reached 90%+ user satisfaction.
- Work productised as *FilahaAdvisor* and published as a first-author paper at ICDTA 2025.

Data Science Intern July – September 2022

Haut-Commissariat au Plan (HCP) — National Statistics Institution *Rabat, Morocco*

- Implemented a feed-forward neural network for economic forecasting, achieving a 23% reduction in RMSE on validation data through systematic hyperparameter tuning.
- Designed a blockchain-based data pipeline guaranteeing transparency and integrity of government statistical data.
- Integrated macroeconomic indicators into long-horizon market prediction models.
- Collaborated with the senior research team on model selection, cross-validation strategy and results interpretation.

V EDUCATION

Ph.D. in Artificial Intelligence October 2025 – Present

École Mohammadia d'Ingénieurs (EMI), Mohammed V University *Rabat, Morocco*

- Doctoral Studies Centre CEDoc "Sciences et Techniques pour l'Ingénieur" (STI), domiciled at EMI; host research structure: ALELM Laboratory. Discipline: Artificial Intelligence & Machine Learning. First thesis registration: 28 September 2025; thesis charter signed by the candidate, the director and the co-director; re-registered for 2026–2027.

- Thesis: "Enhancing the Linguistic Dictionary of Arabic Using a Multi-AI Approach" — ALELM Research Laboratory.
- Supervision: Prof. Karim Bouzoubaa (Head, ALELM Laboratory, EMI); Co-direction: Dr. Yousra Chtouki (Al Akhawayn University in Ifrane).
- Research on AI generation of Arabic scientific terminology from trilateral roots and morphological patterns, combining Semitic morphology with neural architectures, Retrieval-Augmented Generation and agentic reasoning systems.
- Building the Bank of Arabic Terms (BAT): a lexical resource targeting millions of systematically generated Arabic scientific terms.

M.Sc. in Artificial Intelligence (in progress, distance learning) Expected July 2028
University of Essex Online *United Kingdom*

M.Sc. in Software Engineering — *With Honors* 2024 – 2025
Al Akhawayn University in Ifrane (AUI) *Ifrane, Morocco*

- Specialisation: AI Engineering, MLOps and Cloud Computing.
- Dean's List — Fall 2023–2024.

B.Sc. in Computer Science — *With Honors* 2020 – 2024
Al Akhawayn University in Ifrane (AUI) *Ifrane, Morocco*

- Minors in International Relations and Business Administration.
- Exchange semester: California State University, San Marcos & UCLA Extension (January – July 2022).
- Dean's List — Fall 2022–2023.

LL.B. in Private Law (in progress) Sept. 2025 – Expected July 2028
Moulay Ismail University *Meknès, Morocco*

- Pursued deliberately alongside the doctorate to support work on AI for justice, legal-text processing, data-protection compliance and the governance of algorithmic systems.

Classes Préparatoires aux Grandes Écoles (CPGE) — MP Track 2016 – 2020
CPGE Ibn Ghazi & CPGE Omar Ibn Al-Khattab *Rabat & Meknès, Morocco*

- Four-year intensive programme in advanced mathematics and theoretical physics; admitted through the Concours National Commun (CNC), Morocco's national competitive entrance examination to the Grandes Écoles.
- Mathematics: real & complex analysis, measure theory and Lebesgue integration, topology, abstract algebra (groups, rings, fields), linear algebra, bilinear forms, matrix decomposition, ODEs & PDEs, functional analysis, Fourier & Laplace transforms, probability, combinatorics.
- Physics: classical mechanics (Lagrangian & Hamiltonian formulations), electromagnetism (Maxwell's equations), thermodynamics & statistical physics, wave optics, foundations of quantum mechanics, solid & fluid mechanics, signal processing, electronics.
- Computer Science: algorithmic complexity, data structures, recursion, formal logic, Python & Caml programming.

