Jamal Boussouf

+212 635228747 - jamalbssouf@gmail.com - github.com/jboussouf - linkedin.com/in/jboussouf/

EDUCATION

Mohammed Premier University, Nador, Morocco **Expected: 2028**
Ph.D. in Artificial Intelligence and Federated Learning Security

- Research focus: Enhancing AI security and privacy in decentralized learning systems.
- Topics: Federated learning, adversarial robustness, secure model aggregation, and differential privacy.

Mohammed Premier University, Nador, Morocco **2022 – 2024**
Master in Data Science and Artificial Intelligence

- Coursework: Machine Learning, Big Data, NLP, Security, Cloud Computing, and Web Development.
- Thesis: Development of efficient deep learning models for fetal ultrasound analysis at DeepEcho.

Bachelor in Mathematics and Computer Science **2018 – 2022**
Master in Data Science and Artificial Intelligence

- Core competencies: Advanced Databases, Data Security, Java, Linux OS, Networking, and Optimization.
- Bachelor's thesis: Comparison of digital signature algorithms for secure blockchain transactions.

EXPERIENCE

Blockward — Casablanca, Morocco **December 2024 – September 2025**
Computer Vision – Video Analytics for Sports

- Designed and implemented a multi-object tracking pipeline for sports video analysis using PyTorch.
- Built a custom annotated dataset from raw sports footage to train and evaluate tracking performance.
- Generated trajectory visualizations to analyze player movement and ball dynamics for enhanced tactical insights.

DeepEcho — Rabat, Morocco **March 2024 – September 2024**
Machine Learning Research Intern

- Developed and optimized energy-efficient deep learning models (ViTs, GANs) for fetal ultrasound image analysis.
- Improved model accuracy and reduced computational costs for deployment on battery-powered edge devices.
- Collaborated with a multidisciplinary research team to enhance AI-assisted prenatal diagnostics and workflow efficiency.

Publications & Conferences

IOTA TANGLE 2.0: AN OVERVIEW **15 Dec 2023**
EDPACS - doi.org/10.1080/07366981.2023.2293322

- Compared digital signature schemes across IOTA 1.0, 1.5, and 2.0 for security and decentralization.
- Analyzed cryptographic evolution enabling IOTA 2.0's coordinator-free, smart contract–capable architecture.

Signing Algorithms Behind Blockchain Digital Transactions — Nador, Morocco **March 2024 – September 2024**
MASI - Conference

- Analyzed and compared blockchain signature algorithms, including EdDSA, ECDSA, and RSA.
- Evaluated elliptic curve–based schemes against RSA for signing and verification efficiency and security.

PROJECTS (https://jboussouf.github.io/)

Legolingo: AI-Powered Language Learning Platform

Technologies: LLM integration, prompt engineering, conversational agents, and dynamic reasoning.

- Developed a multi-platform (web, mobile, desktop) application that teaches Spanish, English, French, and German using conversational AI, evaluating users' writing, speaking, and listening skills.
- Integrated Chat GPT API with custom prompt engineering and chain-of-thought reasoning to dynamically adapt lessons and assessments based on user proficiency.

AI-Powered House Price Prediction with Conversational Interface

Technologies: KNN imputation, Geo-Data analysis, API integration, Prompt engineering

- Integrated ChatGPT-3.5 API with KNN imputation enables conversational property data extraction and handles missing user inputs effectively.
- CatBoost regression model achieved 91.31% R2 accuracy in predicting house prices, outperforming other algorithms in the Seattle housing market analysis.

Simulation of Deep Learning in a Distributed Data Parallel Scenario with PyTorch

Technologies: Python, Pytorch, Federated learning

- Simulated distributed data parallel training using PyTorch to accelerate model training and ensure data privacy across multiple workers.
- Synthetic binary classification dataset with Multi-Layer Perceptron (MLP) model, comparing loss functions to evaluate collaborative learning performance.

Advanced anomaly detection

Technologies: IDS, Network analysis, one class classification, time-series, Pytorch, LSTM, Naive Bayes

- LSTM outperformed Naive Bayes in anomaly detection, achieving 99.97% accuracy on KDD Cup 99 and consistently higher performance across multiple real-world network datasets.
- Comprehensive evaluation of four industry-standard datasets (KDD, UNSW- NB15, CICIDS, NSL-KDD) to identify optimal ML models for practical intrusion detection systems.

TECHNICAL SKILLS

Programming Languages: Python, JavaScript, Java, C/C++, TypeScript, SQL, Shell

Frameworks and Tools: Next.js, TensorFlow, PyTorch, Scikit-learn, Docker, Hadoop, LangChain, Model Context Protocol, PyTorch Lightning, Whisper/ESPnet, Spark, Hive, HBase, MongoDB, AWS, Docker, Git, GCP

Concepts: Machine Learning, Deep Learning (CNNs, ViTs, GANs), NLP, Agentic AI, time-serie synthetic data generation, LLM Inference, Chain-of-Thought Reasoning, Secure AI Pipeline, Big Data Processing, Secure P2P Systems, Blockchain Fundamentals

Soft/hard skills

Languages: Tamazight, Arabic, English, France

Soft skills:

- Strong written communication for clear, concise collaboration across digital channels.
- Self-discipline and time management to maintain productivity without direct supervision.
- Adaptability to navigate evolving tools, time zones, and distributed team dynamics.