Timofey Generalov

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EDUCATION

The University of British Columbia (UBC) | Vancouver, BC *Bachelor of Science, Major in Mathematics, Minor in Economics* | **Expected April 2028**

- **Concentration**: Mathematics of Information
- **GPA**: 3.0 (Strong upward trend in Mathematics core)
- **Relevant Coursework**: Matrix Algebra, Calculus III, Mathematical Proof, Elementary Statistics, Introduction to Probability, Introduction to Data Science, (Upcoming: Stochastic Processes, Real Analysis, Linear Programming, Econometrics I & II)

PROJECTS

News Sentiment & Volatility Prediction Model | *Python, Scikit-Learn, FinBERT, Numba*

- Developed a Logistic Regression model to predict "4-sigma" volatility jumps in intraday equity data, achieving a **0.8711 AUC** by fusing news sentiment with price-action features.
- Engineered a high-dimensional feature set including **FinBERT** sentiment scores, **BART-based** topic tags, and an **SVM Anomaly Score** to quantify news-driven market surprises.
- Applied **Principal Component Analysis (PCA)** to reduce 768-dimension BERT embeddings into 10 key vectors, capturing latent news themes while preventing model overfitting.
- Simulated market realism via **Walk-Forward Optimization** over two years of data, incorporating Numba-accelerated slippage models, partial fill logic, and transaction costs.
- **Result**: Achieved a **6.11 Sortino Ratio** and 2.96 Sharpe Ratio in out-of-sample backtesting.

Dual-AI Forex Strategy: LSTM Scout & RL Manager | *PyTorch, Stable-Baselines3, OANDA API*

- Architected a two-part autonomous system for identifying and managing high-probability reversal patterns on the GBP/JPY pair.
- **Scout**: Built a multi-head **LSTM** model in PyTorch for multi-task learning to predict trade quality, reward-to-risk ratios, and failure probabilities.
- **Manager**: Trained a Reinforcement Learning agent (**PPO**) in a custom Gymnasium environment to determine optimal exit policies for active positions.
- Integrated an **Explainable AI (XAI)** pipeline using **SHAP** to identify the top market features influencing LSTM predictions.
- Developed a hybrid feature engineering process combining technical indicators with **DBSCAN-based** liquidity zone detection.

Quantitative Equity & Derivatives Analysis Platform | *Python, Pandas, NumPy, Scikit-learn*

- Engineered a desktop workstation integrating eight specialized modules for equity and derivatives trading, from idea generation to portfolio risk management.
- Implemented a **Monte Carlo** engine featuring **Heston**, Jump-Diffusion, and Rough Bergomi models for advanced options pricing and risk modeling.
- Built a comprehensive Greek sensitivity dashboard to monitor first and second order risks across multi-leg options portfolios.
- Developed an event-driven **Strategy Tester** with parameter sweeps and performance metrics, benchmarked against SPY.
- Integrated a standalone portfolio suite featuring **Value-at-Risk (VaR)**, rolling volatility, and crash stress tests.

SKILLS

- **Programming & Development**: Python, Git, GitHub, Numba (HPC), Tkinter, Matplotlib.
- **Quantitative & Machine Learning**: Pandas, NumPy, Scikit-learn, PyTorch, Stable-Baselines3, Gymnasium, SHAP, NLTK.
- **Financial Concepts**: Algorithmic Trading, Derivatives Pricing (Greeks), Stochastic Modeling, Backtesting, Risk Management (VaR), Portfolio Analysis.

CERTIFICATIONS

- **Machine Learning for Trading** – Google Cloud & New York Institute of Finance (Coursera)
- **Financial Markets** – Yale University (Coursera)