Strategy Report for SpreadHunter

How I Explored the Dataset

To understand the dynamics of the market, I began by exploring the order book dataset using pandas. The steps included:

- Viewing the first few rows to understand the structure of bids and asks.
- Plotting the evolution of best bids and best asks over time.
- Calculating and visualizing the bid-ask spread.
- Looking for patterns where trades followed tight or wide spreads.

From this exploration, I observed:

- The bid-ask spread was generally small and stable.
- Trades often occurred at or near the best bid/ask prices.
- Larger trades frequently followed sharp changes in the spread.

What Inspired My Strategy

The core inspiration for my trading strategy came from:

- The concept of providing liquidity at favorable prices.
- Market microstructure theory: liquidity providers profit by buying near the bid and selling near the ask.
- The consistent observation that trading slightly inside the spread can yield profits, especially in low-volatility conditions.
- The need to respect position limits to avoid overexposure.

Core Logic of the Algorithm

The strategy, titled **SpreadHunter**, follows these main steps:

- Calculate the best bid and ask from the current order book.

- Compute the spread and midpoint price.
- Define a buy price as a discount from the midpoint (25% of the spread).
- Define a sell price as a premium over the midpoint (25% of the spread).
- If the best ask is lower than the buy price, buy up to the maximum allowed position.
- If the best bid is higher than the sell price, sell down to the minimum allowed position.

This approach ensures that:

- Trades are only placed when prices are clearly favorable.
- Position limits are respected to manage risk.
- The strategy reacts to temporary price inefficiencies in the spread.

Experiments, Variations, and Insights

Throughout development, I tested and tuned the following:

- Varying the percentage offset from the midpoint (10%, 25%, and 50% of the spread).
- Adding more aggressive position limits to reduce risk exposure.
- Trying multi-level order placement to catch more volume when price is favorable.

Key insights:

- A 25% offset from the midpoint strikes a good balance between profitability and execution rate.
- Adding simple position management avoids dangerous drawdowns in volatile conditions.
- The strategy performs well in tight-spread environments, but needs enhancements for trending or highly volatile conditions.

Next Steps

Possible improvements for future versions:

- Incorporating volatility detection and adaptive spread margins.
- Adding short-term trend following to improve entry/exit timing.
- Including trade history analysis to detect large trader behavior.