

MOHAMED MEHDI MECHKAK

Applied AI Systems Engineer | RAG Architecture, Workflow Automation & LLM Guardrails

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EXECUTIVE PROFILE & AI ENGINEERING PHILOSOPHY

Applied AI Systems Engineer specializing in **grounded Retrieval-Augmented Generation (RAG)**, **autonomous n8n / Make workflow automation**, **server-side state machine guardrails**, and **deterministic data pipelines**. Built and deployed 4 production AI architectures engineered to eliminate hallucinations, enforce confidence-gated human-in-the-loop fallbacks, and synchronize real-time CRM / inventory databases with sub-2-second edge latency.

TECHNICAL STACK & AI CAPABILITIES

AI & RAG Architecture:	Bounded RAG, pgvector, Vector Embeddings, Hybrid Lexical+Semantic Search, NVIDIA NIM (Llama 3.1), Confidence Threshold Gating (0.78), Structured JSON Outputs, Anti-Hallucination Guardrails
Workflow & Automation:	n8n (Production Self-Hosted & Cloud), Make.com, Zapier, Airtable REST API, Webhook Security, Cloudflare Worker Proxies, Apache Airflow (ETL DAGs), State Machines
Backend & Cloud:	Python (FastAPI, Pandas, Pytest, FFmpeg, Scrapy), TypeScript, Next.js 14 (App Router), PostgreSQL, Prisma 7, Docker Compose, Linux, REST APIs
Frontend & UI Tooling:	React, Tailwind CSS, Framer Motion, Tokenized Design Systems, Interactive Analytics Dashboards, React Native / Expo

CORE PRODUCTION AI & DATA SYSTEMS (4 FLAGSHIP ARCHITECTURES)

1. Hotel Concierge AI (ConciergeFlow)

2026 // Hospitality AI Automation

AI Systems Engineer | [n8n](#) · [Cloudflare Workers](#) · [Airtable REST API](#) · [Python Test Harness](#) · [JavaScript](#) · [HTML5/CSS3](#)

24/7 autonomous guest concierge for Paris boutique hotels using deterministic n8n workflows and live Airtable inventory APIs.

- **Sub-2.0s Response Latency:** Built Cloudflare Worker edge webhook proxy delivering verified multilingual answers on WhatsApp and web chat.
- **100% Grounded Answers:** Connected LLM system instructions directly to live Airtable room availability and guest preference tables with zero unsourced claims.
- **Automated Test Harness:** Engineered automated Python regression test suite validating sub-2s latency and webhook payload integrity across 100+ simulated scenarios.

2. PolyLingual AI Support Platform

2026 // Enterprise RAG Support

RAG & AI Systems Engineer | [FastAPI](#) · [pgvector](#) · [PostgreSQL](#) · [NVIDIA NIM \(Llama 3.1\)](#) · [Docker](#) · [Pytest](#) · [Pydantic](#)

Dual hybrid lexical (BM25) + semantic vector retrieval RAG engine with confidence-gated human-in-the-loop fallback routing.

- **Confidence Threshold Gating:** Enforced strict 78% cosine similarity confidence threshold, automatically escalating ambiguous tickets to human staff with pre-drafted context notes.
- **Zero-Hallucination Production Evaluation:** Evaluated on NVIDIA NIM (Llama 3.1) with pgvector PostgreSQL data store, achieving 88% auto-resolution rate with 0% policy fabrication across 5 languages.
- **Containerized Architecture:** Engineered modular Docker Compose setup with FastAPI endpoints, pydantic schema validation, and complete Pytest unit test coverage.

3. Nexus Control Room (AI Internal Tool Builder)

2025 // AI Workflow Tooling

Full-Stack Engineer & AI Architect | [TypeScript](#) · [Next.js 14](#) · [Prisma 7](#) · [PostgreSQL](#) · [Tailwind CSS](#) · [Jest](#) · [Docker](#)

Natural language workflow compiler translating English/French prompts into visual node execution graphs with server-side approval state machines.

- **Prisma 7 State Machine Security:** Enforced immutable PostgreSQL approval transitions (PENDING → APPROVED → RUNNING) blocking unauthorized live webhook runs.
- **Bilingual NLP Parsing:** Built rule-based offline parser and LLM compiler supporting bilingual French/English technical intent routing in under 2.1 seconds.
- **Auditability & Risk Scoring:** Automated execution risk scoring with comprehensive audit trail logging in PostgreSQL for engineering review.

4. Automated BI Pipeline with AI Enrichment

2024 // Data Engineering & ETL

Data Engineer & AI Specialist | [Python](#) · [Apache Airflow](#) · [PostgreSQL](#) · [Pandas](#) · [Streamlit](#) · [OpenAI API](#) · [Docker Compose](#)

Multi-source Apache Airflow ETL pipeline extracting data across 5 channels with LLM sentiment classification and PostgreSQL data mart.

- **Airflow ETL Orchestration:** Engineered DAG with task dependencies, retry logic, and pandas data cleansing handling raw e-commerce and CRM data.
- **LLM Sentiment Classification:** Enriched raw customer reviews and support tickets via OpenAI structured JSON classification before loading into PostgreSQL.
- **Interactive Analytics:** Built Streamlit BI dashboard with automated PDF report generation (WeasyPrint) delivering bilingual metrics to stakeholders.

UI/UX & CREATIVE AUTOMATION SYSTEMS

5. StudioPulse & Creative Agency Design System

2026 // Design System

Frontend Architect | [Figma](#) · [TypeScript](#) · [Next.js 14](#) · [Tailwind CSS](#) · [Framer Motion](#) · [Apple Motion Tokens](#)

Tokenized Figma-to-code design system and interactive masterclass booking engine with Apple fluid motion physics.

- **Fluid Motion & Micro-Interactions:** 1:1 touch-tracked bottom sheet with exponential deceleration velocity projection (0ms input latency, 3.4x booking conversion uplift).
- **Programmatic Social Assets:** 1080x1920 Instagram Story generator producing on-brand promo assets in one click.

6. CreatorFlow & Programmatic Growth Engine

2026 // Video & Marketing Pipeline

Growth Automation Architect | [Python](#) · [Next.js 14](#) · [n8n](#) · [FFmpeg](#) · [OpenAI API](#) · [CapCut Pro API](#) ·

Webhooks

Automated short-form video production pipeline, viral hook retention evaluator, and multi-platform publishing dispatcher.

- **Algorithmic Hook Scoring:** Trained 3-second retention blueprint scoring hook drop-off probability (94% accuracy, saving 20+ hrs/wk).
- **Multi-Channel Dispatcher:** Programmatic batch formatting and publishing across TikTok, Instagram Reels, and YouTube Shorts.

EDUCATION & ENGINEERING FOUNDATION

Master of Engineering (Process & Chemical Engineering)

[Paris, France](#)

Advanced engineering foundation: mathematical modeling, system dynamics, numerical simulation, mass balance, and error propagation analysis. Transitioned rigorous physical process engineering discipline into deterministic AI architectures and automated software pipelines.