Strategy Report for Drowzee

How I Explored the Dataset

I began by loading and inspecting two datasets: `drowzee_prices.csv` and `drowzee_trades.csv`. The prices dataset provided timestamped snapshots of the order book, including up to three levels of bid and ask prices with corresponding volumes. The trades dataset recorded executed trades with their price, quantity, and timestamp.

I explored:

- The bid-ask spread at each timestamp to assess typical market tightness.
- The frequency and size of trades to understand market activity.
- The volatility of best bid and ask prices over time.

These observations revealed that the spread was often small (typically 2 to 4 ticks), and trades were of modest size, suggesting a relatively stable and liquid market.

What Inspired My Strategy

The data indicated a low-volatility environment with tight spreads. This inspired a market-making strategy:

- Focus on providing liquidity by placing limit orders at the best bid and ask prices.
- Exploit the small but frequent spread opportunities with controlled position limits to minimize risk.

This approach aligns with low-risk trading, as it avoids chasing price movements and limits exposure to large adverse moves.

Core Logic of My Algorithm

The core logic of the algorithm is as follows:

1. At each timestamp, identify the best bid and best ask prices and their volumes from the order book.
2. If the spread is small (e.g., ≤ 4 ticks), place:

- A buy order at the best bid if the current position is below a defined long limit (e.g., 50).
- A sell order at the best ask if the current position is above a defined short limit (e.g., -50).

3. Keep trade sizes small (e.g., 10 units) to avoid excessive inventory risk.

Experiments, Variations, and Insights

I tested several variations:

- Adjusting the maximum position limits (e.g., from 50 to 100)—larger limits increased potential profit but also risk.
- Changing trade size (e.g., from 10 to 20)—larger trades captured more spread per trade but exposed the strategy to larger inventory swings.
- Modifying the spread threshold (e.g., ≤ 2 ticks instead of ≤ 4) — tighter thresholds reduced trade frequency but improved per-trade profitability.

Insights:

- The market-making strategy is well-suited for this dataset's low volatility.
- Risk is effectively managed through tight position limits and modest order sizes.
- The majority of profitability comes from consistently capturing the spread rather than predicting price direction.