Gabriel James

AI/ML Engineer | FinTech · Time-Series · Python · Cloud

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PROFESSIONAL EXPERIENCE

Software Lead – Structural Inspection Drone (SID)
IDEATOR, Government Engineering College Thrissur
02/2026 – Present

- Leading a **team of 8** designing and building an AI-powered drone system for automated structural defect detection.
- Trained **YOLOv11s-seg** segmentation model across 90 epochs, achieving **Box mAP@50: 0.716** for crack and damage classification.
- Architected the full ML pipeline from data collection through edge deployment on **Jetson Orin NX 16GB**.

AI Project Lead – Team Arete (Hackathon Research Team)
Government Engineering College Thrissur
04/2025 – Present

- Led a multidisciplinary team building **production-grade AI systems**, including a **real-time crowd risk detection platform** and a **legal document processing engine**.
- **Owned system design and ML direction**, unblocking implementation issues to deliver **end-to-end solutions**.
- Achieved **Top 6 at HackOdisha 5.0** and **Top 15 at HackHazards '25** *(17,000+ teams)*.

Backend Developer - SaaS Platform
Production System | Spring Boot · React · PostgreSQL
2026 – Present

- Architecting a **manifest-driven cross-module routing system** with a **wrapper-client SDK** and **config.xml single source of truth** for a live production platform serving real users at scale.

TECHNICAL SKILLS

Languages & Tools
Python, **Java**, C, **TypeScript**, SQL, **Flask, Spring Boot**, **FastAPI**, **React**, Next.js, **Git**, **Docker**

AI/ML & Data Science
PyTorch, **TensorFlow**, **NumPy**, **Pandas**, **scikit-learn**, **OpenCV**, **YOLOv8**, **YOLOv11**, NLP, **HMM**, **Signal Processing (STFT/CWT/HHT)**, Predictive Modeling

Databases & Cloud
PostgreSQL, SQLite, AWS, Supabase, CI/CD

EDUCATION

Bachelor of Technology in Computer Science and Engineering
Government Engineering College, Thrissur
2024 – 2028
CGPA: 9.89/10

CERTIFICATIONS

Financial Markets (Yale) · **Machine Learning Specialization (Stanford & DeepLearning.AI)** · **Advanced Learning Algorithms (Stanford)** · **Generative AI Engineering & Fine-Tuning Transformers (IBM)** · **AWS Cloud Practitioner (AWS)**

ACHIEVEMENTS & LEADERSHIP

Winner - Srishti 2025 (XENIA) · **Top 15 - HackHazards '25** (17,000+ teams) · **Top 6 - HackOdisha 5.0** (500,000+ participants)

PROJECTS

ChronoSpectra – Financial Time-Series Forecasting Platform
Full-Stack ML Platform | FastAPI · React 19 · PyTorch · Docker

- Applied **STFT, CWT, and HHT** spectral decomposition to financial time-series, extracting **frequency-domain features** that capture **market regime shifts** invisible to raw price inputs.
- Architected end-to-end: **PyTorch** forecasting model, **FastAPI** inference layer, **React 19** frontend, **Dockerized deployment** across multiple asset classes.

Stampede Predictor
Computer Vision & Real-Time ML | YOLOv8 · OpenCV · Python

- Built a **real-time crowd density and stampede risk prediction** system processing video streams with **YOLOv8** object detection and spatial grid-based density analysis.
- Implemented **multi-tier risk classification** with spatio-temporal aggregation and live alerts.
- Achieved **~30 ms/frame inference** and **Top 15 / 17,000+ teams** at HackHazards '25.

Market Volatility Spike Detector
Statistical ML & Time Series | Python · NumPy · Pandas · SciPy · Flask

- Built a **multivariate anomaly detection system** using **Rolling Gaussian models** and **Mahalanobis distance** for market stress detection.
- Modeled joint behavior of **returns, volatility, volume, and |return|**, flagging the **top 0.5% extreme events** via percentile thresholds.
- Validated detections against **real-world market shocks** including the **COVID crash, SVB collapse, and major Fed rate actions**, confirming model reliability on historically significant events.

Baum-Welch Algorithm Engine
Probabilistic ML | Python · JavaScript · HTML

- Implemented a production-grade **Hidden Markov Model** engine with **forward-backward algorithm** and **parameter re-estimation** from scratch in Python.
- Built a **real-time interactive web dashboard** for HMM state visualization, transition matrix inspection, and training diagnostics.

XENIA – AI-Powered Study Suite
Applied ML + LLM Systems | Gemini 2.5 Flash · Flask · Next.js · Python

- Designed an **AI pipeline for syllabus parsing, difficulty estimation, and adaptive plan generation**.
- Implemented **analytics-driven regeneration** using performance signals and weak-area detection.
- Achieved **<2s plan generation**, **95% quiz relevance**, and **87% 30-day retention**.

ATHENIS – Legal Document Simplifier
NLP & ML Systems | PyTorch · Transformers · Flask

- Built an **AI engine for clause-level legal simplification and risk classification** using transformer embeddings.
- **Top 6 finalist at HackOdisha 5.0** out of 500,000+ participants.