PrimeTrade Historical Trade Data Analysis Report

1. Introduction

This report outlines the analysis of historical trade data from various Binance accounts over a period of 90 days. The objective of this task was to calculate key financial metrics for each account, rank the accounts based on their performance, and present the top 20 accounts. The key metrics include Return on Investment (ROI), Profit and Loss (PnL), Sharpe Ratio, Maximum Drawdown (MDD), and others.

2. Data Exploration

The dataset provided contains historical trades from multiple Binance accounts, with each trade having details like timestamp, asset, side (BUY/SELL), price, and realized profit. The dataset required cleaning and processing, particularly with respect to missing values in the `Trade_History` column.

- **Missing Values**

: The `Trade_History` column had some missing entries, which were filled with an empty list for consistent processing.

- **Trade Parsing**: Each account's trade history was stored as a list of trades in JSON-like format. These were parsed into structured fields such as time, symbol, side, positionSide, price, quantity, and realizedProfit for further analysis.

3. Methodology

3.1. Feature Engineering

Key financial metrics were calculated from the trade data:

- **ROI (Return on Investment)**: Calculated as the total realized profit divided by the total quantity invested.

- **PnL (Profit and Loss)**: Sum of realized profits across all trades.

- **Sharpe Ratio**: A risk-adjusted return metric, calculated as the average ROI divided by its standard deviation.

- **Maximum Drawdown (MDD)**: Measures the maximum loss from a peak to a trough of the portfolio before a new peak is achieved.

- **Win Rate**: The ratio of profitable trades (those with positive realized profit) to total trades.

- **Total Positions**: The total number of trades taken by an account.

- **Win Positions**: The total number of profitable trades.

3.2. Metrics Calculation

Each account's parsed trades were used to calculate the above metrics. For example:

- **ROI** was calculated by dividing the total realized profit by the total quantity invested across trades.

- **PnL** was derived by summing up the `realizedProfit` field across all trades in the account.

- **Sharpe Ratio** was computed using the average and standard deviation of ROI for each account's trades.

- **MDD** was calculated by tracking the peak and lowest values of the running total of profits.

3.3. Ranking Algorithm

A weighted scoring system was developed to rank the accounts based on the following metrics:

- **ROI**: 30%

- **PnL**: 30%

- **Sharpe Ratio**: 20%

- **MDD**: 10%

- **Win Rate**: 5%

- **Win Positions**: 5%

The accounts were ranked based on the weighted score, and the top 20 accounts were selected for the final results.

4. Findings

The analysis yielded the following key insights:

- The top-performing accounts exhibited consistently high ROIs and PnL values, along with low MDD, indicating good risk management.

- Accounts with a higher Sharpe Ratio were given priority in ranking since it reflects a better risk-adjusted return.

- The top 20 accounts generally maintained a strong win rate with high numbers of winning positions.

5. Assumptions

- It was assumed that the `realizedProfit` field in the data is the definitive indicator of profit and loss for a given trade.

- The weights assigned to the metrics for ranking are subjective and may vary depending on the user's investment preferences.

- The Sharpe Ratio was calculated using ROI as a proxy for returns, and standard deviation of ROI was used as a measure of risk.

- MDD was calculated based on realized profits only and may not reflect unrealized losses during open positions.

This report summarizes the data exploration, methodology, and findings from the analysis of Binance accounts. The final CSV file contains detailed metrics and rankings of the top 20 accounts based on performance.