MARIO NICOLÒ DE MATTEIS

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EDUCATION

CARNEGIE MELLON UNIVERSITY, TEPPER SCHOOL OF BUSINESS   New York, United States
Master of Science in Computational Finance – MSCF   ***GRE Quant: 168/170***   08/24 - 12/25
- Upcoming coursework: Financial Computing, Fixed Income, Machine Learning and Advanced Derivative Models

BOCCONI UNIVERSITY   Milan, Italy
Bachelor of Science in Economics and Finance   ***GPA: 29/30***   08/21 - 07/24
- **Programming skills:** Python (NumPy, Pandas, SciPy and PyTorch), C++ (STL), Java and Julia
- **Leadership:** Cofounder of Bocconi Financial Engineering Club, Head of IT at JEME (Bocconi Consulting Club)
- Research Paper on Dynamical Portfolio Optimization methods (Grade: 4/4)
- Exchange Semester at University of Illinois Urbana-Champaign and Summer School at London School of Economics

EXPERIENCE

Hiop (Data engineering firm)   Milan, Italy
Data Scientist Intern   06/23 – 09/23
- **Machine Learning Modeling:** Implemented Generative Adversarial Networks and Variational Autoencoders to fit the distribution of 5+ years of consumer preferences for an Italian restaurant chain, improving menu options for customers
- **Deep Learning Research:** Built Python library designed to convert website into complex graph data structures, aiming to model non-Euclidean objects for more valuable results in web data analysis using Graph Neural Networks
- **API Design:** Developed Python library leveraging Rust bindings for validating SQL queries with DataFusion, significantly enhancing time performance

PROJECTS

C++ Quantitative Analytics Library for Advanced Financial Derivative Pricing   03/24 – 08/24
- **Pricing Algorithms:** Implemented Black-Scholes, Heston, SABR, Hull-White and Local Volatility models; utilized numerical techniques like Monte Carlo, finite difference and lattice methods for exotic derivatives and fixed income products
- **Modern C++ implementation:** Designed with object-oriented and generic programming paradigms; utilized C++20 features (concepts, ranges, coroutines) and STL for optimized computational efficiency and memory management

Portfolio Optimization Techniques through Deep Reinforcement Learning Models   01/24 – 06/24
- **Performance Result:** Yielded 65.6% (2.70 vs. 1.63) higher Sharpe ratio and 94.6% (22.24% vs. 11.43%) higher return than Static Markowitz portfolio in 1-year period, using dynamic portfolio optimization based on Reinforcement Learning
- **Methods:** Designed models based on Convolutional and Recurrent Neural Networks using two custom-built variants of the Fama-French 12 Industries dataset incorporating sentiment analysis and financial information (e.g., periodic volatility); Implemented model using DDPG adapting Deep Q-Learning to continuous action spaces via actor-critic architecture
- **Literature Contributions:** Different versions of the model significantly outperformed two variants of Markowitz portfolios (p-value < 0.05); CNN architectures consistently outperformed RNN variants yielding highest returns and lower volatility

Order Management System   01/23 – 10/23
- **Software:** Developed an order management system in Python interfacing with the MetaTrader platform via MetaTrader5 API; Incorporated simulation capabilities for strategy testing and risk analysis tools to enhance decision-making for users
- **Development Tools:** Built API Server in FastAPI to manage administrators and investors requests; Database management through MongoDB and PostgreSQL; Containerized the infrastructure using Docker for seamless system implementation
- **Interface:** Designed and implemented front-end platform in Python using Streamlit to allow administrators and investors managing their accounts, performing market state simulation and performing backtesting on their basic trading strategies

ADDITIONAL INFORMATION

- Interest: Philosophy, running and Italian cuisine
- Languages: English (Fluent), French (Intermediate), Italian (Native)