VI PUBLICATIONS & CONFERENCE PRESENTATIONS

[P3] Ismaili, A., **El Amrani, A.**, Chtouki, Y., Lamharhar, H. "AI-Driven Detection of Misclassified Imports: A Machine Learning and LangChain-Based RAG Approach for Customs Fraud." IEEE International Conference on Artificial Intelligence, Systems and Emerging Technologies (IEEE-ICAISET 2026), El Shorouk Academy — Higher Institute of Computer and Information Technology, Cairo, Egypt, 21–23 April 2026. *IEEE Egypt Section.* *Conference paper — awarded a Certificate of Appreciation by the conference chairs for the contribution.*

[P2] Massdar, F. E., **El Amrani, A.**, Chtouki, Y. "Advancing Web-Accessibility: A Systematic Review of Machine Learning Approaches for Web Content Summarization and Accessibility for the Visually Impaired." IEEE International Conference on Computer and Applications (IEEE/ICCA 2025), Arab Open University, Kingdom of Bahrain, 22–24 December 2025. Paper #1571176092. *IEEE Bahrain Section.* *Published December 2025 — Certificate of Appreciation from the conference chairs; "Most Read Monthly" featured research on ResearchGate.*

[P1] **El Amrani, A.**, Mourhir, A., Qorchi, H. "An AI-Powered Advisory System for Moroccan Agriculture (*FilahaAdvisor*)." International Conference on Digital Technologies and Applications (ICDTA 2025), Ifrane, Morocco, 17–18 April 2025, Paper ID 338 — oral presentation. Published by Springer (Scopus-indexed series); book chapter released May 2026. Reported performance: F1 = 0.85, ROUGE-L = 0.79, sacreBLEU = 0.73, 90%+ user satisfaction. *First author.*

VII ACADEMIC SERVICE & PROGRAMME COMMITTEES

Member, PhD Volunteers Committee 24–29 March 2026
EACL 2026 — Conference of the European Chapter of the Association for Computational Linguistics *Rabat, Morocco*

- Contributed to the organisation of a flagship international NLP venue hosted in Morocco; awarded a Certificate of Organization by the General Chair.

Technical Committee Member & Reviewer 9–10 October 2026

ICDTA 2026 — 6th International Conference on Digital Technologies and Applications (*Springer, Scopus-indexed*) *Vaughn College of Aeronautics and Technology, New York, USA*

- Serving on the Technical Committee and reviewing submissions — a distinction uncommon for a first-year doctoral researcher.

VIII FELLOWSHIPS, DOCTORAL PROGRAMMES & PEER AWARDS

Selected Participant — Afretec–UNILAG Doctoral Academy 2.0 29 June – 3 July 2026

Afretec Network (*powered by Carnegie Mellon University Africa*) *— joint researcher–supervisor track* *University of Lagos, Nigeria*

- Admitted to the second cohort of a pan-African doctoral development programme, with Dr. Yousra Chtouki committing as accompanying supervisor and Prof. Karim Bouzoubaa endorsing on the EMI side.
- Five-day residential programme covering research methodology, academic writing and grantsmanship for top-tier venues (ACL, EMNLP, COLING, NeurIPS).
- Peer Award — "Most Active Virtual Participant", voted by fellow doctoral candidates and supervisors (Afretec–UNILAG Peer Awards, signed by the Knowledge Creation Pillar Lead and the Network Coordinator).

IX SELECTED ENGINEERING & RESEARCH PROJECTS

AgriAdvisor — Full-Stack AI Advisory Platform Summer 2024

Master's Capstone / Orvignon Internship — RAG, LLMs, MLOps

- Architected a full-stack AI advisory system digitising agricultural extension services, powered by Qdrant vector databases and advanced ML models.
- Implemented RAG over LLMs for real-time multilingual responses (Arabic, French, Darija).
- Built the complete MLOps pipeline in Python, Flask, Docker and MLflow for automated deployment, monitoring and retraining.
- Iterated with farmers and domain experts to tune recommendations to Moroccan agronomic conditions and water optimisation.

ETL and ELT Data Integration Pipelines Spring 2024

Data Engineering & Visualisation (*CSC 5356*) *— Dr. T. Rachidi*

- Designed and implemented ETL and ELT pipelines to consolidate large-scale data from heterogeneous sources.
- Built scalable architectures processing over 1 TB of data with Apache Spark, Hadoop and Kafka.
- Improved transformation efficiency by 40% via modern framework selection and pipeline parallelisation.
- Implemented data-quality validation layers enforcing consistency, completeness and integrity; enabled real-time analytics and seamless cloud migration (S3, GCS, Azure Blob).

