Deep Nexus

Introduction

Deep Nexus applies a **statistically rigorous** approach for quantitative algorithmic portfolio management named *Quantum*.

Quantum is built upon principles from the field of Information Theory. It **amplifies a weak signal in noisy data**; uncovering persistent, market-wide signals that are often obscured in price data. It **generates exceptional returns with low risk** and typically executes a combination of long and short trades simultaneously across an ensemble of assets.

The nature of the approach means its edge can never be arbitraged away as it exploits consistent underlying statistical behavior in financial markets.

From a scaling perspective, there is a very clear optimization and execution focus. Resources are not wasted chasing highly random or elusive patterns in noisy data. Refining the trade execution systems and ongoing optimization of the algorithms maximize the system's performance.

Common Approaches

The Quantum system avoids the pitfalls associated with discovering alpha factors and the limitations of using Artificial Intelligence (AI) for time-series analysis.

Alpha factors are typically some form of time-series data that, if interpreted properly, can predict what direction the market (or a particular asset) will move. In many cases, these factors are derived from market price data, fundamental data, the market order book, or alternative data from non-financial market sources. This method often relies on discovering inefficiencies or anomalies in the data that others have missed. As computing power and data mining algorithms grow in use, these inefficiencies are arbitraged away by other market participants.

In recent years, advancements in AI, including Deep Learning and GPUs, have seemingly opened up new avenues for market prediction. These advanced statistical models, while highly useful in certain areas of finance, suffer from challenges related to non-stationarity. The mean and variance of the data need to remain consistent across the training data and out-of-sample data (defined as *stationary data*). Otherwise, the model will degrade and fail when deployed.

Even the Nobel prize-winning Modern Portfolio Theory suffers the same problem; it fits an optimization algorithm to historical data but the inputs to the model require accurately predicting future returns — and so it fails to live up to expectations in the real world.

Implementation Requirements

To implement Quantum, a portfolio of at least 20 assets is beneficial. Portfolio composition can expand to include as many liquid assets as are available. Equities, futures, and emerging tokenized assets (ideally *via* perpetual swaps) are eligible.

Transaction costs obviously play a role, however, they are not an impediment for this approach and the algorithms can be optimized to minimize their impact.

Use of leverage is not required but is easily implemented. The maximum leverage depends on liquidity and the expected value of a trade.

Trades are executed on an intra-day basis and a quant prime broker is preferred.