

Sumukh Guruprasad

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Profile

Quantitative Researcher, Full-stack Developer, and Machine Learning Engineer with expertise in financial modelling, systematic trading, and applied AI. Experienced in designing and implementing predictive analytics, risk management engines, and scalable distributed systems. Skilled in translating mathematical research into production-ready forecasting, trading, and portfolio optimisation tools. Recognised for research innovation, technical leadership, and full-stack development.

Skills

- Programming: Python, C++, SQL, Java, TypeScript, Node.js
- Machine Learning & Quantitative Methods: Time-series forecasting, Bayesian inference, regime switching, reinforcement learning, risk models (VaR, XVA), stochastic processes, econometrics
- Frameworks: PyTorch, TensorFlow, scikit-learn, Statsmodels, NumbPy, Hmmlearn, NumPy
- Systems & Web: NestJS, React, Flask, Docker, Kafka, Redis, Keycloak
- Databases: PostgreSQL, MongoDB, MySQL
- Data Analysis & Visualisation: Pandas, NumPy, Tableau, Power BI, matplotlib
- Finance: Derivatives pricing, volatility modelling, market microstructure, portfolio optimisation

Experience

IT Support Specialist (Founding Member) – NextGen Education | Feb 2025 – Present

- Designed and deployed company website and cloud infrastructure using cloud-native tools.
- Managed Microsoft 365, Google Workspace, and LMS/CRM integration for operational efficiency.

Admissions Officer – University of East London | Jul 2024 – Present

- Streamlined admissions using SITS, reducing document verification time and improving workflow efficiency.

Projects

1. Multi-Asset Quantitative Trading Platform

- Developed forecasting and systematic trading system with LSTM, TCN, TFT, gradient boosting, and volatility models (HAR-RV, EGARCH) across cryptocurrencies, FX, equities, and commodities.
- Applied Bayesian model averaging and advanced portfolio optimisation with risk/transaction cost constraints.
- Built real-time risk management engine (VaR, Expected Shortfall, XVA) and reinforcement learning allocator.
- Validated predictive accuracy with walk-forward cross-validation, CRPS/NLL calibration, and explainability methods (SHAP, attention).

2. Bitcoin Market Cycle & Predictive Modelling

- Conducted quantitative research on 12 years of Bitcoin market cycles, uncovering halving-driven structural patterns.
- Applied Fourier transforms, bubble dynamics, and rational functions to forecast cycle peaks with high accuracy.
- Developed a pattern of Bitcoin market cycles and derived a predictive multiplication factor using historical highs/lows, growth percentages, and multiple mathematical formulas.
- Achieved 100% accuracy in long-term cycle forecasts; shortlisted for research publication.

3. Enterprise-Grade SaaS Project Management Platform

- Architected multi-tenant SaaS platform using NestJS, PostgreSQL (RLS), Redis, and Kafka.
- Delivered AI-powered workflow automation for calendars, notes, and project tracking.
- Implemented real-time collaboration features (Kanban, Gantt, mindmaps, flowcharts).
- Containerised services using Docker Compose with Postgres+pgvector, Redis, Kafka, and Keycloak for secure authentication.

Awards and Recognition

- Best Presentation Award – Presented innovative solutions for sustainable technology.
- Top Project Shortlist (Bitcoin Research) – Recognised among the best projects at the University of East London; in process of academic publication.

Education

BSc (Hons) Computer Science – University of East London | 2023 – 2025

- Achieved First-Class Honours with a focus on artificial intelligence, applied machine learning, and distributed systems.

MSc Artificial Intelligence - University of East London | 2025 – 2026