Tahar Yassine Soltani

Phone: 07511005894 • E-Mail: ysolta1969@gmail.com • Portfolio• GitHub

Education

Kings College London MSc Financial Mathematics (*Sept. 2025 – Sept.v2026*)

- Selected modules: Risk-Neutral Valuation, Stochastic Analysis, Numerical Methods in Finance, C++ for Financial Mathematics, Machine Learning, and Stochastic Control. Focus: stochastic calculus, derivative pricing, and algorithmic optimisation. Planned dissertation: Numerical methods for stochastic volatility models in derivative pricing.

Brunel University BSc (Hons) Mathematics with Computer Science (*Sept. 2022 – Jun. 2025)* First Class Honours (82% Average)

- **Key Modules:** Stochastic Processes (90%), Numerical Methods (80%), Calculus (98%), Numerical Analysis (98%), Linear Algebra (91%), Probability & Statistics (87%), Artificial Intelligence, Algorithms (86%).

Projects

- **MDX (Mikon Derivatives Exchange) - Market Structure & Exotic Options Standardization**: Investigating the structural bifurcation between centrally cleared and OTC derivative markets. Proposed a design framework to standardize exotic options by restricting payoff flexibility and enforcing parameter grids, rendering them suitable for Central Counterparty (CCP) clearing. Designing an RFQ-based trading mechanism to support competitive pricing while preserving risk discipline. This project aims to bridge the gap between bespoke OTC trading and fully centralised exchanges, solving the liquidity and clearing feasibility trade-off for complex instruments.

- **Pricing of Barrier Options:** Developed and implemented mathematical models for pricing barrier options, including analytical methods, Monte Carlo simulations, and numerical techniques such as Forward Euler, Backward Euler, and Crank–Nicolson schemes. Explored the application of Ito's Lemma, stochastic processes, and the Black-Scholes model to derive and validate pricing frameworks for both standard and exotic options; **benchmarked results against QuantLib to detect anomalies and ensure robust code engineering**. Designed and deployed a user-friendly Streamlit dashboard integrating Python-based calculators for option pricing, demonstrating expertise in computational finance. Applied variance reduction techniques and sensitivity analysis to optimise simulations, ensuring accuracy and computational efficiency; in particular, the use of antithetic variates and control variates reduced the number of paths required by **approximately 40%** to achieve pricing estimates within a **95% confidence interval**. Conducted in-depth research on the effects of parameters such as volatility, maturity, and barrier conditions, and extended pricing models to include path-dependent features. Implemented binomial and trinomial trees, modelling rebates and exploring stochastic jump diffusions and dynamic barriers. Notably, an adaptive binomial mesh model produced pricing estimates that were **83% more accurate** than those generated by traditional binomial methods, especially near the barrier, highlighting the benefits of dynamic grid refinement in capturing discontinuous payoffs.

- **Algorithmic Trading Engine:** Engineered a Python-based, event-driven algorithmic trading system for US equities, focusing on modularity and execution precision. Implemented automated data ingestion pipelines using Linux cron jobs to fetch, sanitize, and aggregate **5 years** of daily OHLCV data for **over 500 tickers** from the Alpaca API, building a high-fidelity SQL historical database. Developed and rigorously backtested quantitative strategies—specifically mean-reversion pairs trading and ML-based momentum forecasting—incorporating bias mitigation protocols (survivorship-bias free data and walk-forward analysis). Integrated advanced risk management logic to handle dynamic position sizing (Kelly Criterion), volatility scaling, and strict drawdown constraints. Benchmarked strategy performance, achieving a **Sharpe Ratio of 1.45**, **Sortino Ratio of 1.9**, and limiting **Maximum Drawdown to 12%** in out-of-sample testing. Transitioned the execution layer from simulation to live trading capability via Interactive Brokers, ensuring **sub-100ms** latency for order routing and real-time state management.

Teaching & Work Experience

Full-Stack AI Engineer - Contractor (Jun. 2025 – Present) (Current: Dar Al-Mandumah)

- Developed and scaled a large-scale retrieval-augmented generation (RAG) platform powering AI-assisted academic research across millions of Arabic documents. Built end-to-end pipelines to transform unstructured PDFs and text into structured JSON datasets, carefully optimising document chunking, embedding strategies, and metadata alignment to maximise retrieval quality. Integrated and orchestrated multiple LLM providers, including OpenAI and Google Gemini, designing abstraction layers to support model switching, prompt versioning, and response consistency across providers. Engineered low-latency similarity search using distributed vector databases (FAISS and Qdrant), implementing caching, query batching, and parallel retrieval to improve throughput—achieving a 2.3× speedup in retrieval and ~30% latency reduction. Built full-stack monitoring and analytics dashboards to track latency, token usage, retrieval depth, and failure modes, enabling continuous, data-driven optimisation of both the ML and systems layers.

Skills

- Languages: Python, C++, Java, MATLAB, R,SQL, Git, JavaScript
- Libraries: PyTorch, Tensorflow, Pandas, NumPy, Scikit-learn, Flask, Matplotlib, NextJS, FastAPI, Docker,Postgres OS: Windows and Linux (Ubuntu)

Soft skills, Achievements and Interests

- Academic Excellence CEDPS Scholarship and Institute of Mathematics and its Applications Progression Prize and Student Award
- Hackathons, and Rubik's cube solving
- English (fluent), French (Conversational), Arabic (Conversational)
- Soft Skills: Analytical Thinking, Problem Solving, Leadership, Communication, Collaboration, Attention to Detail