

EMMANUEL MAYOWA SAMUEL

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SUMMARY

AI/ML Engineer building production LLM and machine learning systems. Specialises in agentic architectures (LangGraph, MCP, AWS Bedrock, Google Vertex AI), retrieval-augmented generation, and multi-tenant platform engineering across Python, TypeScript, FastAPI and Next.js. Experience spanning fintech, legal tech, fashion tech, construction and education, from data model to production deployment.

EXPERIENCE

ThreadChain

United Kingdom (Remote)

AI/ML & Software Engineer

May 2026 - Present

- **AI generation pipeline:** Build the Gemini orchestration behind an AI design-specification generator for fashion brands, producing garment renders, artwork and measurement tables from a questionnaire, via a client factory switching between Vertex AI and the Gemini Developer API per environment.
- **AI cost metering:** Instrumented per-call cost tracking via OpenTelemetry counters and a PostgreSQL audit log, pricing prompt, output, thinking and image tokens separately against a per-model rate table, surfaced through billing-summary endpoints.
- **Model-call resilience:** Centralised model calls behind one retry layer using equal-jitter exponential backoff on 503, 429, quota and network-reset errors, stabilising generation across ~20 Celery tasks.
- **Credit billing:** Implemented Stripe credit billing across plans, subscriptions, checkout and webhook reconciliation, with a 402-triggered paywall intercepted centrally in the API client.
- **Observability:** Instrumented FastAPI, Celery and SQLAlchemy with OpenTelemetry exporting to Prometheus, Grafana and Jaeger across an 11-service Docker Compose stack.
- Deliver full-stack features across a Next.js 15 / React 19 frontend and a FastAPI backend of 63 models and 62 API routers, including pgvector retrieval, Tolgee i18n and document export to PDF and Excel.

Metcore Digital Technologies

Lagos, Nigeria (Hybrid)

AI/ML Engineer

Sep 2025 - Present

- **Agentic AI platform:** Architected LangGraph agents on AWS Bedrock AgentCore across 7 product lines, loading tool catalogues dynamically over MCP from vendored OpenAPI contracts, with HMAC-signed identity tokens and SigV4 signing enforcing tenant authorisation at the tool-call boundary.
- **Multi-channel agent delivery:** Shipped the same agents across three surfaces: speech-to-speech voice on LiveKit with Amazon Nova Sonic, a per-tenant API-key REST endpoint streaming over SSE, and an embeddable JavaScript widget with React bindings.
- **AI Ops platform:** Built an operator console for a national telecom, integrating six monitoring systems (Grafana, StableNet, Azure Monitor, Elastic, Metabase, Wavefront) behind a connector SDK, with a Python/FastAPI service for anomaly detection (isolation forest, RCF, seasonal), forecasting, change-point detection, log-template mining and root-cause ranking.
- **Architecture recovery:** Diagnosed a production tool-routing failure and re-architected a supervisor plus five sub-agent systems into a flat single-agent design over a unified ~23-tool catalogue, eliminating misroutes from fragmented tool namespaces.
- **Enterprise RAG platform:** Built multi-tenant retrieval on AWS S3 Vectors with Bedrock Titan v2 embeddings (1024-dim, cosine), over a 35-table Drizzle/PostgreSQL schema with BullMQ-queued Crawlee ingestion across a 7-service Turborepo.
- **Construction intelligence platform:** Shipped a Bedrock agent exposing 31 custom tools behind a circuit breaker and custom MCP server over a NestJS/PostGIS backend of 61 tables and 300+ endpoints, with SSE streaming and ONVIF/Kinesis camera ingestion.
- **Payments & education platforms:** Shipped Bedrock agents for payment operations (tool calling, guardrails, circuit breakers over a dual test/live platform of 54 models and 180 routes) and K-12 tutoring (Claude 3.5 Haiku, 7 tools, SSE, enrollment-scoped guardrails, per-student rate limits).

Legal Action Media

United States (Remote)

AI & Software Engineer

Jul 2025 - May 2026

- **Agentic workflows:** Owned the AI layer across a US personal-injury law firm's product suite, building LangGraph/LangChain pipelines with PostgreSQL checkpointing for resumable claim-intake and document-processing workflows.
- **AI content generation:** Built a FastAPI service orchestrating OpenAI Agents SDK agents with LiteLLM multi-provider routing, rate-limit-aware retries and live WebSocket progress streaming, turning legal articles into structured production plans.

