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Project Abstract: High-Frequency Trading Assistant with High-Probability Setups

Our interests converged to the idea of finance technology. We will focus on the development of high-frequency trading algorithms designed to capitalize on short-term market inefficiencies through three high-probability setups: mean reversion, momentum ignition, and bid-ask spreads.

High-frequency trading is characterized by the rapid execution of a large number of trades, often within milliseconds, and requires algorithms to maximize profits faster than human cognition. The proposed bot will integrate intermediate algorithmic techniques to identify profitable trading opportunities in real-time using a combination of statistical analysis, basic machine learning applications available in the common market, and historical data backtesting.

The first setup leverages mean reversion, detecting when asset prices diverge from their historical averages and executing trades in a common hedged position, anticipating a high probability of reversion.

The second setup is based on momentum, where the bot will identify volume trends as they emerge and execute trades in the direction of the momentum, profiting from short to medium-term asset movement..

Finally, the bot will revert back to implement a market-making strategy, scalping small profits by executing trades based on the bid-ask spread in high volatility and liquid markets. These strategies will be integrated into a cohesive system that dynamically adjusts based on market conditions, employing real-time risk management techniques such as position sizing and automated stop-loss mechanisms.

We will need to research and implement real-time data acquisition systems, integrate high-performance computing platforms for low-latency execution, and backtesting frameworks to evaluate the performance of the strategies on historical data. The trading assistant will be designed with a strong emphasis on speed, reliability, and compliance with regulatory standards in financial markets. The outcome of this project is expected to demonstrate our effectiveness with implementing the algorithms learned in this class and providing a vessel to test our technical abilities.