2024 U.S. Presidential Election Outcome Prediction Spring 2024

AI for Digital Transformation (*CSC 5386*) *— Dr. A. Mourhir*

- Developed a BERT-based sentiment and stance analysis model to forecast the 2024 U.S. presidential election outcome.
- Analysed over 1 million tweets for stance detection and sentiment classification, reaching 87% accuracy.
- Engineered a large-scale NLP pipeline covering extraction, preprocessing, tokenisation and feature engineering.
- Produced predictive analytics actionable for political strategists, digital marketers and researchers.

Planning and NLP — Analysis of the SHRDLU System Summer 2023

Languages and Compilers (*CSC 4301*) *— Dr. Cavalli-Sforza*

- Developed a formal language describing a 3D micro-world and defined action schemas for object manipulation.
- Implemented partial-order and hierarchical planning algorithms to solve complex spatial-reasoning problems.
- Analysed natural-language interactions with SHRDLU, identifying linguistic ambiguities and required inferences.

Real-Estate Price Prediction with Neural Networks & Blockchain Summer 2022

Data Science Internship Project — Haut-Commissariat au Plan (*HCP*)

- Built a feed-forward neural network with gradient-descent optimisation predicting property prices from surface area, location, room count and amenities.
- Reduced RMSE by 23% through hyperparameter tuning and integration of macroeconomic indicators for long-horizon forecasting.
- Designed a blockchain-based data-governance pipeline ensuring transparency and integrity of government data.

X LEADERSHIP, TEACHING & COMMUNITY ENGAGEMENT

Vice-President Sept. 2023 – Aug. 2024
White Hats Cybersecurity Club, Al Akhawayn University *Ifrane, Morocco*

- Led workshops and awareness campaigns on cybersecurity reaching 200+ students.
- Organised inter-university competitions strengthening hands-on security skills.
- Managed a 15-member team; delivered 5+ events with 500+ cumulative participants.

Community Trainer May – June 2023
Ifker Association *Morocco*

- Delivered digital-literacy programmes to 100+ participants in underserved rural communities.
- Developed bilingual (Arabic / French) pedagogical content for foundational digital-skills training.

XI HONORS & DISTINCTIONS

- Dean's List — Fall 2022–2023 and Fall 2023–2024, Al Akhawayn University in Ifrane.
- Peer Award — "Most Active Virtual Participant", Afretec–UNILAG Doctoral Academy 2.0, University of Lagos, July 2026.
- Three peer-reviewed conference papers presented across three countries (ICDTA 2025 — Morocco; IEEE/ICCA 2025 — Bahrain; IEEE-ICAISET 2026 — Egypt), including one as first author, published with Springer and IEEE.
- Certificates of Appreciation from the conference chairs of IEEE/ICCA 2025 (Arab Open University, Bahrain) and IEEE-ICAISET 2026 (El Shorouk Academy, Cairo).
- Technical Committee member and reviewer, ICDTA 2026 — appointed in the first year of doctoral studies.
- Certificate of Organization, EACL 2026 — PhD Volunteers Committee, European Chapter of the ACL, Rabat.
- "Most Read Monthly" featured research on ResearchGate for the IEEE/ICCA 2025 accessibility review.
- Microsoft Azure AI Engineer Associate and AWS Machine Learning Specialty certifications earned within one year of graduation.
- Graduated With Honors in both B.Sc. Computer Science and M.Sc. Software Engineering.
- Admitted through the Concours National Commun (CNC) after four years of CPGE (MP track).
- Organised 5+ cybersecurity events totalling more than 500 participants as Vice-President of the White Hats Club.

XII RESEARCH INTERESTS

Arabic NLP & Computational Linguistics · LLMOps & MLOps · Retrieval-Augmented Generation · Agentic AI Systems · Digital Transformation & e-Government · AI for Social Choice & Civic Participation · AI for Accessibility · AI for Justice & Legal-Text Processing · AI Governance, Ethics & Data Protection · Computational Modelling in Political Science & Constitutional Law · Low-Resource & African-Language AI

XIII LANGUAGES

- Arabic — Native speaker (Modern Standard Arabic and Moroccan Darija); research-level command of Arabic morphology, derivation and scientific terminology.
- French — Advanced (C1); full professional and academic proficiency; language of doctoral administration and teaching.
- English — Advanced; full professional and academic proficiency; language of publication and international collaboration.