

Oussama Hassan Ibrahim

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Professional Summary

Analytical and process-driven professional combining hands-on workflow automation, data analytics, and AI tooling with a strong quantitative foundation. Skilled at mapping how work flows across teams, identifying bottlenecks and failure points, and using data to design, implement, and measure improved processes. Practical experience building end-to-end automation in n8n, designing dashboards and KPI frameworks, and translating operational needs into clear specifications and living documentation. Equally comfortable turning a messy, undocumented workflow into a clear diagram with decision points and handoffs, and collaborating with AI teams to automate the fix rather than just advise on it. Strong communicator across technical and non-technical stakeholders, and effective in fast-paced environments where measurable results matter more than slide decks.

Education

American University of Beirut (AUB)

Aug 2023 – Feb 2026

Master's in Computational Science, Specialization in Machine Learning for Engineers

GPA: 4.0/4.0

Graduate Assistant Full Scholarship

Thesis Title:

"Neuro-Symbolic Approach for Discovering Completely Separable Hamiltonian Equations"

Relevant Coursework:

Advanced Machine Learning, Statistical Learning, AI in Industry, Data-Driven Modeling in Science and Engineering, Advanced Optimization Techniques, Discrete Models for Differential Equations

Lebanese University

Master 2 in Numerical Analysis and PDEs

Oct 2020 – Nov 2021

Thesis: "The Limit Behavior Equation of Solutions for the Nonlinear Schrödinger Equation Including Nonlinear Loss/Gain with Variable Coefficient"

Average: 67.97/100

Master 1 in Pure Mathematics

Oct 2019 – June 2020

Average: 77.30/100

BS in Pure Mathematics

Oct 2016 – June 2019

Average: 71.32/100

Relevant Experience

Business Process & AI Automation, Agentic AI Bootcamp, ZAKA

Apr 2026 – Jun 2026

- Designed and built a Telegram-based Supervisor multi-agent system that automates appointment booking, rescheduling, cancellation, and customer support, reducing manual handling through end-to-end orchestration in n8n.
- Integrated Pinecone (RAG), Google Calendar, and Google Sheets as the data layer, connecting previously manual, disconnected steps into a single streamlined pipeline, with input/output guardrails for jailbreak and PII detection.
- Built an automated evaluation framework by an LLM judge, tracking correctness against defined KPIs to validate that each change improved outcomes.
- Documented the system architecture, workflows, and requirements as living technical documentation for reuse and handoff.

Data Analyst, Center for Earth Science, AUB

Sep 2024 – May 2026

- Extracted, cleaned, and structured large meteorological datasets from multiple regional sources across Lebanon for analysis and reporting.
- Conducted exploratory data analysis and data cleaning to ensure accuracy and consistency, applied visualization tools to extract insights, and performed data preprocessing, feature engineering, and predictive modeling to surface trends and actionable insights for stakeholders.
- Translated raw, messy data into structured reports and Power BI dashboards that supported decision-making.

Research Assistant, Mechanical Engineering Department, AUB

Sep 2024 – Feb 2026

- Developed **SympNeuroSR**, a novel neuro-symbolic AI architecture for transforming non-separable Hamiltonian systems into separable forms while discovering interpretable analytical equations.

- Designed modular deep learning pipelines combining neural networks, symbolic regression, and optimization methods for scientific discovery and physics-informed learning.
- Implemented scalable experimentation and hyperparameter optimization frameworks using synthetic and analytical time-series datasets.

AI Internship, Mechanical Engineering, AUB

Feb 2025 – May 2025

- Developed “PsyProtection,” an AI-powered healthcare platform for predicting psychiatric medication dependency risk using multimodal deep learning on Brain MRI and Electronic Health Records.
- Fine-tuned pretrained 3D Vision Transformer (3D ViT) models for MRI-based feature extraction and clinical prediction tasks.
- Designed Retrieval-Augmented Generation (RAG) pipelines integrating GPT models and vector databases for personalized healthcare assistance and recommendation generation.
- Developed backend AI services using Flask and FastAPI while deploying scalable microservices using Docker and Docker Compose.
- Implemented Explainable AI (XAI) techniques and experiment tracking workflows using MLflow.
- Built React-based dashboards and integrated cloud-based storage services using AWS S3.

Teaching Assistant, AUB

Jan 2024 – May 2025

- Assisted in teaching the “Numerical Computing” course.
- Conducted office hours, graded assignments and examinations, and supported students in MATLAB-based numerical methods.

Research Assistant, CAMS, AUB

Jun 2024 – Aug 2024

- Applied machine learning and deep learning methods to study Hamiltonian systems and discover analytical representations of physical dynamics.

Selected Projects

- **Bright Smile Dental Clinic AI Agent:** Built a Telegram-based Supervisor multi-agent system in n8n that automates appointment booking, rescheduling, cancellation, and clinic-information support. Integrated a Pinecone RAG knowledge base, Google Calendar, and Google Sheets as the data layer, with input/output guardrails for jailbreak and PII detection. Designed an automated evaluation pipeline across multiple scenarios and model configurations to measure correctness and reliability.
- **PsyProtection**
Developed a multimodal AI healthcare platform integrating MRI data, Electronic Health Records, Explainable AI, and Retrieval-Augmented Generation for psychiatric medication dependency risk prediction.
- **Neuro-Symbolic Hamiltonian Discovery System**
Developed a neuro-symbolic architecture capable of discovering analytical Hamiltonian equations and learning interpretable transformations for physical systems.
- **Image Generation Based on Music**
Implemented multimodal deep learning architectures for generating images conditioned on musical inputs.
- **Sentiment Analysis System**
Developed and evaluated multiple NLP models for product review sentiment classification and comparative performance analysis.
- **Movie Recommendation Engine**
Built collaborative filtering and matrix factorization recommendation systems for personalized movie recommendations.

Technical Skills

Programming Languages: Python, MATLAB

Machine Learning & AI: PyTorch, TensorFlow, Scikit-learn, Deep Learning, Generative AI, LLMs, Prompt Engineering, RAG Architectures, AI Agents, Neuro-Symbolic AI, Physics-Informed Neural Networks (PINNs), Explainable AI (XAI), NLP

Data Visualization: Matplotlib, Seaborn, Plotly, Power BI, Dashboards

Frameworks & APIs: FastAPI, Flask, REST APIs

Automation & Orchestration: n8n, Zapier, Workflow Automation, Tool Calling, Memory Systems

MLOps & Infrastructure: Docker, Docker Compose, MLflow, AWS S3, Prometheus, Grafana

Databases & Vector Stores: Pinecone, Vector Databases

Other Tools: LaTeX, Git, Microsoft Office, FreeFEM

Languages: Arabic (Fluent), English (Professional Proficiency), French (Basic)

Soft Skills

Problem Solving • Critical Thinking • Cross-Functional Communication • Analytical Thinking • Time Management • Ownership