Report: Financial Metrics-Based Account Ranking and Analysis

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1. Introduction

This report documents the methodology, analysis, and findings of an account performance evaluation using various financial metrics like ROI, PnL, Sharpe Ratio, and Win Rate. The objective is to rank the accounts based on these metrics and provide insights into account performance. The data consists of trading histories, including realized profits, quantities traded, and positions held.

2. Data Exploration and Cleaning

In this section, explain how you explored and cleaned the dataset.

Subsections:

2.1 Loading the Data

- Used Jupyter Notebook and libraries used (e.g., pandas, NumPy, seaborn).
- The dataset was loaded using pandas, and initial exploration revealed columns such as Port_IDs and Trade_History. The Trade_History column contains JSON-like data representing each account's trades.

2.2 Handling Missing Values and Anomalies

- Missing values were handled by imputing based on historical trade data, while outliers (trades with extreme realized profit) were capped to reduce their influence on performance metrics.

3. Feature Engineering

Subsections:

3.1 Position Identification

We combined the side (BUY/SELL) and positionSide fields to identify the nature of each trade, allowing us to distinguish between long and short positions.

3.2 Calculating Key Metrics

Key metrics like PnL, ROI, Sharpe Ratio, and Win Rate were calculated for each account. The Sharpe Ratio was calculated assuming a 0% risk-free rate, and Win Rate was based on the count of trades with positive realized profit.

4. Ranking Algorithm

4.1 Weighted Scoring System

A weighted scoring system was implemented, with weights assigned as follows: ROI (30%), PnL (25%), Sharpe Ratio (20%), MDD (15%), and Win Rate (10%).

4.2 Final Score Calculation

Metrics were normalized using Min-Max scaling to ensure fair comparison, and a final score was calculated by applying the weights to each metric.

4.3 Ranking the Accounts

Accounts were ranked in descending order of their final score. The top 20 accounts were selected for further analysis based on their financial performance.

5. Key Findings

Provide a summary of the most important insights and patterns discovered during the analysis.

5.1 Top Performing Accounts

The top 20 accounts displayed high ROI and relatively lower PnL volatility. Accounts with a strong Sharpe Ratio consistently ranked in the top 5, indicating a good balance of returns and risk management.

5.2 Trends and Patterns

Interestingly, accounts with a higher Win Rate did not always have the highest ROI, suggesting that frequent small wins might not be as impactful as fewer, larger profitable trades.

6. Assumptions

- **Sharpe Ratio:** A risk-free rate of 0% was assumed in the Sharpe Ratio calculation due to a lack of data on risk-free investments.
- **PnL Calculation:** Realized profit was used as the basis for PnL, without accounting for any unrealized gains or losses.
- **Data Cleaning:** Trades with missing or incorrect data (e.g., negative quantities) were removed.

7. Conclusion

The ranking algorithm provided a clear view of account performance based on multiple financial metrics. High-performing accounts displayed strong ROI and Sharpe Ratios, while accounts with frequent profitable trades did not necessarily rank higher. This analysis provides valuable insights for portfolio optimization and risk management.

8. Deliverables

The deliverables include:

- A Jupyter Notebook with the complete analysis and code.
- A CSV file containing all calculated metrics (PnL, ROI, Sharpe Ratio, etc.) for each account.
- A CSV file listing the top 20 ranked accounts.
- This report documenting the methodology, findings, and assumptions.