- **Claims platform:** Delivered full-stack features with the platform team on a Next.js 16 claims-management system of 100 Prisma models and 399 routes, integrating Twilio Voice/Video, Nylas, DocuSeal and Stripe behind an Inngest/BullMQ workflow engine.
- Automated call-recording ingestion with a pandas/boto3 pipeline moving spreadsheet-sourced audio into AWS S3.

Egbin Power Plc

Lagos, Nigeria

Industrial Engineering Intern, National Youth Service Corps (NYSC)

Jul 2024 - Jul 2025

- **Budget management application:** Shipped a budget-management application adopted by every department at the plant, administered by the finance team, covering planning, tracking and approval of departmental budgets.
- **Estate operations automation:** Eliminated a backlog of dozens of unattended tickets by replacing manual triage with Zoho automation routing each request to the right handler on submission by housing or defect type, across a 430-bed estate serving 500+ staff.
- **OPEX reporting:** Cut OPEX report preparation from one week to two days (60%) with a desktop ticket-merger application consolidating maintenance ticket data into reporting documents for the facilities-management contractor.

Ingressive for Good, FUT Minna Software Developer, Team Lead

Sep 2022 - Feb 2023

- Led technical bootcamps in Python and web development for 200+ undergraduates, curating curriculum and resolving technical escalations across the community.

SELECTED PROJECTS

Sports Prediction Platform ensemble ML and LLM commentary (Node.js, Python, Docker)

- Built a Flask ML microservice combining Poisson regression, XGBoost and an Elo baseline in a weighted ensemble (0.35/0.45/0.20) with Monte Carlo simulation for football, F1 and boxing outcomes.
- Integrated GPT-4o commentary behind a regional compliance filter with rate-limit retries and token-usage tracking, served through tiered Stripe subscriptions on a 5-service Docker stack.

Machine Learning & Computer Vision [GitHub](#)

- CNN landmark classification for image geolocation, a PyTorch image classifier deployed as a CLI, an OpenCV traffic monitoring system for vehicle detection and counting, and an end-to-end SageMaker workflow classifying delivery vehicle types.

TECHNICAL SKILLS

GenAI & LLM: LLM agents (LangGraph, LangChain, OpenAI Agents SDK, Strands), RAG, Model Context Protocol (MCP), AWS Bedrock (Converse, AgentCore, Titan, Nova Sonic), Google Gemini/Vertex AI, vector search (S3 Vectors, pgvector), LiveKit voice agents, Langfuse, prompt engineering

Machine Learning: PyTorch, TensorFlow, Keras, scikit-learn, XGBoost, OpenCV, pandas, NumPy, Amazon SageMaker; deep learning, computer vision, NLP, ensemble methods, AIOps - anomaly detection, forecasting, change-point detection and root-cause ranking

Languages: Python, TypeScript, JavaScript, SQL, Solidity

Backend: FastAPI, NestJS, Hono, Express, Django, Node.js, Bun, Celery, BullMQ, Redis, Inngest, WebSockets, SSE

Frontend: Next.js, React, Tailwind CSS

Data: PostgreSQL, PostGIS, Prisma, Drizzle ORM, ClickHouse, Redis

Cloud & DevOps: AWS (Bedrock, S3, Kinesis, Transcribe, Polly, ECS, RDS), GCP (Vertex AI), Azure, Digital Ocean, Docker, Turborepo, OpenTelemetry, Prometheus, Grafana, CI/CD

EDUCATION

Federal University of Technology, Minna B.Eng. Electrical/Electronics Engineering

2018 - 2023

CERTIFICATIONS

Machine Learning Fundamentals Nanodegree, Udacity · AI Programming with Python Nanodegree, Udacity · Introduction to Python, DataCamp

AWARDS & LEADERSHIP

- **PAYAZA Hackathon 3.0 — 4th Place, Team Lead (Nov 2024):** Led a cross-functional team building an AI solution for MSME financial inclusion, owning the architecture and development lifecycle.
- **Google Developer Student Clubs, FUT Minna — Lead (2022-2023):** Led the campus chapter, and led the team that placed Minna Champions in the 2023 Google Solution Challenge with an AI-powered waste management platform aligned to SDG 12.