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SAIFIN (Satellite data and Artificial Intelligence for FINtech)

One of the most promising methods for evaluating trading strategies relies on the analysis of satellite data. The primary objective of SAIFIN (Satellite data and Artificial Intelligence for FINtech) is to develop an AI-based algorithmic trading system capable of identifying financial trading strategies by leveraging information retrieved from both web sources and satellite data.

The system will be organized into three main components: data acquisition and preprocessing, nowcasting and predictive analysis, and execution and management of trading strategies. The first component focuses on collecting and processing raw data from satellite imagery—such as optical images, radar, and multispectral sensors—to assess macroeconomic indicators like agricultural production, logistics, and energy consumption. It also gathers web-based data, including economic news, social media sentiment analysis, and financial market feeds. Advanced AI technologies like Convolutional Neural Networks (CNNs) for image processing and Transformer models for Natural Language Processing (NLP) are employed, alongside distributed high-performance computation (GPUs) to handle large volumes of data efficiently.

The second component involves nowcasting and predictive analysis to generate forecasts of economic variables and financial markets across various time scales. AI models such as Long Short-Term Memory (LSTM) networks and Gated Recurrent Units (GRUs) model temporal relationships in economic data. GPU-accelerated frameworks like PyTorch and TensorFlow are utilized for efficient computation, enabling high-frequency forecasts for intraday trading, short-to-medium-term forecasts for swing trading, and long-term analyses for strategic investments.

The third component implements automated trading strategies based on signals generated by the predictive analysis module. It features a decision engine using Reinforcement Learning (RL) models like Deep Q-Networks (DQN) and Proximal Policy Optimization (PPO) to optimize buying and selling decisions. Simulation and backtesting are conducted to evaluate strategies, analyzing risks and performance. Automation is achieved through integration with financial broker APIs for real-time order execution. The system manages multiple time scales, from high-frequency trading requiring rapid forecasting supported by GPUs to medium-term trading that identifies seasonal or cyclical trends, as well as strategic investments employing ensemble approaches that combine AI models with traditional indicators.

This approach, which combines satellite data analysis with high-performance computing, enables nowcasting of critical variables to achieve better outcomes in high-frequency trading (HFT), short-term, and medium-to-long-term trading scenarios. The integration of standard commercial models with insights derived from the nowcasting trading system is expected to yield superior results, particularly during exogenous shocks, such as global pandemics or conflicts with significant geopolitical implications.

The need for effective trading strategies arises from the complex dynamics that drive financial markets, making it challenging to devise robust approaches. The execution of models involving large datasets and multiple variables requires substantial computational power, parallelization, and efficiency. To address this, the project will develop algorithms specifically designed for GPU acceleration. The system's architecture enables scalable and flexible operations, adaptable to the rapid and unpredictable dynamics of financial markets, ensuring that trading can be conducted across different time scales, from intraday to longer-term periods.

Giorno preferito

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Primary author: GARINEI, Alberto (Università Guglielmo Marconi - Dipartimento di Scienze Ingegneristiche)

Presenter: GARINEI, Alberto (Università Guglielmo Marconi - Dipartimento di Scienze Ingegneristiche)